



10885 NE Fourth Street
Suite 700
Bellevue, WA 98004-5579

+1.425.635.1400
+1.425.635.2400
PerkinsCoie.com

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DELIVERY VIA ELECTRONIC FILING

David E. Capka, P.E.
Office of Energy Projects
Director, Division of Dam Safety & Inspections
Federal Energy Regulatory Commission
888 First Street, N.E., Routing Code: PJ-13
Washington, D.C. 20426

Kimberly D. Bose
Secretary, Federal Energy Regulatory
Commission
888 First Street, N.E.
Washington, D.C. 20426

**Re: FERC Nos. P-2082; P-14803, NATDAM-OR00559, CA00323, CA00234,
CA00325; Response to Independent Board of Consultants' Recommendations**

Dear Director Capka and Secretary Bose:

The Klamath River Renewal Corporation (the "Renewal Corporation") respectfully provides these final responses to recommendations contained in the November 28, 2018 "Letter Report: Board of Consultants Mtg. No. 1." This letter is concurrently filed in the docket nos. P-2082-062 and P-14803-000 in support of the License Amendment and Transfer Application.¹ In Section VI below, the Renewal Corporation requests approval of that application and proposes next steps in the license surrender proceeding, docket nos. P-2082-063 and P-14803-001.

I. Board of Consultants' Review of License Amendment and Transfer Application

The Federal Energy Regulatory Commission (the "Commission" or "FERC") required an independent Board of Consultants (the "BOC") to review "all aspects of the dam removal process"² proposed by the Amended Klamath Hydroelectric Settlement Agreement ("KHSA").³ As its first task, the BOC was charged to "determine the adequacy of cost estimates, insurance, bonding, and

¹ "Joint Application for Approval of License Amendment and License Transfer," FERC Accession no. 20160923-5367 (hereinafter the "License Amendment and Transfer Application").

² Letter to Mark Sturtevant, PacifiCorp, and Mike Carrier, Renewal Corporation (Oct. 7, 2017); "Order Amending License and Deferring Consideration of Transfer Application" (Mar. 15, 2018), *PacifiCorp*, 162 FERC ¶ 61,236 (2018) (hereinafter "License Amendment Order"), Appendix, item 4. The License Amendment Order bifurcated the original license between the Klamath Hydroelectric Project No. 2082 (which now consists only of the East Side, West Side, Keno, and Fall Creek Developments) and the new Lower Klamath Project No. 14803 (which consists of the J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate Developments).

³ The Renewal Corporation attached the KHSA as Exhibit A, Attachment F to its June 23, 2017 response (FERC Accession no. 20170623-5103) to the Commission's April 24, 2017 Additional Information Request.

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the overall financial resources available to implement the [dam removal] plan”⁴ for the purpose of the Commission’s action on the License Amendment and Transfer Application. On November 28, 2018, the BOC issued its Report No. 1, including three recommendations for revising the Renewal Corporation’s Definite Plan (July 2018) (the “Definite Plan”).⁵ On December 12, 2018, the Renewal Corporation responded, accepting all recommendations.⁶ The Renewal Corporation satisfied Recommendation no. 3 by providing a copy of the Request for Proposals for the general contractor.⁷ On January 23, 2019, the Commission directed the Renewal Corporation to provide further responses on Recommendation nos. 1 and 2, relating to the updated cost estimate and cost overrun contingency (“January 23, 2019 Letter Order”).⁸ The Renewal Corporation requested an extension of time until July 29, 2019 to file these further responses.⁹ The Commission granted this request.¹⁰

In its Report no. 1, the BOC recommended that the Renewal Corporation develop a Plan B with respect to project costs in excess of the state cost cap specified in the KHSA. This recommendation relates to the Draft Risk Management Plan, which was included as Appendix A in the Definite Plan. The BOC also recommended an update to the cost estimate contained in the Estimate of Project Cost Report, which was included as Appendix P in the Definite Plan. Pursuant to its procedures,¹¹ the BOC held six informal meetings with the Renewal Corporation in 2019 to review work products responsive to these recommendations.¹²

The first such informal meeting was held on March 14, 2019 to review the revised construction cost estimate in detail. Based on this review, the BOC provided further guidance that AECOM, the Renewal Corporation’s technical consultant, used to refine the cost estimate.

A second informal meeting was held on March 25, 2019 to review the draft Project Agreement between the Renewal Corporation and the general contractor. Based on this review, the BOC provided comments regarding the risk, insurance, indemnification, and pricing elements of the draft Project Agreement.

⁴ Letter to Mark Sturtevant, PacifiCorp, and Mark Bransom, Renewal Corporation (May 22, 2018), “Approval of Independent Board of Consultants,” FERC Accession no. 20180522-3002, Attachment A, item 2.

⁵ The Renewal Corporation filed the Definite Plan on June 29, 2018 (FERC Accession no. 20180629-5018).

⁶ FERC Accession no. 20181212-5147.

⁷ The Renewal Corporation filed the RFP in its April 3, 2019 filing, and the updates are included in the updated data package provided to FERC on July 25, 2019.

⁸ FERC Accession no. 20190123-3007.

⁹ FERC Accession no. 20190404-5015.

¹⁰ FERC Accession no. 20190418-3064.

¹¹ “Independent Board of Consultants Procedures” (Aug. 28, 2018), FERC Accession no. 20180828-5110.

¹² Report no. 1 proposed an iterative review of certain information and analysis to be provided in response to its formal recommendations. The Renewal Corporation appreciates the BOC’s diligent work and thoughtful consideration of the information that was provided by the Renewal Corporation in response to the BOC’s information requests. Documents provided in response to the BOC’s information requests were submitted to the Division of Dam Safety on July 25, 2019, as an update to the data package provided to the BOC in advance of its formal meeting on October 24, 2018.

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A third informal meeting was held on May 2, 2019 to review the recommended insurance approach and indicative pricing for implementation of the proposed insurance program. Based on this review, the BOC provided comments on coverage levels and suggested benchmarking based on established insurance and cost-estimating guidelines.

A fourth informal meeting was held on June 6, 2019 to review a proposed plan for liability transfer and indemnification, the selection of a special corporate indemnitor, as well as preliminary pricing. The BOC discussed the information presented and requested further clarification about how risks will be allocated across the Renewal Corporation's various risk management tools. The Renewal Corporation provided additional information in response to this request.

A fifth informal meeting was held on July 9, 2019 to review AECOM's updated cost estimate and the proposed plan for indemnification. On July 17, 2019, the BOC provided the Renewal Corporation with a draft supplemental report. A sixth informal meeting was held on July 22, 2019 to review this report. On July 26, 2019, the BOC provided the Renewal Corporation with its "Letter Report: Supplement to Board of Consultants Mtg. No. 1" (July 29, 2019) ("Supplemental Report no. 1"). This report and the Renewal Corporation's responses are attached as Attachment A. The Renewal Corporation's responses are summarized in appropriate locations below. The Supplemental Report no. 1 also includes minutes of the BOC's informal meetings from March 14 through July 22, 2019.

II. Legal, Technical, and Financial Capacity of Renewal Corporation

In its License Amendment Order, the Commission stated that license transfer as proposed in the KHSA, for the sole purpose of decommissioning and dam removal, "raises unique public interest concerns" not present in an ordinary license transfer proceeding.

If a project is transferred to an entity that lacks the financial and operational capacity to complete these measures, and if the Commission can no longer hold the former licensee liable, the responsibility to decommission a project or restore project lands may fall to federal or state authorities. To prevent this, the Commission applies more scrutiny to [such a license transfer application].¹³

The Renewal Corporation accepts this heightened scrutiny. Through this filing as well as in its responses to prior Additional Information Requests ("AIRs")¹⁴ in this proceeding, the Renewal Corporation has demonstrated that it has the legal, technical, and financial capacity to manage these

¹³ License Amendment Order ¶ 51.

¹⁴ The Commission made two AIRs related to the License Amendment and Transfer Application, dated April 24, 2017 (FERC Accession no. 20170424-3020) and October 5, 2017 (FERC Accession no. 20171005-3005). In addition, the License Amendment Order and the January 23, 2019 Letter Order requested further information. The Renewal Corporation responded to the AIRs and related requests on June 23, 2017 (FERC Accession no. 20170623-5103), December 4, 2017 (FERC Accession no. 20171204-5131), June 28, 2018 (FERC Accession no. 20180629-5018), and April 3, 2019 (FERC Accession no. 20190404-5015).

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risks and complete Facilities Removal¹⁵ as proposed in the KHSA and Definite Plan; and that the transfer of the license for the Lower Klamath Project to the Renewal Corporation is in the public interest.

The Renewal Corporation is a California non-profit corporation in good standing. It has the legal capacity to be licensee.¹⁶ It also has the technical capacity. The Renewal Corporation has secured a best-in-industry team to perform all aspects of Facilities Removal.¹⁷ AECOM is the Renewal Corporation's technical representative, with unique expertise as a result of its having participated as a lead designer or advisor in every dam removal effort on the West Coast.¹⁸ As described below, Kiewit Infrastructure West Co. ("Kiewit") will perform design, construction, and mitigation activities; Resource Environmental Solutions LLC ("RES") is expected to operate as mitigation surety and as specialty corporate indemnitor; and Aon Risk Insurance Services West, Inc. ("Aon") will ensure that a comprehensive insurance and surety bond program is in place and consistent with the descriptions below.

Financial capacity is the gravamen of the heightened scrutiny in this license transfer proceeding. As the License Amendment Order states:

[T]he Amended Settlement Agreement provides that the Renewal Corporation will have three sources of funding for decommissioning, removal, and restoration of the Lower Klamath Project, totaling \$450,000,000: (1) \$184,000,000 from the Oregon Customer Surcharge; (2) \$16,000,000 from the California Customer Surcharge; and (3) \$250,000,000 from the California Bond Measure. These funds, known as the state cost cap, are the maximum monetary contributions available from the states of Oregon and California. The applicants have not identified any additional sources of funding if the cost of the measures required exceeds the state cost cap.¹⁹

The Renewal Corporation understands its obligations to comply with the license for the Lower Klamath Project if transfer is approved, and a license surrender order if issued. The Renewal Corporation understands that the state cost cap in the KHSA is not a limitation on such

¹⁵ KHSA defines this term to mean the "physical removal of all or part of each of the Facilities to achieve at a minimum a free-flowing condition and volitional fish passage, site remediation and restoration, including previously inundated lands, measures to avoid or minimize adverse downstream impacts, and all associated permitting for such actions."

¹⁶ See June 23, 2017 AIR Response, item 6. The Renewal Corporation is a "corporation" for purposes of 16 U.S.C. § 796(3) and has the legal capacity to be a "licensee" as defined in 16 U.S.C. § 796(5), subject to the review and approval of the Commission pursuant to 16 U.S.C. § 801. See also *Econ. Dev. Corp. of Augusta & Augusta Dev. Corp.*, 1 FERC ¶ 61,207 at 61,541 (1977) (license transfer to non-profit development corporation approved).

¹⁷ *Alcoa Power Generating Inc. Cube Yadkin Generation LLC*, 157 FERC ¶ 62,188, at ¶ 4 (2016) (finding transfer to be in public interest where transferee was affiliated with numerous companies with extensive expertise in operating and maintaining hydroelectric projects).

¹⁸ See "Informational Filing in Support of Joint Application for License Transfer and License Amendment" (Mar. 1, 2017), FERC Accession no. 20170301-5327, Attachment D-2.

¹⁹ License Amendment Order ¶ 55.

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compliance.²⁰ The Renewal Corporation understands that, upon acceptance of license transfer, it must manage the financial risks associated with license compliance.²¹

As discussed below, the Renewal Corporation has \$450 million in committed funds.²² The Renewal Corporation will manage these funds in a reasonable and prudent manner to complete Facilities Removal. These funds are sufficient to cover all estimated costs (including contingency and cash reserves) for construction, mitigation, and restoration activities. Kiewit has provided a Parent Company Guaranty, and it will secure surety bonds in an amount equal to the direct costs in the Project Agreement, to assure its performance. The Renewal Corporation and Kiewit will secure a comprehensive insurance program. The Renewal Corporation is engaging a special corporate indemnitor to address risks not otherwise resolved through these more typical instruments. And, the Renewal Corporation has a Plan B to seek additional funds if needed. The Renewal Corporation would secure such funds through the mechanisms established by the KHSA, with the affirmative support and assistance of PacifiCorp, the states of Oregon and California (collectively, the “States”), and other signatory parties.

In its 1995 Decommissioning Policy, the Commission addressed the risk that a project would be “abandoned” and become the unwanted financial or regulatory responsibility of a state.

Several commenters noted also that a licensee might seek to transfer an increasingly marginal project to a new licensee that lacked the financial resources to maintain it or close it down in an appropriate manner. Through that process, the former owner relieves itself of the responsibility, which then may fall to State authorities or, at least when Federal lands are involved, on other Federal agencies. While the Commission is aware of no widespread

²⁰ Commission, “Policy Statement on Hydropower Licensing Settlements,” 116 FERC ¶ 61,270, 62,088-62,089 (2006) (stating “[t]he Commission expects the required measure to be performed by the licensee, even if the cost exceeds the agreed-upon cap” and “[d]ollar figures agreed to by the parties are not absolute limitations” on the licensee’s license obligations in the absence of authorization from the Commission to the contrary) (quoting *Virginia Electric Power Company*, 110 FERC ¶ 61,241 at 10 (2005)); *Hawks West Hydro LLC*, 161 FERC ¶ 62,228, at *7 (2017) (staff did not recommend cost cap because licensee’s obligation to complete a measure required by a license is not limited to particular cost cap); *PacifiCorp*, 133 FERC ¶ 61,232, 62,316 (2010) (if a measure is required, the Commission expects a licensee to perform even if the cost exceeds agreed-upon cost caps in settlement agreement).

²¹ See *Fraser Papers Inc.*, 89 FERC ¶ 61,286, 61,896 (1999); *AER NY-Gen LLC*, 133 FERC ¶ 62,143, 64,317–64,318 (2010); *Menominee Company*, 74 FERC ¶ 61,023, 61,067–61,068 (1996). See, e.g., *Mead Corporation, Publishing Paper Division*, 72 FERC ¶ 61,027, 61,069 (1995) (stating where the Commission’s consideration and balancing of all public interest factors concludes the project is in the public interest, the Commission will offer the license to the applicant, even if there appear to be negative economic benefits because it is the applicant that must ultimately decide whether to accept the license and any financial risk that entails); *Hawks West Hydro LLC*, 161 FERC ¶ 62,228, at *19 (2017) (although the Commission found the project would cost more to operate than the Commission’s estimated cost of alternative power, the Commission pointed out that the applicant must decide on whether to accept the license and any financial risk that entails).

²² A detailed discussion of the source and availability of these funds, and the funding agreements pursuant to which the \$450,000,00 is committed to the Renewal Corporation is provided in the Renewal Corporation’s Dec. 4, 2017 AIR response, Attachment A, Response 13. Copies of the executed funding agreements have previously been provided to the Commission and are in the record of this proceeding.

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problems on this score, it agrees that transfer applications should be scrutinized to foreclose this sort of situation, and where warranted, other authorities should be consulted before transfers are approved.²³

Here, PacifiCorp and the States, among other parties, entered into an agreement to establish an orderly and safe process for removal of the Lower Klamath Project. PacifiCorp applied for and secured \$200 million in rate surcharges,²⁴ and the state of California dedicated another \$250 million in bond funds, to implement the agreement.²⁵ These funds are committed. The States and PacifiCorp have actively participated in implementation. The Renewal Corporation will manage the very risks raised by the License Amendment Order, as well as the Decommissioning Policy, through mechanisms that require the States' affirmative endorsement.

Before the Renewal Corporation will accept license transfer, the States and PacifiCorp must each be "assured that sufficient funding is available to carry out Facilities Removal," and that "their respective risks associated with Facilities Removal have been sufficiently mitigated consistent with [KHSa] Appendix L."²⁶ Thus, before license transfer is effective, the States will have assessed and accepted any risk that "then may fall to State authorities."²⁷

The Commission has a stated goal of resolving end-of-license responsibilities to the satisfaction of the successor agencies.

The Commission's goal is that generally matters of this type can and will be resolved to the *satisfaction of the successor agency* as part of the Commission's decommissioning process, obviating the need for any later other action. There could then be a *smooth transition to the new regime with a minimum of interruption*.²⁸

KHSA section 7.1 is tailor-made to fulfill this goal. Through this mechanism, the States will affirmatively endorse the license transfer, allowing the Commission to be assured of the sufficiency of the resources needed to protect the States' interests.

²³ Commission, "Project Decommissioning at Relicensing: Policy Statement," 60 Fed. Reg. 339, 345 (1995) ("Decommissioning Policy").

²⁴ Oregon S.B. 76 (2009, Section 4 (authorizing rate surcharges)) and Oregon Public Utility Commission ("OPUC"), Order No. 10-364 (2010), Order No. 16-218 (2016); California Public Utilities Commission ("CPUC"), Decision 11-05-002 (2011) and Decision 17-11-019 (2017). See March 1, 2017 Informational Filing, Attachment E; December 4, 2017 AIR Response, item 13 and Exhibit A.

²⁵ March 1, 2017 Informational Filing, Attachment G.

²⁶ KHSA section 7.1.4. See letter from the Renewal Corporation to the Commission (June 28, 2018), Question 5, to explain the standards and procedures that the States and PacifiCorp will follow under KHSA section 7.1.4. Further, having found that Facilities Removal is in the best interests of PacifiCorp's customers, the States' public utilities commissions (collectively "PUCs") require these very sign-offs to assure that Facilities Removal will be completed once started. See OPUC, Order no. 17-018, Appendix A (Funding Agreement section 14.1, requiring the Renewal Corporation to indemnify the state of Oregon as required by KHSA section 7.1.3); CPUC, Decision 17-11-059 at 18 (requiring compliance with KHSA section 7.1.4).

²⁷ Decommissioning Policy at 346.

²⁸ *Id.* (emphasis added).

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III. Final Response to Recommendation no. 1: “The BOC recommends that a Plan B be developed with regard to where additional funding would come from should the project costs exceed the state cost cap.”

As stated in its December 12, 2018 response, the Renewal Corporation agrees with this recommendation. This section describes Plan A and Plan B.

The Renewal Corporation provided a preliminary response to this recommendation on December 12, 2018. At that time, the Renewal Corporation anticipated a series of developments to update the Draft Risk Management Plan (June 2018) and to address the risk of cost overrun in project²⁹ implementation, among other risks.³⁰ The Renewal Corporation now attaches an Amended Risk Management Plan (Attachment B), which supersedes the prior plan. The developments anticipated in January 2019 have now occurred. The Renewal Corporation has engaged Kiewit as general contractor under a progressive design-build contract (the “Project Agreement”). Aon has structured an insurance and bond program and has provided indicative pricing. The Renewal Corporation is working with RES to serve as a mitigation surety and specialty corporate indemnitor. AECOM and Aon used separate methods to validate and update the risk register. AECOM updated the cost estimate. These developments are described below. Further, the Renewal Corporation has secured extensions of its funding commitments to allow up to four additional years to complete Facilities Removal.

The information in this section is also responsive to the January 23, 2019 Letter Order, which requests updates to the Draft Risk Management Plan to (a) describe insurance, bond, and indemnification coverages, (b) verify that these coverages will be in place before the commencement of decommissioning work, (c) establish the estimated date by which the Renewal Corporation expects that it will have reached agreement on a Guaranteed Maximum Price with Kiewit, and (d) describe how the project will be funded if the Facilities Removal extends beyond the expiration dates identified in the Funding Agreements.³¹

A. Plan A

The Draft Risk Management Plan (June 2018) described measures to manage the risk of cost overrun, among other risks. The Renewal Corporation has now completed certain measures, including the selection of Kiewit as Project Contractor, and has obtained indicative terms for or otherwise planned all other measures.

1. Project Contractor

The Renewal Corporation selected Kiewit as the general contractor to undertake final design specifications, development of a Guaranteed Maximum Price (“GMP”), site preparation,

²⁹ The “project” refers to Facilities Removal as proposed in the KHSA and described in the “Application for Surrender of License for Major Project and Removal of Project Works” (Sept. 23, 2016), FERC Accession no. 20160923-5370 (Surrender Application). The Definite Plan is the Renewal Corporation’s specific plan for Facilities Removal.

³⁰ See December 12, 2018 letter from the Renewal Corporation to David E. Capka, at 2-3.

³¹ January 23, 2019 Letter Order at 2.

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deconstruction, and mitigation and restoration measures. Kiewit has an exceptional track record completing large-scale and challenging civil projects of all types, including hydroelectric projects. As a recent example, it completed the emergency repair of the Oroville Dam, which involved reconstruction of the main and emergency spillways in less than 18 months, as well as extensive debris and sediment removal, access roads, and other work. Kiewit has substantial experience working with the states of California and Oregon and with PacifiCorp. Kiewit's qualifications are described in Attachment C.

Kiewit anticipates that it will complete a 60% design for the project by January 31, 2020. The target date for the GMP is February 15, 2020. Once 60% design has been achieved and after the GMP has been established, the Renewal Corporation will update relevant portions of the cost estimates. Kiewit has provided an indicative statement that, based on its pre-GMP due diligence to date, the Renewal Corporation has adequate financial capacity. See Attachment D.

The GMP will provide definitive market proof of the sufficiency of the overall project budget. It will be subject to adjustments only if final permit terms are materially more costly than draft permit terms, or costs otherwise increase due to circumstances outside of Kiewit's control. The Renewal Corporation will secure insurance against the occurrence of such uncontrollable circumstances, to the extent such insurance is commercially reasonable to obtain.³² In the past decade of experience with water resources projects, Kiewit has not exceeded a GMP in this manner.

2. Project Agreement

The Renewal Corporation and Kiewit have entered into a Project Agreement (Attachment E) that governs all aspects of Facilities Removal. The contract applies a delivery method known as "Progressive Design-Build." Under this method, Kiewit is responsible for design and construction activities (including mitigation and restoration), and for correcting any errors or omissions that arise through its or its subcontractors' fault.³³ Per Appendix 9 of the Project Agreement, Kiewit will secure an insurance package that assures recourse for insured events. And per Article 15 of the Project Agreement, Kiewit will indemnify the Renewal Corporation for events relating to Kiewit's fault and certain other events specified in the Project Agreement. Overall, by establishing a single point of accountability, this delivery method substantially reduces the risks of cost overrun relative to other methods conventionally used in civil works projects, such as Boston's Big Dig.³⁴ Among other things, it minimizes the risk of litigation between owner, contractor, subcontractors, and their respective insurers, which has routinely occurred under other methods in the absence of a single point of accountability.³⁵

³² See Project Agreement section 5.11.

³³ Hawkins Delafield & Wood, "Report on Risk Mitigation and Insurability for the Klamath Restoration Project" (Nov. 13, 2015) (Attachment F), Sections 2-4.

³⁴ As noted by the BOC, response strategies—in this case the proposed delivery method—that reduce the risk of significant changes and cost overrun are preferred, relative to other methods conventionally used in civil works projects to manage these risks, such as in the case of Boston's Big Dig. Report no.1 at 5.

³⁵ Hawkins Delafield & Wood, *supra*, Section 4.2. See also June 23, 2017 AIR Response, Item 3.

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3. Parent Guarantee and Surety Bonds

Under the Project Agreement, Kiewit will provide a Parent Company Guaranty for its performance. Under that guarantee, its parent, Kiewit Infrastructure Group, Inc. will perform or pay for performance if it defaults. The parent company has \$4.8 billion in revenue, no operational long-term debt, and a strong balance sheet that offers assurance that their projects will get completed. The executed Parent Company Guaranty is set forth as Attachment G.

Further, the Project Agreement requires Kiewit to secure performance, payment and maintenance bonds (surety bonds), prior to the commencement of any physical work, in an amount equal to the face value of the Project Agreement. The bond forms are attached to the Project Agreement as Transaction Form B (“Form of Performance Bond”); Transaction Form C (“Form of Payment Bond”), and Transaction Form D (“Form of Maintenance Bond”).

4. Insurance

The Renewal Corporation engaged Aon as its insurance advisor and broker. Aon is one of the world’s leading consultants in risk management, working across nations, industry sectors, and public and private clients. Its qualifications are described in Attachment H. Its Risk and Insurance Due Diligence Report (July 2019) is attached to the Amended Risk Management Plan (Attachment B thereto).

As consultant to the Renewal Corporation, Aon applied methods commonly used in insurance underwriting, including Project Enterprise Risk Assessment, to identify and quantify risk exposure associated with Facilities Removal. This method establishes the probability of an event, assesses claim cost exposure, and then simulates a year of claim costs. This process is repeated to generate 50,000 simulated results via a Monte Carlo simulation. This underwriting method complements and independently validates the separate analysis AECOM did to compile and update the risk register included in the Amended Risk Management Plan. As recommended by the BOC, Aon benchmarked its modeling against actualized risks in other dam removal and civil works projects.

Aon analyzed insurance options. It recommended a Contractor Controlled Insurance Program (“CCIP”). Relative to alternatives, a CCIP would provide greater insurance cost efficiencies given the long-tail nature of these claims, greater participation by minority and woman-owned business, avoidance of gaps in coverage, and avoidance of trigger and exhaustion issues associated with long-tail claims. Kiewit will secure the insurance package before Facilities Removal. The program will cover potential third-party losses at a 99.5% confidence level. As Aon’s modeling shows, this coverage will be sufficient to cover the largest expected risks and other project risks on each line of coverage.³⁶

³⁶ Risk and Insurance Due Diligence Report (July 2019), at 3.

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Largest Insurance Coverages in Renewal Corporation's Comprehensive Insurance Program³⁷

Insurance Type	Function	Amount
Umbrella Excess Liability	Commercial and general liability	\$200 million
Builder's Risk/Inland Marine	Physical loss and/or damage to covered property arising out of a covered cause of loss	Probable Maximum Loss
Pollution Liability	Pollution caused by construction or by site	\$100 million unknown pre-existing or new pollution incidents associated with the project site and pollution incidents resulting from the project work

Such contingent instruments are part of financial capacity under generally accepted accounting principles.³⁸ Consistent with those principles, the Nuclear Regulatory Commission credits such instruments in assuring capacity to decommission a nuclear powerplant.³⁹ The Commission has also relied upon such instruments to assure capacity for license compliance, including license surrender.⁴⁰

³⁷ *Id.* at 10-13.

³⁸ The Financial Accounting Standards Board ("FASB") provides guidance as to generally accepted accounting principles for preparation of financial statements, including guidance regarding any presumption that an entity is able to continue in business as a going concern. When conditions or events exist that raise substantial doubt about an entity's ability to continue as a going concern, the entity should consider whether its plans that are intended to mitigate the relevant conditions or events will alleviate the substantial doubt. FASB Subtopic 205-40, Update No. 2014-15 at 2 (Aug. 2014). The mitigating effect of management's plans may be considered as offsetting factors to the extent that (a) it is probable that the plans will be effectively implemented and, if so, (b) it is probable that the plans will mitigate the conditions or events that raise substantial doubt about the entity's ability to continue as a going concern. This guidance allows for taking financial assurances into consideration in assessing an entity's fiscal capacity to discharge its financial obligations.

³⁹ 10 C.F.R. §50.75(e)(1)(iii). Guarantee mechanisms accepted by the NRC include letters of credit, parent company guarantees, licensee self-guarantees, surety bonds, and insurance policies. 10 C.F.R. §72.30(e)(2).

⁴⁰ *St. Anthony Hydro LLC*, 146 FERC ¶ 62,048, 64,078 (Jan. 17, 2014) (requiring licensee to file documentation that it "has obtained a bond or equivalent financial instrument that ensures the licensee has the financial means necessary to implement the Financial Assurance Plan"); *Whitestone Power & Commc'ns*, 141 FERC ¶ 62,054, 64,130-64,131 (Oct. 19, 2012) ("licensee shall file . . . each year proof of the maintenance of a letter of credit, surety bond, or equivalent financial instrument, to cover the entirety of the cost of removing the project"); *Ocean Renewable Power Co. Maine, LLC*, 138 FERC ¶ 62,168, 64,575 (Feb. 27, 2012) (approving letter of credit covering entirety of costs of removing Phase I of hydrokinetic power project and requiring licensee to maintain a bond or equivalent financial

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5. Mitigation Surety and Specialty Corporate Indemnitor

The Renewal Corporation intends to engage RES for two functions: as surety for long-term management of restoration and mitigation measures, and as a specialty corporate indemnitor. RES's qualifications are described in Attachment I.

RES identified risks that could occur during and after Facilities Removal that are not otherwise covered by insurance or Kiewit's contractual indemnification. In the Amended Risk Management Plan, these are called "residual risks."⁴¹ RES identified and analyzed two categories of residual risks: (1) risks associated with long-term impacts to natural resources and (2) risks associated with impacts to property arising through no error in Kiewit's design or implementation. RES undertook this analysis in coordination with Aon and AECOM. The analysis and recommendations are described in the Amended Risk Management Plan,⁴² and RES's Summary of Risk and Liability Transfer Approach (July 12, 2019) is Attachment J.⁴³

The Renewal Corporation intends that RES will assume responsibility for long-term maintenance and adaptive management of mitigation measures. This includes conditions in the surrender order as well as post-surrender obligations under other permits. This responsibility is not limited by any cost cap.

Further, the Renewal Corporation and RES intend that a RES entity will function as specialty corporate indemnitor to provide an indemnification program protecting PacifiCorp and the states against loss or expense associated with the physical impacts of Facilities Removal. This program will cover risks which are not otherwise fully covered by the Project Agreement or the insurance and bond programs. As described in the Amended Risk Management Plan, RES will form a Local Impact Mitigation Fund to address claims (such as loss in groundwater production, or diminution in property values) that may arise without fault in Kiewit's performance. The Renewal Corporation has an obligation under KHSa Appendix L to address such claims, which it recognizes are outside of the Commission's jurisdiction,⁴⁴ The costs of the mitigation surety and

instruction throughout license term); *Eugene Water & Electric Board*, 155 FERC ¶ 62,242 (2016) (requiring licensee, within 60 days of license transfer, to obtain insurance to cover the cost of unexpected maintenance and repairs).

⁴¹ Residual Risks (i.e., risks not otherwise covered by insurance or contractual indemnification) include the risk of claims for matters which the likelihood of occurrence is remote, as well as matters for which the Renewal Corporation may not be held to be legally responsible. Thus, in a given case, the risk may be limited to defense and settlement costs incurred in response to non-meritorious claims.

⁴² Amended Risk Management Plan sections 3.4-3.5.

⁴³ A non-redacted version of Attachment J is being concurrently filed as Privileged Information pursuant to 18 C.F.R. § 388.112 because the document contains proprietary business information that reflects RES's process in assessing and mitigating risk.

⁴⁴ A licensee is liable for all damages occasioned to the property of others by the operation and maintenance of its project works pursuant to its license. 16 U.S.C. § 803(c). The extent to which any such claims are cognizable, and to the extent that they are not preempted, they are matters outside of the Commission's jurisdiction and are to be determined under applicable state law. See, e.g., *DiLaura v Power Auth. of State of NY*, 786 F.Supp. 241 (W.D.N.Y. 1991); *Skokomish Indian Tribe v. United States*, 410 F.3d 506, 519 (9th Cir. 2005); *United States v. S. Cal. Edison Co.*, 300 F.Supp.2d 964, 978 (E.D. Ca. 2004); see also, *Simmons v. Sabine River Auth.*, 732 F.3d 469 (5th Cir. 2013) (the

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indemnification are included in the Amended Estimate of Project Costs Report (July 2019), which is Attachment K hereto.

6. Operation and Maintenance Agreement

In Report no. 1, the BOC stated that the Operation and Maintenance Agreement (“O&M Agreement”) between PacifiCorp and the Renewal Corporation will go into effect upon license transfer.⁴⁵ After that event, PacifiCorp will continue to operate and maintain the Lower Klamath Project, at its cost,⁴⁶ until the Renewal Corporation is prepared to begin Facilities Removal in compliance with a license surrender order. If the Commission approves license surrender, and the Renewal Corporation accepts that order, PacifiCorp will be responsible for “decommissioning” the project,⁴⁷ defined as disconnecting project works from the grid and salvaging any useful equipment. During the period that PacifiCorp operates the project pursuant to the O&M Agreement, it will indemnify the Renewal Corporation “from, and against any loss, expense, cost, liability, damage, claim, fine or penalty resulting from or otherwise related to the operation, maintenance, replacement, restoration or repair of the Lower Klamath Project or any failure by PacifiCorp to observe and comply with the terms and conditions” of the O&M Agreement.⁴⁸

7. Extension of Funding Agreements

In Report no. 1, the BOC found that the Renewal Corporation’s funding agreements could expire prior to completion of Facilities Removal.

Both the Oregon and California Funding Agreements have expiration dates of January 31, 2022, and that the California Bond Measure has an expiration date of June 30, 2021, with exceptions for funds devoted to ongoing mitigation or monitoring activities. In response to FERC’s question about whether the funding sources would still be available if facilities removal extends beyond these dates, Renewal Corporation only stated that it would seek extensions from the states but provided no assurances that the states would be amendable to those extensions.⁴⁹

The January 23, 2019 Letter Order asks how the “project will be funded if the facilities removal extends beyond the expiration dates identified in the funding agreements.”⁵⁰

Federal Power Act preempts state property damage claims based in tort law where the alleged damage is the result of the licensee operating in compliance with a FERC-issued license).

⁴⁵ The O&M Agreement is Attachment A to the March 1, 2017 Informational Filing.

⁴⁶ O&M Agreement sections 5 and 6.

⁴⁷ As defined by section 1.4 of the KHSa “Decommissioning” means PacifiCorp’s physical removal from a facility of any equipment and personal property that PacifiCorp determines has salvage value, and physical disconnection of the facility from PacifiCorp’s transmission grid.

⁴⁸ See O&M Agreement section 14. See also October 5, 2017 AIR, item 12.

⁴⁹ Report no. 1 at 8.

⁵⁰ January 23, 2019 Letter Order at 2.

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The Renewal Corporation previously advised the Commission that it would secure extensions of these dates (if and as needed),⁵¹ and that post-completion activities can be funded under the express terms of each of its funding agreements into escrow accounts before funding deadlines occur.⁵² The Renewal Corporation has now secured extensions of all of its funding agreements. These extensions, as documented in Attachment L, are summarized in the following table. After construction and mitigation activities are completed, the Renewal Corporation will encumber funds as necessary for monitoring and continued operation of the mitigation measures in compliance with permit conditions.⁵³

Funding Agreement	Amount	Original Expiration	New Expiration
OPUC	\$184 million	1/31/22	12/31/24 (approved 5/21/19)
CPUC	\$16 million	1/31/22	12/31/24 (approved 7/10/19)
California Bond	\$249.5 million	7/1/20	7/1/25 (approved 12/5/18)

B. Plan B

The financial capacity of the Renewal Corporation is an integrated package consisting of the following elements: (1) \$450 million in committed funding; (2) use of Progressive Design-Build contract to assure a single point of accountability; (3) engagement of best-in-industry project team; (4) requirement of GMP before the Renewal Corporation's acceptance of license transfer; (5) insurance, bond, and indemnity program that provides many hundreds of millions of dollars of risk protection; (6) a project cost estimate at the industry standard P(80) level; and (7) cash and contingency reserves that exceed the industry standard P(80) level. As discussed below, the cash reserve will likely increase as the project proceeds, as current risks based on uncertainties are retired. Further, the States and PacifiCorp must agree to the sufficiency of the financial capacity before license transfer.

The Renewal Corporation has the financial capacity to move forward with Facility Removal, and to do so from a position of strength. However, like any licensee that is responsible to meet its license obligations, unforeseen and remote circumstances theoretically could arise that would require the Renewal Corporation, if the Commission approves license transfer, to raise additional funds. Facing these circumstances, how would the Renewal Corporation respond?

The Renewal Corporation would evaluate value-engineering opportunities.⁵⁴ This is a best practice in any complex construction project. Prior to construction, the Kiewit team will identify such opportunities to reduce costs and risks that could arise after construction begins, consistent with the project purpose and any permit terms for protection of environmental quality and public interest. The Renewal Corporation will examine these opportunities on an iterative basis as

⁵¹ Renewal Corporation, December 4, 2017 AIR Response, item 13. The Amended Project Costs Report includes \$21.5 million for post-construction monitoring and operation of mitigation measures.

⁵² *Id.*

⁵³ See October 5, 2017 AIR, item 13.

⁵⁴ KHSa section 7.2.1.A(5).

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construction proceeds. The Renewal Corporation has received authorization for such adjustments in Oregon's water quality certification and will seek such authorization in other permits.⁵⁵

Additionally, under KHSA sections 7.2.1.A(5) and 8.7, parties will meet and confer to address and resolve any such circumstances that could arise after license transfer or surrender (in this case, after construction begins). Further, while its financial capacity of \$450 million is created and limited by the state cost cap, the parties agree to "work jointly to identify potential partnerships to supplement funds generated pursuant to this Settlement."⁵⁶

In connection with the removal of the Edwards Project, the Commission approved a license transfer subject to future financial contributions to the transferee.⁵⁷ Similarly, for the removal of Penobscot Project, the Commission approved license transfer on the transferee's representation of expected philanthropic contributions.⁵⁸ Here, the Renewal Corporation almost certainly has all funds necessary for Facilities Removal; and, as Plan B, the States and other KHSA signatories will work with other parties to "identify potential partnerships to supplement funds" if necessary after license transfer. In sum, the Renewal Corporation reasonably expects to secure additional funds if necessary, taking into consideration the strength of the project team, and the active support of the States and other parties for completion of Facilities Removal as an essential step in restoration of the basin ecosystem. Finally, the Renewal Corporation may continue accruing interest on the customer funds in excess of the \$28 million assumed in the cost cap.⁵⁹

IV. Final Response to BOC Recommendation No. 2: "The BOC recommends that AECOM prepare another version of the Project's cost estimate."

In its Recommendation no. 2, the BOC recommended an update to the Project's cost estimate. Report no. 1 provides specific guidance on the update, including: the addition of line item cost estimates for project-specific insurance policies and a specialty corporate indemnitor; the application of a template (Chant's standard 28 Item Indirect Cost accounts or equivalent) to detail

⁵⁵ Oregon Department of Environmental Quality ("ODEQ"), "Clean Water Act Section 401 Certification for the License Surrender and Removal of the Lower Klamath Project" (Sept. 7, 2018), Condition 7 at 6 (authorizing a "Remaining Facilities and Operations Plan"). See also California State Water Resources Control Board ("SWRCB"), "Draft Water Quality Certification" (Sept. 23, 2018), Condition 6 at 28 ("Remaining Facilities"). Of course, the Renewal Corporation will expect to receive the Commission's approval of any such adjustment as specified in a license surrender order.

⁵⁶ KHSA section 7.3.8.B. The BOC also notes, in reference to this obligation, the "broad support in the state governments for the completion of the project." Supplement to Report no. 1 at 9.

⁵⁷ *Edwards Manufacturing Company, Inc.*, 84 FERC ¶ 61,227 (1998). The effectiveness of license transfer was subject to Condition A.1, providing for the State's notice that "Bath Iron Works Corporation has deposited \$2.5 million for Edwards Dam removal in the appropriate trust fund"; and subject to Condition A.4, providing that the State, pursuant to Section IX.B.5 of the Edwards Settlement Agreement, has "determined ... that there is adequate funding available to meet the State's obligations" for dam removal. *Id.* at 62,096.

⁵⁸ Penobscot River Trust, "Joint Application for Transfer of Project License, Great Works Project," FERC Accession no. 20081107-5068, paragraph 9 ("Statement of Financial Resources") (describing a second phase of fundraising for dam removal that would begin "... primarily when the projects are acquired").

⁵⁹ KHSA section 7.3.8.A.

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with respect to indirect costs; adjustments to percentages used to calculate overheads and profits; a breakdown of labor rates used in the cost estimate; further detail and modifications with respect to the estimates for equipment rates used in the cost estimate; a correlation of cost estimates with past cost experience; the inclusion of a critical path schedule to support the cost estimates; and further verification of certain non-dam related construction costs.⁶⁰ AECOM prepared the updated cost estimate consistent with the BOC's guidance provided in Report no. 1 and subsequently.

The Amended Estimate of Project Costs Report is Attachment K hereto. This report supersedes the prior version, which was Appendix P in the Definite Plan.

The updated cost estimate is \$433.7 million, inclusive of all expenditures to date; the future costs of planning, oversight, construction, and mitigation; the costs of insurance, bonds, and indemnification; and project contingencies discussed below.⁶¹ The estimate is based on AECOM's Monte Carlo simulations of scenarios.⁶² It reflects the P(80) standard, under which 80% of remaining project risks break against the project.⁶³ P(80) is a conservative industry standard used for complex construction projects.⁶⁴ The cost estimate is \$442 million under the P(95) standard, which is highly conservative, assuming 95% of project risks break against the project.⁶⁵ Each is under the state cost cap.

Under the P(80) standard, the Renewal Corporation has \$16.3 million as cash reserve relative to its cost cap, along with \$62.8 million as a risk contingency.⁶⁶ Under the P(95) standard, the Renewal Corporation has \$8 million as a cash reserve, along with \$7.4 million as a risk contingency.⁶⁷ As planning proceeds to GMP (February 2020), and if provided contingencies do not materialize, the corresponding financial benefit of greater certainty would be an increase in cash reserves. Thus, up to \$27.7 million P(80) or \$ or \$31.6 million P(95) will possibly move from contingency to cash reserve when this milestone is achieved.⁶⁸

Despite cost inflation, the updated estimate is roughly \$43 million less than the estimate in Appendix P of the Definite Plan. This is a result of risks being retired (e.g., risks related to engaging a Progressive Design-Build contractor), better defined as to probability (e.g., risks associated with wildfire), or assigned (e.g., risks to be assigned to RES), in various combinations.⁶⁹

V. Additional Matters Raised by January 23, 2019 Letter Order

⁶⁰ Report no. 1 at 8-11.

⁶¹ AECOM, Amended Estimate of Project Costs Report, Attachment E, "Cost Overview" at 2.

⁶² Amended Estimate of Project Costs Report at 26. *See* June 23, 2017 AIR Response at pp. 13-14; Dec. 4, 2017 AIR Response, Item 1.

⁶³ Cost Overview at 2.

⁶⁴ Amended Estimate of Project Costs Report at 63. *See* December 4, 2017 AIR Response, item 6.

⁶⁵ Cost Overview at 2.

⁶⁶ *Id.*

⁶⁷ *Id.*

⁶⁸ *Id.* at 6.

⁶⁹ *Id.* at 5.

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The January 23, 2019 Letter Order raises two additional matters. First, the Commission asked about the implications if hatchery facilities capable of meeting the mitigation requirements of the KHSA are not operational by the time of removal of the Iron Gate Dam.⁷⁰ Removal of the Iron Gate Dam will not commence unless and until a hatchery facility capable of meeting the mitigation requirements of the KHSA is operational. This requirement is reflected in the Definite Plan and will be proposed as a condition of any license surrender order.

Second, the Commission asked for verification that the action proposed for the Commission's approval is full removal of the dams of the Lower Klamath Project. The Renewal Corporation verifies that. The "Full Removal" scenario described in the Amended Estimate of Project Costs Report is the proposed action. The "Partial Removal" alternative is proposed in the Definite Plan primarily for purposes of environmental review by all state and federal agencies. For instance, in its final water quality certification, ODEQ included a condition that the Renewal Corporation may submit a "Remaining Facilities and Operation Plan" after license surrender and before initiating the proposed action.⁷¹ The Renewal Corporation expects the California SWRCB may provide similar authorization, subject to the Commission's oversight.⁷² KRRC will comply with those requirements by identifying Project facilities that will not be removed or modified and including appropriate mitigation measures, if and as determined by the Commission.

VI. Sequence and Proposed Schedule

PacifiCorp and the Renewal Corporation requested that the Commission act on the License Amendment and Transfer Application before the license surrender application. This is to assure that the Renewal Corporation would be the sole licensee for license surrender, if both applications are approved.⁷³ Further, the joint applicants requested that the Commission allow the Renewal Corporation an extended period of 6 months after the order approving license transfer to submit proof of acceptance of license transfer.⁷⁴ While the Renewal Corporation initially sought action on the License Amendment and Transfer Application by December 2017, it subsequently withdrew that request in light of the time needed for complete responses to the information requests related to its financial capacity.⁷⁵

As the Commission has noted, the KHSA establishes a target date of December 31, 2019 for actions on both applications.⁷⁶ KRRC's implementation of the KHSA is time sensitive. While

⁷⁰ January 23, 2019 Letter Order at 3.

⁷¹ ODEQ, 401 Certification at 6.

⁷² SWRCB, Draft 401 Certification at 28.

⁷³ "Notice of Applications Filed with the Commission" (Nov. 10, 2016), FERC Accession no. 20161110-3055 at paragraph (k); "Notice of Application for Amendment and Transfer of License and Soliciting Comments, Motions to Intervene, and Protests" (Oct. 5, 2017), FERC Accession no. 20171005-3019, paragraph (o).

⁷⁴ License Amendment and Transfer Application at 18.

⁷⁵ December 3, 2017 AIR Response at 14 (item 14).

⁷⁶ October 5, 2017 AIR at 6-7 (item 14).

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securing an order on surrender by that date is no longer feasible, the Renewal Corporation respectfully proposes the following schedule for both proceedings.

A. Proposed Timeline

In entering into the KHSA, the parties concluded “that decommissioning, and removal of the [Lower Klamath Project] will help restore Basin natural resources, including anadromous fish, fisheries and water quality,” as an “important part of the resolution of longstanding, complex, and intractable conflicts over resources in the Klamath Basin.”⁷⁷ The KHSA secures critical benefits for the states of California and Oregon and their citizens, PacifiCorp and its customers, tribal nations, local governments, non-governmental organizations, irrigators, and other interested parties. The KHSA establishes “target” dates of January 1, 2020 for start of Facilities Removal, and December 31, 2020 for completion “at least to a degree sufficient to enable a free-flowing Klamath River allowing volitional fish passage.”⁷⁸ The agreement also contemplates the possibility of an extended schedule if necessary to secure regulatory approvals or for other reasons.⁷⁹

The Renewal Corporation respectfully requests that the Commission act on the license transfer and surrender applications, so that the Renewal Corporation (if authorized to proceed) may complete Facilities Removal by December 2022. That target date requires the start Facilities Removal and the commencement of pre-drawdown actions no later than May 2021.

⁷⁷ KHSA Section 1.1 “Recitals.”

⁷⁸ KHSA section 7.3.1

⁷⁹ KHSA section 7.3.6. Among other things, starting Facilities Removal after December 31, 2020 avoids a payment of \$27 million to PacifiCorp, as “Required Additional Value to Customers,” associated with the January 1, 2020 target. KHSA section 7.3.3.

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Proposed Timeline for KRRC's Actions Related to Facilities Removal

Date	Event	Explanation
February 2020	Execution by the Renewal Corporation of GMP amendment to Project Agreement; negotiated instruments for bonding and indemnification consistent with Amended Risk Management Plan.	
May - December 2021	Pre-drawdown construction actions.	These actions include: replacement of Yreka water system, hatchery modification, access improvements, and flood control improvements. ⁸⁰ These actions will require a seven-month period.
January – March 15, 2022	Reservoir drawdown.	Drawdown must occur during this limited period in order to protect fishery resources. ⁸¹
Mid-March - December 2022	Construction and mitigation actions.	The Renewal Corporation will complete these actions in an eight-month period following reservoir drawdown. ⁸²

B. Action on License Transfer

The License Amendment and Transfer Application was filed with the Commission on September 23, 2016.⁸³ Over the ensuing period, the Renewal Corporation has provided the

⁸⁰ Definite Plan at 221.

⁸¹ *Id.* at 81.

⁸² *Id.* at 305.

⁸³ The License Amendment and Transfer Application seeks to remove PacifiCorp as licensee of the Lower Klamath Project, with KRRC as the sole licensee for the purpose of dam removal. As the Commission recognized in the License Amendment Order, the KHSa “provides that PacifiCorp will not be a co-applicant or co-licensee for the Renewal Corporation’s surrender application.” *PacifiCorp*, 162 FERC ¶ 61,236, at ¶ 14 (2018). While the Commission

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Commission with detailed information regarding its legal, technical and financial capacity to assume the obligations of licensee of the Lower Klamath Project;⁸⁴ responses to AIRs from Commission Staff;⁸⁵ responses to information requested in the License Amendment Order;⁸⁶ and responses to BOC Report no.1⁸⁷ and its Supplemental Report no. 1. With this filing, the joint applicants have responded to all questions and recommendations received from the Commission and the BOC. Moreover, the Commission is informed by numerous interventions and public comments, both in favor of and in opposition to this application, that collectively augment the record of this proceeding.

Accounting for preparatory activities and the window for reservoir drawdown (January 1 to March 15 in a given year), the Renewal Corporation must start work in May 2021 if Facilities Removal is to be complete in 2022. In order to maintain this schedule, the Renewal Corporation respectfully requests that the Commission act on this application as soon as possible and turn its attention to the surrender application.

As acknowledged in the License Amendment and Transfer Application, Section 7.1.4. of the KHSA includes specific preconditions to Renewal Corporation's acceptance of license transfer.⁸⁸ Further, the Commission has recognized that approval of license transfer could include conditions subsequent. "If the Commission approves the [license] transfer, the approval order will specify what information PacifiCorp and the Renewal Corporation will need to provide and any conditions that will need to be satisfied before the transfer can take effect. After receipt of any additional information and satisfaction of conditions, FERC would issue a notice that the transfer is effective."⁸⁹

Acceptance of license transfer is subject to a standard condition that the transferee must hold fee title to the properties under the license. PacifiCorp will transfer and the Renewal Corporation will accept fee title to the properties that comprise the Lower Klamath Project, once the Renewal Corporation meets the requirements of KHSA section 7.1.4 and 7.6.4.D for protection of the States and PacifiCorp.

C. Commencement of License Surrender Proceeding

In its October 5, 2017 notice related to the license transfer, the Commission stated: "We are not requesting comments at this time on the surrender application. After receiving the applicants' supplemental filing regarding a decommissioning plan, the Commission will issue a notice requesting comments, protests, and motions to intervene in that proceeding."⁹⁰

correctly noted that the KHSA provides for a co-licensee arrangement upon mutual agreement, *see id.*; KHSA section 7.1.7(A), such proposal is not before the Commission for the purpose of dam removal.

⁸⁴ FERC Accession no. 20170301-5273.

⁸⁵ FERC Accession nos. 20170623-5103 and 20171204-5131.

⁸⁶ FERC Accession nos. 20180629-5017 and 20180629-5018.

⁸⁷ FERC Accession no. 20181213-5050.

⁸⁸ License Amendment and Transfer Application at 18.

⁸⁹ FERC Accession no. 20180522-3002, Attachment A, item 4.

⁹⁰ FERC Accession no. 20171005-3019, paragraph o.

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The Renewal Corporation has filed the Definite Plan, now amended with respect to the Estimate of Project Costs Report and the Risk Management Plan in the License Amendment and Transfer proceeding. In order to maintain the aforementioned schedule, and if the Commission does not have further AIRs regarding license transfer, the Renewal Corporation will file the Definite Plan in the surrender proceeding and respectfully requests that, upon receipt of this filing, the Commission Staff proceed with its notice and pre-decisional steps related to license surrender, including environmental review. This would be consistent with the Commission's May 22, 2018 letter order, which provided: "If the Commission approves the transfer, FERC will issue a public notice of the surrender application, soliciting comments, interventions, and protests."⁹¹ This would be helpful to the determination under KHSA section 7.1.4, as the basis for the Renewal Corporation's acceptance of license transfer.

Over the course of the [due-diligence period related to the Project Agreement and Liability Transfer Corporation], KRRC will continue to pursue and assess the terms and conditions of all necessary permits and approvals to implement the Definite Plan. This includes, without limitation, pending Water Quality Certifications, Endangered Species Act and National Historic Preservation Act consultations, and other regulatory requirements that are likely to influence or be embedded in FERC's surrender order. KRRC will assess the terms and conditions to be required by FERC in its surrender order to comply with the Federal Power Act, looking specifically to guidance provided by the BOC. The primary objective of these inquiries is to ascertain any potential inconsistencies of these regulatory requirements with the KHSA before KRRC's acceptance of the license transfer. The KRRC will keep PacifiCorp and the States informed about the status of these efforts.

Upon completion of its due diligence, KRRC will inquire of PacifiCorp and the States as to satisfaction with the progress in obtaining permits and approval.

PacifiCorp's and the States' assessment of this precondition will be iterative. PacifiCorp will consider, among other things, the status of permitting processes including feedback from permitting authorities, feedback from the BOC, best utility practices, and PacifiCorp's experience with dam removal projects.⁹²

VII. Conclusion

The Renewal Corporation has demonstrated that it has the legal, technical, and fiscal capacity to become licensee for the Lower Klamath Project, and that license transfer is in the public interest. The Renewal Corporation respectfully requests that the Commission approve the License Amendment and Transfer Application and take the further steps proposed above to act on the license surrender application.

⁹¹ FERC Accession No. 20180522-3022, Attachment A item 4.

⁹² June 28, 2018 AIR Response, Exhibit A item 5(b).

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Sincerely,



Markham A. Quehrn

Laura G. Zagar

Perkins Coie LLP

Attorneys for Klamath River

Renewal Corporation

Attachments

- A. Board of Consultants, Supplemental Report no. 1 (July 29, 2019) and Response of Renewal Corporation
- B. AECOM, Amended Risk Management Plan (July 2019)
- C. Qualifications of Kiewit Infrastructure West Co.
- D. Letter from Jamie Wisenbaker, Senior Vice President, Kiewit Infrastructure West Co. to Laura Hazlett, Chief Financial Officer, Klamath River Renewal Corporation (July 19, 2019).
- E. "Project Agreement for Design, Construction, Demolition and Habitat Restoration Services in Connection with the Lower Klamath River Project Dams between The Klamath River Renewal Corporation and Kiewit Infrastructure West Co." (April 24, 2019)
- F. Hawkins Delafield & Wood, "Report on Risk Mitigation and Insurability for the Klamath Restoration Project" (November 13, 2015)
- G. Parent Company Guaranty
- H. Qualifications of Aon Risk Insurance Services West, Inc.
- I. Qualification of Resources Environmental Solutions, LLC
- J. RES, Summary of Risk and Liability Transfer Approach (July 12, 2019)
- K. AECOM, Amended Estimate of Project Costs Report (July 2019)
- L. Extensions of Funding Agreements

cc: Lower Klamath Project Independent Board of Consultants
Douglas Johnson, (D2SI) Portland Regional Engineer
Service List (FERC No. 2082-062 and 14803-000)

Attachment A

**Board of Consultants, Supplemental Report no. 1 (July 29, 2019)
and Response of Renewal Corporation**

BOARD OF CONSULTANTS

Lower Klamath Project

July 29, 2019

Mr. Mark Bransom
Klamath River Renewal Corporation
423 Washington St. 3rd Floor
San Francisco, CA 94111

**Re: Letter Report; Supplement to Board of Consultants Mtg. No. 1
Lower Klamath Project FERC Nos. P2082, P-14803
Klamath River Renewal Corporation**

Dear Mr. Bransom,

The Independent Board of Consultants (BOC) for the review of the Lower Klamath Project (Project) respectively submits the following Supplement to Board of Consultants Mtg. No. 1 Letter Report.

INTRODUCTION

The Board of Consultants (BOC) submitted a Letter Report, Board of Consultants Meeting No. 1 (Report No. 1) to the Klamath River Renewal Corporation (Renewal Corporation) on December 10, 2018. Report No. 1, provided as Appendix A, presents the BOC's initial assessment of the proposed Project and the Renewal Corporation's financial ability to complete the process, including the additional information required in the Appendix to the Commission's March 15, 2018 order (Federal Energy Regulatory Commission's May 22, 2018 letter to the Renewal Corporation).

This report supplements the findings, conclusions and recommendations presented in Report No. 1.

Since Report No. 1, the following significant changes to the Project development have occurred:

- The Renewal Corporation has entered into a Progressive Design Build (PDB) agreement with Kiewit Infrastructure West Co. (Kiewit) to perform the Preliminary Services phase of the Project; and
- The Renewal Corporation has entered into negotiations with Resource Environmental Solutions (RES) to assume the role as the Liability Transfer Corporation (LTC).

More importantly, the Renewal Corporation continues to dialogue with PacifiCorp and the States of California and Oregon (States) to come to an agreement on what constitutes an acceptable "real" and "feasible" indemnification limit which satisfies the requirements of paragraph 7.1.3 of the Klamath Hydroelectric Settlement Agreement (KHSA) dated February 18, 2010 as amended April 6, 2016 & November 30, 2016.

Subsequent to the submittal of Report No. 1, the BOC obtained additional information from the Renewal Corporation and participated in a number of informal meetings with the Renewal Corporation and their consultants to further clarify our understanding of the Renewal Corporation's financial ability to complete the Project in accordance with the requirements of the Federal Energy Regulatory Commission's (FERC) Federal Power Act (FPA) and the KHSA. The informal meetings focused on reviewing and assessing the ability of the Renewal Corporation to secure adequate funding for the removal of the dams, identify and manage risks, obtain appropriate levels of insurance, and meet the indemnification requirements in the KHSA.

The informal meetings consisted of the following:

- Review of Intermediate Cost Estimate Review – 2nd Readout, March 14, 2019;
- Review of Draft Project Agreement, March 25, 2019;
- AON's Preliminary Risk and Insurance Recommendations, May 2, 2019;
- RES's Liability Transfer Corporation (LTC) Approach, June 6, 2019;
- Review of Liability Transfer Plan, July 9, 2019; and
- Revised Cost Estimate Read-Out, July 9, 2019.

The BOC prepared memoranda summarizing the results of each of the six informal meetings. The informal meeting memoranda are provided as Appendix B.

REVIEW DOCUMENTS

The Renewal Corporation provided the BOC with a number of additional documents in advance of the informal meetings, as well as in response to requests from the BOC. Appendix C presents a list of the review documents provided by the Renewal Corporation.

REFERENCE LIBRARY

During the preparation of this report, a number of additional references were either obtained through the Renewal Corporation, or were provided by the BOC to Renewal Corporation for consideration:

1. Hydrology, Hydraulics, and Sediment Transport Studies for the Secretary's Determination on the Klamath River Dam Removal and Basin Restoration, Klamath River, Oregon and California Mid-Pacific Region, U.S. Department of the Interior, Bureau of Reclamation, April 2011.
2. Flood Insurance Study, Siskiyou County, California and Incorporated Areas, Flood Insurance Study Number 06093CV000a, Federal Emergency Management Agency, Effective January 19, 2011
3. Klamath Dam Removal Drawdown Scenario 8: Potential Impacts of Suspended Sediments on Focal Fish Species with and without Mechanical Sediment Removal Final Technical Memorandum, Stillwater Sciences, April 2011
4. Emergency Action Plan, Klamath Hydroelectric Project (FERC No. P-2018), PacifiCorp Hydro Resources, December 2018

5. J.C. Boyle Development, Klamath River Project, Supporting Technical Information Document, PacifiCorp, April 2015
6. Copco 1 Development, Klamath River Project, Supporting Technical Information Document, PacifiCorp Energy, April 2015
7. Iron Gate Development, Klamath River Project, Supporting Technical Information Document, PacifiCorp Energy, April 2015
8. Dams Sector, Estimating Economic Consequences for Dam Failure Scenarios, Homeland Security, September 2011
9. Various references illustrating the consequences resulting from historic dam failures and removals

UNDERSTANDING OF THE ASSIGNMENT

The FERC requested the BOC's review of the adequacy of cost estimates, insurance, bonding, and the overall financial resources available to implement the Definite Plan. Additionally, in the Appendix to the Commission's March 15, 2018 order (per FERC's May 22, 2018 letter to the Renewal Corporation), information is specifically required regarding the following:

- a) A detailed explanation of how the Renewal Corporation would provide or obtain the necessary funds to operate the Lower Klamath Project if the surrender is not approved before the expiration of the California and Oregon Funding Agreements and the California Bond Measure,
- b) A detailed explanation of how the Renewal Corporation would provide or obtain the necessary funds to decommission and remove the Lower Klamath Project facilities in the event that funds equal to or greater than the maximum cost estimate for the full removal alternative are required, and
- c) A detailed explanation of how operation and maintenance of the Lower Klamath Project will continue in the event the surrender is denied.

The BOC submitted Report No. 1 to Mr. Mark Bransom on December 10, 2018. Report No. 1 presented the BOC's findings, conclusions and recommendations regarding the five specific questions posed in the FERC letter to the Renewal Corporation dated March 15, 2018.

The five specific questions for BOC review were:

- Question 1 – The updated maximum and probable cost estimate, and probability that each will occur;
- Question 2 – The updated project contingency reserve based on updated project costs;
- Question 3 – The types and amounts of insurance policies and surety arrangement anticipated to be secured by Renewal Corporation;
- Question 4 – The risk register and risk management plan; and
- Question 5 – The adequacy of funds and the funding mechanisms described in the data package.

In the months following the submittal of Report No. 1, the Renewal Corporation has made significant progress in addressing each of these five questions posed by the FERC. It is during the interim the BOC has obtained and evaluated additional information provided by the Renewal Corporation to update the BOC's findings, conclusions and recommendations presented in Report No. 1.

The BOC's update of the Report No. 1 findings, conclusions and recommendations follow.

FINDINGS

Question 1 – The updated maximum and probable cost estimate, and the probability that each will occur

The BOC has reviewed:

1. The Definite Plan – Appendix P Cost Estimate published by the Renewal Corporation in June 2018. A 1st Readout with the BOC was conducted by the Renewal Corporation (AECOM) in Denver during the month of November 2018,
2. A revised Appendix P Cost Estimate published in February 2019, with a 2nd Readout to the BOC in March 2019, and
3. The most recent Cost Estimate published in July 2019 with a 3rd Readout to the BOC performed in July 2019.

The July 2019 Cost Estimate presents the Total Project Cost for Full Removal, at the P80 confidence level at \$433,648,000, including contingency. Current available funding for the Project stands at \$450 million.

During the 1st and 2nd Readouts of the Cost Estimate, the BOC together with Renewal Corporation (AECOM) thoroughly vetted the Cost Estimates means, methods, sequencing, work breakdown structure and cost development strategies. From each of the 1st and 2nd Readout sessions, the BOC provided the Renewal Corporation (AECOM) with written comments regarding opportunities for improvement (OFIs) in the Cost Estimate that would heighten the BOC's confidence in the quality of the estimated cost outcomes. With no remarkable exceptions, the Renewal Corporation (AECOM) addressed, to the satisfaction of the BOC, each of the BOC's identified OFIs for the Cost Estimate.

Subsequent to the 3rd Readout (that associated with the July 2019 Cost Estimate publication), the BOC has produced an Informal Meeting Report Memorandum that summarizes the findings of its involvement in the Cost Estimate – 3rd Readout. This memorandum is included in Appendix B-6 of this Supplement to Board of Consultants Mtg. No. 1.

Renewal Corporation and their team have worked diligently to understand probable costs and risks to the Project, and to further the project risk management strategy. While numerous changes have been made to the various cost categories within the Cost Estimate since first published in June 2018, the overall estimated cost of the project has remained within the \$450 million "state cost cap." It is the BOC's opinion that the Renewal Corporation has made significant progress since June 2018 in developing a realistic, rational and sound maximum and probable Cost Estimate for the Work.

The BOC, under FERC Letter of May 22, 2018 has been assigned, in part, to undertake the following inquiry:

Review of adequacy of available funding and reasonableness of updated cost estimates for the most probable cost and maximum cost for the Full Removal alternative, and the assumptions made to calculate those estimates;

The BOC's position is that the July 2019 Cost Estimate has been assembled, compiled and independently vetted (quality assurance processes) consistent with industry standards. Costs and contingencies appear to be reasonable and have a high likelihood of being adequate given the PDB contracting model, the choice of a proven, competent contractor and proposed Risk Management Plan. Ultimately, the Contractor's assessment of cost and resultant Guaranteed Maximum Price (GMP) along with the confirmation of other cost elements will determine the adequacy of the current level of Project funding.

It is the BOC's understanding that the GMP, LTC Agreement, other stakeholder agreements, total cost, contingency and risk evaluation will likely come together at a common point in time, targeted currently to be during the first quarter of 2020.

Question 2 – The updated project contingency reserve based on updated project costs

An updated Monte Carlo analysis was completed based on current risk understandings, and a P80 level of certainty has been included in the 3rd Readout of the Cost Estimate. The Project Contingency identified in the July 2019 Cost Estimate stands at \$62 million.

The Renewal Corporation has further developed the Draft Amended Risk Management Plan (July 2, 2019; Risk Management Plan) for the Project. The BOC's review of the Risk Management Plan shows that certain specifics of the plan remain a work in progress, as some uncertainty still needs to be addressed. When taken in the context of the development of the Risk Management Plan and Kiewit's GMP, the level of contingency carried in the July 2019 Cost Estimate is within industry standards for such a project.

On a related note, the BOC notes that the Renewal Corporation (AECOM) has divided the Project contingency into three (3) major categories:

1. Estimate Uncertainty
2. Pre-GMP Contingency
3. Post GMP Contingency

While this categorical approach to developing assessments may be useful in defining and establishing the various contingent funds given the Project's timelines and under a Monte Carlo methodology, it is the BOC's understanding that the Project will maintain the full level of contingency money (no partial retirement of funding) past the Estimate Uncertainty and Pre-GMP milestones. It is the BOC's further understanding that the contingency is intended to fund the cost of residual lawsuits and claims that are not addressed by insurance, contractual indemnification or the LTC. As such, some portion of the contingency should remain intact for some time after Project completion.

The BOC recommends the contingency be re-assessed once the final GMP is identified, LTC terms, conditions and costs are established, and assignment/mitigation strategies for the remaining risks are addressed.

Question 3 – The types and amounts of insurance policies and surety arrangements anticipated to be secured by the Renewal Corporation

The BOC review of the Risk Management Plan is not intended to represent a risk assessment of the Project. Instead, it is intended to assess the overall approach taken so far to identify and manage risks associated with the Project. It is recognized that the Risk Management Plan must address the requirements of the KHSR, specifically Appendix L – DRE and Contractor Qualifications, Insurance, Bonding, and Risk Mitigation Requirements.

- a. The BOC finds that the types of insurance policies and bonds identified in the Risk Management Plan and the anticipated insured limits of liability are appropriate for a project of this type, size and duration. For the reasons cited in the BOC's letter report (December 10, 2018) and AON's Risk and Insurance Draft Due Diligence Report (July 2, 2019), transition from an Owner Controlled Insurance Program (OCIP) to a Contractor Controlled Insurance Program (CCIP) for Commercial General Liability, Excess Liability and Workers Compensation/Employers Liability (as recommended in the Risk Management Plan) is viewed positively by the BOC.

One change in the Renewal Corporation recommended insurance program is to allow Kiewit to use its corporate Professional Liability insurance policy to satisfy insurance requirements in this area, in lieu of a project-specific policy. This results in an estimated savings of approximately \$2 million in costs. It is the BOC's understanding that Kiewit's corporate insurance policy limits of liability apply to all Kiewit projects collectively and not just for the Project. The BOC suggests that one area that should be explored, prior to the time a guaranteed maximum price is negotiated, is for Renewal Corporation to obtain and evaluate the merits of an insurance proposal for an Owners Protective Professional Indemnity (OPPI) insurance policy. An OPPI is intended to provide coverage to Renewal Corporation for damages that exceed the professional liability insurance maintained by the Kiewit and its design team. An OPPI does not insure Kiewit or its subcontractors or sub-consultants.

- b. The Renewal Corporation recommended a Project Insurance Program and the construction insurance requirements under the PDB contract are a work in progress. The BOC recommends it review future iterations of these items, and in particular: (1) the program structure, (2) the scope and level of protection afforded to the Renewal Corporation, PacifiCorp and the States, and (3) the responsibility for deductibles and other forms of retention.
- c. The previous Cost Estimate did not include line items for project-specific insurance policies or the estimated cost for an LTC. The estimated cost for these two items were included within the "Design & Construction Contingency" line item (set forth in Table 1 on page 64, Appendix P of the Definite Plan dated June 2018). The estimated costs of these items have been removed from this line item and are segregated in the updated July 2019 estimate (Appendix

P). The current cost estimate for the combined LTC and Local Impact Mitigation Fund is \$35,730,000, and Project insurance is estimated at \$6,989,000.

Question 4 – The risk register and risk management plan

A risk register is a tool that project teams use to identify, assess, address and document risks throughout the project. It is a living document and is subject to frequent revisions throughout the life of the project. The latest iteration of the Risk Register appears as Attachment A to the Risk Management Plan. The BOC notes that the Risk Register was updated in general and reformatted to include keys at the top of the columns which identify and describe the inputs. In addition, “Risk Costs Coverage” columns were added to identify primary and secondary contingency carriers. These are all positive developments. However, the BOC suggests that the Risk Register be updated monthly.

The updated Risk Management Plan incorporates new components. The Renewal Corporation has received a proposal from RES to address specified risks not covered by insurance or contractual indemnification. These include (1) certain natural resources risks, (2) cultural resources risks, and (3) specific property damage related risks arising without fault of Kiewit (e.g., flooding of downstream properties, sediment impacts on downstream infrastructure and impacts to groundwater wells). For the first two categories, RES would indemnify the Renewal Corporation, PacifiCorp and the States against damage claims through an indemnity agreement. The latter category of risks would be addressed through implementation of a “Local Impact Mitigation Fund” (Fund). This Fund, the cost of which is included in the LTC estimate, would be administered by an independent third party following an agreed upon methodology for compensating impacted parties. The Renewal Corporation has acknowledged that participation in the Fund will be voluntary and that there is potential for litigation outside the Fund.

The RES proposal/LTC structure is in the early stages. The scope, terms and cost will be refined during negotiations as more information becomes known. The BOC understands that the contract between RES and the Renewal Corporation will be developed by the time the GMP is determined in the first quarter of 2020.

The Renewal Corporation acknowledges that not every identified risk will be addressed by insurance, contractual indemnification or the LTC. For instance, there may be legal claims such as those which allege lost profits or other economic losses suffered by persons or businesses, loss of property taxes, impacts on energy prices or complaints involving water quality. In addition the Renewal Corporation will retain the risk of delays caused by (1) “Uncontrollable Circumstances” (as defined in the PDB contract), (2) work scope changes directed by the Renewal Corporation, and (3) the inaccuracy of any reliance document provided by Renewal Corporation to Kiewit that formed the basis of the decommissioning plan and that could not be reasonably verified by Kiewit. Many of these risks are or will be incorporated in the Risk Register and risk management mitigation tools will be identified. The BOC recommends that the Renewal Corporation continue to work with PacifiCorp and the States to define the scope, level and term of indemnification that is currently set forth in the KHSA Appendix L.

Question 5 – The adequacy of funds and the funding mechanism described in the data package

The BOC understands that Renewal Corporation will have three sources of funding for decommissioning, removal, and habitat restoration of the Lower Klamath Project, totaling \$450 million:

- \$184 million from the Oregon Customer Surcharge;
- \$16 million from the California Customer Surcharge; and
- \$250 million from the California Bond Measure.

These funds, known collectively as the “state cost cap,” are stated to be the maximum monetary contributions available from the States.

As detailed in questions 1 through 4, the Renewal Corporation has worked diligently to refine cost estimates and identify tools that will help assure that the Project can be completed within the state cost cap. As stated by the Renewal Corporation, “The financial capacity of the Renewal Corporation is an integrated package consisting of: (1) \$450 million in committed funding; (2) use of PDB contract to assure a single point of accountability; (3) engagement of best-in-industry project team; (3) requirement of a GMP before the Renewal Corporation’s acceptance of license transfer; (4) insurance, bond, and indemnity program that provides many hundreds of millions of dollars of risk protection; and (5) a project cost estimate at the industry standard P(80) level that includes a contingency reserve currently estimated at \$62 million.”

The draft Plan B text provided by Renewal Corporation on July 7, 2019 asserts that the *“States and PacifiCorp must agree to the sufficiency of the financial capacity before construction begins, but after all permits are obtained, all conditions are known, and uncertainties around pricing and design are resolved.”* The BOC concurs that this integrated package appears to reduce the Project risk of exceeding the state cost cap. However, the BOC still awaits Kiewit’s GMP and the RES agreement, which will have great bearing on this question. Both milestones are anticipated in the first quarter of 2020. The BOC encourages the Renewal Corporation to continue refining the Definite Plan, including Plan B.

The draft “Plan B” language provided by the Renewal Corporation provides a list of options that could be undertaken if the financial capacity of Renewal Corporation is not sufficient to complete the Project. These are:

- a. Contract stripping and value engineering;
- b. Seek and obtain additional funds from third parties per the KHSA;
- c. Seek philanthropic contributions; and/or
- d. Accruing interest on the customer funds in excess of the \$28 million assumed in the cost cap.

These items are certainly possible options provided by the draft of Plan B.

Renewal Corporation's "Plan B" will also rely, if necessary, on the use of Section 7.3.8 B. (see below) of the KHSa to work with PacifiCorp, the States, and other signatories to identify and seek additional funding should the project costs exceed the state cost cap.

7.3.8 B. Third Party Funding

The Parties agree to work jointly to identify potential partnerships to supplement funds generated pursuant to this Settlement. Such third-party funds may be employed to acquire generation facilities that can be used to replace the output of the Facilities, to fund aspects of Facilities removal, or for other purposes to achieve the benefits of this Settlement.

The BOC understands that, while the Renewal Corporation has initiated conversations with potential additional funding sources, it has not entered into any formal agreements with such third-party funding entities.

During an informal meeting call on July 22, 2019, Renewal Corporation arranged for representatives from the States of California Department of Natural Resources and Oregon Department of Environmental Quality to offer input on Plan B. While the States could not guarantee additional funding, they did indicate broad support in the state governments for the completion of the project.

The BOC also notes that Renewal Corporation shared a copy of a letter from Kiewit dated July 19, 2019, stating that Kiewit believes the design and construction can be completed within Renewal Corporation's overall proposed budget.

CONCLUSIONS

In summary, it is the BOC's opinion that Renewal Corporation has made good progress, is using reasonable approaches, and is using a qualified team to estimate Project costs, including those for potential risks. While not likely based on updated analyses, the BOC at this time cannot rule out the possibility of the Project exceeding the state cost cap. There is still the GMP to be factored in, and like all large projects, there are natural and man-caused circumstances that cannot be foreseen which would also increase the final Project cost.

The BOC opines that the Renewal Corporation has made real progress toward demonstrating, with a high degree of confidence, that the Project can be completed within the state cost cap. This high degree of confidence is contingent on successfully accomplishing the GMP, RES contract and Plan B milestones.

RECOMMENDATIONS

The BOC presents the following recommendations:

1. The BOC recommends that the contingency be re-assessed once the final GMP is identified, LTC terms, conditions and costs are established, and assignment/mitigation strategies for the remaining risks are addressed.
2. The BOC recommends that the BOC reviews future iterations of the Project Insurance Program and PDB contract insurance requirements.

3. The BOC recommends that the Risk Register be updated monthly.
4. The BOC recommends Renewal Corporation continue to work with PacifiCorp and the States to define the scope, level and term of indemnification that is currently set forth in the KHSA Appendix L.
5. The BOC recommends that further refining of "Plan B" continue.

NEXT MEETING

To be determined.

CLOSURE

The BOC respectfully submits the Supplement to Meeting No. 1 Letter Report providing our findings, conclusions and recommendations addressing the questions raised regarding Renewal Corporation's capacity to realize the Lower Klamath Project.

Yours sincerely,



MaryLouise Keefe



Steve Coombs



James Borg



Craig Findlay



Dan Hertel



Ted Chant

APPENDIX A

Meeting #1 Report

BOARD OF CONSULTANTS

Lower Klamath Project

December 10, 2018

Mr. Mark Bransom
Klamath River Renewal Corporation
423 Washington St. 3rd Floor
San Francisco, CA 94111

**Re: Letter Report; Board of Consultants Mtg. No. 1,
Lower Klamath Project FERC Nos. P-2082, P-14803
Klamath River Renewal Corporation**

Dear Mr. Bransom,

The Independent Board of Consultants for the review of the Lower Klamath Project respectfully submits the following Report No. 1.

INTRODUCTION

A Board of Consultants (BOC) was convened to review and assess the aspects related to the proposed Lower Klamath Project (Project) and the financial ability of the Klamath River Renewal Corporation (Renewal Corporation) to complete the process, including the additional information required in the Appendix to the Commission's March 15, 2018 order (per FERC's May 22, 2018 letter to the Renewal Corporation).

This letter report presents our Findings, Conclusions and Recommendations following our first BOC meeting of October 24, 2018, as well as our informal meeting and site visit of October 23, 2018. This includes our review of the materials and correspondence provided by the project team and by Renewal Corporation regarding the ongoing studies for the proposed removal and restoration associated with the Lower Klamath Project comprised of J.C. Boyle, Copco 1, Copco 2, and Iron Gate Hydroelectric Projects (FERC No. P-14803).

BOC Meeting No. 1 primarily addressed the anticipated transfer of these dam and hydropower facilities from current owner PacifiCorp to Renewal Corporation. Matters addressed included the Definite Plan, the feasibility and cost associated with the Definite Plan, as well as the capacity of Renewal Corporation to accept transfer of license from PacifiCorp.

Subsequent to the meetings of October 23 and October 24, AECOM representatives met with BOC members Ted Chant and Dan Hertel in Denver, CO. Additionally, separate conference calls were held between BOC member Steve Coombs and (1) Seth Gentzler (AECOM); (2) representatives from Renewal Corporation, Hawkins, Delafield & Wood LLC, and Willis Towers Watson (Willis) and (3) Charlie Cantwell (Willis).

REVIEW DOCUMENTS

In advance of the informal meeting, site visits and initial BOC meeting, the Renewal Corporation provided the BOC with a number of documents for review, including the following:

1. Definite Plan with Appendices A through Q (with specific attention to Appendix A "Risk Management Plan" and Appendix P "Estimate of Project Cost Report");
2. Klamath River Renewal Corporation Informational Filing in Support of Joint Application for License Transfer and License Amendment, dated March 1, 2017 (with specific attention to pp. 5-8 "Technical Capacity," pp 8-14 "Financial Capacity," and the attachments referenced therein);
3. Response to April 24, 2017 Additional Information Request, dated June 23, 2017 (with specific attention to Renewal Corporation Response Nos. 1, 2.B., 3, 6.B. and 10, and the exhibits referenced therein);
4. Response to October 5, 2017 Additional Information Request, dated December 4, 2017 (with specific attention to Renewal Corporation Response Nos. 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, and 13, and the exhibits referenced therein);
5. Appendix L to Amended Klamath Hydroelectric Settlement Agreement (KHSA);
6. KRRC "Reference Library" of associated documents, including FERC Additional Information Requests (AIRs) and Responses, Construction Photographs, KHSA, and various agreements.

Additional information pertinent to the assignment was subsequently provided by Renewal Corporation through BOC requests.

REFERENCE LIBRARY

During the BOC review, a number of additional references were provided by Renewal Corporation:

1. FERC Additional Information Requests and Renewal Corporation Responses
2. Final Oregon Clean Water Act Section 401 Certification
3. Draft California Clean Water Act Section 401 Certification
4. State Water Resources Control Board California Environmental Quality Act Scoping Report
5. PacifiCorp Design or As-built Drawings (CEII)
6. Available Dam Inspection Reports (CEII)
7. Available Support Technical Information Documents (STID, CEII)
8. Dam Construction Photos
9. Amended Klamath Hydroelectric Settlement Agreement
10. Renewal Corporation Funding Agreements
11. U.S. Department of Interior, 2012 Environmental Impact Statement
12. U.S. Department of Interior, Klamath Dam Removal Overview Report for the Secretary of the Interior

UNDERSTANDING OF THE ASSIGNMENT

This letter report presents the BOC's findings, conclusions and recommendations regarding the five specific questions posed in the FERC letter dated March 15, 2018.

The five specific questions for BOC review were:

1. The updated maximum and probable cost estimate, and the probability that each will occur;
2. The updated project contingency reserve based on updated project costs;
3. The types and amounts of insurance policies and surety arrangements anticipated to be secured by Renewal Corporation;
4. The risk register and risk management plan;
5. The adequacy of funds and the funding mechanisms described in the data package.

The Federal Energy Regulatory Commission requested the BOC's review of the adequacy of cost estimates, insurance, bonding, and the overall financial resources available to implement the Definite Plan. The BOC review findings and conclusions follow.

Additionally, in the Appendix to the Commission's March 15, 2018 order (per FERC's May 22, 2018 letter to the Renewal Corporation), information is specifically required regarding the following: a) A detailed explanation of how the Renewal Corporation would provide or obtain the necessary funds to operate the Lower Klamath Project if the surrender is not approved before the expiration of the California and Oregon Funding Agreements and the California Bond Measure, b) A detailed explanation of how the Renewal Corporation would provide or obtain the necessary funds to decommission and remove the Lower Klamath Project facilities in the event that funds equal to or greater than the maximum cost estimate for the full removal alternative are required, and c) A detailed explanation of how operation and maintenance of the Lower Klamath Project will continue in the event the surrender is denied. The BOC does not have in its possession the materials described above and therefore is unable to address those details.

FINDINGS

Question 1 - The updated maximum and probable cost estimate, and the probability that each will occur

The BOC's review of the Definite Plan and AECOM Cost Estimate (Appendix P to the Definite Plan) is not intended to represent a quality control/quality assurance or independent technical review. The review is intended to provide a broad overview of AECOM's approach to planning the Project, a mid-level assessment of the appropriateness of the means, methods and sequencing of the detailed delivery plan (Cost Estimate), and an appraisal of the thoroughness of the Cost Estimate.

- a. The BOC finds that the approach to meeting Project Objectives as presented in the Definite Plan, including conceptual designs and the selected means, and methods and sequencing of the work appropriately recognize project requirements and vulnerabilities.

b. The Association for the Advancement of Cost Engineering (AACE) Cost Estimate Classification System maps the phases and stages of project cost estimating together with a generic project scope definition maturity and quality of inputs. AECOM had not categorized their Cost Estimate and advancing an understanding of the nature of the Cost Estimate will benefit from them doing so. The BOC is most familiar with AACE recommendations for the hydropower industry (AACE Recommended Practice Manual 69R-1.) with respect to classifying cost estimates.

In accordance with AACE, a Class 3 Cost Estimate (hydropower industry) has the following characteristics:

- Maturity Level of Project Definition Deliverables (expressed as a % of complete definition) between 10% and 40%;
- End Usage (typical purpose of cost estimate) is for budget authorization or control;
- Methodology (typical estimating method) includes semi-detailed unit costs with assembly level line items;
- Expected Accuracy Range (typical variation in low and high ranges including P50 contingency) ranging from a Low of -10% to -20% to a High of +5% to +20%.

The BOC opines that the Maturity Level of Project Definition Deliverables meets or exceeds the Class 3 guideline. Given the nature of the work the typical estimating method expectation for Class 3 can be more than satisfied.

c. The BOC finds that the Cost Estimate as presented lacked a thorough internal quality control review on the part of AECOM. There are inconsistencies, coding errors and some omissions in the current product. We would anticipate another two or possibly three iterations in the cost estimate compilation process to reach an acceptable finished product of a Class 3 Cost Estimate.

d. The BOC finds that the context under which the Cost Estimate has been assembled is predicated on a *commercially viable* contract between Renewal Corporation and the Progressive Design-Build (PDB) Contractor that contemplates excusable delays and assignment of project risks to those parties best suited to manage them. The details of the ultimate PDB Contract are not currently known however. The BOC finds that the current Cost Estimate does not contemplate additional costs a PDB Contractor may charge related to a greater scope and level of assumed risks, beyond those typical to a PDB Contract.

e. The BOC finds that major shortcomings in the current cost estimate include the allowance provided for Contractor Overhead and Profit (which the BOC considers inadequate in the context of the Project), and the absence of cost premiums commensurate with the contemplated Klamath Corporation insurance program including, but not limited to the anticipated costs of the liability transfer entity. Additional comments with respect to the AECOM Cost Estimate can be found later in this Report under the heading Other Cost Considerations.

Question 2 - The updated project contingency reserve based on updated project costs

The BOC has reviewed Renewal Corporation's overall approach to project contingency reserve. However, this review is not intended to represent a quality control independent technical review, nor re-assess probabilities of various cost and schedule risks. The BOC is intended to render its opinion if the overall approach taken by Renewal Corporation and AECOM is within industry guidelines, contemplates known risks with active response strategies, and if it is adequate.

a. The BOC finds that the general approach to contingency is within industry guidelines. However, any unforeseen significant cost would not be covered by the proposed funding. It is realistic to anticipate that a major change could occur on this project, as has happened on significant civil work in recent history (Calaveras Dam, Oakland Bay Bridge, Devil's Slide, the Boston Big Dig). Our concern would be for unforeseen cost overruns beyond the allowed contingency and project cost cap.

b. The BOC finds that the proposed level of contingency is unclear. Appendix P indicates that contingency was arrived at in two different ways; a) by using an allowance of 30% of direct construction costs and b) by using a Monte Carlo simulation to arrive at a total probable project cost. Under the first method, a contingency of about \$65 million (Nov 2018) was stated, and under the second method, a contingency of \$130 million was stated at the MP90 level of certainty. Appendix P seems to be conflicted regarding this contingency. Under Section 2.7 –Monte Carlo Analysis, it is stated that the P80 cost would be an industry standard. We agree with that. The P80 Cost is stated as approximately \$465 million and includes \$113 million in contingency (Nov 2018.) Section 2.7 then goes on to state: *"Due to the unique nature of this Project and the KRRC, KRRC selected a conservative P90 to represent the MPH for the Project. The P90 estimate covers the most likely final project cost in 90% of all scenarios."* This is restated in Section 4.1 in a similar manner.

Appendix P also states an "Estimated Project Cost" as about \$400 million (Nov 2018), including a contingency of \$65 million, or 30% of Direct Construction Cost. The actual project contingency appears to be driven by the available funds, minus the expected cost.

c. It is the BOC's understanding that some movement toward the partial removal option could expand the contingency accordingly on an as-needed basis as the design proceeds and construction begins.

Question 3 - The types and amounts of insurance policies and surety arrangements anticipated to be secured by the Renewal Corporation

The BOC review of the Risk Management Plan (Appendix A to Definite Plan) is not intended to represent a risk assessment of the Project. Instead, it is intended to assess the overall approach taken so far to identify and manage risks associated with the project. It is recognized that the Risk Management Plan must address the requirements of the Amended Settlement Agreement, specifically Appendix L- DRE and Contractor Qualifications, Insurance, Bonding, and Risk Mitigation Requirements.

a. The BOC finds that the types of insurance policies and bonds identified in the Risk Management Plan and the anticipated insured limits of liability are appropriate for a project of this type, size and duration. The BOC opines that one area that should be explored, prior to the time a guaranteed maximum price is negotiated, is to obtain an alternative from the selected PDB Contractor to supply a Contractor Controlled Insurance Program (CCIP) for Commercial General Liability, Excess Liability and Workers Compensation. Generally, large sophisticated contractors are able to secure CCIP's with better terms. Also, the labor-intensive administration of the CCIP would become the responsibility of the PDB Contractor.

The BOC opines that it is not reasonably feasible for Renewal Corporation to include Workers Compensation insurance under an Owner Controlled Insurance Program or OCIP structure because (a) the statutory requirements in Oregon make it difficult to do so (or may preclude it altogether), and (b) there would be insurer mandated requirements to escrow monies to fund the payment of claims falling within applicable deductibles, and to secure and maintain an ongoing letter of credit to collateralize the program. In addition, Workers Compensation claims may not settle for many years following completion of the project. The BOC opines that it may be acceptable for the PDB Contractor and its subcontractors to provide traditional Workers compensation

insurance not under a CIP approach. However, the Commercial General Liability and Excess Liability should be addressed by a CIP, whether sponsored by the selected PDB Contractor or Renewal Corporation.

b. The Cost Estimate does not include line items for project-specific insurance policies or estimated cost for a specialty corporate indemnitor (a Liability Transfer Corporation or LTC). Renewal Corporation indicated that the estimated cost for these two items is included within the "Design & Construction Contingency" line item (set forth in Table 1 on page 64, Appendix P of the Definite Plan). The estimated cost for these two items, which is substantial, should be removed from the Design & Construction Contingency (thereby potentially reducing this line item) and separately identified and added to the Cost Estimate (similar to how corporate insurance costs of Renewal Corporation are identified).

Question 4 - The risk register and risk management plan

A risk register is a tool that project teams use to identify, assess, address and document risks throughout the project. It is a living document. The first iteration of the Risk Register appears as Attachment A to the Risk Management Plan and is an excellent start. The BOC suggests the following improvements to the Risk Register.

- a. For projects over \$100 million, it the BOC's opinion that it is an industry best practice that the risk register design be modified to incorporate quantitative risk analysis [for each identified risk, there are a low/high/ probable percentage; cost impact in dollars (low/high/probable) and time impact in days (low/most high/probable). This helps staff and stakeholders prioritize the treatment of risks.
- b. A "key" should be inserted at the top of each column which defines/describes the inputs (similar to the "New Tunnel" risk register supplied by AECOM). This will help readers and users of the risk register to better understand the information.
- c. The register should be expanded further to include additional risks and be updated monthly after the PDB Contractor is under contract.

The Risk Management Plan (Appendix A to the Definite Plan) is an excellent road map to overall structure. However, a project specific- written Risk Management Plan should be drafted that addresses how risk management will actually be performed. This typically includes methodology, roles and responsibilities, timing, development of strategies to address the risks inventoried in the risk register, reports/deliverables, follow up procedures and the like. The Plan does not need to be complicated or lengthy to be effective. But staff and stakeholders should be able to readily understand who is doing what, when, how and why.

A significant part of the project risk management strategy involves the scope and level of the insurance and indemnification provisions that will be contained in the PDB Contract (being directed to selected PDB bidders) and ultimately negotiated and agreed to by the design-builder. The PDB Contract was not available for BOC review during the assignment.

At this point there is nothing available for BOC review regarding the potential use of an LTC. An LTC may be used to satisfy the requirements of Appendix L. However, potential residual liabilities associated with the project will not be fully known until the PDB Contract is fully negotiated and the project specific insurance policies are finalized and become effective. As such, this will be available for further BOC review at a later time.

Question 5 - The adequacy of funds and the funding mechanisms described in the data package

As articulated in their "Order Amending License and Deferring Consideration of Transfer Application" (Order), dated March 15, 2018, the Federal Energy Regulatory Commission (FERC) has limited its Order to the "Application to Amend" the license for the existing Klamath Project to create the new Lower Klamath Project, licensed to PacifiCorp Energy. This Order separated the "Application to Transfer" the new Project to the Renewal Corporation due to concern, in part, with regard to whether the transferee will have the financial capacity to safely remove project facilities and adequately restore project lands.

From reviewing the Order, the BOC understands that the FERC policy in past decisions held that a transfer may be approved on a showing that the transferee is qualified to hold the license and operate the project, and that a transfer is in the public interest. The Order indicates that the FERC has not previously considered an application to transfer a license to a new entity whose sole purpose is to surrender the license and decommission the project, as is the case with the Lower Klamath River Project. To exemplify their concern, the FERC Order references two previous projects that involved surrender and decommissioning. In light of administrative inefficiencies and liability concerns that arose, the transfer of both projects took several years to resolve. In one case, the FERC denied the applications as initially proposed and advised that the original Licensee and the Transferee to become co-licensees. This change ameliorated concerns with the adequacy of funding, so the FERC approved the license transfer, and subsequently the surrender. As a result of concerns with the adequacy of funding for the Lower Klamath Project removal, the FERC has asked that the BOC opine on the adequacy of funds and funding described in the Definite Plan.

The BOC understands from the FERC Order that Renewal Corporation will have three sources of funding for decommissioning, removal, and restoration of the Lower Klamath Project, totaling \$450,000,000:

- \$184,000,000 from the Oregon Customer Surcharge;
- \$16,000,000 from the California Customer Surcharge;
- \$250,000,000 from the California Bond Measure.

These funds, known collectively as the "state cost cap", are stated to be the maximum monetary contributions available from the states of Oregon and California. The applicants have not identified any additional sources of funding if the cost of the measures required exceeds the state cost cap.

The BOC understands that trust accounts have or are to be established, two in each state, to hold and administer charges collected from PacifiCorp's retail customers in California and Oregon. The collection of the customer surcharges began in May 2011 pursuant to orders issued by the Oregon and California Public Utility Commissions (PUCs.) The Renewal Corporation is the beneficiary of the trust accounts.

On January 24, 2017, the Oregon PUC approved the Oregon Funding Agreement for the disbursement of funds from the two Oregon trust accounts over three phases: startup activities, planning, and regulatory work (Phase 1); development of the Definite Plan and procurement of contractors (Phase 2); and implementation of the Definite Plan (Phase 3). In its March 1, 2017 filing, the Renewal Corporation provided that it had entered into an agreement with the Oregon Department of Fish and Wildlife for the disbursement of \$308,369 in initial startup costs as part of Phase 1. The Oregon Funding Agreement provides that, before disbursements may be made for Phase 2 or 3 activities, the Renewal Corporation must submit project descriptions and budgets for those activities. Renewal Corporation filed a proposed California Funding Agreement that provided for disbursement of funds over three phases, similar to the Oregon Funding Agreement, and was authorized by the CPUC in December 2017. The FERC has indicated

concern that these state funding mechanisms are not subject to the FERC's direction, but rather are subject to the terms of the Amended Settlement Agreement, to which the Commission is not a signatory.

The California bond measure is part of a water bond enacted by the California legislature in November 2009 and approved by voters in 2014 to fund the difference between the customer surcharges administered by the California and Oregon PUCs and the actual cost of dam removal, up to \$250,000,000. In 2016, the state legislature appropriated the bond funds to the California Natural Resources Agency (CNRA) for disbursement to the Renewal Corporation.

The FERC Order indicated that Renewal Corporation has stated that both the Oregon and California Funding Agreements have expiration dates of January 31, 2022, and that the California Bond Measure has an expiration date of June 30, 2021, with exceptions for funds devoted to ongoing mitigation or monitoring activities. In response to FERC's question about whether the funding sources would still be available if facilities removal extends beyond these dates, Renewal Corporation only stated that it would seek extensions from the states, but provided no assurances that the states would be amendable to those extensions.

During AECOM's presentation to the BOC at the October 23, 2018 introductory meeting, it was indicated that the Project had been costed for "Full Removal" and "Partial Removal" Schemes. Full removal includes removal of the dams, conveyances and powerhouses to near-pre-project conditions, while partial removal would leave some of the project components, primarily non-water retaining facilities, partially or fully in place. However, in either of the full or partial removals, the dams would be completely removed to the point of allowing free flow conditions for volitional salmonid migration to occur.

It is noted that the FERC Order references the December 4, 2017 Renewal Corporation filing that, "[c]ommitted and available funds to implement the [Amended Settlement Agreement] exceed AECOM's verified budget by well over \$100,000,000", but acknowledged that "it is theoretically possible that the full amount of the \$450 million would not be sufficient" to fully remove the project facilities and restore the area. In addition, the FERC Order notes that PacifiCorp and Renewal Corporation have entered into an operations and maintenance agreement that provides for PacifiCorp to continue to operate and maintain the Project until the removal of the facilities is imminent. However, the agreement is not effective until Renewal Corporation accepts (and the FERC approves) the transfer of license for the Lower Klamath Project. As stated in the FERC March 15, 2018 Order, the FERC has required that "a detailed explanation as to how Renewal Corporation would provide or obtain the funds necessary to operate and maintain the Lower Klamath in the event that the Commission does not approve the surrender application." The FERC also required "a detailed explanation of how the Renewal Corporation would provide or obtain the funds necessary to decommission and remove the Lower Klamath Project in the event that funds equal to or greater than the maximum cost estimate for the full removal alternative are required." KRRRC responded to these questions in their June 28, 2018 letter. However, the responses to the FERC March 15, 2018 Order do not provide any specific mechanism or "Plan B" to address any potential project overruns beyond the current \$450 Million cost cap.

The following examples from the June 28th response help to demonstrate our concern:

“If overall project cost is anticipated to exceed \$450 million, and if the risk and probability of such exceedance is not sufficiently covered by insurance, performance bond or other indemnification or security instruments, then KRRC, in consultation with the parties, would decide if the project can be modified to make it more financially viable”.

“If the foregoing measures are not sufficient, consistent with Section 7.2.1(A)(S) of the KHSA, KRRC could also pursue additional funds to address such a cost overrun. KRRC has not sought and does not have any legally enforceable commitments for additional funds to address this contingency at this time. KRRC believes that, if necessary, additional funding in material amounts would be available if necessary, to complete the project.”

“KRRC is confident that it is adequately funded to complete the project. In the unlikely event, however, that its current funding commitments are inadequate, KRRC will still have viable paths forward to complete the dam removal project.”

The response discusses vague future measures, which the BOC has not seen and therefore cannot evaluate. It is further worth noting that any significant unforeseen cost that would cause the Project to exceed the current \$450 Million cost cap would not likely be identified until after the Surrender or when the Project is well underway.

Other Cost Estimate Considerations

a. Overall Cost Estimate. BOC members met with AECOM in Denver on November 13th and 14th, 2018. The meeting was productive and the BOC appreciated the opportunity to better understand of the cost estimate. The BOC recognizes that the cost estimate is a live document and is subject to ongoing design changes and improvements, as well as peer review and overall quality control. During the meeting, a number of inconsistencies for potential improvements to the cost estimate were discussed. Some of these would potentially increase the cost estimate, while others would potentially decrease the cost estimate. The BOC did not attempt to recap those areas of discussion in this document, but will rely on AECOM to make adjustments as they deem appropriate.

b. Site Overhead or General Conditions Cost. The current cost estimate attempts to capture the contractor's general conditions or site overhead by adding 15% of direct costs. This does not seem to be uniformly applied to all direct costs. Exceptions include Restoration, Transportation, Recreation, Mitigation, and Monitoring. The BOC would encourage the estimators to detail this cost, due to the nature of the work. There are really three primary work sites (Boyle, Copco 1&2, and Iron Gate), each requiring contractor site personnel such as managers, engineers, safety supervisors, QC personnel, etc., as well as second shift supervision as necessary. Additionally, each site will require offices, support equipment, vehicles, etc. Only by detailing these costs through the duration of the project, will the expected cost be ascertained.

Chant's standard 28 Item Indirect Cost accounts were reviewed with AECOM as an example of a contractor style work breakdown structure (WBS) for Construction Indirect Costs. The BOC recommends that the next iteration of the Cost Estimate use such a template to detail Indirect Costs.

c. Contractor Corporate Overheads and Profit. The Cost Estimate includes an allowance for Contractor Overheads and Profit of 8% applied to Construction Direct and Indirect Costs. The USACE Profited Weight Guidelines were used to arrive at this rate. This does not account for the Contractors General Overhead, sometimes referred to as G&A, Corporate Overhead, or Home Office Overhead.

For the type of PDB Contractors that this Project will attract (large, civil self-performers) this appears to be very low. The BOC would expect a contractor to have between 6% and 8% Corporate Overheads (this can be ultimately supported by audit if necessary). This percentage is typically derived from Sales and not Cost of Sales. The BOC would suggest using 8% of Sales for Corporate Overheads.

A profit expectation in the order of 12% (or higher) would be more appropriate than the 8% listed. Current market conditions are such that contractor and subcontractor margin expectations are at the high end of the spectrum. This profit expectation will be directly related to contract language, risks borne by the Contractor, the definition of direct costs, and potential opportunities.

The Contractor's Corporate Overhead and Profit assignment would normally not include a risk component. Individual project related risks would be assessed and included in the Construction Indirect Cost (or elsewhere) as a separate line item and may be weighed against potential opportunities. Minimum margin guidelines may be related to certain productivity standard risks (minimum guideline not less than 60% of Labor Costs for example) but typically would again, not include any project specific known, known-unknown and unknown-unknown risks.

Margin (Corporate Overhead and Profit) under this perspective would total 20% compared to the 8% currently in the Cost Estimate.

The BOC's experience is that civil contractor's mark-up subcontractor's work at the same rate (more or less) as their self-performed work and much more than an ICI (building) contractor would. In any event, it is the BOC's opinion that the amount of subcontracted work identified in the Cost Estimate is very small, and this application would have minimal effect under the current cost estimate assumptions regarding subcontracting.

d. Insurance Cost. The PDB Contractor's insurance multiplier is stated at 1% of Construction Direct and Indirect Costs. The BOC believes that actual costs for the PDB Contractor will be lower if Renewal Corporation secures the project specific insurance policies contemplated by the Risk Management Plan (Appendix A to the Definite Plan). However, this percentage will increase if the PDB Contractor ultimately provides a CCIP. Such additional costs would largely be offset by reduced insurance costs incurred by Renewal Corporation, due to the shifting of insurance responsibilities.

As stated earlier, The BOC does not see a line item in the Cost Estimate for the LTC – which we anticipate being substantial in magnitude and needs to be identified and included in the overall Project Cost. It seems that the cost associated with an LTC is an expected cost and should be addressed as a cost line item, and not something absorbed in the contingency.

e. Bond Cost. The PDB Contractor's bond rate at 1% is considered adequate to provide 100% Performance and Labor and Material Payment surety instruments.

f. Labor and Equipment Rates. The labor rates included in the Cost Estimate were taken from a known and current fair wage analysis and include payroll burdens, add-ons and fringes. Labor related costs such as travel, living out per diem rates, small tool allowances, safety supplies and items of like import are assumed in the Cost Estimate to be included in the Construction Indirect Costs, although this is not clear. The BOC has requested a breakdown of labor rates used in the cost estimate.

Equipment rates were obtained from Equipment Watch Blue Book, which are assumed to include equipment ownership, indirect, insurance, interest expense, operation and maintenance costs, without the operator. In equipment intensive undertakings such as the Project, equipment mobilization is an item that should be assessed in detail. Other components of equipment rates, most importantly ownership and ownership related costs, should also be assessed based on the actual envisioned make-up of the contemplated fleet. Estimators should evaluate "dead rent" or underutilized equipment that will be required at the project and capture these costs in the estimate. The remote nature of the project will dictate that certain support equipment will need to be present on the project but will lack full utility. Examples of this may be cranes, forklifts, water trucks, blades, as well as light equipment such as pumps and generators.

g. Productivity Index Setting. Correlation of Cost Estimates with past cost experience is an important component of an effective high confidence cost estimating processes. An important aspect of this is correlation is relating past productivities to the context of the Project. We did not see tangible evidence of validation having taken place for most of the outputs from the Cost Estimate. AECOM seems to have assumed a progressive labor environment in compiling the Cost Estimate, meaning a unionized setting with non-restrictive manning stipulations and workable jurisdictional conditions.

h. Schedule. The construction schedule supporting the Cost Estimate reflects the schedule presented in the Definite Plan. AECOM informed us that a more detailed P6 (Critical Path or CPM) supported execution schedule is well advanced in development and will be made available to the BOC - but likely not by the due date for the November 28 BOC report.

One issue that was identified during discussions was the definition of "in-channel work" and identifying which work would be considered not permissible outside of the in-water work windows. The constraints presented by the "likely" permit restrictions and their possible effect on the Project Schedule need to be better understood.

While the costs and responsibility for Iron Gate and Fall Creek hatchery renovations and improvements are outside Lower Klamath Project decommissioning and removal costs these actions are linked to dam removal by a clause in the Amended Settlement Agreement (SA). The SA indicates that for both hatcheries there appears to be a contingency established by the SA that production facilities capable of meeting mitigation requirements must be operational by the time of removal of Iron Gate Dam. The implications of delay are not expounded upon. Given the federal ESA status and associated mitigation obligations under the existing Biological Opinion, additional explanation of this contingency and consequences of delay on vulnerabilities under ESA are warranted.

i. Non Dam-Related Construction Costs. Restoration of Vegetation was not considered as being delivered directly by the PDB Contractor. This grouping of costs was assembled using a Plant Item based on the experience of AECOM (and others), then the total was distributed (allocated) to the various line items within the grouping. The BOC considers that to be a prudent approach as it avoids double accounting of costs when each individual line item is addressed separately. We did not review the details of the Plant Item cost compilation for this work. It would be good practice to provide reference project costs, with appropriate adjustments for escalation, location, etc.

The estimated costs for the Transportation (Bridges, Culverts and Roads) Grouping is based on a comprehensive plan that may vary from what is ultimately executed BUT the plan as described represents a valid concept solution in our opinion. Analysis of the costs for the bridge components of this grouping (using parametric costs from our past experience) found the estimated costs to be within the range of expectations for like work. Some costs here were referenced to CalTrans cost indexes.

Mitigation Measures and Monitoring and Other Costs, like Permitting, Environmental Compliance Support, Design Data, Engineering – AECOM, Procurement and Construction Management are substantial but not warranted by AECOM. They are all reported to have been established from AECOM's past experience on similar work, confirmed with a detailed FTE analysis (only that for Construction Management was presented in the Cost Estimate information) and compared to typical industry standards as percentage of construction costs.

CONCLUSIONS

The BOC has been asked to assess the adequacy of funds and the funding mechanisms described in the information that has been provided by the Renewal Corporation. Based on our review of the documents provided by the Renewal Corporation, it is the BOC's opinion that it is likely that there will be sufficient funding within the state cost cap. However, the information reviewed also indicates that there is a possibility of exceeding the state cost cap for both full removal and partial removal schemes, although the high end cost for the partial removal appears to get the project costs to be within about \$16,000,000 above the cap. (P80 Cost November 2018)

It is not clear to the BOC what will happen if the state cost cap of \$450,000,000 is exceeded by even one dollar. It is the BOC's opinion that while not likely based on AECOM's analysis, the possibility of the project exceeding the state cost cap cannot be ruled out. Therefore, it is the BOC's opinion that some planning and/or restructuring with regard to what happens if the project overruns state cost cap is imperative. This could be agreements with the states to obtain further contributions from rate payers or possibly co-licensing between the current Licensee and the Transferee. There may well be other alternatives; however, leaving this aspect of the project undefined carries the risk of incomplete dam removal and incomplete restorative efforts which could result in public safety issues.

RECOMMENDATIONS

1. The BOC recommends that a "Plan B" be developed with regard to where additional funding would come from should the project costs exceed the state cost cap.
2. The BOC recommends that AECOM prepare another version of the Project's Cost Estimate having reflected on the questions, observations and comments of the BOC and that the BOC be afforded the opportunity to again meet with AECOM to review the *revised* Cost Estimate in detail. It would be beneficial to this review if AECOM prepared a summary of the nature of the changes (by D – Grouping) made to the original version of Appendix P including a quantitative comparison (again by D-Grouping) of the net impact of the adopted changes on the Cost Estimate.
3. The BOC recommends that Renewal Corporation provide a copy of the RFP (including draft contract) being directed to PDB Contractors, for BOC review.

NEXT MEETING

To be determined.

CLOSURE

The BOC respectfully submits letter report No. 1 providing our findings, conclusions and recommendations addressing the questions raised regarding Renewal Corporation's capacity to realize the Lower Klamath Project.

Yours sincerely,



MaryLouise Keefe



Steve Coombs



James E. Borg



Craig Findlay



Dan Hertel



Ted Chant

APPENDIX B

Meeting Memoranda

APPENDIX B-1

Review of Intermediate Cost Read-Out

BOARD OF CONSULTANTS**Lower Klamath Project**

Date: July 1, 2019**Informal Meeting Report Memorandum
Review of Intermediate Cost Estimate Review – 2nd Readout
Klamath River Renewal Corporation**

The informal telephonic meeting was held on March 14, 2019. The workshop began at 9:00 Pacific Time and ended at about 3:30 PM Pacific. The call was attended by AECOM representatives Seth Gentzler, John Roadifer, Eric Jones, Stuart Green; and Board of Consultants (BOC) representatives Ted Chant, Dan Hertel, and selectively by Jim Borg, MaryLouise Keefe, Steve Coombs, and Craig Findlay.

An agenda and handouts were prepared by AECOM and KRRC, and included topics such as approach to markups, indirect costs, labor and equipment costs, construction schedule, and select work items. KRRC's internal costs, Liability Transfer Corporation (LTC) costs, as well as design and permitting costs were not addressed.

Overall, the Read-Out went well. The AECOM team has been responsive to the BOC concerns of thoroughness, *completeness and reasonableness* discussed in the 1st Read-Out held in November 2018. The AECOM team continues to display an open-mindedness and willingness to accept BOC comments, and have responded to BOC input proactively. Generally speaking, the BOC is more comfortable with the cost adjustments and approach associated with the 2nd Read Out of the cost estimate.

Overall, the total project funding remains at \$450 million. The February Estimated Cost as presented is stated as approximately \$451 million, including Direct Cost, Progressive Design Build (PDB) Field Overhead, PDB HO Overhead, Profit, Insurance, Bonds, Escalation, and Contingency. Overall, it appears that the sum of Direct Costs, Indirect Costs, and Markups have increased approximately \$31 million, which would indicate that the available contingency has decreased. Depending on the revised Definite Plan, selected PDB Contractor, Contract, LTC, and Risk Mitigation Measures, the overall question of potential project cost overruns remains. This has been of vital concern to the BOC. The BOC looks forward to seeing the Revised Definite Plan and Cost Estimate in April and better understanding this.

Major areas of cost reduction included concrete demolition and some earthworks, while cost increases were mostly associated with diversion works and site indirect costs.

A number of action items for KRRC/AECOM remain, based on BOC requests, including the following:

1. Provide Supervisor/Craft Ratios for the Iron Gate Site Indirect Work Breakdown Structure (WBS) items. This will give the BOC an indication of the expected level of supervision to compare to industry standards.
2. Provide change in total haul unit hours from Definite Plan presented in November 2018 to February 2019 versions of the Cost Estimate.

3. Rework the assessment for "Dead Rent". During the 2nd Read-Out, it became apparent that the BOC observation regarding dead rent had been misinterpreted and AECOM will revise their assessment accordingly.
4. Make minor adjustments to OH-3 (Temporary Buildings) in the J.C. Boyle Site Indirect (and we assume the Iron Gate Site Indirect cluster as well).
5. Re-evaluate the rate of Small Tools (\$/labor hour) to ensure it is adequate.
6. Correct a relatively few minor busts (matters that were intended to be made by the estimator but did not make it into the cost estimate).
7. Revisit of major earthwork items (most importantly 4.023.1) with respect to truck loading times, haul cycle balance, and the truck load factor (y3/trip) employed.
8. Production of a Mass Haul Diagram.
9. AECOM mentioned that they "potentially" may separate the LTC cost from the project contingency. The BOC continues to recommend this be done. The LTC cost will eventually be known/finalized. Even if a final cost is not determined by the end of April, AECOM/KRRC should include their best estimate as a placeholder and acknowledgment of cost.
10. The Definite Plan Comments relating to PDB Insurance are incorrect. The Definite Plan assumes an Owner Controlled Insurance Program (OCIP), not a Contractor Controlled Insurance Program (CCIP). In the February 2019 column, the \$1,814K amount must be light if the PDB will provide a CIP. AECOM will check on this with KRRC. Also, AECOM will check with KRRC on the accuracy of \$100K for Owner's insurance costs. (Note: the \$100K does not contemplate any of the project insurance that KRRC plans to secure.)
11. In the Itemized Field Overhead numbers, insurance costs are shown as 2% of the subtotal on page 3 of each document. AECOM confirmed this is a mistake and should be corrected to 1% (which will also change the \$\$ amounts). AECOM will make the changes.
12. The original goal of transferring all risks to the PDB via a special indemnity agreement was not realized.
 - a. KRRC replaced their insurance broker (Willis) with AON to do a project risk assessment. The AON deliverable is a matrix identifying each risk and how the risk is being addressed and estimated costs (e.g., via PDB contract, OCIP or CCIP, other Project insurance, other PDB insurance, LTC, etc. The AON matrix should be ready at the end of March).
 - b. KRRC/AECOM interviewed LTC providers. They are finding out that all residual risks cannot be transferred to the LTC. ("The LTC market has changed- no one will cover all risks.") They are obtaining more information and pricing indications. Timing was not discussed. AECOM mentioned that the project contingency could address risks that aren't addressed by any of the foregoing techniques. (Comment: This does not appear to be in keeping with Appendix L to the Settlement Agreement.)
 - c. As respects a Risk Register, AECOM mentioned that they were striking any items that are the responsibility of the PDB. It was recommended that they not do that, but rather in the comments section, indicate that a specific risk is a PDB responsibility. AECOM understood the expressed concern.

Additional Comments:

1. Some additional assessment should be made regarding sub-contracted and self-performed work. The Cost Estimate as currently assembled as 99% self-performed. The execution plan will require that 60% of the Work be subcontracted. Under normal conditions (no mandated percentage to be performed by third parties), work is subcontracted when a third party offers improved cost performance, risk mitigation, or schedule certainty – meaning self-performed as a

basis of a Cost Estimate is a conservative approach (from an overall cost perspective) in that making the decision to subcontract should reflect an improvement on the base case (the self-perform approach) OR a contractor would simply self-perform that component of the work.

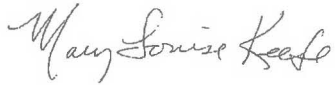
2. In addition, normally, self-performing contractors would not subcontract out work that is on the critical path (some exceptions of course, but as a general rule of thumb). If one does subcontract critical path work for whatever reason, this approach might attract a contingency on the subcontractor's price for contractor directed overtime costs, required changes the subcontractors means, methods and sequencing or the risks of having to provide additional contractor support to move things along consistent with the contractor's needs.
3. At Klamath, with a 60% floor on subcontracted work, other parameters will enter into the subcontracting decision-making process (making the 60% target). The means and methods of translating the current 99% self-performed premise of the cost estimate to a 60% minimum subcontracted value require some additional thought. How do we reasonably undertake this translation (anticipate the additional cost involved)? We asked AECOM to think about this, as it may alter the risk approach and contract markup.
4. It is the BOC's understanding that the costs of Iron Gate and Fall Creek hatchery renovations and improvements are outside Lower Klamath Project decommissioning and removal costs. It was stated that these costs are covered under separate agreement with PacifiCorp. However, the linkage between performance of hatchery renovations and the overall restoration project (per KHSa) may result in unknown cost consequences to the overall project.
5. In the Definite Plan, Appendix P – Estimate of Project Cost, Table 1-2 provided a summary of expected project costs. At the point of the 2nd Reading of the Cost Estimate, it was unclear to the BOC what the revised costs are at this point. Please provide total estimated expected project costs in the table below.

Cost Description	Total Cost First Readout Definite Plan	Total Cost 2 nd Readout February Amended Plan
KRRC Internal Cost		
LTC Premium		
Project Oversight		
Environmental Compliance and Permitting		
Engineering and Procurement – AECOM		
Construction Management		
PDB Design Costs		
Construction – Including Contractor's Indirects, Markup and Insurance		

Closure

KRRC and AECOM discussed the next steps listed in the agenda. The BOC expressed thanks to KRRC and AECOM and the other meeting attendees.

Yours sincerely,



MaryLouise Keefe



Steve Coombs



James Borg



Craig Findlay



Dan Hertel



Ted Chant

APPENDIX B-2

Review of Draft Project Agreement

BOARD OF CONSULTANTS**Lower Klamath Project**

July 1, 2019**Informal Meeting Report Memorandum
Review of Draft Project Agreement
Klamath River Renewal Corporation**

An informal telephonic meeting was held on Monday March 25th to obtain an overview of the draft Progressive Design Build (PDB) contract focusing on risk, insurance, indemnification and pricing sections. The conference call began at 8:00AM Pacific Time and ended at about 9:30AM. The call was attended by Eric Petersen (Hawkins Delafield and Wood), Olivia Mahony, and Board of Consultants (BOC) representatives Ted Chant, Dan Hertel, Jim Borg and Steve Coombs. Olivia Mahony provided a brief agenda in advance of the call.

General Comments

1. The call was led by Eric Petersen.
2. The initial Progressive Design Build (PDB) contract is currently being negotiated and will be executed in about 30 days.
3. There will eventually be a Guaranteed Maximum Price (GMP) amendment for the construction, subject to adjustment based on FERC approvals (estimated December 2019).
4. Then another amendment will be signed with a hard GMP (estimated mid-2020).
5. PacifiCorp believes the current schedule is too aggressive. The schedule will be amended.

Risk

1. AON was hired (replacing Willis) to perform a risk assessment of the project. This will include an identification of each risk, how each risk is addressed (e.g., insurance, indemnification, Liability Transfer Corporation (LTC)) and the associated estimated incremental costs. The report should be done by the end of March. The BOC verbally requested a copy of this report.
2. The bulk of the permitting responsibility is retained by KRRC (a list of needed permits is in the PDB contract). KRRC expects to have all permits in hand prior to construction.
3. FERC License transfer would not happen until after the GMP is established.

Insurance

1. As respects the LTC:
 - a. There was extensive outreach to nine firms. Seven were eliminated either due to cost or the proposed project is outside their general scope of what they are willing to do.
 - b. Two LTCs were interviewed by KRRC, with PacifiCorp in attendance.
 - c. KRRC is working closely with PacifiCorp and the respective states as a "team."
 - d. Currently working towards a Memorandum of Understanding with one LTC (a restoration services company). This will culminate in a non-binding "term sheet" in the next two months.

- e. It appears likely that a LTC will not be able to provide complete protection against all risks contemplated by Appendix L.
- f. When questioned what will happen if Appendix L is not completely addressed, Eric Petersen said that KRRC and PacifiCorp will “have to take stock” of alternatives. Eric mentioned that KRRC is essentially providing the indemnification already. However, the BOC notes that KRRC’s indemnification is limited by its assets and planned corporate lifespan.
- g. The timing of the LTC is such that it must take effect before construction commences. (Note: PacifiCorp indicated to KRRC that it does not want the PDB construction amendment to be signed until the LTC is in place.)

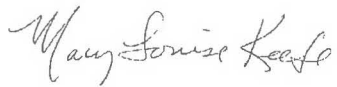
Indemnification

- 1. The PDB bidders will not agree to provide the specialty indemnity requested (in order to comply with Appendix L). (Comment: This will place greater reliance on the LTC to satisfy Appendix L.)
- 2. The indemnification clauses currently incorporated in the PDB contract are traditional, as compared to other similarly sized projects.

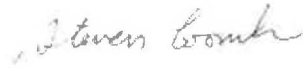
Cost

- 1. The only fixed pricing currently being negotiated with the PDB contractor is the fee.
- 2. The proposed fee ranges for the two leading PDB finalists are 10% and 12% respectively.
- 3. Time was spent (very worthwhile) reviewing the project’s original and revised time lines/milestones and process off-ramps.
- 4. Section 8.1.B (Replacement of Project Manager) – the BOC suggested that KRRC develop further requirements to ensure stronger continuity commitments from the Project Company for not only the Project Manager but many (as many as 8-10 is my thought) other key members of the Contractor’s Management Team. Our thinking here is that if the Project Manager is replaced (with or without a *fine*), takes ill or leaves the employment of the Contractor we want to ensure that there is a substantial contingent of the Contractor’s project delivery team that participated in the entire Preliminary Services effort that are available to the construction phase of the Work.
- 5. Section 8.3.C (Performance Failure) and Appendix 8.4.2.E (Unallowable Costs Defined) – there is an apparent conflict between these two sections regarding the PDB Contractor’s opportunity for recoverable costs for litigation (enforcing contractual rights and remedies for the benefit of the Project) with subcontractors.
- 6. Appendix 2 (Preliminary Services) – the revised schedule dramatically extends the period for the Preliminary Services – important to reflect this extended period (doubled) in the resource planning for the negotiated not-to-exceed cost – providing twice the time will not result in twice the value with respect to planning outputs.

Yours sincerely,



MaryLouise Keefe



Steve Coombs



James Borg



Craig Findlay



Dan Hertel



Ted Chant

APPENDIX B-3
AON's Preliminary Risk and Insurance
Recommendations

BOARD OF CONSULTANTS

Lower Klamath Project

June 29, 2019

**Informal Meeting Report Memorandum
AON's Preliminary Risk and Insurance Recommendations
Klamath River Renewal Corporation**

The informal telephone meeting was held on May 2, 2019 and was attended by the BOC members and representatives from KRRC, AON and PacifiCorp. The meeting topics were listed in an agenda prepared and submitted prior to the meeting by KRRC. The order of comments in this memorandum largely follows the order of the agenda.

AON Preliminary Risk and Insurance Recommendations

Following introductions, the BOC noted that AON serves as an insurance advisor and broker to both KRRC and Kiewit (the successful PDB Contractor). The Board expressed a concern that this could potentially compromise AON's objectivity in providing advice to KRRC for the Project. AON representatives stated that there are internal walls of separation that eliminate the possibility of any real conflicts in this regard, although they understood the perception of possible conflict.

A. Information Relied Upon for Preliminary Recommendations

As part of its analysis AON reviewed a wide variety of documents and attended various meetings and calls with KRRC and its advisors. This was all done in preparation to its analysis of risks associated with the dam removal and ancillary projects. AON fully understands its goal is to assist with the design and implementation of programs leading to compliance with Part 7.1.3 of the Klamath Hydroelectric Settlement Agreement Settlement Agreement.

B. AON Recommended Insurance and Bond Plan

KRRC asserted that the planned loss protection programs consist of three primary components: (a) proposed Kiewit CCIP/Bonds, (b) corporate insurance programs secured by Kiewit and KRRC, including various project specific insurance policies, and (c) the risk allocation provisions contained in the PDB Agreement, which ultimately are backstopped by Kiewit's balance sheet. The LTC option was not discussed, but will be addressed at a future meeting.

1. Insurance Policies and Limits

The recommended types of insurance policies, insured limits and projected costs were reviewed and discussed. AON confirmed that all CCIP costs and deductibles were the responsibility of Kiewit.

BOC Recommendation:

The Contractor Controlled Insurance Program (CCIP) Excess Liability limit recommended by AON is \$100 million. The BOC expressed its concerns that this limit significantly underestimates true risk potential of the Project. The BOC recommends this limit be increased to \$200 million. The BOC concluded that the benchmarking information that AON used to arrive at some of its conclusions did not utilize similar projects (all projects utilized in the benchmarking were new construction only, and largely consisted of highways, bridges, tunnels and rail). Likewise, the benchmarking of the proposed insurance limits to PacifiCorp's insurance program did not seem helpful because the former is for a dam demolition project while the latter is for the operation of a utility. To assist AON with its analysis, the BOC agreed to provide resource materials on the documented financial losses of historical dam failures. AON was encouraged to rework their benchmarking exercise around dam projects and actual loss experience. In the interim, AON agreed to reprice the Excess Liability insurance cost accordingly.

2. AON Supporting Information

The AON Supporting Information-Model Flows document was reviewed and discussed. This is an actuarial study of specific scenarios identified in the AECOM risk registers. The scenarios analyzed were dam failure, substation failure, wildfire, water main relocation, damage to houses, debris removal, and hatchery fish kill. The AON project assumptions, process, and analysis were all reviewed. The probabilities of risk occurrence and estimate of costs will be further refined during preliminary services technical studies and analyses.

Through its analysis, AON concluded the three largest risks based on estimated costs (excluding Project operations costs) KRRC faces are from hatchery failure and its impact on the salmon population, pipeline relocation due to sediment movement and deposition or scour, and downstream fatalities and property damage resulting from dam failure during the removal efforts.

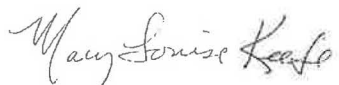
BOC Recommendation:

The AON Analysis is based on AON's internal methodology and not regulatory methodology for conducting risk assessments or estimating economic consequences. Various governmental agencies produce risk assessment/consequences related materials, including FERC, FEMA, Department of Interior and Homeland Security. The BOC agreed to send several documents to AON for their consideration. The BOC also agreed to send materials regarding the economic costs of historical wildfire losses.

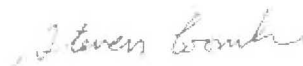
Closure

KRRC and AON discussed the next steps listed in the AON report. The BOC expressed thanks to AON and KRRC. The discussions were very helpful in better understanding the planned treatment of risks associated with the Project.

Yours sincerely,



MaryLouise Keefe



Steve Coombs



James Borg



Craig Findlay



Dan Hertel



Ted Chant

APPENDIX B-4

RES's Liability Transfer Corporation (LTC) Approach

BOARD OF CONSULTANTS

Lower Klamath Project

July 1, 2019

**Informal Meeting Report Memorandum
RES's Liability Transfer Corporation (LTC) Approach
Klamath River Renewal Corporation**

The informal telephonic meeting was held on June 6, 2019 and was attended by the BOC members and representatives from KRRC, RES, AON, Feinberg Law Firm and PacifiCorp. The meeting topics were listed in an agenda prepared and submitted prior to the meeting by KRRC. The comments in this Memorandum largely follow the order of the agenda.

RES's LTC Approach

In advance of the meeting, KRRC distributed an Executive Summary of the RES LTC Draft Proposal and KRRC Liability Protection Program Overview.

A. Executive Summary of the RES LTC Draft Proposal

This document is composed of five parts: Introduction, Price and Performance Risks, Residual Risks, LTC Costs, and Recommended Alternative.

1. Introduction

RES's focus is on potential liabilities which are not subject to price and performance risks, including related insurance and bonds, for which it can assume. These are considered as designated "mitigatable risks." The Executive Summary is a preliminary working document. PacifiCorp is currently reviewing this approach and has not finalized its position. RES also identified and discussed past and current projects and a history of its organization.

2. Price and Performance Risks

These risks relate to the removal of the dams and the restoration required by permits. These risks are addressed per the PDB Agreement, Kiewit parental guarantee, bonds, and Kiewit and KRRC insurance programs/policies.

3. Residual Risks

Residual risks are risks other than price/performance risks that RES can mitigate (mitigatable risks) and other potential legal claims (for which KRRC assumes). The RES mitigatable risks are (a) flooding impacts on property; (b) impacts of sediment release (including contamination), (c) rim instability issues, (d) wildfires; (f) impacts on water rights (e.g., groundwater wells); (g) risks associated with project permits (including impacts to natural resources); and (h) impacts to water rights. Based on a review of the AECOM Risk Register RES believes these risks account for the majority of impacts that are expected to occur.

When questioned where the risks associated with the impact on salmon populations are allocated, RES confirmed this would be fall into category (g) permits.

The second category, other potential legal claims, includes all potential legal actions that are not price/performance risks or mitigatable risks. These would include, for example, actions alleging economic losses suffered by third parties, loss of property taxes and energy price changes. Based on the advice of outside counsel, RES believe such risks are speculative in nature.

4. LTC Costs

A table outlining mitigatable risks, estimated cost to mitigate, contingency and LTC fees were reviewed and discussed. RES explained that these amounts were calculated based on its experience with other projects, Monte Carlo Analysis and estimates by Stantec (as sub-consultant to RES).

5. Recommended Alternative

RES recommended that KRRC establish a defense fund to cover legal risks and mitigatable costs (other than permitting risks which would remain with RES). This fund has a cap and be voluntary (those that bring claims could be subject to the settlement fund procedures or could use the court systems). RES and representatives from The Law Offices of Kenneth R. Feinberg described fund administration characteristics. The funding amount and procedures were discussed but were very preliminary in nature.

BOC Recommendations/Requests:

The BOC questioned how the financial implications "Uncontrollable Circumstances" (as defined by the PDB Agreement) are going to be addressed. KRRC agreed to provide additional information.

The BOC questioned what criteria were used by RES to select the specifically identified "mitigatable risks." KRRC agreed to provide a response.

The BOC requested (a) a copy of the RES PowerPoint, (b) the most recent AECOM Risk Register and (c) a copy of the full RES proposal when it becomes available. KRRC will provide copies.

B. KRRC Liability Protection Program

KRRC reviewed various risks, including permits, price/performance, insurable and residual. Most of the comments in this document had been discussed previously as part of the RES LTC Draft Proposal. KRRC did confirm that (a) Kiewit will be responsible for correcting any non-compliance issues with regulatory permits for Facilities Removal; (b) PacifiCorp will be solely responsible for power generation, transmission and decommissioning of the facilities, and (c) the California Department of Fish and Wildlife will be responsible for the operation of the Iron Gate and Fall Creek Hatcheries.

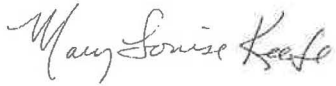
BOC Recommendations/Requests:

The BOC was unclear regarding the KRRC comment that RES will "hold the CIP." KRRC agreed to address further after RES prepares their proposal. The bonding issues will also be reviewed further

Closure

KRRC and RES discussed the next steps listed in agenda. The BOC expressed thanks to KRRC, RES and other meeting attendees.

Yours sincerely,



MaryLouise Keefe



Steve Coombs



James Borg



Craig Findlay



Dan Hertel



Ted Chant

APPENDIX B-5

Review of Liability Transfer Plan

BOARD OF CONSULTANTS**Lower Klamath Project**

July 12, 2019**Informal Meeting Report Memorandum
Review of Liability Transfer Plan
Klamath River Renewal Corporation**

An informal telephonic meeting was held on July 9, 2019 and was attended by the BOC members and representatives from KRRC, AECOM, RES, AON, and PacifiCorp. The meeting topics were listed in an agenda prepared and submitted prior to the meeting by KRRC. The comments in this Memorandum largely follow the order of the agenda.

RES's LTC Approach

In advance of the meeting, KRRC distributed the following documents for BOC review: (a) a June 21, 2019 Draft Risk and Liability Transfer Plan (LTC plan) and associated appendices, (b) a June 21, 2019 draft of the Overview of Risk Register and Risk Allocation Matrix, and (c) a July 2, 2019 draft of an appendix to the Definite Plan, Appendix A - Draft Amended Risk Management Plan. The BOC reviewed these documents, prepared and delivered written questions to KRRC. Thus, the meeting goal was to address the BOC questions on these recently drafted risk and liability plans.

The approach presented in the RES Draft LTC plan is focused on identifying, managing and mitigating (a) all natural resources risks associated with the regulatory process during the Post-Construction phase of the project and (b) specified property risks and related impacts (e.g., flooding impacts on homes and bridges; sediment impacts; rim stability; groundwater wells and diminution in land values). As a sub-consultant to Kiewit, RES will also be actively engaged in regulatory consultation and negotiation of natural resource related permits and will be responsible for habitat restoration construction, monitoring, and compliance. It is the BOC's understanding that RES, as the LTC, will be responsible for long-term stewardship of the restoration within the criteria and timeframe established by regulatory permits.

Discussion Summary

The following summarizes the major areas covered during the call.

1. KRRC believes that RES meets the minimum criteria set forth in Appendix L of the Klamath Hydroelectric Settlement Agreement (KHSA).
2. The RES Risk and Liability Transfer Plan is in draft stage and is subject to change. RES will continue to refine the plan as new information becomes available, including research on historical litigation associated with dam removals. Eventually a term sheet will be developed leading ultimately to a formal contract. The formal contract will outline roles, responsibilities, costs, the specific risks that RES will be responsible for and other contract terms. It is anticipated that the cost will be a set dollar amount.
3. RES's performance as a subcontractor to Kiewit will fall under Kiewit's required bonds. RES will also provide a performance bond for its activities within its LTC role. It is assumed the bond amount will be the same as the contract amount.

4. KRRC believes that the requirements of KHSa Part 7.1.3 Liability Protection and Appendix L will be satisfied by the combination of the Risk Management Plan- Appendix A and the RES Plan. KRRC indicated that feedback from the States of California and Oregon has been positive.
5. It is anticipated that RES will ultimately provide indemnification protection to the States of California and Oregon and PacifiCorp. The exact scope and level of the indemnification protection must ultimately be reviewed and agreed to.
6. RES will assume KRRC's obligation for retentions/deductibles under the project specific insurance secured by KRRC.
7. KRRC will work with consultants to determine if new studies are needed to establish a base case for comparison of pre-removal conditions with those experienced during and after removal of the dams.
8. The anticipated protection to be afforded by RES does not replace insurance. If a claim involves overlapping insurance, indemnification, and the LTC, it is anticipated that the LTC protection would apply after insurance and indemnification are exhausted.
9. KRRC has established a reserve in the estimate for litigation not covered by insurance, indemnification or the LTC.
10. RES explained that their responsibilities regarding natural resources risks will include (a) non-compliance with condition of natural resource related permits (including additional costs due to delay); (b) changes in regulations during the life of the permits, and (c) damage to plantings that is not otherwise covered by insurance. For instance, if a wildfire destroys the natural resources restoration work prior to permit expiration, RES maintains responsibility (assuming insurance does not apply to this damage).
11. RES believes it is crucial to the success of the LTC approach for it to be part of the team that negotiates natural resources related permits. They will undertake those activities as a subcontractor to Kiewit working on implementation of restoration measures.

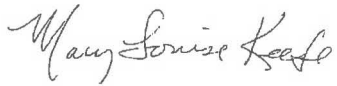
BOC Recommendations/Requests/Comments

1. The RES approach is a work in progress and is based on many assumptions. The BOC welcomes the opportunity to review further modifications and refinements to the RES, along with updates to the Risk Register.
2. THE BOC does not recommend a full blown RIDM exercise. AECOM indicated it would use the Potential Failure Mode Analysis (PFMA) process. This approach is supported by the BOC.
3. The BOC requested (a) additional information on RES and projects it has completed, and (b) a consolidated RES cost summary.

Closure

KRRC and RES discussed the next steps listed in agenda. The BOC expressed thanks to KRRC, RES and other meeting attendees.

Yours sincerely,



MaryLouise Keefe



Steve Coombs



James Borg



Craig Findlay



Dan Hertel



Ted Chant

APPENDIX B-6

Revised Cost Estimate Read-Out

BOARD OF CONSULTANTS**Lower Klamath Project**

July 11, 2019**Informal Meeting Report Memorandum
Revised Cost Estimate Read-Out
Klamath River Renewal Corporation**

An informal telephonic meeting was held on July 9, 2019 and was attended by the BOC members and representatives from KRRC, AECOM, RES, and PacifiCorp. The meeting topics were listed in an agenda prepared and submitted prior to the meeting by KRRC. The comments in this Memorandum largely follow the order of the agenda.

AECOM Review of Project Cost Development

AECOM presented an overview of the project cost development dating back to the Definite Plan Appendix P Cost Estimate developed in June of 2018 (referred to as the 1st Cost Estimate Readout), cost estimate refinements presented to the BOC in March of 2019 (the 2nd Cost Estimate Readout) and the current cost estimate dated July 2019 (3rd Cost Estimate Readout). The AECOM presentation focused on each principle cost category, with emphasis on specific information requests or previous questions posed to AECOM by the BOC.

Changes to the Project Cost

The BOC's understanding of the 3rd Cost Estimate Readout costs and related issues as presented on July 9 can be summarized as follows:

- The overall project budget remains at \$450 million. There have been material line item changes made to the original AECOM Cost Estimate in both the 2nd and 3rd Cost Estimate Readouts. Significant changes also occurred between the 2nd and 3rd Cost Estimate Readouts. It is the BOC's opinion that all changes to the original Cost Estimate have been developed and implemented in a rationale, prudent and transparent manner, tracked and satisfactorily documented by AECOM.
- KRRC has (since the 2nd Cost Estimate Readout) negotiated a Preliminary Services Agreement (PSA) with Kiewit which clarified certain issues including PDB Contract expected fees and markups, insurance costs and the assignment of risk/risk mitigation responsibilities to the PDB Contractor. The clarity and cost certainty afforded by the Kiewit PSA cost had a positive impact with respect to "firming up" certain key aspects of the 3rd Readout of the Cost Estimate.
- Kiewit is in the process of developing a "Proof of Concept" memorandum. This deliverable (due in July 2019) involves Kiewit reviewing and confirming AECOM's approach to the PDB Contractor's means, methods, sequencing and costs of construction. This is an important step and key milestone in the Project's cost confidence process.
- Kiewit has offered a 10% Fee on construction direct and indirect costs. The Fee is to include Corporate General and Administrative (G&A) expenses, Profit, and Kiewit-assigned risk. This

provides a significant savings over the 2nd Cost Estimate Readout and has been reflected into the July 3rd Cost Estimate Readout.

- KRRC is in discussions with Resource Environmental Solutions, LLC (RES).
 - RES will have three specific roles in the project:
 - a. Subcontractor to Kiewit for design and implementation of restoration measures including monitoring, maintenance and reporting during construction
 - b. Contractor to KRRC for long-term implementation of the restoration plan, including monitoring, maintenance, repair/replacement and reporting during the post construction period up to (and possibly beyond) Site Closure, and
 - c. As Mitigation Surety (indemnification of PacifiCorp, Oregon, California and the KRRC with respect to damage claims.
 - Involvement of RES in the roles b. and c. above provides some cost certainty and risk reduction although final details of the RES agreement are a work in progress:
 - RES has identified line items within the WBS that can be removed from the Cost Estimate (partially or completely) as a result of their involvement in the Project (WBS line items transferred to them and included in their lump sum fee – see following bullet). The “transferring out to the LTC” of these WBS Line Items decreased the 3rd Readout of the Cost Estimate by approximately \$40 million.
 - RES has proposed the establishment of a Local Impact Mitigation Fund in the amount of approximately ■■■ million. This cost is included in the 3rd Readout of the Cost Estimate.
 - RES has provided an indicative cost estimate of its fee for its role as a Specialty Indemnification Company (roles b. and c. above) at approximately ■■■ million, which is now included in the 3rd Readout of the Cost Estimate as a Line Item.
 - *Note to Reader: The BOC notes that there seems to be three terms in circulation for the responsibilities being assumed by RES: Specialty Indemnification Company, Liability Transfer Corporation, and Mitigation Surety. The original term in the KHSa is Liability Transfer Corporation.*
 - KRRC and RES are currently developing a “Term Sheet” outlining scope and terms which would ultimately develop into a contract(s) between KRRC and RES for each of items b. and c. above.
- Other material additional cost changes reflected in the 3rd Readout of the Cost Estimate include:
 - The PDB Contractor’s Final Design and Permitting Costs have been increased by approximately \$15 million. This is based on initial scope and related negotiations with Kiewit.

- AON and Kiewit, in conjunction with KRRC, have developed an integrated project insurance program with total premiums valued at approximately \$7 million. Premiums for *long-tail* insurance coverage have been reported as included. These anticipated premiums now show as an independent Line Item in the Cost Estimate.
 - An additional year has been added to the project schedule and a 4% escalation factor has been added to reflect this extended time frame. The associated additional cost is approximately \$9 million.
 - Design changes were made to the Yreka Waterline Replacement. Costs for Fire Management and Spawning Gravel were added for a bundled additional cost of approximately \$13 million.
 - Subcontract Markup was adjusted to reflect the PDB's 60% subcontracted work *target* which added approximately \$3 million.
 - Field Overhead costs were adjusted to reflect Kiewit's management plan. This resulted in a cost decrease of \$3 million.
 - Project Oversight costs, to be administered by AECOM, were increased by approximately \$11 million. This, in part and again based on discussions with Kiewit, reflects mirroring Kiewit's approach to project staffing and management as well as an additional year of project oversight (start of construction now in 2021).
 - Technical Support costs, to be provided primarily by AECOM, were increased by approximately \$5 million. This is, in part, due to the planned delay in the start of construction to 2021.
 - Monitoring and Reporting costs have been reduced on the order of \$8 million, to coincide with the RES contracting and monitoring strategy.
 - The overall Contingency has been reduced from approximately \$68 million (1st Readout) to \$63 million. This reduction in contingency is based on further project definition and risk reduction measures associated with the revised insurance program and the engagement of Kiewit and potentially RES.
- The overall PDB contract value remains at approximately \$235 million, which is a similar value to that of the 1st and 2nd Cost Estimate Readouts.
 - Kiewit will be providing a cost estimate at the end of 2019, with a GMP in early 2020. Until the GMP is finalized and agreed upon, the Cost Estimate is considered an approximation.

Board of Consultants Position and Understanding

Cost Estimate: KRRC and their team have worked diligently to understand probable costs and risks to the project, and to further the project risk management strategy. While numerous changes have been made to the cost categories since the 1st Readout of the Cost Estimate as outlined above, the overall expected cost of the project has remained within the \$450 million budget.

Contingency: At \$63 million and given the level of insurance and the engagement of RES (and taking their contemplated scope as a given) the level of contingency is within industry standards for such a project. A Monte Carlo analysis was completed based on current risk understanding and a P80 level of certainty. The resultant cost was carried in the 3rd Readout of the Cost Estimate. KRRC and AECOM have divided contingency into three major categories: Estimate Uncertainty, Pre-GMP Contingency, and Post GMP Contingency. While this approach may be useful in defining various contingencies, it would be prudent to maintain full contingency funds, without retirement past the Estimate and Pre-GMP milestones.

Plan B: The BOC has been concerned that, in the event the overall final project cost exceeds the \$450 million in currently available funds, a "Plan B" is needed to provide for that funding. It was explained by KRRC that "Plan B" is really a combination of value engineering (partial removal), outreach to the States and reaching out for philanthropic support. The KHSa allows for each of these actions. KRRC intends to incorporate a narrative to this effect within the body of the Final Definite Plan. It is the BOC's understanding that the States, KRRC, and other stakeholders are currently engaged in Plan B discussion and will ultimately agree on a Risk Management Plan and limits of indemnification.

Conclusion

The Board of Consultants, under FERC Letter of May 22, 2018¹ has been assigned, in part, to undertake the following inquiry:

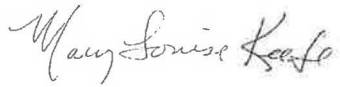
Review of adequacy of available funding and reasonableness of updated cost estimates for the most probable cost and maximum cost for the Full Removal alternative, and the assumptions made to calculate those estimates¹

The BOC's position is that the Cost Estimate have been compiled and vetted consistent with industry standards. Funds and contingencies appear to be reasonable and have a high likelihood of being adequate given the PDB contracting model, the choice of a proven, competent contractor, the inclusion of an experienced Specialty Indemnification Company (given the proposed scope) and the proposed (with certain details still evolving) Risk Management Plan.

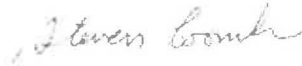
Ultimately however, it will be the Contractor's assessment of cost and the resultant GMP along with the confirmation of other cost elements that will determine the adequacy of funds. It is the BOC's understanding that the GMP, SIC Agreement, other stakeholder agreements, total cost, contingency, and risk evaluation will likely come together at a common point in time currently thought to be in the first quarter of 2020.

¹See, *PacifiCorp*, 162 FERC, 61,236 (2018) ("May 22 Letter Order").

Yours sincerely,



MaryLouise Keefe



Steve Coombs



James Borg



Craig Findlay



Dan Hertel



Ted Chant

APPENDIX C

List of Review Documents

REVIEW DOCUMENTS

The Renewal Corporation provided the BOC with a number of additional documents in advance of the informal meetings, as well as in response to requests from the BOC. Provided below is a list of the review documents provided by the Renewal Corporation.

1. KRRC Request for Extension of Schedule to July 29 to Complete Response to Independent Board of Consultants Report No. 1: FERC Nos. P-2082; P-14803, NATDAM-OR00559, CA00323, CA00234, CA00323, to David E. Capka, P.E., Office of Energy Projects, Director, Division of Dam Safety and Inspections (D2SI), Federal Energy regulatory Commission, April 3, 2019
2. Klamath River Renewal Project, Estimate Review, 2nd Read Out, March 14, 2019, KRRC
3. KRRC Budget Implementation Estimate – Full Demolition, DRAFT 2/25/2019
4. KRRC Cost Estimate – Full Removal (Draft Construction Extract Only), June 2018 & February 2019
5. Klamath River Renewal Project 2019 Construction Schedule, CONFIDENTIAL DRAFT, 12-Mar-19 11:26 (13 pages)
6. Draft Agreement informal meeting agenda and presentation information, Olivia email, March 22, 2019
7. KRRC Cost Estimate – Full Removal (Draft Construction), June 2018 & February 2019
8. Review of Aon's Preliminary Risk and Insurance Recommendations, May 2, 2019
9. Klamath River Renewal Corporation, Supporting Information – Model Flows Subject to Refinement and Change, Aon, May 2, 2019
10. KRRC Insurance Summary – Confidential – For use by BOC Only
11. Proposed Liability Protection Program of Klamath River Renewal Corporation, KRRC, Draft – June 3, 2019
12. Liability Transfer Corporation, Klamath Hydroelectric Settlement Agreement, Presentation to: Board of Consultants, RES, June 6, 2019
13. Risk and Liability Transfer Plan, RES, June 6, 2019
14. Appendix B Risk Assessment Summary, Stantec, June 6, 2019
15. Review of RES' Liability Transfer Corporation (LTC) Approach, June 6, 2019
16. Executive Summary, RES LTC Draft Proposal, Klamath River Renewal Corporation, June 6, 2019

17. Proposed Liability Protection Program of Klamath River Renewal Corporation. Klamath River Renewal Corporation, June 6, 2019
18. Overview of Risk register and Risk Allocation Matrix, Klamath River Renewal Corporation, June 21, 2019
19. Definite Plan for the Lower Klamath Project, Appendix A - Draft Amended Risk Management Plan, Klamath River Renewal Corporation, July 2, 2019
20. Risk and Insurance Draft Due Diligence Report, Klamath River Renewal Project, Prepared for the Klamath River Renewal Corporation, AON, July 2, 2019
21. Klamath River Renewal Project, Board of Consultants Informal Meeting, Revised Cost Estimate Read-Out, Klamath River Renewal Corporation, July 9, 2019
22. RES Company Overview & Introduction, July 12, 2019
23. RES Estimated Mitigation Costs, July 12, 2019
24. Klamath River Renewal Corporation Organization Chart, Jul7 12, 2019
25. Project Agreement for Design, Construction, Demolition and Habitat Restoration Services in Connection with the Removal of the Lower Klamath River Dams, between the Klamath River Renewal Corporation and Kiewit Infrastructure West Co. (redacted), April 24, 2019
26. Appendices to the Project Agreement for Design, Construction, Demolition and Habitat Restoration Services in Connection with the Removal of the Lower Klamath River Dams, between the Klamath River Renewal Corporation and Kiewit Infrastructure West Co. (redacted), April 24, 2019
27. Draft Plan B Statement, Klamath River Renewal Corporation, July 12, 2019



July 29, 2019

DELIVERY VIA ELECTRONIC FILING

David E. Capka, P.E.
Office of Energy Projects
Director, Division of Dam Safety and Inspections (D2SI)
Federal Energy Regulatory Commission
888 First Street, N.E., Routing Code: PJ-13
Washington, D.C. 20426

**RE: Response to Independent Board of Consultants Supplemental Recommendations
FERC No. P-14803, NATDAM-OR00559, CA00323, CA00234, CA003251**

Dear Director Capka:

On November 28, 2018 the Lower Klamath Independent Board of Consultants ("BOC") issued its "Letter Report: Board of Consultants Mtg. No. 1 ("Report No.1"). After further review of the Klamath River Renewal Corporation's ("Renewal Corporation") response to the BOC's recommendations, on July 26, 2019, the BOC provided the Renewal Corporation with its "Letter Report: Supplement to Board of Consultants Mtg. No. 1" ("Supplemental Report no. 1"). The Supplemental Report no. 1 contains additional recommendations to which the Renewal Corporation now responds.¹ The Renewal Corporation appreciates the BOC's hard work and thoughtful responses to the questions that FERC asked the BOC to review. In response to these additional recommendations, KRRC submits the following plan and schedule to FERC for its review and approval.

Recommendation 1: The BOC recommends that the contingency be re-assessed once the final GMP is identified, LTC terms, conditions and costs are established, and assignment/mitigation strategies for the remaining risks are addressed.

Response: The Renewal Corporation accepts this recommendation. The GMP will be established in February of 2020 and included in an amendment to the Project Agreement. On or before this date, the Renewal Corporation anticipates that it will have negotiated a definitive agreement with RES as surety for long-term management of restoration and mitigation measures,

¹ This response to the BOC's Supplemental Report no. 1 is solely and exclusively attributable to the Renewal Corporation. PacifiCorp has cooperated with the Renewal Corporation and BOC to allow the BOC's work to be performed and completed in a thorough and timely manner. Except as may otherwise be expressly provided by PacifiCorp, all statements in this response are based on facts and information that are known to the Renewal Corporation and are not attributable to PacifiCorp or any other party.

David E. Capka, P.E.
 July 29, 2019
 Page 2

and as a specialty corporate indemnitor, fulfilling its obligations under KHSA Appendix L to provide a specialty corporate indemnitor covering such risks. The Project Cost estimate and resulting contingency will be updated at that time. The Renewal Corporation will provide notice to the FERC and the BOC when these events have occurred.

Recommendation 2: The BOC recommends that the BOC reviews future iterations of the Project Insurance Program and PDB contract insurance requirements.

Response: The Renewal Corporation accepts this recommendation. The Renewal Corporation will work closely with Kiewit to refine the insurance program described in the Amended Risk Management Plan and will provide the BOC with updates should the recommendations stated in the plan change. The BOC will have an opportunity to review future iterations of the insurance plan. The final insurance plan will be reflected and updated (as necessary) when the Project Agreement is amended to incorporate the GMP. The Renewal Corporation will provide notice to FERC and the BOC when it has all binding commitments for insurance, bonds, and indemnification consistent with the Amended Risk Management Plan in place.

Recommendation 3: The BOC recommends that the Risk Register be updated monthly.

Response: The Renewal Corporation accepts this recommendation. The Renewal Corporation will update the risk register on a monthly basis. The Renewal Corporation will provide FERC and the BOC with updates of the Risk Register on a quarterly basis, or more frequently if requested.

Recommendation 4: The BOC recommends Renewal Corporation continue to work with PacifiCorp and the States to define the scope, level and term of indemnification that is currently set forth in the KHSA Appendix L.

Response: The Renewal Corporation accepts this recommendation. The Renewal Corporation will continue to work with PacifiCorp and the States to satisfy the conditions to acceptance of the transfer established by KHSA section 7.1.4, including but not limited to the requirements of KHSA Appendix L. The Renewal Corporation will provide notice to FERC and the BOC when it has satisfied the conditions of KHSA section 7.1.4.

Recommendation 5: The BOC recommends that further refining of "Plan B" continue.

Response: The Renewal Corporation accepts this recommendation. The Renewal Corporation will continue to work with PacifiCorp and the States to further refine Plan B.

The first milestone for such refinement is when the Renewal Corporation has established the GMP and LTC terms. At this point, should there be need for additional funding, the Renewal Corporation, in partnership with the states of California, Oregon and PacifiCorp, will evaluate value-engineering opportunities to reduce costs and risks that could arise after construction

David E. Capka, P.E.
July 29, 2019
Page 3

begins. The Parties may also decide at this time to pursue additional funding sources in furtherance of their obligation to do so pursuant to Section 7.3.8.B of the KHSA.

The second milestone at which the Renewal Corporation would refine Plan B (if necessary) is when all permitting conditions are known or can be anticipated with reasonable certainty. Should there be need for additional funding identified at this time, the Parties will again evaluate any further means to reduce cost or development risk. By way of example only, the Parties may consider the potential risks and benefits of pursuing the Partial Removal Alternative (as described in the Definite Plan for purposes of environmental review) in lieu of the current proposal, and then take such steps as might be required to pursue this alternative.

If, notwithstanding the Renewal Corporation's efforts to reduce cost and development risk, the Parties were to determine that additional funding is needed prior to acceptance of the license transfer, then Parties would respond by identifying potential partnerships to supplement funds in furtherance of their obligations to do so pursuant to Section 7.3.8.B of the KHSA. These additional funding sources, and commitments from such sources, would be incorporated in Plan B. As the BOC notes, there is broad support in the state governments for the completion of the project.

These refinements, should they be needed, will be in place before the Renewal Corporation may accept license transfer. The States and PacifiCorp must each be "assured that sufficient funding is available to carry out Facilities Removal," and that "their respective risks associated with Facilities Removal have been sufficiently mitigated consistent with [KHSA] Appendix L. This is required by Section 7.1.4 of the KHSA. Thus, before license transfer is effective, the States must assess and accept any risk that would fall under their purview as FERC jurisdiction over the project is relinquished under the terms and conditions of the surrender order.

Please do not hesitate to contact me if you need any additional information. Thank you.

Respectfully submitted,



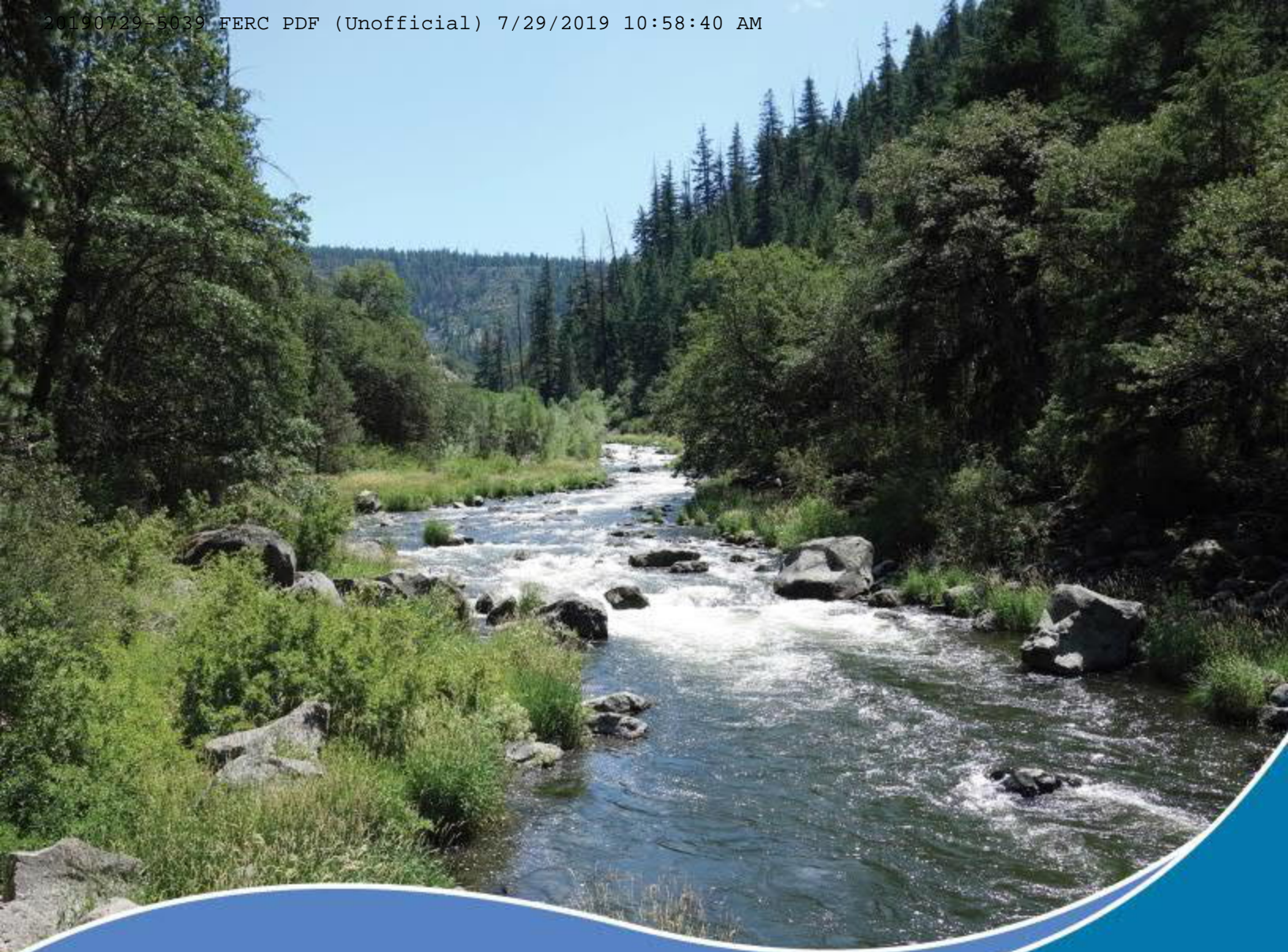
Laura Hazlett
Chief Operations Officer & Chief Financial Officer
Klamath River Renewal Corporation

Enclosures

cc: Douglas Johnson, (D2SI) Portland Regional Engineer
Dustin Till (PacifiCorp)
Service List (FERC No. 2082-062 and 14803-000)

Attachment B

AECOM, Amended Risk Management Plan (July 2019)



Definite Plan for the Lower Klamath Project

Appendix A – Amended Risk Management Plan

July 2019



Prepared for:

Klamath River Renewal Corporation

Prepared by:

KRRC Technical Representative:

AECOM Technical Services, Inc.
300 Lakeside Drive, Suite 400
Oakland, California 94612

CDM Smith
1755 Creekside Oaks Drive, Suite 200
Sacramento, California 95833

River Design Group
311 SW Jefferson Avenue
Corvallis, Oregon 97333

Aon
200 E. Randolph Street, 12th Floor
Chicago, Illinois 60601

Resource Environmental Solutions, LLC
6575 West Loop South, Suite 300
Bellaire, Texas 77401

List of Preparers:

Laura Hazlett (KRRC) – COO and CFO Klamath River Renewal Corporation

Richard Roos-Collins (Water Power Law) - Legal

Sam Burley (RES) – Legal and Risk Management

Carol Stark (Aon) – Insurance and Risk Management

Seth Gentzler, PE (AECOM) – Project Management and Hydraulic Engineer

Shannon Leonard, PE (AECOM) – Civil Engineer

John Roadifer, PE (AECOM) – Geotechnical Engineer

Tuna Tanriover (AECOM) – Quantitative Risk Assessor

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Acronyms and Abbreviations

BOC	Board of Consultants
CCIP	Contractor-Controlled Insurance Program
CEQA	California Environmental Quality Act
CPL	Contractor’s Pollution Liability
FERC	Federal Energy Regulatory Commission
GMP	Guaranteed Maximum Price
ID	Identification
KRRC	Klamath River Renewal Corporation
KHSA	Klamath Hydroelectric Settlement Agreement
LTC	Liability Transfer Corporation
NEPA	National Environmental Policy Act
OCIP	Owner-Controlled Insurance Program
PDB	Progressive Design-Builder
PFMA	Potential Failure Modes Analysis
PLL	Pollution Legal Liability
RES	Resource Environmental Solutions, LLC
USFWS	United States Fish and Wildlife Service

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Chapter 1: Plan Objectives and Background

1. PLAN OBJECTIVES AND BACKGROUND

1.1 Plan Objectives

The Klamath River Renewal Corporation's (KRRC) objective is to manage risks to assure performance as required by any license surrender order and other permits, and to further manage risks of property damages as required by the Klamath Hydroelectric Settlement Agreement (KHSA). This amended plan was developed in conjunction with the amended Estimate of Project Costs report (KRRC 2019), where cost impacts associated with all risks were categorized and quantified.

The implementation of any project comes with uncertainty and risk that can affect schedule, budget, and project performance. This is even more applicable to large, multi-disciplinary and high-profile projects. Successful implementation includes planning to identify and manage those uncertainties and risks. Section 7.2 of the KHSA, as amended, sets forth the essential elements of a risk management plan to be included in and implemented as part of the Definite Plan. These elements include the following:

- Insurance, performance bond, or similar measures as required by Appendix L to the KHSA;
- Accounting procedures that will result in the earliest practicable disclosure of any actual or foreseeable cost overrun;
- Appropriate mechanisms to modify or suspend performance of any task subject to such cost overrun; and
- Measures to reduce risks of cost overruns, delays, or other impediments to dam removal.

This plan addresses these requirements as follows:

- Section 2 summarizes KRRC's selected progressive design-build project delivery method and the process utilized to select the preferred Progressive Design-Builder (PDB), and finalize the Project Agreement
- Section 3 identifies the insurance, bonds and other surety arrangements to be secured by the KRRC in compliance with Appendix L to the KHSA
- Section 4 includes a design and construction risk register and measures to reduce risks of cost overruns, delays, or other impediments to dam removal

The objective of this Risk Management Plan is to provide the tools and processes to identify and quantify the design and construction risks that are particular to the Lower Klamath Project (Project), assign those risks to the appropriate party, develop design and construction risk management strategies to reduce or eliminate the risk, and to manage and re-evaluate the risks as the KRRC progresses through the project lifecycle.

1.2 Changes Since Previous Plan

Modifications to this Risk Management Plan fall into several categories and are summarized below:

1. **Phase of Project:** Several risks were associated with a phase of the project that is now complete (e.g. procurement), and those risk have therefore been retired. If any of these risks impacted cost or schedule, that is now incorporated into the latest estimate of project costs and implementation schedule.
2. **Latest Project Understanding:** Over the past year, risk management strategies have been implemented, project details have been refined, and informal agency consultations have allowed a more comprehensive understanding for some of the included risks, and the register and associated data now incorporates this latest understanding.
3. **Input from Insurance and Liability Transfer Entities:** The KRRC has contracted with companies in the past year to obtain refined input into the question of project insurance and liability transfer. This input is summarized in the sections herein, and in many cases has informed the risk register and associated data.
4. **Input from Progressive Design-Build:** The KRRC has contracted with a progressive design-build contractor to complete the final design and construction for the project. Input from the design-builder in many cases has informed the risk register and associated data.

1.3 Project Background & Overview

The proposed Project is described in Sections 4 through 7 of the Definite Plan, and generally includes the decommissioning and full removal of four dam developments (Iron Gate, Copco No. 1 and No. 2, and J.C. Boyle) on the Klamath River approximately 200 miles from the Pacific Ocean in the states of Oregon and California by the KRRC. Figure 1.3-1 provides an overview of the Klamath River watershed and the locations of the four dams. The Project objectives are to restore free-flowing river conditions and volitional fish passage by the complete removal of dams, power generation facilities, water intake structures, canals, pipelines, and ancillary buildings. The Definite Plan also describes a partial removal alternative which is presented for purposes of environmental review. Under the partial removal alternative, the objectives of a free-flowing river conditions and volitional fish passage would be achieved, but portions of each dam would remain in place, along with ancillary buildings and structures such as powerhouses, foundations, and pipes.

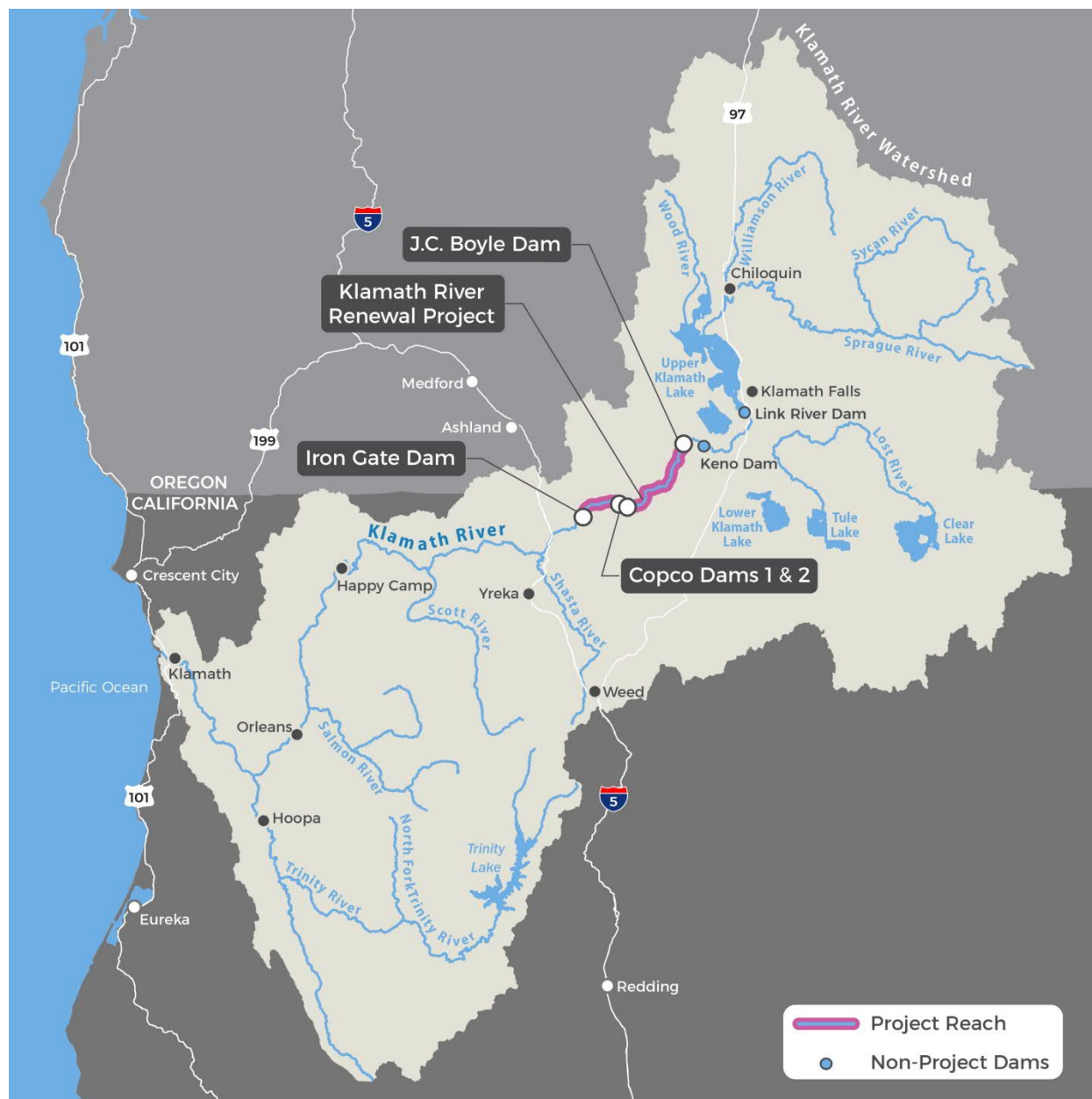


Figure 1.3-1 Klamath River Watershed and Facilities Locations

Prior to removal of the dams and hydropower facilities, the KRRC will drawdown the water surface elevation in each reservoir as low as possible to facilitate accumulated sediment evacuation and to create a dry work area for facility removal activities. To meet drawdown timing and duration, specific infrastructure modifications are required at Iron Gate and Copco No. 1 dams in advance of drawdown. In general, drawdown will begin on January 1 of the drawdown year, and will extend through March 15 of the same year.

After drawdown is accomplished, dam and hydropower facility removal will begin, and the KRRC will stabilize remaining reservoir sediments to the extent feasible. Full reservoir area restoration will begin after drawdown, and extend throughout the year, and possibly into the subsequent year. Vegetation establishment could extend several years.

Other key project components include measures to address aquatic and terrestrial resources, road and bridge improvements, relocation of the City of Yreka's pipeline across Iron Gate Reservoir and associated diversion facility improvements, flood improvements downstream, as well as demolition of various recreation facilities adjacent to the reservoirs.

1.4 Project Funding and Plan B

The financial capacity of KRRC is an integrated package consisting of: (1) \$450 million in committed funding; (2) use of PDB contract to assure a single point of accountability; (3) engagement of best-in-industry project team; (3) requirement of a Guaranteed Maximum Price (GMP) before KRRC's acceptance of license transfer; (4) insurance, bond, and indemnity program that provides many hundreds of millions of dollars of risk protection; and (5) a project cost estimate at the industry standard P(80) level. As discussed below, the cash reserve will likely increase as the project proceeds, as current risks based on uncertainties are retired. Further, the States and PacifiCorp must agree to the sufficiency of the financial capacity before license transfer.

The KRRC has the financial capacity to move forward with Project implementation, and to do so from a position of strength. However, like any licensee that is responsible to meet its license obligations, unforeseen and remote circumstances theoretically could arise that would require the KRRC, if the Commission approves license transfer, to raise additional funds. Facing these circumstances, how would the KRRC respond?

The KRRC would evaluate value engineering opportunities.¹ This is a best practice in any complex construction project. Prior to construction, the Kiewit team will identify such opportunities to reduce costs and risks that could arise after construction begins, consistent with the project purpose and any permit terms for protection of environmental quality and public interest. The KRRC will examine these opportunities on an iterative basis as construction proceeds. The Renewal Corporation has received authorization for such adjustments in Oregon's water quality certification and will seek such authorization in other permits.²

¹ KHSa section 7.2.1.A(5).

² Oregon Department of Environmental Quality ("ODEQ"), "Clean Water Act Section 401 Certification for the License Surrender and Removal of the Lower Klamath Project" (September 7, 2018), Condition 7 at 6 (authorizing a "Remaining Facilities and Operations Plan"). See also California State Water Resources Control Board ("SWRCB"), "Draft Water Quality Certification" (September 23, 2018), Condition 6 at 28 ("Remaining Facilities"). Of course, the Renewal Corporation will expect to receive the Commission's approval of any such adjustment as specified in a license surrender order.



Additionally, under KHSA sections 7.2.1.A(5) and 8.7, parties will meet-and-confer to address and resolve any such circumstances that could arise after license transfer or surrender (in this case, after construction begins). Further, while its financial capacity of \$450 million is created and limited by the state cost cap, the KRRC has a duty to seek, and the other parties have a duty to support, third-party funding as appropriate to supplement that capacity.³ Specifically, the parties are contractually committed to “identify potential partnerships to supplement funds generated pursuant to this Settlement.”⁴

In sum, the KRRC reasonably expects to secure additional funds if necessary, taking into consideration the strength of the project team, and the active support of the States and other parties for completion of Project implementation as an essential step in restoration of basin ecosystem. Finally, the KRRC may continue accruing interest on the customer funds in excess of the \$28 million assumed in the cost cap.⁵

³ KHSA section 7.3.8.B; see June 24, 2017 AIR Response, item 10; December 4, 2017 AIR Response, item 3; June 28, 2018 AIR Response, Item 3(c).

⁴ KHSA section 7.3.8.B.

⁵ KHSA section 7.3.8.A.

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Chapter 2: Project Delivery Method

2. PROJECT DELIVERY METHOD

2.1 Overview of Progressive Design-Build Delivery Method

KRRC executed a PDB contract (the Project Agreement) in April 2019 with Kiewit Infrastructure West Co. (Kiewit). Kiewit is currently developing their detailed design packages. The KRRC and Kiewit intend to negotiate and agree to a GMP by February 2020 and subsequently execute the Project Implementation Contract Amendment to begin physical work, following FERC approval. By the time the GMP is negotiated, the circumstances that most often lead to cost overruns for which the owner remains responsible - unknown site conditions – while not eliminated, will have been significantly narrowed even beyond where it is today. As a result, final pricing will be determined prior to KRRC's acceptance of the project license.

The Project Agreement stipulates that the Kiewit team will complete both design and deconstruction on an integrated basis and will assure that, absent contractually defined uncontrollable circumstances, the work will be performed with minimal cost overruns. Thus, any project costs incurred within the defined work scope that are in excess of the GMP will be the responsibility of Kiewit, not KRRC. In addition, daily liquidated damages will be payable to KRRC for unexcused delays, and KRRC will not be responsible for any cost overruns except those caused by predetermined risks that are outside of Kiewit's ability to reasonably manage and control. A qualified construction-management entity will oversee the performance of the dam decommissioning and removal work under the Project Agreement.

This integrated project-delivery approach will be particularly useful for the Project because it will mitigate several elements of project-completion risk, in addition to mitigating the general price risk inherent in all construction projects. Integrated project delivery involves a mostly self-selected team (in this case led by Kiewit) of highly qualified firms whose business interests are aligned, thus decreasing the risk of disputes among team members. By addressing multiple aspects of the work in a single contract, integrated project delivery also has the key advantage of creating one point of accountability for the Project, allowing KRRC to bring a claim against a single entity for any flawed work. Additional benefits of integrated project delivery include accelerated project delivery and improved project quality.

2.2 Risk Transfer to Design-Builder

In general, the selected delivery method makes Kiewit responsible for correcting any errors in design and/or construction. Specific risks transferred to Kiewit under the project agreement include the risk of errors or omissions in their work products; unexcused delays; unexpected work that Kiewit needs to perform to carry out the basic work scope; unavailability of materials; non-compliance with the decommissioning plan; adherence to applicable law and governmental approvals; intellectual property infringement; and the risk of exacerbating any existing known hazardous substances or other pollution conditions. KRRC will retain the risk of any delays caused by (i) uncontrollable circumstances (such as changes in law, force majeure, the discovery of cultural relics, and dam conditions unknown at the time the contract is entered into); (ii) any work scope changes directed by KRRC; and (iii) the inaccuracy of any reliance document information

provided by KRRC or its subcontractors to Kiewit that formed the basis of the decommissioning plan and that could not reasonably be verified by Kiewit.

The risk register included in Attachment A provides additional clarity as to who owns what risk. Depending on the risk, the associated liability may be covered by Kiewit, insurance (see Section 3.2), the Specialty Corporate Indemnitor (see Section 3.4), the Local Impact Mitigation Fund (see Section 3.5) or may be retained by KRRC (see Section 2.8).

2.3 Contractor Selection Process

Kiewit was selected as the PDB using two-stage qualifications-based-selection (QBS) process. The first stage involved a request for qualifications (RFQ), and the second stage involved a request for proposals (RFP). QBS standards during the RFQ included:

- Past performance of similar projects in scope, magnitude (complexity and size, such as but not limited to performance of work at multiple locations at the same time), and type (waterway work; environmentally regulated, etc.)
- Sufficient financial strength, including basic financial metrics such as corporate net worth and profitability
- Experience with federally regulated permitting processes
- Longevity in industry

KRRC then invited three pre-qualified firms to make project submittals on a competitive proposal basis in response to an RFP issued by KRRC. KRRC set forth the requirements for making project proposals in the RFP and based them on the terms of the Definite Plan. KRRC selected the proposer submitting the best value proposal (best overall price and technical merit) to perform the work. The states of California and Oregon (States) and PacifiCorp were given the opportunity to review and comment on the selection process and resulting project agreement to assure that their interests were protected and that the project work would be properly carried out.

2.4 Performance Security and Indemnities

Sections 3.3 and 3.4 address bonds and the special corporate indemnitor in further detail. Kiewit will furnish a conventional performance bond from a financially sound surety company, further assuring KRRC that Kiewit will perform the project agreement as required. In addition, Kiewit is providing a parent company guaranty securing performance of the project agreement. KRRC retains the right to call upon any such guaranty or to draw on any such letter of credit if Kiewit fails to perform and use the proceeds to pay any non-performance damages it is owed under the project agreement. Kiewit will also indemnify KRRC for any loss or expense incurred by third parties resulting from an unexcused breach of the contract or any

negligence or willful misconduct by Kiewit. Each party, as is conventional in contracts of this nature, will waive the right to make a claim for punitive or consequential damages.

Kiewit has a stellar track record with large-scale and technically challenging civil projects, including most recently, the emergency reconstruction of the Oroville Dam spillway, which involved removal and repair of both the main flood control and emergency spillways in less than 18 months as well as extensive debris and sediment removal, development of access roads, and other work. Kiewit has also undertaken projects such as the Folsom Dam Spillway Construction (Phases II & IV), East Toba and Montrose Hydroelectric Design-Build and the Kwalsa and Upper Stave Hydroelectric Design-Build. Kiewit brings relevant experience working with the states of California and Oregon, PacifiCorp as well as other business relationships that will greatly enhance the KRRC project team.

2.5 Construction Management

AECOM will provide oversight of Kiewit, including detailed design review and full construction-management services throughout the duration of the project agreement. The owner's representative will participate in Kiewit's design development meetings and will review all final design documents developed by Kiewit. KRRC anticipates detailed reviews at the 30%, 60%, 90% and 100% completion levels, as well as review of final Construction Documents (plans, specifications, design report and cost estimate). The construction manager will be involved in recurring activities such as progress meetings, pay estimates, weekly progress reporting, and schedule updates. These recurring activities are the basic machinery for transferring information, making decisions, and identifying potential risks during construction. The construction manager will meet weekly with Kiewit to review the status of completed work onsite. Kiewit will prepare and KRRC will review and approve a written safety plan that Kiewit is required to follow, thus providing a uniform approach toward project safety.

2.6 Post-Construction

While certain project construction risks will remain the responsibility of Kiewit through the Project Agreement warranty and establishment requirements, many of the longer-term post-construction risks will be managed by the Specialty Corporate Indemnitor, per the agreement discussed in Section 3.4. In general, the Specialty Corporate Indemnitor will indemnify the KRRC, States, and PacifiCorp against all harm associated with post-construction impacts to natural resources, in addition to assuring compliance with all post-construction permit requirements related to natural resources. KRRC will continue to consult post-construction as provided in the KHSa.

2.7 Independent Board of Consultants

In accordance with the FERC letter dated May 22, 2018 regarding approval of the Board of Consultants (BOC), the BOC will review project documents as well as dam removal schedules, plans and specifications, staging sequence, and supporting engineering studies as directed. KRRC will consider any recommendations with respect to the various design submittals.

2.8 Retained Risk and Project Contingency

If accurate information is supplied to the project contractor, no scope changes are requested by KRRC after contract execution, and no uncontrollable circumstances occur, the Kiewit will be obligated to complete the Project for the GMP (which is based on competitively bid elements of the construction work) established at the GMP Amendment signing. On the other hand, if any of the risks retained by KRRC occur, KRRC as the project owner will bear the costs. Accordingly, the project budget will include an appropriate contingency reserve for any such risks, and KRRC will use insurance and other mechanisms such as contingency and reserve funds to manage these risks. In addition, the KRRC will set up a Local Impact Mitigation Fund to manage and bear the costs of certain retained risks as defined in Section 3.5.

Section 2.6 of the amended Appendix P (Estimate of Project Costs; July 2019) of the Definite Plan (KRRC 2019) discusses the calculated Project contingency, based on updated construction costs and Project risks. Contingency was analyzed using a Monte Carlo analysis on any retained risks that were not covered by insurance and were not transferred to Kiewit, Specialty Corporate Indemnitor, or managed through the Local Impact Mitigation Fund. The current Project implementation estimate can accommodate a P80 Contingency, in addition to an approximately \$18 million reserve below the current funding limits.

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Chapter 3: Insurance, Bonds and Other Surety Arrangements

3. INSURANCE, BONDS AND OTHER SURETY ARRANGEMENTS

3.1 Overview

The KRRC will insure against all insurable risks, at a level of coverage sufficient to cover the risks. This section of the Risk Management Plan identifies the insurance, bonds and other surety arrangements that KRRC will maintain in fulfillment of its obligations under Appendix L of the KHSa and prudent business practices. KRRC developed this plan with specialized guidance and advice from Aon and Resource Environmental Solutions, LLC. (RES).

Aon is a global professional services firm and its Commercial Risk Solutions' division provides risk advisory, risk transfer and structured solutions to reduce the client's total cost of risk⁶. Working with Aon as its insurance and risk advisor, KRRC has established and will maintain a robust insurance program to minimize first-party and third-party risks associated with the Project. The insurance program is designed to protect all the key stakeholders and KRRC.

RES is the nation's only fully scaled operating company providing comprehensive ecological restoration and water resource solutions, as well as risk management and corporate indemnification solutions⁷. Working with RES as its corporate indemnitor advisor, KRRC has developed a liability transfer program that will allow them to fulfill their unique obligations under Appendix L of the KHSa.

3.2 Insurance

3.2.1 Overview

The KRRC received a Risk and Insurance Due Diligence Report from Aon in June 2019, which is attached to this plan as Attachment B. The insurance recommendations included herein come from this Aon report.

KRRC will maintain two insurance programs, each of which will be designed to address different insurance needs and requirements throughout the evolution of the Project. Prior to the commencement of dam removal activities, the insurance currently maintained by KRRC is best viewed as a corporate insurance program that covers KRRC's general business risks (discussed below as the Corporate Insurance Program).

⁶ Additional information regarding this firm may be found at <https://www.aon.com>

⁷ Additional information regarding this firm may be found at <https://www.res.us>

The insurance that will be maintained for final design and construction (Kiewit tasks) will fully comply with the KHSa and Appendix L to the KHSa but will be procured by KRRC and/or Kiewit, as summarized below.

3.2.2 Timing

KRRC's corporate insurance program is in place and is described below.

Kiewit insurances are also summarized below. The actual insurance policies will be put in place in coordination with the beginning of the design or construction activities to which they relate, including certain preliminary site work. For example, insurance for design work was in place at the time the Project Agreement became effective. Insurance for the actual construction may not be in place until construction is ready to commence.

3.2.3 Corporate Insurance Program

KRRC's corporate program includes the following coverages summarized in Table 3.2-1:

Table 3.2-1 KRRC Current Corporate Insurance Summary

Type of Coverage	Effective Date	Limits	Carrier
General Liability	6/30/19 – 6/30/20	\$1M occ/\$1M prod comp ops/\$2M general policy agg	RSUI Indemnity
Auto Liability – Hired & Non-Owned	6/30/19 – 6/30/20	\$1M CSL	CNA
Workers Compensation and Employer's Liability	6/30/19 – 6/30/20	Statutory and \$1M	CNA
Property	6/30/19 – 6/30/20	Various but includes limits for off-site coverage	CNA
D&O/E&O	6/30/19 – 6/30/20	\$5M	PGU
D&O/E&O	6/30/19 – 6/30/20	\$5M	Validus Specialty

3.2.4 Project Insurance Program

In structuring the Project insurance program for KRRC, Aon focused on two key factors: (1) protection of the Project and the Stakeholders and (2) delivering the best value. With those guiding principles in place, Aon recommended several modifications to previously proposed insurance programs. The first change is to have Kiewit procure the general liability and workers compensation under a contractor-controlled insurance program ("CCIP"). The reasons for switching from an owner-controlled insurance program ("OCIP") to a CCIP include the following:

1. the fact that KRRC is a special purpose entity with no long-term operational history whereas Kiewit is a 135-year-old construction and engineering company with a proven track record of success;
2. Kiewit's purchasing power in the insurance market is greater than that of KRRC, which means it can obtain more competitive pricing and terms and conditions; and
3. KRRC will eventually sunset after license surrender is effective, whereas Kiewit's operations will continue. This will allow Kiewit to manage any long-tail claims associated with the Project.

The second modification to the previously proposed insurance program is that Kiewit is being permitted to use its corporate professional liability policy. Aon has reviewed the policy and it complies with all the requirements that were set forth in the current Aon specifications. This saves the Project over \$2M in costs given that a project specific policy does not need to be purchased.

The last modification was to have the contractor's pollution liability ("CPL") and pollution legal liability ("PLL") with linked limits and written with the same insurer. The reason that this is important is that claims often trigger coverage under both policies, and having one carrier, whose limits are linked, avoids coverage disputes. Aon has also recommended, based upon its actuarial analysis and industry expertise, to purchase a limit of \$50M vs. two \$100M policies to avoid paying for coverage that will likely not be triggered.

Table 3.2-2 summarizes the proposed KRRC Project insurance program:

Table 3.2-2 KRRC Recommended Project Insurance Program

Type of Coverage	Effective Date	Limits	Carrier
Builder's Risk	Upon start of construction activities	Probable Maximum Loss	Kiewit
CCIP for general liability, workers compensation/employer's liability and excess liability	Upon start of construction activities	\$200M for the GL and Excess Statutory for WC and \$1M for employer's liability	Kiewit
Auto Liability	Upon start of construction activities	\$5M CSL	Kiewit's corporate policy
CPL/PLL	Upon start of construction activities	\$50M linked limits	KRRC
Professional Liability	Upon start of construction design	\$25M	Kiewit's corporate policy
Aircraft and Watercraft Liability	If aircraft and watercraft are used	\$5M for watercraft, aircraft and drones over 10 kg \$10M for helicopters	Kiewit's corporate policy

3.2.5 Independent Board of Consultants

The BOC have reviewed the KRRC suggested Project Insurance Program list of insurance policies and insured limits. The BOC includes a member or members with expertise in insurance coverage and bonding for large and complex civil construction projects.

3.2.6 Ongoing Evaluation

KRRC and Aon will review all policies of insurance on a not-less-than-annual basis to make sure that they are sufficient and cost effective relative to other insurance products and risk management tools as may subsequently become available. If certain risks evolve, the insurance will be modified, as appropriate.

3.3 Bonds

3.3.1 Requirements and Timing

Appendix L to the Amended KHSa addresses bonding requirements. Bond requirements include bid bonds, performance bonds (in an amount equivalent to original contract value) and payment bonds (in an amount equivalent to original contract value). These bonds will be secured in connection with awarding the Project Agreement to undertake decommissioning activities. Kiewit will maintain these bonds in addition to a parent company guaranty. In the Project Agreement, the KRRC requires that all bonds be obtained from financially sound surety companies. Bonds do not cover uncontrollable circumstances.

3.3.2 Performance Bond

The performance bond securing the contractor's performance under the Project Agreement will be in the full amount of the dam removal contract. The contractor's surety company issuing the bond will determine the form of bond; however, AIA Form 312 is the predominant form in use at this time. To the extent alternate forms are used, they are expected to be substantively similar.

3.3.3 Independent Board of Consultants

The BOC have reviewed the bonding requirements in the Project Agreement. Because the performance bond backstops the dam removal contractor's performance, it cannot be issued until the dam removal construction contract is in place and will be issued at that time.

3.3.4 Ongoing Evaluation

As with insurance, KRRC and Aon will periodically review the amount and form of bonds (and/or parent company guaranty or standby letter of credit) to make sure that they are sufficient and cost effective relative to other products and risk management tools as may subsequently become available.

3.4 Specialty Corporate Indemnitor

3.4.1 Overview

Appendix L to the KHSA requires KRRC to identify and contract with a specialty corporate indemnitor (a Liability Transfer Corporation, or LTC) to protect the States, as well as PacifiCorp from potential liabilities that are not covered contractually by insurance or other risk mitigation strategies (e.g. PDB Agreement, Local Impact Mitigation Fund, etc.). KRRC will fulfill this requirement in consultation with the States and PacifiCorp and in connection with the design and implementation of the insurance and bonding program discussed above. KRRC will use this risk management tool to address certain risks not covered by the proposed insurance program. Parameters established by the KHSA to assess the sufficiency of a corporate indemnitor include:

- Appropriate capitalization (as agreed to by the States and PacifiCorp)
- Performance in projects of similar scope, magnitude, complexity and type
- Experience with federally regulated permitting processes
- Longevity in the industry

The specialty corporate indemnitor will be structured contractually, through third-party indemnities or potentially with additional special insurance products. As described in more detail below, the specialty corporate indemnitor will perform certain portions of the Project and will assume responsibility for various project risks, both during project execution and post-project (including the fulfillment of any long-term mitigation obligations established by the Definite Plan or regulatory approvals).

The KRRC received a liability transfer plan from RES and will implement the proposed structure for addressing risks that occur after the dams are removed and are not otherwise covered by insurance or other contractual indemnification. These risks include (1) certain natural resources risks, (2) certain risks associated with cultural resources and (3) risks related to property damages arising without fault of Kiewit.

For the first two categories of risk listed above (natural resources and cultural resources), the current intent of the parties is that RES will serve as the LTC and will indemnify the KRRC, PacifiCorp and the States against harm associated with those risks for a fee, through an indemnification agreement. This agreement would also require RES, as LTC, to complete all activities (monitoring, maintenance, reporting, and responding to unforeseen conditions) associated with natural resource-related permitting, California

Environmental Quality Act (CEQA) and National Environmental Protection Act (NEPA) requirements, as well as cultural resource inadvertent discoveries.

“Natural resource-related permitting” includes all requirements included in natural resource-focused permits, including, but not limited to, the United States Army Corps of Engineers Clean Water Act Section 404 permit, the Endangered Species Act Section 7 Consultation (Biological Opinion), the Wild and Scenic Rivers Act, Section 7 (Consistency Determination), the Oregon Clean Water Act Section 401 (Water Quality Determination), the Oregon Endangered Species Act Incidental Take Permit, the Oregon Department of Fish and Wildlife Fish Passage Approval, the California Clean Water Act Section 401 (Water Quality Certification), the California Department of Fish and Wildlife Section 1602, and the California Endangered Species Act Take Permit. In addition, all natural resource-related requirements in any federal, state or local permit or Memorandum of Understanding, will be the responsibility of RES, who will indemnify the KRRC, PacifiCorp and the States against any damages associated with related compliance.

For the third category of risk above (property damages arising without fault of Kiewit), a RES entity or, potentially, the KRRC will implement a Local Impact Mitigation Fund to proactively address mitigation and associated risks. The Local Impact Mitigation Fund is discussed in more detail below in Section 3.5.

3.4.2 Timing

KRRC expects to fulfill this requirement concurrently with the execution of the GMP Amendment for dam removal construction.

3.4.3 Independent Board of Consultants

The BOC have reviewed the KRRC identified risks that will be transferred to a specialty corporate indemnitor. KRRC’s final decision on how best to use this risk management tool is, however, subject to the approval of the States and PacifiCorp, in consultation with the Federal Parties, whose approval may not be unreasonably withheld.

3.5 Local Impact Mitigation Fund

3.5.1 Overview

The Local Impact Mitigation Fund would be a pool of capital independently administered by a third party following a methodology for compensating parties impacted by the removal of the dams, and covering funds for defense of claims, as necessary. Based on discussions with persons who have successfully administered such funds, RES believes a fund would be a cost-effective way to address potential litigation, and for this Project, could address all the property impacts, while containing a reserve for litigation.

RES identified five key areas of property damage where insurance or indemnification (through the specialty corporate indemnitor) was not available, and where a Local Impact Mitigation Fund would be a cost-effective

solution to manage associated risks: (1) the potential for increased flooding, (2) impacts associated with the release of sediment, (3) the potential for instability around reservoir rims, (4) impacts to groundwater wells and (5) the potential for diminution in land value and similar claims.

3.5.2 Timing

KRRC expects to develop the fund and begin management of the fund within the next 6 to 12 months, to allow sufficient time to complete associated outreach, negotiation, detailed design (where applicable) and execution of agreements prior to the start of construction.

3.5.3 Independent Board of Consultants

The BOC have reviewed the KRRC identified risks that will be addressed through the Local Impact Mitigation Fund and have provided their initial comments. KRRC's final decision on how best to use this risk management tool is, however, subject to the approval of the States and PacifiCorp, in consultation with the Federal Parties, whose approval may not be unreasonably withheld.

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Chapter 4: Risk Register

4. RISK REGISTER

4.1 Overview

This section identifies planning, design and construction risks (in the form of a risk register) and estimates their likelihood and consequences of occurrence, ranking those risks to determine which pose the greatest risk to the Project, and developing risk management strategies for the highest-ranking risks. Input from Aon (on insurance) and RES (for Liability Transfer) have been considered in development of certain information contained within the risk register (e.g. probability, impact), and were used to populate the risk “owner” and “contingency carrier” columns, where appropriate.

The risk register will be a living document prepared with the participation of the full project team (KRRC, consultants, stakeholders, etc.) eventually including Kiewit. This plan is based on the Project as it has been described and developed in the Federal Energy Regulatory Commission (FERC) Definite Plan for Decommissioning (KRRC 2018) (Definite Plan).

The plan will be updated periodically by the full project team to add newly identified risks and adjust risks that have been previously identified either upward or downward.

The risk register identifies planning, design and construction risks as they are recognized throughout the duration of the Project, and the KRRC is prepared to address all identified risks in the risk register in the course of implementing a license surrender order. As described in more detail below, the KRRC has identified an owner for each risk and is accounting for costs associated with each risk through one of the surety arrangements summarized in Section 3, or through project contingency reserves, which have been calculated using a Monte Carlo analysis and are documented in the amended Estimate of Project Costs report (KRRC 2019).

KRRC has assigned each identified risk its own unique Risk identification (ID) number and categorized into one of eleven risk categories, which are described in further detail in Section 4.3. Risk ID numbers are not necessarily sequential, since they were derived from an initial broader list that may not have all moved forward. The register also includes specific information and data associated with each risk as follows:

- A description of the risk
- The root cause(s) of the risk
- The phase of the project when the risk would be actualized
- The likelihood (probability) that the risk will occur
- A rating of the impact or consequence if the risk event occurred

- A risk score (rating) by combining the likelihood and related consequence
- The selected risk management strategy
- A summary of risk management measures
- The assigned owner of the risk
- The primary and secondary carriers of risk costs
- The risk status

As the risk register is further developed and implemented, responsible parties from the KRRC and Kiewit will be assigned to further define and implement risk management measures identified for each risk. As risks are avoided or mitigated, or as new relevant information is obtained, risk category, score and rating will be updated to reflect the latest information.

Since the risk register will evolve and KRRC will update it throughout the life of the Project, ongoing assessment and reporting will be necessary. Reporting and other continuing risk management activities are discussed in Section 4.8.

4.2 Related Risk Guidelines

FERC has developed interim guidelines for risk-informed decision making (FERC 2016) and the United States Department of Homeland Security has published a resource for estimating economic consequences for dam failure scenarios (DHS 2011). While both references are specific to dam facilities currently in operation (which will remain PacifiCorp's risk through completion of the Operations and Maintenance Agreement), the considerations are relevant when considering risks associated with dam removal. Both references, in addition to several dam failure case studies, were reviewed while identifying and estimating consequences associated with dam safety risks during the removal process. Dam safety risks specific to dam removal will be further developed through FERC's Potential Failure Modes Analysis (PFMA) process, and the risk register will be updated at that time, as appropriate.

A PFMA is a dam and project safety evaluation tool developed by FERC to be used in the Part 12, Subpart D, program of dam and safety evaluations for FERC regulated projects. For dams that will be undergoing major modifications, remedial work or are scheduled to have substantial changes which can include removal, FERC's Engineering Guidelines indicate that Supplemental PFMA's shall be conducted to evaluate the recommended dam removal plan prior to de-construction. The PFMA process typically includes the following Steps, which will be completed for this Project prior to GMP finalization:

1. Collection of Background Data (complete)
2. Selection of the PFMA Core Team

3. Site Visit and Review
4. Comprehensive Data Review
5. PFMA Session
6. Evaluation of Surveillance and Monitoring
7. Documentation

4.3 Risk Category

KRRC has categorized each risk into one of the following general categories:

1. Environmental & Permitting – These are design and construction risks primarily related to environmental, compliance and permitting aspects of the Project. Environmental aspects and associated risks could involve existing or future biological, cultural or other environmental conditions/species, potential construction related effects such as air quality or noise, or potential downstream environmental effects. Permitting includes process-related considerations, requirements associated with compliance and acquisition of all necessary regulatory permits.
2. Right-of-Way or Easements – Risks that primarily relate to acquiring access to other properties or construction within existing easements on the project site.
3. Procurement – Risks that relate to the negotiation of the GMP.
4. Design – These are risks primarily related to development of the project design and subsequent performance of associated Project features. Risks could involve performance failures as a result of incorrect assumptions or calculations, incomplete or inaccurate drawings and specifications, etc.
5. Field Conditions – Risks that primarily relate to field conditions that may occur or be discovered during construction.
6. Construction - Risks primarily related to actual construction of the Project including labor, equipment, material, existing conditions, subsurface conditions, site safety, etc. Construction related risks could involve Kiewit's quality of work or production, as well as health and safety.
7. Reservoir Drawdown – Risks primarily related to the drawdown operation prior to dam removal.
8. Contractor Performance – Risks associated with the performance or quality during construction.
9. Dams, Powerhouses, Reservoirs – Risks primarily associated with the site improvement or the facilities and their removal.

10. Yreka Water Supply Pipeline – Risks primarily associated with the construction of the relocated pipeline.
11. External Events – These are risks primarily related to events or conditions outside of the control of the Project, such as unforeseen site conditions, forces of nature (e.g. floods and wildfires), etc.

4.4 Phases

Each identified risk will exist during particular phases of the Project. The Project phases include the following:

1. Design: Design is the period during which the detailed and final design of the Project is performed by Kiewit. Activities during this phase include field investigations for final design, final design, permitting activities, and regulatory review and approval of the final design documents.
2. Construction: The period during which construction activities to implement the final design take place. Activities during the Construction Phase include mobilization, preparation of the site, pre-reservoir drawdown construction activities, other early construction activities, dam and appurtenances demolition activities, followed by site restoration.
3. Post-Construction: The period following dam removal and site restoration.

The risk register identifies the phase when each risk would be actualized. Risks associated with regulatory compliance will be mitigated throughout the required regulatory monitoring period.

4.5 Risk Score and Rating

The risk score and rating are a function of the probability of the risk occurring and the consequence if the risk were to occur. Probability of occurrence is broken into five different categories to provide sufficient ranges of likelihood, as listed below:

- Probability Score of 5: Risk has a 60% or greater probability of occurrence, meaning it is very likely to occur
- Probability Score of 4: Risk has a 40 to 59% probability of occurrence, meaning it is likely to occur
- Probability Score of 3: Risk has a 20 to 39% probability of occurrence, meaning it is less likely to occur
- Probability Score of 2: Risk has a 10 to 19% probability of occurrence, meaning it is unlikely to occur

- Probability Score of 1: Risk has a less than 10% probability of occurrence, meaning it is very unlikely to occur

Consequence of the risk occurring is also broken into five different categories to provide sufficient ranges for the consequences of impact. Since impacts for various risks can apply to one or more aspects, it can be difficult to quantify all risks using the same metric (e.g. cost increase in dollars, etc.). For that reason, engineering and management judgment is involved when assigning consequence of impact scores. A high level of coordination and collaboration among key project decision makers is necessary for assigning consequence of impact scores. Table 4.5-1 provides some general guidance on consequence of impact scores under relevant aspects.

The risk score is calculated by multiplying the probability of risk by the consequence of impact, and then categorizing or rating the risk as low, moderate, or high as shown on the risk score matrix in Table 4.5-2. As shown in the risk score matrix, any risk that has a consequence of impact score of 5 is categorized as a very high risk.

Table 4.5-1 Consequence of Impact Definition for Various Aspects

PRIMARY ASPECT	CONSEQUENCE OF IMPACT				
	Very Low (1)	Low (2)	Moderate (3)	High (4)	Very High (5)
Schedule	No or little impact to schedule	Schedule delay of less than 3 months	Schedule delay of 3 to <6 months	Schedule delay of 6 to 12 months	Schedule delay of more than 12 months
Cost	<\$1M	\$1M-\$5M	\$5M-\$10M	\$10M-\$30M	≥\$30M
Safety	No or little impact to public safety	Number of individuals exposed to minor safety risk less than 5	Number of individuals exposed to minor safety risk greater than 5	Number of individuals exposed to serious safety risk less than 5	Number of individuals exposed to serious safety risk more than 5, or any life-threatening risk (1 or more)
Environmental Impact	No significant impact to any environmental resource	Short-term impact that is insignificant	Short-term impact that is significant. Long-term impact that is insignificant.	Long-term significant impact to non-listed species	Long-term significant impact to fisheries or listed species

Table 4.5-2 Risk Score and Ranking Matrix (green=low, yellow=medium, red=high)

Probability of Occurrence	5 (60-100%)	5	10	15	20	25
	4 (40-59%)	4	8	12	16	20
	3 (20-39%)	3	6	9	12	15
	2 (10-19%)	2	4	6	8	10
	1 (1-9%)	1	2	3	4	5
		1	2	3	4	5
		Consequence of Impact				

4.6 Risk Management Strategy

During development and implementation of the Project, KRRC will assign the risk strategy to identified risks using the following codes:

1. **Manage:** Risk management seeks to reduce the likelihood of the risk occurring and/or the consequence of the risk, should it occur.
2. **Avoid:** Avoidance of the risk eliminates the likelihood of the risk occurring and/or the consequence of the risk, should it occur.
3. **Transfer:** Transference of the risk makes the risk either partially or completely another party's responsibility.
4. **Accept:** Acceptance of the risk recognizes that the risk cannot be fully managed, avoided, or transferred.
5. **Shared:** Shared risk means that the liability associated with the risk can be partially transferred (as described above), but certain aspects of the risk remain with the KRRC and will need to be managed, avoided or accepted.

KRRC will secure insurance, bonds, and indemnities before accepting license transfer and becoming owner, to manage all relevant risks in the risk register.

4.7 Risk Status

As the Project develops and is implemented, the status of identified risks will be assigned using the following codes:

1. Open: risks that continue to pose a threat for the Project. These are risks that may or may not have occurred that will not expire until some future date
2. Managed: risks which have had risk management measures implemented such that the likelihood of occurrence or consequences of occurrence has been reduced to a level that the Project can accept in the event the risk occurs
3. Expired: risks that may, or may not, have occurred but no longer pose a threat to the Project. When a risk expires, the probability becomes zero thereby making the risk score zero

4.8 Continuing Risk Management

As mentioned above, KRRC will update the risk register throughout the life of the Project, with ongoing assessment and reporting. The project team will manage and track the risk register through all phases of the Project.

Now that Kiewit has begun their work on Preliminary Services (investigation and design), they are developing their own risk register, which will focus solely on the design and construction phases of the Project. The KRRC will work proactively with Kiewit to identify and manage all risks associated with design, permitting and construction, while continuing to manage any risks outside of Kiewit's scope of work.

KRRC will secure insurance, bond, and indemnity before accepting license transfer and becoming owner, to manage all relevant risks in the risk register.

4.8.1 Risk Workshops

After the initial identification of risks, KRRC will conduct a series of risk workshops at strategic points throughout the Project duration. The goal of these risk workshops will be to further update and refine risks, conduct evaluations and explore mitigation opportunities, while engaging new partners in the Project and the risk management process. Likely times for subsequent risk workshops include:

- After completion of Kiewit's Preliminary Services risk workshop
- After key permits are issued (e.g. FERC Surrender order)
- Prior to first commencement of significant construction activities
- Midpoint of construction, or prior to significant phase(s) of construction

4.8.2 Monitoring and Control

During each risk management meeting, the attendees will review status, risk score and risk management opportunities for all active risks. Output of the risk management meeting will be an updated risk register for distribution.

Project monthly progress reports will include a list of open risks, the status of associated risk management actions, and any changes to action completion dates. A narrative will explain any significant exceptions to risk management action completion dates. KRRC will report any new risks.

KRRC will not delete expired risks (i.e. those that have occurred but no longer pose a threat to the Project) – these will remain on the risk register as closed items, or they will be transferred to a register of expired risks for documentation purposes.

Design Phase

At a minimum, KRRC will complete quarterly updates throughout the detailed design phase.

Construction Phase

KRRC and Kiewit will hold routine risk management meetings at least once every two months. The owners assigned to risks in the current project phase will attend these meetings.

4.8.3 Closing Risk Registers and Lessons Learned

Closing risk registers involves documenting all managed risks and final impacts on the overall Project. Impacts include, but are not limited to, impacts on project costs and schedule. KRRC will similarly document monitored but unmitigated risks. This information will be available for use on future projects and can be used to adjust severity and probability indices, better define risk tolerance levels and improve risk management efforts.

KRRC will prepare a Lessons Learned Report when the risk register is closed. The primary focus will be to identify activities which were highly effective, effective, partially effective, or not effective, and to recommend ways to improve overall effectiveness for risk management activities.

4.9 Risk Register

The current risk register is included as Attachment A. Each risk is categorized by project phase, and the root cause of each such risk is identified. The risk register identifies probability, impact and weight, and provides an overall ranking for each risk, as well as a strategy for managing each risk, and risk management measures, where appropriate. Finally, the risk register identifies the risk owner and the status of each risk. As noted above, the risk register will evolve and be updated throughout the life of the Project, involving ongoing assessment and reporting.

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Chapter 5: References

5. REFERENCES

Federal Energy Regulatory Commission 2016. Interim Guidance, Risk-Informed Decision Making (RIDM), Risk Guidelines for Dam Safety, Version 4.1. March 2016.

KRRC 2018. Definite Plan for the Lower Klamath Project, Klamath River Renewal Corporation. June 2018.

KRRC 2019. Amended Appendix P, Estimate of Project Costs, to the Definite Plan for the Lower Klamath Project, Klamath River Renewal Corporation, July 2019.

United States Department of Homeland Security 2011. Dams Sector: Estimating Economic Consequences for Dam Failure Scenarios. September 2011.

United States Fish and Wildlife Service 2016. "Penobscot River Restoration Project Celebrates Final Milestone, Reconnects River to the Sea" (June 14, 2016), available at <https://www.fws.gov/news/ShowNews.cfm?ID=4F928157-CED5-9E63-1D41C23A5AC7707F>.



Attachment A Risk Register



Attachment A Risk Register

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Owner

Owner / Force Majeure

PDB

Owner / PDB

Owner / PDB / Force Majeure

Owner's Egr

Owner's Egr / PDB

Owner / Owner's Egr / PDB

LTC

PDB / LTC

Owner / PDB / LTC

Owner / LTC

PacifiCorp

Post-GMP Contingency

Pre-GMP Contingency

LTC

Local Impact Mitigation Fund

PDB

Insurance

-

Post-GMP Contingency

Pre-GMP Contingency

LTC

Local Impact Mitigation Fund

PDB

Insurance

-

Open

Managed

Expired

Risk Identification					Risk Assessment (for Risk Management)				Risk Mitigation			Risk Costs Coverage		
Risk ID	Risk Category	Risk Description	Root Cause(s)	Phase When Actualized	Probability (P)	Impact (I)	Risk Weight (P x I)	Overall Rating	KRRC Management Strategy	Risk Management Measure	Risk Owner	Primary Contingency Carrier	Secondary Contingency Carrier	Risk Status
Environmental & Permitting														
4	Environmental & Permitting	Unanticipated FERC/DSOD Requirements Unanticipated Project requirements from agencies, FERC, or DSOD (including through BOC or PFMA processes) may cause delays to the project and increase costs.	Agency, FERC, DSOD, BOC, or PFMA reviews result in unanticipated requirements	Design	2 Unlikely (10-19%)	2 Low	4	Low	Manage	Close coordination where possible with referenced agencies; Prepare technical assessments that can hold up to scrutiny. Proactive agency coordination and field studies are underway.	Owner	Pre-GMP Contingency	-	Open
8	Environmental & Permitting	Unanticipated Other Permit Requirements Unanticipated permit requirements that increase contract price if not known at time of preparation of the Guaranteed Maximum Price (GMP).	Permitting agencies require offsite mitigation or any other requirements beyond anticipated requirements	Design	4 Likely (40-59%)	3 Moderate	12	Med	Manage	Early consultation with agencies; Sound approach to restoration. Proactive agency coordination and field studies are underway.	Owner / LTC	Pre-GMP Contingency	LTC	Open
15	Environmental & Permitting	KRRC-Managed Permitting Delays There may be delays to acquire permits (e.g. Corps 404, ESA Sec 7, CDFW MOU, Siskiyou County MOU)	Agency unable to process permit to allow for required construction start date	Design	3 Less Likely (20-39%)	2 Low	6	Med	Manage	Ongoing early consultation with agencies and early permit application submittal. Proactive agency coordination and field studies are underway.	Owner	Pre-GMP Contingency	-	Open
76	Environmental & Permitting	FERC Process Delays FERC process (including NEPA) may take longer than anticipated, resulting in Project delay.	FERC schedule delays	Design	4 Likely (40-59%)	3 Moderate	12	Med	Accept	Proactive response to FERC requests and strict adherence to FERC standard protocol and processes.	Owner	Pre-GMP Contingency	-	Open

Risk ID	Risk Category	Risk Description	Root Cause(s)	Phase When Actualized	Probability (P)	Impact (I)	Risk Weight (P x I)	Overall Rating	KRRC Management Strategy	Risk Management Measure	Risk Owner	Primary Contingency Carrier	Secondary Contingency Carrier	Risk Status
93	Environmental & Permitting	Listed Species - Western Pond Turtle Western Pond Turtle becomes Federally listed during permitting process. This may result in additional cost.	Project effect on listed species	Any time	4 Likely (40-59%)	3 Moderate	12	Med	Manage	Proactive coordination with appropriate regulatory agencies on likely requirements and associated field work; Address contingency in consultations. Proactive agency coordination and field studies are underway.	Owner / LTC	Pre-GMP Contingency	LTC	Open
112	Environmental & Permitting	Permit Reopener Changes during construction that require an amendment to a permit.	Unforeseen or changed site condition requires altering planned construction and project impacts which require a change to a permit. Design change by PDB to save costs or time.	Construction	2 Unlikely (10-19%)	3 Moderate	6	Med	Transfer	Flexible project descriptions that allow for design options; Comprehensive field investigation and documentation.	PDB / LTC	LTC	LTC	Open
27	Environmental & Permitting	Construction Permits PDB may be unable to obtain construction permits (e.g. County encroachment permits) in time for construction. This may lead to schedule delays.	Poor planning, insufficient communication, difficulty negotiating requirements	Design	3 Less Likely (20-39%)	2 Low	6	Med	Share	Owner coordination with Contractor for proactive communication with Counties; Contingency planning for delayed start during first year of construction.	PDB	PDB	-	Open
37	Environmental & Permitting	Special-Status Species Presence Special-status species (incl. bald and golden eagles) presence delays construction	Unanticipated species found onsite cause stop work	Construction	4 Likely (40-59%)	2 Low	8	Med	Transfer	Additional surveys to identify nest locations in the years leading up to construction; Implementation of the avoidance and minimization measures identified in the Definite Plan; Effective transfer of risk through Contract terms to Design-Builder. Pre-construction surveys; Design planning; Require work areas to be cleared prior to nesting season; Proactive surveys for nesting activity during nesting season; Proactive nesting mitigation measures during nesting season.	LTC	LTC	Insurance	Open
40	Environmental & Permitting	Permit Requirements Not Satisfied Mitigation measures or permit requirements may not be satisfied. This may lead to delays and additional costs.	Responsible party (PDB or LTC) does not meet expectations of permitting agencies in meeting permit requirements	Post-Construction	4 Likely (40-59%)	1 Very Low	4	Med	Transfer	Coordination between Designer, Contractor, and permitting agencies; Satisfy permit requirements.	LTC	LTC	-	Open
42	Environmental & Permitting	Cultural Resource Damage Known cultural resource may be damaged during construction. This may lead to a cost impact.	Mitigation measures fail to protect resource	Construction	2 Unlikely (10-19%)	1 Very Low	2	Low	Transfer	Identification of existing cultural resources to the extent feasible; Ongoing coordination with tribes and local historical societies to assess potential damage and identify measures.	PDB / LTC	Insurance	LTC	Open
68	Environmental & Permitting	Downstream Biological Resource Damage Greater than anticipated effect on downstream biological resources may lead to additional costs.	Effect of suspended sediment causes greater than anticipated impact to given species	Construction	2 Unlikely (10-19%)	2 Low	4	Low	Transfer	Develop appropriate aquatic resource measures through coordination with the regulatory agencies; Implement risk management measures to address effect on downstream resources.	PDB / LTC	LTC	Insurance	Open
70	Environmental & Permitting	Protected Species Loss Coho or Bald and Golden Eagle net loss within 5 years of construction completion may lead to additional cost in fines.	Mitigation and rehabilitation measures provide insufficient protection	Post-Construction	2 Unlikely (10-19%)	2 Low	4	Low	Transfer	Proactively monitor species before and during construction; Implement additional risk management measures.	LTC	LTC	Insurance	Open

Risk ID	Risk Category	Risk Description	Root Cause(s)	Phase When Actualized	Probability (P)	Impact (I)	Risk Weight (P x I)	Overall Rating	KRRC Management Strategy	Risk Management Measure	Risk Owner	Primary Contingency Carrier	Secondary Contingency Carrier	Risk Status
71	Environmental & Permitting	Bat Loss Bat roosts do not meet success criteria requiring additional mitigation, which may lead to additional cost in fines.	Predictive model of bat roost effectiveness is incorrect	Post-Construction	2 Unlikely (10-19%)	1 Very Low	2	Low	Transfer	Agency input into performance requirements in DB contract and design; Proactive QA/QC during construction. Cost estimates should assume prudent amount of replanting or other habitat maintenance.	PDB / LTC	LTC	Insurance	Open
72	Environmental & Permitting	Habitat Restoration Unanticipated maintenance or repair required during regulatory monitoring and reporting period (e.g. plant establishment, tributary passage blockage, etc.). Habitat restoration may lead to additional cost.	Constructed project component does not meet agency expectations	Post-Construction	2 Unlikely (10-19%)	2 Low	4	Low	Transfer	Agency input into performance requirements in DB contract and design; Proactive QA/QC during construction. Cost estimates should assume prudent amount of replanting or other habitat maintenance.	PDB / LTC	LTC	Insurance	Open
86	Environmental & Permitting	Restoration Materials Unavailable Local restoration materials (seed, plants) may not be available. This may lead to schedule delays and increased costs.	Insufficient quantities available for collection or insufficient quantities produced by propagation	Construction	2 Unlikely (10-19%)	2 Low	4	Low	Share	Early collection of seed and nursery propagation of plants for restoration prior to award of DB contract.	PDB	PDB	-	Open
88	Environmental & Permitting	Flood Mitigation Delays Flood mitigation improvements delay reservoir drawdown.	Implementation of downstream flood improvements take longer than anticipated and are not completed prior to reservoir drawdown	Construction	2 Unlikely (10-19%)	2 Low	4	Low	Manage	Complete early outreach to residents and owners in affected areas; Evaluate decision to proceed with drawdown even if there are holdouts that do not allow flood improvements.	Owner	Local Impact Mitigation Fund	Insurance	Open
96	Environmental & Permitting	Proliferation of Weeds Weeds outcompete native plants and site restoration goals are not met. This may lead to a cost impact for the project. More monitoring at the end of tail end.	Proliferation of weeds	Post-Construction	2 Unlikely (10-19%)	2 Low	4	Low	Transfer	Contract warranty period; Post-construction maintenance requirements in contract.	PDB / LTC	LTC	PDB	Open
Right-Of-Way or Easements														
28	ROW	Easement Restrictions ROW/construction easements may be denied for modification of access roads or other improvements	Insufficient communication and compromise with property owner	Any time	4 Likely (40-59%)	1 Very Low	4	Med	Manage	Proactive communication with access road owners; Contingency planning for use of access roads without modification.	Owner	Post-GMP Contingency	-	Open
83	ROW	Adjacent Properties Impacted Unforeseen impact to adjacent properties during construction.	Unanticipated impacts during roads work or downstream mitigations	Construction	3 Less Likely (20-39%)	2 Low	6	Med	Share	Contractor required to develop final design that considers adjacent properties; Early identification of property impacts.	Owner / PDB	Local Impact Mitigation Fund	Insurance	Open
106	ROW	Property Restrictions The title search may uncover easements or other property instruments that affect the implementation of the work.	Difficulty in completing the title report in a timely manner and/or research reveals challenge to design or construction	Design	1 Very Unlikely (1-9%)	1 Very Low	1	Low	Manage	Work proactively to manage this task so that it does not become critical path.	Owner	Pre-GMP Contingency	-	Open

Risk ID	Risk Category	Risk Description	Root Cause(s)	Phase When Actualized	Probability (P)	Impact (I)	Risk Weight (P x I)	Overall Rating	KRRC Management Strategy	Risk Management Measure	Risk Owner	Primary Contingency Carrier	Secondary Contingency Carrier	Risk Status
Procurement														
18	Procurement	Guaranteed Maximum Price Agreement Failure to agree to GMP during detailed design. This may lead to a schedule delay.	Disconnect between DB and Owner	Design	3 Less Likely (20-39%)	2 Low	6	Med	Manage	Robust Engineer's estimate to include Monte Carlo analyses; Independent review of Engineer's estimate, Include adequate contingency for project risk; Utilize project delivery method that provides Contractor's progress cost estimates to control budget (PDB). Close coordination and transparency on costs and associated assumptions during progress cost estimated prepared by DB; Provide contract exit strategy that Owner can terminate for convenience and implement alternate delivery approaches.	Owner	Pre-GMP Contingency	-	Open
Design														
13	Design	Increased development Increased development within the floodplain beyond mitigations already included requires additional flood mitigation beyond what is planned	City/county allows construction permits to be issued to developers	Design	1 Very Unlikely (1-9%)	1 Very Low	1	Low	Accept	Coordination with appropriate agencies; Consider an early CLOMR application to Counties.	Owner / Force Majeure	Post-GMP Contingency	Local Impact Mitigation Fund	Open
17	Design	Disputes DB Designer and Contractor disputes may lead to schedule delays and cost increases	Breakdown in PDB team relationship	Design	2 Unlikely (10-19%)	2 Low	4	Low	Transfer	Consider contractual measures to maximize design/contractor collaboration such as require Designer to be a partner rather than a subcontractor and provisions that oblige Contractor to continue work even when dispute arises.	PDB	PDB	-	Open
25	Design	Errors and Omissions Design errors or omissions lead to Project delays or cost overruns	Designer error	Construction	3 Less Likely (20-39%)	2 Low	6	Med	Transfer	Comprehensive design review; proactive QA/QC.	PDB	Insurance	PDB	Open
Field Conditions														
19	Field Conditions	Field Conditions General changed field condition (geotechnical, existing utilities, hazardous materials, and biological resources) leads to redesign, project delays and/or cost overruns.	Field condition differs from documented findings	Construction	3 Less Likely (20-39%)	1 Very Low	3	Low	Manage	Comprehensive field investigation and documentation.	Owner / PDB / LTC	Post-GMP Contingency	Insurance	Open
29	Field Conditions	Quantity Overruns Quantity overruns on earthwork, concrete demolition, etc.	Existing as-built data, exploratory data not adequate or accurate	Construction	1 Very Unlikely (1-9%)	2 Low	2	Low	Manage	Obtain new topographic and bathymetric data for use by Designer and Contractor; Rigorous QA by Owner on design calculations and assumptions related to earthwork volumes.	Owner	Post-GMP Contingency	-	Open
36	Field Conditions	Sediment Access Reservoir sediment may be more difficult to access than anticipated, causing construction delays (restoration)	Lack of material properties understanding	Construction	2 Unlikely (10-19%)	2 Low	4	Low	Transfer	Comprehensive investigation and testing during planning and detailed design phase (with PDB).	PDB / LTC	LTC	Insurance	Open
41	Field Conditions	Non-burial Related Discoveries Unanticipated non-burial related cultural resources (foundations, barns, etc.) discovered during reservoir drawdown or construction (beyond current allowance). Costs exceed allowances	Non-burial cultural resource not disclosed or already known about	Construction	2 Unlikely (10-19%)	1 Very Low	2	Low	Transfer	Identification of existing cultural resources to the extent feasible; Ongoing coordination with Native American groups and local historical societies; Development of treatment measures that would implemented following drawdown or during construction.	Owner / LTC	LTC	Post-GMP Contingency	Open

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43	Field Conditions	Burial Related Discoveries Unanticipated burial related conditions may exist. Including sites, human remains, or funerary items discovered within reservoir areas during reservoir drawdown - requiring cessation of construction activities for a long duration. Discovery impacts ability to perform construction - primarily Yreka waterline, Fall Cr Hatchery, Iron Gate Hatchery, and bridges	Burial site not disclosed or already known about	Construction	4 Likely (40-59%)	3 Moderate	12	Med	Transfer	Identification of existing cultural resources to the extent feasible; Ongoing coordination with Native American groups and local historical societies; Development of an Inadvertent Discovery Plan, Monitoring Plan, and NAGPRA Plan of Action, and rapid response plan to address the possibility of burial sites becoming exposed during drawdown.	Owner / LTC	LTC	Post-GMP Contingency	Open
91	Field Conditions	Fish Barriers Unknown fish passage barriers are found during drawdown. Their discovery will lead to additional cost.	Unknown pre-existing barriers exposed during drawdown	Construction	3 Less Likely (20-39%)	1 Very Low	3	Low	Transfer	Review of historic documents for evidence of barriers; Require Contractor to develop contingency plan to evaluate for barriers following reservoir drawdown and actions to remove barriers during dam removal.	LTC	LTC	Insurance	Open
Construction														
33	Construction	Cofferdam Failure Failure of temporary cofferdams result in demolition delays	Unconservative design of cofferdams; unanticipated foundation conditions	Construction	2 Unlikely (10-19%)	2 Low	4	Low	Transfer	Comprehensive field investigation, review of original construction, and design review	Owner / PDB	Insurance	PDB	Open
35	Construction	Hazardous Material - Unforeseen Condition Discovery or release of unknown hazardous material (other than from construction activities) to river during construction (unforeseen condition) may lead to cost impacts.	Project results in unanticipated release of hazardous material into river	Construction	1 Very Unlikely (1-9%)	1 Very Low	1	Low	Transfer	Completion of the Phase 1 hazardous material assessments and follow-up evaluations, appropriate health and safety qualifications, experience and other requirements during the procurement process, implementation of BMPs to avoid or contain the release of hazardous material, as well as active overview and enforcement of the Contractor's Hazardous Material Management Plan.	PDB	Insurance	PDB	Open
51	Construction	Diversion Blockage Rapid-drawdown causes slope instability leading to rock slope failure, blocking the diversion intake. This failure will lead to schedule delays and significant cost impacts.	Design analyses unable to cover all geologic conditions and slope geometries; insufficient data	Construction	2 Unlikely (10-19%)	2 Low	4	Low	Share	Comprehensive field investigation and design review; Develop slope monitoring plan for implementation during drawdown; Stockpile riprap for repairs of slope if local failures occur.	Owner / PDB	Post-GMP Contingency	Insurance	Open
82	Construction	Hazardous Material - Construction Activities Discovery or release of hydraulic oil or other hazardous material from construction equipment or remediations may be released into the river during construction. This may lead to additional costs.	Contractor mechanical equipment failure results in unanticipated release of hazardous material into river	Construction	1 Very Unlikely (1-9%)	1 Very Low	1	Low	Transfer	Contractor required to develop a Spill Prevention, Control, Countermeasure (SPCC) Plan and active overview and enforcement of the SPCC Plan.	PDB	Insurance	PDB	Open
Reservoir Drawdown														
34	Drawdown	Dam Failure Dam or similar structure fails during drawdown, leading to additional costs.	Failure mode not investigated or analyzed properly	Construction	1 Very Unlikely (1-9%)	1 Very Low	1	Low	Transfer	Rigorous detailed design analysis surrounding dam safety during drawdown; Completion of the FERC Potential Failure Modes Analysis process; Close coordination with the FERC regional office and state dam safety authorities; Implement FERC Emergency Action Plan, as appropriate.	PDB	Insurance	PDB	Open

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45	Drawdown	Regulatory Shutdown - Water Quality Reservoir drawdown impacts water quality more severely than anticipated causing project regulatory shutdown, delaying the project.	Permit conditions and/or inadequate modeling of water quality; duration of drawdown extends past March due to extreme weather	Construction	1 Very Unlikely (1-9%)	1 Very Low	1	Low	Transfer	Perform comprehensive water quality studies prior to construction; Implement risk management measures needed to comply with water quality requirements.	LTC	LTC	-	Open
46	Drawdown	Unanticipated Erosion Reservoir drawdown and subsequent operations results in a greater than anticipated level of erosion at bridges or along channel creating passage barrier. This is likely to lead to additional cost.	Local hydrodynamics result in greater than modeled erosion or scour	Construction	3 Less Likely (20-39%)	1 Very Low	3	Low	Manage	Comprehensive design review; Design additional scour protection for bridges if determined to be needed; Develop monitoring and mitigation plan for during and post reservoir drawdown.	Owner / PDB	Local Impact Mitigation Fund	Insurance	Open
47	Drawdown	Unanticipated Effects on Diversion Intakes Reservoir dewatering and subsequent operations have greater than anticipated effects on diversion intakes for irrigation/livestock. This may lead to additional cost.	Greater than predicted suspended sediment and bedload movement	Construction	3 Less Likely (20-39%)	1 Very Low	3	Low	Share	Comprehensive field investigation and design review; Develop plan for monitoring/mitigating intakes during reservoir drawdown.	Owner / PDB	Post-GMP Contingency	Insurance	Open
48	Drawdown	Unanticipated Effects on Groundwater Wells Reservoir dewatering and subsequent operation has greater than anticipated effects on groundwater wells. This may lead to additional cost.	Difficult to investigate and analyze groundwater relationships	Construction	3 Less Likely (20-39%)	1 Very Low	3	Low	Accept	Comprehensive field investigation and design review; Implement Groundwater Well Management Plan for evaluating changes in groundwater post-reservoir drawdown and proactively mitigate impacted wells.	Owner	Local Impact Mitigation Fund	Insurance	Open
49	Drawdown	Unanticipated Effects on Channel Flooding Reservoir dewatering and subsequent operations have greater than anticipated effect on downstream channel aggradation/flooding. This may lead to additional cost.	Evacuated coarse sediment is greater than anticipated leading to increased channel aggradation and associated flooding	Construction	2 Unlikely (10-19%)	1 Very Low	2	Low	Accept	Rigorous assessment on transport and flooding during detailed design; Monitoring post-drawdown; Raise awareness that active channel management program needed; Implement measures to manage channel aggradation and flood risk.	Owner	Local Impact Mitigation Fund	Local Impact Mitigation Fund	Open
50	Drawdown	Downstream Public Safety Public safety risk in downstream channel during the reservoir drawdown.	Outreach and public safety measures insufficient to keep out public creating potential risk to public safety during drawdown (increased flows)	Construction	2 Unlikely (10-19%)	1 Very Low	2	Low	Share	Comprehensive education and outreach plan; Detailed review and QA of safety program; Development of a Reservoir Dewatering Awareness Plan that will include procedures for notifying public of the schedule and anticipated flows for reservoir drawdown.	Owner / PDB	Post-GMP Contingency	Insurance	Open
89	Drawdown	Ice Impediment Reservoir ice impedes sediment flushing during reservoir drawdown leading to cost increases.	Ice on one or more reservoirs during drawdown might impede sediment erosion	Construction	2 Unlikely (10-19%)	1 Very Low	2	Low	Transfer	Incorporate management measures into design where possible.	PDB	PDB	-	Open

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Contractor Performance														
26	Contractor Performance	Construction Errors Construction errors (quality control) may lead to additional costs.	EOR fails to properly inspect or direct work in the field; QC failures	Construction	4 Likely (40-59%)	1 Very Low	4	Med	Transfer	Clear contract requirements; Owner review and enforcement of Contractor QA/QC Plan and rigorous Owner audit and spot testing to confirm results.	PDB	Insurance	PDB	Open
84	Contractor Performance	Labor Strike Construction shutdown due to labor strike may impact schedule and cost	Labor conditions results in a strike by construction workers	Construction	2 Unlikely (10-19%)	1 Very Low	2	Low	Share	Include Contract requirements for living conditions in camps and worker safety.	Owner / PDB	Post-GMP Contingency	Insurance	Open
Dams, Powerhouses, Reservoirs														
32	Dams	Slope Failure Copco lake reservoir rim or local slope failure along access roads may lead to additional cost and schedule delay.	Slope instability, inadequate access road condition assessment prior to construction. Design analyses unable to be made for all geologic conditions and slope geometries; insufficient data	Construction	3 Less Likely (20-39%)	4 High	12	Med	Share	Comprehensive field investigation and design review; Develop plan to address slope failures along Copco Road if they were to occur during reservoir drawdown.	Owner / PDB	Post-GMP Contingency	Insurance	Open
52	Dams	Large Gate Procurement Copco No. 1 and/or Iron Gate Dam large gate procurements delay gate installation resulting in delay of reservoir drawdown	Manufacturer requires additional information; (note: E&O covered elsewhere)	Design	4 Likely (40-59%)	2 Low	8	Med	Transfer	Early detailed design; Early involvement of the Contractor to initiate gate procurement activities including input from the gate fabricator; Contractual milestones with liquidated damages; Early Contractor input including planning underwater work to modify/demo the existing Iron Gate Dam gate structure.	PDB	Insurance	PDB	Open
53	Dams	Tunnel Modifications Copco. No.1 and Iron Gate Dam tunnel modifications are more difficult to construct causing schedule and cost overruns	Changed site condition or design omission	Construction	3 Less Likely (20-39%)	3 Moderate	9	Med	Transfer	Comprehensive field investigation and design review; Early Contractor input as well as transparent Contractor progress cost estimates based on proven means and methods.	PDB	Insurance	PDB	Open
54	Dams	Dam Diversion Malfunction Copco No. 1 or Iron Gate Dam diversion gate malfunctions during drawdown resulting in delay of reservoir drawdown	Faulty equipment or equipment failure (note E&O covered elsewhere)	Construction	1 Very Unlikely (1-9%)	1 Very Low	1	Low	Transfer	Proactive QA/QC during design; Include backup systems for operating the gates in the design and construction including special inspections and testing of the gates prior to drawdown.	PDB	Insurance	PDB	Open
55	Dams	Diversion Tunnel Intake Blocked Copco No. 1 and/or Iron Gate Dam diversion tunnel intake blocked by debris during drawdown reducing flow capacity. This may lead to schedule delays and increased costs.	Debris within reservoir blocks intake	Construction	3 Less Likely (20-39%)	1 Very Low	3	Low	Share	Maximizing the size of the intakes to match the size of the gates; Design debris grating for intake with ability to clear debris from grating.	Owner / PDB	Post-GMP Contingency	Insurance	Open
65	Dams	Dam Failure Iron Gate Dam or J.C. Boyle Dam overtopped during excavation by storm water flows in excess of 100-year event resulting in dam failure. This would lead to additional cost.	Climate change; increased variability in precipitation patterns	Construction	1 Very Unlikely (1-9%)	1 Very Low	1	Low	Accept	Require that the dam height during excavation not be less than needed to safely pass a 100-year event through the diversion tunnel; Completion of the FERC Potential Failure Modes Analysis process; Implement EAP, if necessary; Close coordination with the FERC regional office and state dam safety authorities.	Owner / Force Majeure	Post-GMP Contingency	Insurance	Open

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66	Dams	Hatchery Delay Iron Gate and/or Fall Creek Hatchery is not brought online in time to begin drawdown. This may lead to schedule delay.	PacifiCorp does not move forward with planning, designing, costing, and seeking approval for hatchery designs. Inadequate planning, equipment, staff, technical issues, or unfavorable weather	Construction	3 Less Likely (20-39%)	3 Moderate	9	Med	Manage	Rigorous design of replacement supply; Pilot treatment technology; Proactive QA/QC during construction.	Owner / PDB	Post-GMP Contingency	PDB	Open
Yreka Water Supply Pipeline														
74	Yreka	Design Changes by City of Yreka Design review by City of Yreka may result in changes to design. Coordination or other design delays related to City of Yreka water system design.	Lack of coordination or agreement on design process or details	Design	3 Less Likely (20-39%)	1 Very Low	3	Low	Manage	Proactive coordination with City engineers on process and design requirements; Strict adherence to schedule milestones and KRRC QA process; Keep Designer under KRRC/AECOM control so payments can be withheld due to schedule delays	Owner	Pre-GMP Contingency	-	Open
100	Yreka	Yreka Water Supply Construction Delays Yreka Water System Pipeline Crossing is not constructed in time for dam removal start. If this happens it pushes the dam removal to next calendar year. Differing Site Condition claim during Yreka Water Supply Pipeline Crossing Construction. On-site investigation shows much more complex.	Unforeseen seasonal flow condition in-river, and other unforeseen adverse conditions (e.g., geology) impacting construction schedule.	Construction	3 Less Likely (20-39%)	2 Low	6	Med	Manage	Consider obtaining permits early; consider approved in-river work window for fish protection and other potential risks to construction schedule in planning for contingencies - in order to complete construction in-time for the dam removal start.	Owner / PDB / Force Majeure	Pre-GMP Contingency	PDB	Open
External Events														
9	External Events	Uncontrolled Circumstances Uncontrollable circumstances (e.g. force majeure, war, terrorism)	Uncontrolled circumstances	Construction	1 Very Unlikely (1-9%)	1 Very Low	1	Low	Accept	Prepare Emergency Response Plan (PERP) and require Contractor to prepare their own PERP	Owner / PDB / Force Majeure	Post-GMP Contingency	PDB	Open
20	External Events	Wet Weather Wetter-than-expected weather or flows higher than expected during instream construction window increases costs and causes delays.	Climate change; Hydrology	Construction	1 Very Unlikely (1-9%)	1 Very Low	1	Low	Accept	Rigorous flow analyses during planning/design; Consider defining anticipated rain days in contract as a number greater than average; Define flow return period; Contract requirement for contractor plan for wetter-than-expected weather.	Owner	Post-GMP Contingency	-	Open
22	External Events	On-site Fire Fire in watershed causes on-site fire damage	Lightning; Accidental; Arson	Construction	3 Less Likely (20-39%)	1 Very Low	3	Low	Share	Fire Management Plan has been developed and Contractor will be required to prepare their own Fire Management Plan.	Owner / PDB	Insurance	-	Open
24	External Events	Earthquake - During Construction Earthquake damages temporary construction leading to additional cost and schedule delays.	Earthquake occurs near project	Construction	1 Very Unlikely (1-9%)	2 Low	2	Low	Transfer	Consider specifying a contract defined design earthquake for temporary construction.	Owner / PDB	Insurance	-	Open
31	External Events	Onsite Public Safety Public safety at construction site. Injuries or damage may lead to additional cost and schedule delays.	Public safety measures insufficient to keep out public	Construction	1 Very Unlikely (1-9%)	1 Very Low	1	Low	Transfer	Development of appropriate health and safety qualifications, experience and other requirements during the procurement process, as well as active overview and enforcement of the Contractor's health and safety and site security plans. No public access to work areas.	PDB	Insurance	PDB	Open

Risk ID	Risk Category	Risk Description	Root Cause(s)	Phase When Actualized	Probability (P)	Impact (I)	Risk Weight (P x I)	Overall Rating	KRRC Management Strategy	Risk Management Measure	Risk Owner	Primary Contingency Carrier	Secondary Contingency Carrier	Risk Status
73	External Events	Earthquake - Post Construction Large seismic event up to design Maximum Credible Earthquake (MCE) occurs after project completion that results in blockage of Klamath River, leading to additional costs.	Large seismic event causes catastrophic landslide or slope failure	Post-Construction	2 Unlikely (10-19%)	3 Moderate	6	Med	Transfer	Develop clear design requirements for PDB contract; Work with dam safety authorities to set reasonable design criteria and associated durations.	LTC	LTC	Insurance	Open
79	External Events	Domestic Terrorism Domestic terrorism or actions to disrupt or stop project during construction may lead to schedule delays.	Extreme opposition to project	Construction	2 Unlikely (10-19%)	1 Very Low	2	Low	Accept	Develop site security plan that includes project response to different scenarios for disruption of project by domestic terrorists	Owner	Post-GMP Contingency	-	Open
104	External Events	Wildfire Wildfire ignited by construction activities spreads and affects other properties.	Hot work, or other activities during the dry months generate sparks or heat that ignite dry grass and brush around the project that then spreads to neighboring populated areas.	Construction	1 Very Unlikely (1-9%)	5 Very High	5	High	Transfer	Fire Management Plan has been developed and Contractor will be required to prepare their own Fire Management Plan.	PDB	Insurance	PDB	Open
111	External Events	Extreme Weather Hotter- or colder-than-expected weather causes work stoppage and schedule delays	Climate change	Construction	1 Very Unlikely (1-9%)	1 Very Low	1	Low	Accept	Weather analysis during construction planning needs to foresee heat/cold delays; consider including greater than average number of excessive heat/cold days; for hot weather, consider ways to increase night work without affecting noise levels	Owner / Force Majeure	Post-GMP Contingency	-	Open
114	External Events	Confiscation by Governmental Body Government confiscates resources or stops work	External events (disaster, etc.)	Construction	1 Very Unlikely (1-9%)	2 Low	2	Low	Accept	N/A	Owner / Force Majeure	Post-GMP Contingency	-	Open
115	External Events	Circumstances Affecting Suppliers External events (disaster, etc.) affect the ability of PDB to acquire supplies and materials	External events (disaster, etc.)	Construction	1 Very Unlikely (1-9%)	2 Low	2	Low	Accept	Early coordination with suppliers to avoid supply limitations	Owner / Force Majeure	Post-GMP Contingency	Insurance	Open



Attachment B Aon Risk & Insurance Due Diligence Report

Risk and Insurance Due Diligence Report

Klamath River Renewal Project

Prepared for the Klamath River Renewal Corporation

Date: July 2019





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Reliance Statement

This report is prepared for the Klamath River Renewal Corporation (KRRRC or Client) in respect to the procurement of the Klamath River Renewal Project (Project). It may be relied on by the following parties (Parties):

- Klamath River Renewal Corporation
- The State of California
- The State of Oregon

We confirm that the Parties may rely upon this report in connection with and for the purpose of:

- The provision or underwriting (as the case may be) of financial accommodation, equity, debt or hybrid investment, leasing finance or residual value guarantees to facilitate the Project
- Pre or post financial close debt financing or sale, transfer or assignment of the above financial accommodation, equity or debt investment, hybrids issues, including the issue of a disclosure document to finance the Project, leasing finance, residual value guarantees or underwriting positions which occurs within 12 months of financial close (together, the Financing)
- FERC license transfer to Klamath River Renewal Corporation

We confirm that the Parties are permitted to extract parts of the report to be inserted into any information memorandum and/or disclosure document (IM) used in connection with any Financing of the Project or any part of it, provided that:

- A full copy of the report is made available to each recipient of the IM
- Each extract is a complete and accurate transcription of the relevant part of the report
- It is clearly stated in the IM that the extract is an extract from the report
- It is clearly stated in the IM that the recipients may not rely upon the extract but only rely on the full Report and then subject to any limitations or disclaimers in the report

We also confirm that we are prepared to answer queries with respect to this report raised by any of the Parties or potential Financiers or underwriters in any syndication or sell down process, which may arise in the six-month period following financial close of the Project. We further confirm that we are prepared to answer queries with respect to this report raised by FERC, the State of California, or the State of Oregon which may arise in the six-month period following FERC license transfer.

For the purposes of this reliance statement, Financiers means each person who provides or participates in financing including:

- a) Each arranger, underwriter, note holder or participant in the facilities related to the Financing and any agent or trustee (including any security trustee or security agent) acting for any of them
- b) Each working capital facility provider
- c) Each interest rate, foreign exchange or other hedge counterparty
- d) Each person who provides Financing as a lessor under a financing or operating lease or as a residual value guarantor on or post financial close including each arranger, underwriter, dealer, participant or note holder in the Leasing Arrangements related to the financing or any agent or trustee acting for any of them
- e) Any credit support provider to a borrower under a financing

in each case as at financial close; and

- Each and any person who becomes a substitute, transferee or assignee of any of the persons referred to in (a), (b) and (e) within 12 months of financial close.

This report is based upon the information that the Client and its representatives have provided. The Client is responsible for the accuracy and completeness of the information, and we accept no responsibility arising from the Client's failure to provide complete and accurate information.



Executive Summary

This report has been produced by Aon at the request of the Klamath River Renewal Corporation for the benefit of the KRRC and related parties (collectively referred to as the “Stakeholders”), involved in the Project. KRRC engaged Aon for certain Insurance Advisory services (“Insurance Services”). This report is provided for the benefit of all Stakeholders and may be relied upon by the Stakeholders.

This report summarizes the Insurance Services and provides certain recommendations based upon those Insurance Services including but not limited to:

- Risk Assessment including analytics and risk modelling:
 - The analytic and risk modelling reveals that the total exposure (general liability, errors and omissions, haul away auto, and workers compensation) at a 99.5% confidence level is \$120.61M.
 - As seen in Appendix C, dam failure presents the greatest risk. At a 99.5% confidence level, the total estimated cost associated with a dam failure is \$119.97M.
 - Wildfire does not present a significant risk and at a 99.99% confidence level the exposure is estimated to be \$6.26.
 - The insurance program proposed by Aon will provide sufficient limits of insurance to cover these risks.
- Risk Assessment including Project Risk Register:
 - Working in conjunction with Aecom and the Stakeholders, Aon has attempted to identify all of the potential causes of loss.
 - Based upon the Project Agreement, Aon identified which party “owns” the risk and the risk mitigation tools available.
 - For those risks where insurance is “potentially available”, the determination for whether insurance is available is based upon the facts associated with the loss (assumes that the loss is not otherwise excluded) and the damages being claimed.
 - Of the 39 risks for which insurance is not available:
 - 4 are ProjectCo (Kiewit risks) and 6 are shared ProjectCo/KRRC
 - 4 are associated with funding and should be known prior to license surrender
 - 12 will be known prior to license surrender
 - 4 will be transferred to the LTC
 - The remaining 9 are either low probability or included in the KRRC contingency.
- Risk Assessment including Project Insurance Program:
 - The Definite Plan made several insurance recommendations, including but not limited to:
 - A general liability only owner controlled insurance program (OCIP)
 - KRRC, Project Co/Kiewit, and all contractors procuring their own workers compensation insurance program
 - Builder’s Risk /Inland Marine limit based upon 100% of the replacement value of any salvaged material or property and procured by KRRC
 - Professional Liability to be purchased by Project Co/Kiewit with limits as high as 20% - 40% of the construction value.
 - Aon recommends certain changes to the Project Insurance Program:
 - A contractor controlled insurance program (CCIP) which includes both the general liability, umbrella liability and workers compensation insurances. This will avoid gaps in coverage, allow for greater participation by minority owned business and most importantly, lower the cost of insurance based upon Kiewit’s purchasing power in the marketplace.



- Builder's Risk/Inland Marine limit based upon the probable maximum loss ("PML") vs. replacement value and to be procured by ProjectCo/Kiewit. By utilizing the PML, the limit will account for the increased value in the roads, bridges and other project improvements
 - Contractor's Pollution Liability and Pollution Legal Liability with linked limits of \$50M and procured by KRRC. This will allow for a more seamless transfer of coverage to the LTC.
 - Professional Liability limits of \$25M and allow for Kiewit to use its corporate program to satisfy this requirement. This will provide the same protections as a project specific placement while eliminating the costs associated with a project specific placement.
 - Watercraft and Aircraft Liability with \$5M limits for each of the exposure, except helicopters which should be \$10M: watercraft, aircraft, helicopters, and drones to the extent there is exposure. However, if the drones are under 10 kg, use of the general liability is permissible.
- The total premium cost associated with the Aon recommended program is estimated to be \$8.2M.

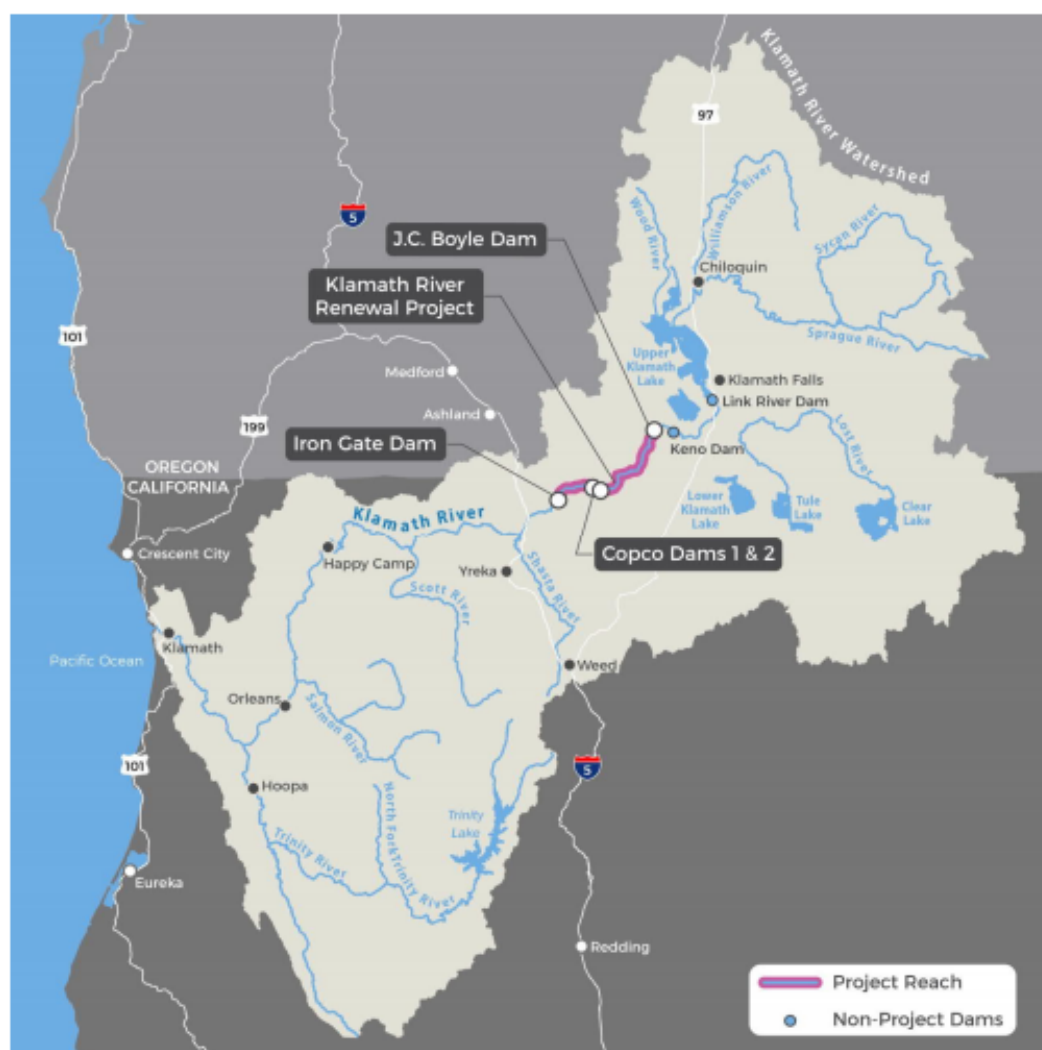
It must be clearly understood that, at this time, no project insurances have been bound and no insurance premium costs have been incurred. KRRC does maintain its corporate insurance program, which was renewed on June 30, 2019. The project insurances will be placed prior to Project Implementation Work.



Project Overview

The Klamath River Renewal Project (the “Project”) comprises the removal of four dams on the Klamath River – J.C. Boyle, Copco 1, Copco 2, and Iron Gate, along with appurtenant structures. The Project is intended to restore the natural, free-flowing condition and restore volitional fish passage through river miles 193.1 to 234.1. In addition to the deconstruction activities, the Project Company will be responsible for remediating and restoring the reservoir sites, minimizing adverse impacts downstream, ensuring project completion with available funds, and avoiding damages and liabilities to PacifiCorp, the States, and third parties. The estimated cost of the progressive design-build contract is estimated to be \$237.6M million. The estimated cost of project oversight, liability transfer, environmental compliance, technical support, construction management, mitigation measures and monitoring and reporting is estimated to be \$133.3M with a contingency of \$62.8M.

Project Map





Method of Approach

The review and commentary on insurance and risk management issues are based on the review of project documentation. This documentation includes the Definite Plan and other data as provided by the Klamath River Renewal Corporation and its advisors.

Specifically, Aon has reviewed the following documents:

- Klamath Hydroelectric Settlement Agreement dated February 18, 2010, Amended April 6, 2016 and November 30, 2016
- Definite Plan dated June 2018 and July 2, 2019
- Request for Proposal dated December 21, 2018
- Project Agreement dated April 24, 2019
- Operations & Maintenance Agreement dated September 20, 2017
- FERC Board of Consultants Letter Report No. 1 and KRRC Response Letter dated December 12, 2018

Risks that have been identified through the review of the above documentation and through consultation with Stakeholders, have been discussed and matched with solutions utilizing the following approach:

Aon has utilized its Project Enterprise Risk Assessment (PERA) approach in its analysis of the risks on the Project. PERA is a proprietary enterprise risk management solution which is tailored to complex construction projects. The PERA methodology involves the following:

- Risk Identification
- Map to potential risk solutions, including transfer by insurance, transfer by contract, transfer by alternative method, and risk controls
- Certain proposed solutions, if possible, could be vetted through meetings with various Stakeholders in order to test the integrity of the solution

This method will also attempt to address risks outside of the usual hazard quadrant and will provide the Stakeholders with a project wide “risk matrix” that includes identified risks and potential solutions. Some solutions may not involve transferring risk to insurance carriers, and Aon will discuss with Stakeholders techniques for implementing these solutions.

Aon’s risk matrices were then compared to the Aecom risk register to ensure that all risks were identified and properly classified. The combined risk matrix/risk register were then used to conduct the risk analytic and modelling and quantify the potential risk. This allowed Aon to determine the appropriate levels of insurance and avoid over insuring the project, which would not have delivered good value for money. Aecom utilized the combined risk matrix/risk register to produce a roll-up contingency estimate.



Project Risk Commentary

Below Aon has provided a summary of critical risk clauses within the Definite Plan and the Project Agreement.

Key Project Risks

The following discussion of project risks explores the risks that were highlighted by Stakeholders during the February 19, 2019 risk workshop held at the Aon San Francisco office. The risks raised by Stakeholders were then quantified and analyzed by Aon Global Risk Consulting (AGRC) to provide estimates of the risk of potential losses by line of coverage and by risk. Below is a summary of potential losses by line of coverage:

		GL	E&O	Haul Away— AL	Workers Comp	Total Before Insurance	E&O— Hatchery
	Average Loss	\$6.19	\$0.53	\$1.15	\$3.72	\$11.58	\$2.02
	CAT Loss	\$62.12	\$10.62	\$3.78	\$12.37	\$70.50	\$56.79
Confidence Level	Years/Event						
10%		\$0.26	\$0.00	\$0.39	\$1.95	\$3.62	\$0.00
20%		\$0.39	\$0.00	\$0.54	\$2.26	\$4.21	\$0.00
30%		\$0.53	\$0.00	\$0.67	\$2.53	\$4.74	\$0.00
40%		\$0.70	\$0.00	\$0.80	\$2.78	\$5.31	\$0.00
50%	2	\$0.93	\$0.00	\$0.94	\$3.05	\$6.04	\$0.00
60%	2.5	\$1.34	\$0.00	\$1.11	\$3.36	\$7.09	\$0.00
70%	3.3	\$2.26	\$0.00	\$1.31	\$3.77	\$9.19	\$0.00
80%	5	\$6.64	\$0.00	\$1.59	\$4.40	\$13.45	\$0.00
90%	10	\$16.93	\$0.00	\$2.09	\$5.90	\$24.48	\$0.00
95%	20	\$29.01	\$0.00	\$2.62	\$8.04	\$36.19	\$0.00
99%	100	\$67.92	\$18.04	\$4.28	\$14.48	\$78.72	\$51.67
99.38%	161	\$109.38	\$25.71	\$4.89	\$17.05	\$120.61	\$92.20
99.5%	200	\$125.98	\$28.87	\$5.27	\$18.19	\$135.36	\$113.71
99.90%	1,000	\$254.81	\$69.71	\$8.97	\$28.27	\$264.49	\$320.70
99.95%	2,000	\$303.28	\$106.86	\$11.75	\$33.35	\$308.11	\$414.71
99.99%	10,000	\$394.77	\$195.56	\$21.18	\$46.28	\$404.89	\$705.41

Wildfire

Wildfire is the is one exposure that has risen to the top of the list for casualty insurers. Though the amount of work associated with disconnecting the electrical transmission lines from the hydroelectric dams is small in comparison to the overall project it is and will most certainly become a major concern from an underwriting



perspective. Unfortunately, starting with the San Diego brush fires to the recent fires in Southern California and most certainly Northern California, wildfire has now reached catastrophic stature in the industry and will become a driving force in the ability to place general liability coverage. Based on an analysis by KRRC's attorney's, of the three potential theories of liability for wildfire damage – negligence, trespass by fire, and inverse condemnation – inverse condemnation would not apply to KRRC as it is not an investor-owned regulated utility. Additionally, PacifiCorp maintains all operational risk until the dams are decommissioned. Consequently, KRRC or the Project Company would only be liable for damages due to negligence and trespass by fire and general liability policies should cover most potential claims for property damage and bodily injury. However, as KRRC's attorneys note, punitive damages cannot be covered by insurance under California law. According to the analysis done by Aon, the potential liability exposure from wildfire is relatively low with losses estimated to be \$6.26M at a 99.99% confidence level. This is primarily due to the rural nature of the project area and PacifiCorp's historic wildfire losses.

Downstream Sediment Deposits

The potential for a negative impact on downstream water quality is of significant concern, especially if there are issues related to contamination of the sediments. There could also be a negative impact at the point at the Klamath empties into the ocean. Much of this risk should be covered by the pollution legal liability coverage.

Dam Failure

The product of the annual probability of dam failure from a particular failure mode and the magnitude of the resulting consequences. Statistically, over 50% of dam failures in the U.S. can be linked to geologic and geotechnical problems. Professional liability underwriters view any dam work substantially more challenging because of the potential for catastrophic loss. According to the analysis by Aon, the potential liability exposure from dam failure is somewhat significant, with projected losses estimated to be \$119.97M at a 99.5% confidence level. However, PacifiCorp is responsible for all operational risks until decommissioning. Consequently, KRRC's exposure is limited to post-decommissioning through dewatering, a period which is estimated to be no more than four months.

Failure of the Substation

Damage to the substation during the period between license surrender by PacifiCorp and decommissioning could add significant costs to the project as substations not easily replaced. Also, should there be substation failure, there could be negative impacts to the environment. The potential losses from substation failure can arise from any time after the project starts to the last date of power generation. Aon estimates that losses at a 99.5% confidence level would be \$20.79M. However, KRRC and/or ProjectCo/Kiewit would only be responsible for losses arising out of damage caused by the deconstruction of the dam, not the operational exposure.

Hatchery Failure or Fish Kill

If the water intake is compromised, there is the risk of losing endangered species. Additionally, there is a risk of loss through KRRC or contractor negligence that causes the hatchery work to fail. Aon estimates that losses at a 99.5% confidence level would be \$113.71M. However, KRRC does not have responsibility for the operation of the hatcheries; this is the responsibility of the Department of Fish and Wildlife. As such, any losses associated with the operational exposure would not fall to KRRC.

Discovery of Tribal Cultural Resources

There is a good chance that during the decommissioning and facilities removal, a contractor will discover tribal cultural resources. If that occurs, work will have to immediately stop until an investigation can be



conducted. This investigation could prolong the construction period and depending on where in the facilities removal cycle process the discovery occurs, there may be a need for work not originally within the scope of work to ensure embankments are stable. This would be considered an uncontrollable circumstance.

Yreka Water Supply Pipeline Move

There is risk that KRRC or contractor negligence may cause the Yreka water supply pipeline to fail or fail to operate properly. Key inputs to understanding the liability implications of this risk would be the duration of the failure and the water usage by the citizens of Yreka. Aon estimates the losses at a 99.5% confidence level would be \$49.49M.

Uncontrollable Circumstances

As defined in the Project Agreement, the Uncontrollable Circumstances are intended to ensure that project risks are transferred to the party best capable of managing, mitigating or transferring each risk. The Uncontrollable Circumstances are comprehensive and have the KRRC retaining risks that are typically retained by Owners on large, complex infrastructure projects. These risks are typically either in the relative control of the KRRC, such as errors, omissions, or insufficiencies in information provided on behalf of the KRRC; are uninsurable, such as labor disputes or strikes affecting specific trades at a regional or national level; or would be considered acts of God, such as earthquakes, fires, tornadoes, or floods. Having the KRRC carry responsibility for these foreseen events allows the Project Company to reduce some of the contingencies that they would otherwise be carrying in their bids. There are some risks that the Project Agreement is silent on that are often described in other project agreements for complex construction projects that may lead to delays and/or disputes in the project. Except for these silent risks, the Project Agreement generally transfers risk to the party best able to mitigate such risk.

Definite Plan and Project Agreement Insurance Requirements

Corporate Program

KRRC procured a corporate insurance program which is intended to address KRRC's general risks as a business entity and include the following coverages:

- \$1,000,000 Commercial General Liability policy which is supplemented by a \$5,000,000 Umbrella policy
- \$10,000,000 Directors and Officers policy that protects the KRRC's board members
- Worker's Compensation and Employer's Liability policy with a \$1,000,000 limit for the KRRC employee(s)
- Commercial Automobile policy with \$1,000,000 in limits
- Commercial Property policy that covers the KRRC's scheduled property

KRRC's corporate insurance program was to name PacifiCorp, the State of Oregon, the State of California, and their respective officers, agents, employees, and members as additional insureds in accordance with the requirements of the Amended KHSA.



Project Insurance Program

Policy Type	Definite Plan – Appendix A	Project Agreement – Appendix 9	Aon Commentary
<p>CIP for General Liability</p> <p>Limits: \$2M occurrence \$4M general aggregate</p>	<p>Policy to cover KRRC, the dam removal contractor and all eligible subcontractors for their work at the Project.</p> <p>The goal was to provide a comprehensive, seamless, and efficient insurance program which: (1) precludes insurers from denying coverage based upon other available coverage; (2) removal of cross-litigation costs caused by multi-party losses on a construction project; (3) allows the project sponsor/owner to control and design the coverage it intends to procure and the costs of coverage.</p>	<p>Policy to cover liabilities that arise out of the performance of the Project Implementation Work</p> <p>Limits of \$2M per occurrence, \$4M products completed operations, and \$4M aggregate limit</p> <p>A products completed operation period of 10 years following Project Final Completion or the Termination Date, whichever occurs first.</p>	<p>Neither the Definite Plan nor the Project Agreement address allowable deductibles and/or self-insured retentions.</p> <p>Appendix 9 provides that Project Co/Kiewit will pay for deductibles/SIRs</p> <p>Our recommendation that the GL should be a CCIP and not an OCIP have been incorporated into Appendix 9. The reasoning for the change is explained later in this document.</p> <p>Our recommendation was that the products completed operations cover be maintained through the statute of repose or the period within which to file a lawsuit.</p>
<p>Umbrella/Excess Liability as part of the CCIP</p> <p>Limits: \$200M</p>	<p>This policy is to follow form to the CGL and will cover all enrolled parties, which is an added value for smaller contractors who cannot afford these limits.</p>	<p>Policy to cover KRRC, the Project Company and all enrolled contractors of every tier.</p> <p>The limits are more specifically delineated as follows:</p> <p>\$200M Combined Single Limit</p> <p>\$200M General Aggregate for Enrolled Parties</p> <p>\$200M Products Completed Operations</p>	<p>As set forth in the GL comments and later in Aon's Risk and Insurance Commentary, we believe there are greater advantages to having Project Company procure this coverage as a CCIP.</p>



Policy Type	Definite Plan – Appendix A	Project Agreement – Appendix 9	Aon Commentary
		10 year products completed operations	
Worker's Compensation/Employer's Liability Limits: Statutory Requirement (WC) \$1,000,000 (EL)	Requires all contractors and subcontractors to procure this coverage separate and apart from the CIP. The reasoning for not covering under an CIP is because the coverage is statutory.	The limits are more specifically delineated as follows: Worker's Compensation as required by law. Employer's Liability: \$1M each accident \$1M each disease (each employee) \$1M for disease (policy limit) Requires USL&H when required by law	Neither the Definite Plan nor the Project Agreement address allowable deductibles and/or self-insured retentions. There are no statutory prohibitions to including the worker's compensation and employer's liability in the CCIP. As set forth in the GL comments and later in Aon's Risk and Insurance Commentary, we believe there are greater advantages to having Project Company procure this coverage as a CCIP
Commercial Auto Liability Limits: \$1M CSL	Required of all contractors and subcontractors for all owned, leased, and non-owned vehicles used in connection with the work. Outside of the CIP	Required Limit of \$5M CSL which could be met by a combination of primary and excess coverage to be procured by all contractors and subcontractors. Requires a Motor Carrier Act Endorsement	Given the exposure, Aon would recommend at least \$5M if not \$10M in coverage for the Project Company and then allow Project Company to determine the appropriate limits for its subcontractors but not less than \$2M. Auto to include MCS 90 and CA 9948.
Builder's Risk/Inland Marine or Commercial Property 100% of the replacement value of any salvaged material or property	Applies a slightly unconventional analysis to the limit. Will be purchased by KRRC as a project specific property cover.	Insures against all risk of physical loss and/or damage including flood and earthquake, subject to normal policy limitations covering full insurable value of any salvage material or	Neither the Definite Plan nor the Project Agreement address allowable deductibles and/or self-insured retentions or if the Project Company and/or the enrolled contractors will be responsible for the



Policy Type	Definite Plan – Appendix A	Project Agreement – Appendix 9	Aon Commentary
		<p>property at the Project Site.</p> <p>Also covers physical damage or loss of equipment and materials purchased in connection with the Early Works Package Amendment.</p> <p>Will cover contractors of any tier as additional insureds as their interests may appear.</p>	<p>deductible and/or self-insured retention.</p> <p>As explained in greater detail in Aon's Risk and Insurance Commentary, we believe there are greater advantages to having the Project Company procure the builder's risk coverage.</p>
<p>Contractor's Pollution Liability ("CPL") and Fixed Site Pollution Liability</p> <p>Limits: \$50M linked limits</p>	<p>CPL to be purchased by KRRC and will cover all contractors and subcontractors at the project site.</p>	<p>Occurrence form</p> <p>Limits: \$100M each pollution condition and \$100M project aggregate</p> <p>Covers pollution caused by or exacerbate by Project Implementation Work and including</p> <p>coverage for clean-up, removal, transportation and disposal and for any sudden and accidental pollution.</p> <p>The policy will not exclude coverage for claims relating to injuries arising from the presence of lead or asbestos.</p> <p>The policy shall include products completed operations through the statute of repose.</p>	<p>Neither the Definite Plan nor the Project Agreement address allowable deductibles and/or self-insured retentions or if the Project Company and/or the enrolled contractors will be responsible for the deductible and/or self-insured retention.</p>



Policy Type	Definite Plan – Appendix A	Project Agreement – Appendix 9	Aon Commentary
Professional Liability/Errors and Omissions Limits: Up to \$25M	To be purchased by Project Company Coverage limits may be as high as 20% - 40% of the construction value.	The limits are more specifically delineated as follows: \$25M/claim \$25M aggregate To cover liabilities due to error, omission, negligence, mistakes, or failure to take appropriate action in the performance of business or professional duties. Coverage to be maintained through the statute of repose following Milestone Final Completion for the Final Habitat Restoration Work. Retroactive date before commencement of any design. Shall not contain exclusions for joint ventures, partnerships or both.	Discussions have been had with Kiewit about their corporate program, and they have demonstrated that they have the same types and kinds of coverages as a CPPI. As such, it is permissible for Kiewit to use their corporate program. Aon agrees that the Project Company and all design professionals must carry professional liability coverage. Limits of 20% - 40% of the construction values could raise red flags for the insurers and raise the overall cost of coverage.
Watercraft and Aircraft Liability Limits: Watercraft - \$5M per occurrence Aircraft - \$5M per occurrence Helicopters - \$5M per occurrence Drones - \$5M per occurrence	The Definite Plan does not contain these insurances	If Project Company or any Subcontractors intend to use any watercraft, aircraft, helicopters, or drones as part of the Project Implementation Work, they must procure and maintain the requisite insurance.	If no other aircraft are being used, drones can often be scheduled on the general liability policy if they are below a certain size.



KRRC CIP Obligations

Each of these policies shall name PacifiCorp, the State of Oregon, the State of California, and their respective officers, agents, employees, and members as additional insureds.

Appendix 9 of the Project Agreement identifies the following excluded parties from the GL and Umbrella CIP coverage:

- (a) Hazardous material remediation, removal, and/or transport companies and their consultants;
- (b) Architects, surveyors, engineers, and soil testing engineers, and their consultants;
- (c) Vendors, suppliers, off-site fabricators, material dealers, truckers, haulers, drivers, and others who merely transport, pick up, deliver, or carry materials, personnel, parts or equipment, or any other items or persons to or from the Project Site;
- (d) Contractors or subcontractors performing day-to-day maintenance and operation work for plant operations;
- (e) Any subcontractor of any tier that does not perform any actual labor on the Project Site; and
- (f) Any other party or entity not specifically identified herein, that is excluded by the KRRC in its sole discretion, even if such party or entity is otherwise eligible.

Enrolled contractor's off-site operations are only covered if the CIP administrator provides a written acknowledgment of such coverage.

Project Company OCIP Obligations and Obligations for the Other KRRC-Provided Coverages

The Project Company shall enroll in the OCIP prior to the commencement of any Project Implementation Work at the Project Site. The Project Company shall ensure that its eligible Subcontractors enroll in the OCIP prior to their commencement of any Project Implementation Work. The Project Company shall, within 10 days of the KRRC's request, submit payroll records, policy rating pages, certified copies of insurance coverages, declaration pages of coverages, certificates of insurance, safety records and history, OSHA citations, construction cost estimates for the Project, and other data the KRRC, the OCIP Administrator, or the OCIP Insurers may request. The KRRC shall be responsible for all premiums associated with the OCIP Coverages as well as deductibles or self-insured retentions associated with the policies.

Project Company Obligations Under Project Company Provided Insurance

1. Maintenance of Insurance

Project Company must keep in force, or cause to be obtained and kept in force, the policies set forth in Appendix 9. Each policy shall be obtained prior and be in force prior to the performance of any work or commencement of any activity intended to be insured by each policy.

2. Insurer Eligibility

Each policy of insurance required to be obtained by the Project Company shall be issued by a company or companies with a rating of not less than "A-VIII" in the last available Best's Rating Guide unless otherwise



approved by the KRRC and be authorized to conduct and transact insurance business in Oregon and California.

3. Verification of Coverage

The Project Company shall deliver to the KRRC Contract Representative a copy of certificates of insurance and policy endorsements (i.e, additional insured CG 2010 and 2037, waiver of subrogation, notice of cancellation, primary and non-contributory coverage) provided by its insurance broker or agent for all insurance required within 10 days after receipt of notice of award of the Project Agreement. All such certificates and policy endorsements must be issued and approved by the KRRC prior to the issuance of a Notice to Proceed.

4. Primary Coverage

Each policy of insurance required to be obtained by the Project Company shall, with the exception of the professional liability, worker's compensation and employers liability, be non-contributing with and shall apply only as primary insurance and not excess to any other insurance, self-insurance, or other risk financing program available to the KRRC.

5. Corporate vs. Project Specific Policies

The Project Company may provide professional liability/errors and omissions liability insurance, commercial auto liability insurance, worker's compensation insurance, employer's liability insurance and insurance and watercraft and aircraft liability insurance through the general corporate policies of the Project Company or its Affiliates.

6. Waivers of Subrogation

The workers compensation and commercial automobile liability must each provide for a waiver of subrogation in favor of the KRRC and all other Indemnitees. The waiver of subrogation endorsement must be attached to the certificate of insurance in order to effectuate waiver of subrogation required. The Project Company shall require similar waivers by its Subcontractors.

7. Coverage Trigger

If any liability insurance purchased by the Project Company has been issued on a "claims made" basis, the Project Company shall agree to either provide certificates of insurance evidencing required coverages through the statute of repose after Milestone Final Completion for the Final Habitat Restoration Work with a retroactive date no later than the beginning of the Project Company's or Subcontractor's work under the Project Agreement. Or the Project Company shall purchase an extended (minimum three years) reporting period (ERP) endorsement for the policy or policies in force during the Term and evidence the purchase of the ERP endorsement by means of a certificate of insurance or a copy of the endorsement itself.

8. Notice of Cancellation

Each policy of insurance required to be obtained by the Project Company shall contain an undertaking by the insurers or the insurer's designated representative to notify the KRRC in writing not less than 30 days before any material change, cancellation or termination (except 10 days for non-payment of premium).

Definite Plan and Project Agreement Bond Requirements



Bond requirements include bid bonds, performance bonds, payment bonds and maintenance bonds which will be maintained by KRRC's vendors and contractors. KRRC will require that all bonds be obtained from financially sound surety companies. The performance bond will be in the full amount of the dam contract. AIA Form 312 is the predominant form in use at this time.

Specialty Corporate Indemnitor

Appendix L to the KHSR requires KRRC to identify and contract with a specialty corporate indemnitor (a Liability Transfer Corporation, or LTC) to protect the States of Oregon, California and PacificCorp from potential liability that may be uninsurable or underinsured. The LTC can be structured contractually, through third-party indemnities or with potentially with additional special insurance products. The LTC may perform portions of the Project and will assume responsibility for various project risks, both during project execution and post-project.

Aon's Risk and Insurance Commentary

Builder's Risk

The unique deconstruction nature of the project leads to a challenge in identifying to adequate coverage requirements for the builder's risk policy. Builder's risk insurance is typically purchased to protect an asset that is increasing in value as the project continues whereas the Klamath River Renewal Project will be primarily focused on the removal of assets. For example, if a covered peril were to occur that causes substantial damage to the existing assets, such as a fire, the builder's risk would not necessarily step in to cover the costs of removal of the damaged assets as dam removal is a key aspect of the Project scope.

The current requirements in the Project Agreement require that the builder's risk policy cover the full value of any salvage material or property at the Project Site. Considerations for the recommended limits for the builder's risk policy should include the values of the road improvements, the Yreka water supply work, recreational facilities, and the revegetation work.

Additionally, the current requirements in the Project Agreement have the KRRC procuring the builder's risk policy. In assessing the efficiency of the KRRC taking this approach to the builder's risk policy, there may be some concern that insurance markets may not necessarily be interested in participating on the project. Our recommendation is to require the Project Company to purchase the builder's risk coverage. By doing so, KRRC and the other stakeholders should be able to take advantage of the Project Company's bargaining leverage with its insurers. This should provide more efficiency in terms of pricing for the project as well as fulsome coverage if the project can be scheduled on the Project Company's master builder's risk policy.

If KRRC does procure the builder's risk policy, KRRC should consider how the deductibles should be paid. There should be some, if not all, of the deductible responsibility assigned to the Project Company or contractor who caused the damage.

General Liability and Worker's Compensation/Employer's Liability Program Structure

While there are many exposures associated with this project, such as lowering the water level in the river so the chosen Project Company will work in dry conditions versus wet, there is one exposure that has risen to the top of the list and that is the wildfire exposure. Though the amount of work associated with disconnecting the electrical transmission lines from the hydroelectric dams is small in comparison to the overall project it is and will most certainly become a major concern from an underwriting perspective. Unfortunately, starting with the San Diego brush fires to the recent fires in Southern California and most certainly Northern



California, wildfire has now reached catastrophic stature in the industry and will become a driving force in the ability to place coverage for contractors and projects alike where there is exposure to wildfire.

From a casualty or third-party liability, inclusive of worker's compensation/employer's liability, perspective there are three ways to approach this project risk. The project can be insured utilizing: 1) an Owner Controlled Insurance Program or OCIP, 2) a Contractor Controlled Insurance Program or CCIP or 3) the use of the Project Company's Practice Program. Each of these approaches are valid ways in which to insure the risks associated with the Project and all three have proven to work over time. Neither one of these ways is necessarily the right or wrong way to approach insuring the Project. Each method has advantages and disadvantages from a KRRC perspective, which will be explored in detail below.

Controlled Insurance Programs Generally:

To understand why controlled insurance programs ("CIPs") are often chosen to insure a project, one must look to how insurance law has developed over the years.

The commercial general liability insuring agreement reads as follows:

We will pay those sums that the insured becomes legally obligated to pay as damages because of "bodily injury" or "property damage" to which this insurance applies. We will have the right and duty to defend the insured against any "suit" seeking those damages. However, we will have no duty to defend the insured against any "suit" seeking damages for "bodily injury" or "property damage" to which this insurance does not apply.

* * *

This insurance applies to "bodily injury" and "property damage" only if:

- (1) The "bodily injury" or "property damage" is caused by an "occurrence" that takes place in the "coverage territory";
- (2) The "bodily injury" or "property damage" occurs during the policy period;

As such, for there to be coverage under the policy, the insured must prove:

1. That there was an "occurrence";
2. That there was "bodily injury" or "property damage" caused by the "occurrence";
3. That the "bodily injury" or "property damage" resulted in "damages";
4. That the insured is legal obligated to pay those damages;
5. That the "occurrence" took place in the "coverage territory"; and
6. That the "bodily injury" or property damage" occurred during the policy period.

The 'legally obligated' wording raises two legal issues: (1) joint and several liability and (2) anti-indemnity. California is a modified joint and several state which means that a defendant can be held 100% responsible for economic damages and severally liable for noneconomic damages. Oregon, with the exception of environmental torts, follows the rule of several liability only unless part of the judgment is uncollectible and then it may be reallocated. As for anti-indemnity, California Civil Code §2782 states that neither public nor private owner can force subcontractor to indemnify or insure another party for that other party's "active negligence or willful misconduct," for defects in the project's design provided to the subcontractor, or for claims arising out of the scope of the subcontractor's work. Oregon Revised Statute §30.140 prohibits intermediate indemnity, which is when the subcontractor assumes responsibility for the other's negligence in whole or in part.



Given these differences in law and the potential for KRRC to be sued in California or Oregon, this creates uncertainties as to whether KRRC is protected under the contractors' and subcontractors' insurance policies. A controlled insurance policy eliminates these uncertainties, to a certain extent, by having all parties insured under a single policy. The CIP will respond to claims against all enrolled contractors thereby eliminating the need for apportionment of fault and indemnification.

The "occurrence" requirement raises issues with respect to trigger of coverage and how the primary policies in effect will be exhausted. California is a continuous trigger state for environmental claims and there is a split in authority for construction defect, but the rulings are trending toward a continuous trigger. Oregon is an "injury-in-fact" state which means that coverage exists under every policy that is in effect during the time periods in which damage to property actually occurs. Since both "triggers" can implicate multiple policies, one must now look to how California and Oregon apply the "exhaustion of coverage" principle. In California, certain courts have adopted a horizontal exhaustion position, but the Supreme Court has yet to rule on the issue. Oregon has yet to rule on the issue. Horizontal exhaustion is the principle that all primary policies that could respond to a loss must be exhausted before each joint tortfeasor's excess policies can be tapped for defense and indemnity.

Trigger and exhaustion are moot when a CIP is placed because all enrolled contractors are insured under a single policy and the policy is for the term of the project.

Owner Controlled Insurance Program

Advantages

- 1) Control of coverage for both general liability and worker's compensation, although worker's compensation is not currently contemplated under the current OCIP.
- 2) Assurance all contractors working on the project will be insured and insured with the same coverage as all other contractors, consistency of coverage.
- 3) Project risks are addressed all in a single policy without the concern for a market renewal.
- 4) Complies with current Federal Regulators understanding of how the project will be insured.

Disadvantages

- 1) Financial obligations for the risk and losses under the program, (i.e. deductible payments) both during and after the completion of the project.
- 2) Project insurance costs (i.e. economies of scale)
- 3) Underwriter focused attention to the risks associated with this single project.

Though an Owner Controlled Insurance Program has certain advantages around control of coverage and limits, it does bring with it the financial obligation that potentially could happen post dissolution of KRRC. This financial obligation is a variable that could pose problems based on the structure of the OCIP. The greater concern is the issue of wildfire coverage and the ability to obtain a program with this coverage. Currently unknown to Aon is whether PacifiCorp's current liability program contains wildfire or excludes it. PacifiCorp may also maintain a separate wildfire only liability program and being an insured party in this program may cause problems in the placement of a dedicated project liability program, as carriers may go over line and not be able to support an OCIP. If we are ultimately required to place a GL only OCIP for this project, we would endeavor to place such coverage including wildfire and would attempt to eliminate any deductible obligations for KRRC post dissolution.

Contractor Controlled Insurance Program

Advantages

- 1) Relieves KRRC of the financial obligations for the risks and losses associated with the project.
- 2) Control of coverage can still be established via contract with the Project Company, (i.e. types of policies and coverage terms – certain coverages have to be included in the CCIP)



- 3) Project Insurance Costs – Project Company will likely have more influence in the marketplace due to the scale of its insurance program vs. that of a single KRRC placement.
- 4) Project risks are addressed all in a single policy without the concern for a market renewal.

Disadvantages

- 1) Underwriter focused attention to the risks associated with this single project. However, if the Project Company has a rolling CIP, it will not be as highly scrutinized.

A CCIP has advantages that may serve this project better than an OCIP. Foremost, it takes away the financial obligations with the potential to be slightly more expansive in coverage. Similar to the OCIP approach, the CCIP would address the project risk without the need for a market renewal eliminating the worry of a renewal and underwriters changing view to possibly insuring the project. While the CCIP approach will bring attention to the project and the associated risks, the Project Company will likely seek coverage from its current corporate insurer and have greater bargaining power. If the Project Company has a rolling CIP program, the project will likely get rolled into the program with little scrutiny.

Project Company's Practice Program

Advantages

- 1) Relieves KRRC of the financial obligations for the risks and losses associated with the project.
- 2) Control of coverage can still be established via contract with the Project Company, (i.e. types of policies and coverage terms – certain coverages have to be included in their practice program)
- 3) Project Insurance Costs – Project Company probably has greater bargaining power in the marketplace due to its economy of scale vs. a single KRRC placement.

Disadvantages

- 1) Project Company's insurance is subject to renewal every year which may have impact on pricing and coverage.
- 2) Reliance on Project Company's ability to manage subcontractors insurance and potential lack of consistent coverage.
- 3) Insurer unlikely to add KRRC as an insured on the policy, thus requiring an Owner's Interest policy.

The Project Company's Practice Program approach has the advantage that this project would just be one of many that the contractor has and would not necessarily receive the same direct underwriting scrutiny that would be done on a project specific basis, either OCIP or CCIP. One potential source of uncertainty in this approach is that the Project Company and its subcontractors will have to deal with their respective insurance renewals and possible changing market conditions during the Project Implementation Work. However, if they are contractual obligated to provide the required limits and coverages then KRRC has that to rely on but with the caveat that the terms required may not be able to be met in year 3 of the program as an example. The other concern is how the legal issues are addressed if there are multiple parties at fault with multiple policies

Owners Interest Liability Program

If a Project Company directed program is selected an option to consider would be to purchase a dedicated "Owners Interest" only liability program that would protect KRRC in the event KRRC is held legally liable for a loss that arises out of its sole negligence or willful misconduct. Though most liability will be driven through the Project Company's operations, such a policy would provide coverage for the unknown or unintended loss. Limits for an Owners Interest program should be evaluated based on how much direct involvement KRRC staff will have in overseeing the project.

Recommendation

As mentioned previously all three approaches to insuring the project will work. It is just deciding which one will work best for KRRC and the successful restoration of the Klamath River. With the river restoration being



KRRC's sole purpose and KRRC not existing beyond its charter, Aon believes that a contractor-directed approach to insuring the project, in lieu of an OCIP, is the better way to proceed. For the reasons previously stated and the fact that the Project Company has direct responsibility for project completion and safety, it seems best to place the insurance program in the hands of the Project Company.

The question is whether to approach this from a CCIP or the Project Company's and its subcontractor's practice program approach. Aon's recommendation is that the liability program should be structured as a CCIP (GL/WC and Excess) for the reasons outlined above. In addition to the advantages sighted above, it would be in all parties' best interest to include KRRC, PacifiCorp, and the State and Federal Parties as Named Insureds, not additional insureds on the CCIP GL and Excess policies. This will address any concerns over all interested parties having coverage under the project insurance program and should satisfy Federal Regulators. This approach will also eliminate any reason to purchase an Owners' Interest Liability Program.

If for KRRC chooses to pursue an OCIP, we recommend that it be able to collect any deductibles/SIRs from the Project Company or contractor, who causes the loss.

Auto Liability

Our only recommendation is that KRRC consider requiring higher limits (\$10M) of Project Company and allow Project Company to determine the appropriate limit for its subcontractors, but not less than \$2M.

Contractors Pollution Liability and Fixed Site Pollution Liability

While similar questions, as those posed in the casualty analysis, can be asked for the pollution cover, the difference is that Project Company will not take ownership of the site. As such, the responsibility for procuring fixed site pollution liability ("PLL") cover falls to KRRC. Therefore, we agree that KRRC should procure both the Contractor's Pollution Liability ("CPL") and the PLL cover and would seek to place at least the primary layer of both policies, and preferably the entire tower, with the same insurer. Environmental claims during the course of construction often fall to both the CPL and PLL (site pollution) and can result in additional complications when two or more insurers are involved. Additionally, it may ultimately be more advantageous for the two policies to have linked limits, as currently the policies have two separate \$100 million towers specified. As Aon continues to analyze the risks and exposures of the Project, the two separate towers may be over-insuring of the Project, when perhaps a single \$50 million may be adequate.

If Project Company is willing to do so, KRRC should work with Project Company to use Project Company's leverage in the insurance marketplace to negotiate coverage, terms and pricing.

We do recommend that KRRC be permitted to collect any deductible/SIRs from the Project Company or contractor who causes the loss.

Professional Liability Structure

Given the size of the project and the inherent, potential risk of a catastrophic loss resulting from the negligent rendering of professional services, the structure of the professional liability coverage will be critical to the success of the project. Aon has reviewed Kiewit's corporate program and it contains the same types and kinds of coverages that would be in a project specific Contractors Protective Professional Indemnity (CPPI). As such, use of Kiewit's corporate program is permissible.

Bonds Requirements



KRRC is requiring Project Company to fulfil the bonding requirements imposed upon it under the KHSa. These include performance, payment Bonds, and maintenance bonds. These are the types and kinds of bonds that would be required in a traditional construction project but, as has been highlighted earlier, this is not a traditional construction project. Any corresponding bonds that could be required in association with the upcoming work should also be passed on to the Project Company (Site Improvement, Road Use, License & Permit Bonds).

Aon has investigated the use of reclamation bonds and believes these bonds could be problematic. Unlike a construction project that may be completed within months or years, reclamation projects can go on for a very long time and the bond amounts can be substantial. A reclamation bond provides a financial guarantee that the disturbed land or water will be brought back to its approximate original state or an acceptable condition as agreed to by the Principal and the applicable State or Federal agency. A reclamation bond may be required by any operation that alters the land to a degree that the land may not recover on its own post operation. For this reason, it is not unusual for State Agencies or the Bureau of Land Management to require a bond or bonds for a substantial project.

The perpetuity exposure related to a reclamation bonds could be problematic. A contractor will not want to tie up their limited surety capacity on a potential large, long-term financial guarantee. As a Liability Transfer Company, ("LTC") any potential KRRC related indemnitor will not be a desirable credit for a surety company. The very nature of a LTC suggests that the surety liability will outlive the LTC. In addition, a LTC has a discreet pool of funds that will shrink over time. One can suspect that for a credit such as this one, a surety would want collateral, up to 100%, to support such a potential bond(s).

In addition, environmental exposures that may present themselves during the work should be reviewed closely. There are contractors that specialize in environmental remediation (Hydro and Soil) and they should be employed when possible and necessary. The surety market is very soft and there is sufficient capacity for environmental contract risks currently. However, if the market should harden, this capacity could become scarce. Environmental requirements that translate into long-term financial guarantees could be a challenge. Not unlike reclamation bonds, these are obligations that a contractor would be reluctant to engage in and the financial wherewithal of Transfer Liability Company ("TLC") would require a surety to require collateral, up to 100% of the bond penalty, to support such a risk.

When afforded the opportunity to transfer surety liability and risk to a third party, KRRC should take immediate advantage of the same. However, there are potential perpetual risks such as environmental and reclamation hazards, that a third party will be reluctant to accept. Our recommendation would be as follows:

1. Proactively look to secure bond waivers with the appropriate Obligors
2. Be prepared to put up collateral in support of these obligations
3. Investigate the funding of escrow with the Obligors over time to meet the Financial Assurance Requirements

Of course, should a surety challenge arise, Aon will make every effort to place a bond or bonds under the best terms and conditions possible.

Liability Transfer Corporation

Appendix L of the Klamath Hydroelectric Settlement Agreement requires that the KRRC contract with a specialty corporate indemnitor (LTC) that would protect the States and PacifiCorp against harm to persons, property, or the environment associated with Facilities Removal. This requirement requires KRRC to contract with an LTC that will protect the States and PacifiCorp from claims that include events that are not traditionally covered by insurance, including events such as third-party diminution in value land or property claims. Aon has worked with KRRC to identify potential companies to serve the role of LTC for the Project. A Request for Information (RFI) was issued to five LTC companies:

- ELT
- EIP



- The TBLS Group
- North Branch Global
- Commercial Liability Partners

Responses to the RFI are due back to the KRRC on March 4, 2019 with interviews scheduled for March 7, 2019. It is KRRC's intention that the ultimate LTC will be amenable to assuming environmental and other liabilities that are not covered by the proposed insurance programs.

As the project moves along KRRC will have better clarity as to what those items are for environmental, but in general risks that the CPL/PLL would not pick up that are classified as "environmental" via risk identification:

- 1) Replanting/restoration of vegetation
- 2) Dredging of any sediment that is required solely to facilitate navigation or bank improvements. The coverage would generally respond if sediment was required to be removed due to a contamination issue.
- 3) The costs to abate/remove asbestos or lead based paint
- 4) Fish kills/natural resources damage assessments due to non-pollution related events (i.e., lack of water at the fish hatchery)
- 5) Criminal fines and penalties. Civil fines and penalties only where allowable by law and only where said fines and penalties result from a pollution incident (i.e. not just a paperwork violation)
- 6) Liquidated damages/delay costs for construction, even if due to a pollution event (this may be able to be negotiated for limited situations, but let's go with the more conservative approach first)
- 7) Pollution claims not related to either the construction or on/at/under/migrating from a covered location. For example, KRRC is required to establish some alternative recreation areas to replace those that will no longer be usable after reservoir draw-down. Unless the locations are part of the CPL scope of work or listed on the site pollution policy, there will be no coverage for any pollution events that occur on, at, under these properties.
- 8) Pollution events caused by a contractor that has no written contract with the GC and/or KRRC
- 9) Willful, intentional, criminal events
- 10) The policy will have a 10-year policy term for site pollution and a maximum of a 15-year term (5 years of construction, 10 years completed operations) for CPL. The CPL could be an occurrence policy, but the site pollution is only claims-made. If we presume the worst and both policies are claims-made, there would be no coverage after policy expiration unless the policies were renewed (pending market availability).
- 11) Pollution conditions resulting from known underground storage tanks, unless the tanks are disclosed and scheduled on the site pollution policy
- 12) Contractual liability, unless we schedule the desired contracts for coverage

Risk Register

As discussed in the key project risks section of this report, there was a meeting in February 2019 with the States, PacifiCorp, KRRC and its consultants in which the group identified a variety of project risks. Aecom and Aon created a project risk register which incorporated the discussions from that meeting as well as the risks set forth in the Project Agreement. The Risk Register is attached as Appendix D to this report.

The risk register is divided into 3 specific sections: risks that are insurable, risks that are potentially insurable, and risks that are uninsurable. It is important to understand that coverage is extremely fact dependent and coverage cannot be guaranteed if the facts reveal that the cause is excluded or that there is some other type of limitation. In breaking the risks into insurable, potentially insurable and uninsurable, Aon has assumed that the insured has complied with all provisions of the policy and that the claim is not otherwise excluded.



For the potentially insurable risks, the facts and alleged damages become even more important in determining coverage. Builder's Risk and Property insurance is what is commonly referred to as a "first-party" coverage, which that the damage must be incurred by the named (or other) insureds. Additionally, for the delay in startup or contractor's continuing expense coverage to be triggered, there must be a loss caused by a peril not otherwise excluded. For the general liability insurance (3rd party coverage), as discussed in controlled insurance program section, there are 5 key factors that go into determining whether there is coverage for the loss. However, there are two key obligations under a general liability policy: defense and indemnification. The duty to defend is broader than the duty to indemnify (pay the damages). As such, often times a carrier will have a defense obligation but as the facts develop, may not have an indemnification obligation. The environmental (1st and 3rd party) and professional coverages (1st and 3rd party) have the same two duties and are also very fact dependent.

Conclusion

Aon has outlined certain recommendations with respect to the insurance program in Appendix A. We are recommending the following:

1. That Kiewit procure a Contractor Controlled Insurance Program for the general liability and Workers Compensation coverage. We believe that Kiewit's purchasing power will provide greater market efficiencies that KRRC would not have. We further believe that Kiewit is in a better position to manage the long-tail claims associated with these coverages versus KRRC because KRRC will sunset as a certain point in time. We further believe that a CCIP will allow for greater minority owned businesses, avoid gaps in coverage, obviate the trigger and exhaustion issues that often arise with respect to long-tail claims and provide the other efficiencies discussed in the CIP section of this report.
2. We recommend that Kiewit procure the Builder's Risk coverage because of its purchasing power and market relationships.
3. We recommend that Kiewit be permitted to use its Professional Liability insurance program as it complies with all of the required specifications.
4. We recommend that KRRC purchase the Contractor's Pollution Liability and Site Pollution Liability policies to assist in post-project completion transfer to the LTC.



Appendix A – Aon Proposed Insurance Plan

Insurance		Limit of Liability		Retention/Deductible		Comments
Policy Type	Recommended Procuring Entity	Baseline Minimum Requirements	Aon's Recommended Approach	Project Agreement Requirements	Aon's Recommended Approach	Relevant Notes
Builder's Risk	Kiewit	Limit to be determined	Builders risk limit to be subject to a Probable Maximum Loss analysis	No Requirements related to Retentions	The AOP deductible should be no higher than \$1M Earthquake will have a percentage deductible Flood will have a percentage deductible	There will be multiple sublimits associated with the Project and those sublimits are being evaluated
CCIP for General Liability, Excess Liability & Workers Compensation	Kiewit	General Liability: \$2,000,000 per occurrence, \$4,000,000 products completed ops, \$4,000,000 aggregate Excess: \$200,000,000 WC/EL: Statutory/\$1,000,000	General Liability: \$2,000,000 per occurrence, \$4,000,000 products completed ops, \$4,000,000 aggregate Excess: \$200,000,000 WC/EL: Statutory/\$1,000,000	No Requirements related to Retentions	A deductible or SIR not greater than \$1M	The specific forms and endorsements to be required will be added once KRRC decides on program structure
Commercial Automobile Liability	Kiewit	\$5,000,000 CSL	Project Company should provide limits of \$10M and be permitted to set limits for its subcontractors but the limit should not be less than \$2M	No Requirements related to Retentions	N/A	In addition to MCS 90 and CA 9948, Aon will outline the specific forms and endorsements in the next draft of this report
Contractor's Pollution Liability/Pollution Legal Liability	KRRC	\$100,000,000 per claim and in the aggregate	Aon recommends linking the CPL and PLL limits with limits of \$50M	No Requirements related to Retentions	Not greater than \$1M	The specific forms and endorsements to be required will be added once there is a better understanding as to limits and a combined CPL/PLL policy
Professional Liability	Kiewit	\$25,000,000 per claim and in the aggregate	\$25,000,000	No Requirements related to Retentions	Not greater than \$1M	Kiewit's corporate program is sufficient
Watercraft and Aircraft Liability	Kiewit	\$5,000,000 per occurrence and in the aggregate for watercraft, aircraft and drones \$10,000,000 per occurrence and in the aggregate for helicopters	Still exploring exposure	No Requirements related to Retentions	TBD	TBD



Appendix B – Insurance Budget

Construction Period Insurances

Line of Coverage	Coverage Description	Limits	Retentions	Estimated Premium	Premium Responsibility	Deductible Responsibility	Cost Period
Builder's Risk	Covers damage to property in the Construction Period	Subject to a Probable Maximum Loss	Not greater than \$1M	\$488,750	Kiewit	TBD	Term
CCIP (GL, Excess & WC)	Covers 3rd party bodily injury and property damage, and injured employees in the course of their employment	GL: \$2,000,000 per occurrence, \$4,000,000 products completed ops and \$4,000,000 general aggregate WC/EL: Statutory/\$1,000,000 Excess: \$200,000,000	Not greater than \$1M	\$6,500,000	Kiewit	TBD	Term
Commercial Automobile Liability	Covers liability from use of autos	\$10,000,000 combined single limit	Not greater than \$1M	\$0 (Corporate program)	KRRC & Kiewit (corporate programs)	TBD	Annual
Contractor's Pollution Liability / Pollution Legal Liability	Covers liability arising from hazardous materials	\$50,000,000 linked limits	Not greater than \$1M	\$1,200,000	KRRC	TBD	Term
Professional Liability	Covers liability arising out of design errors	\$25,000,000 per claim and project aggregate	Not greater than \$1M	\$0 (use of corporate policy)	Kiewit	TBD	Term
Watercraft and Aircraft Liability	Covers liability from use of watercraft or aircraft	Depending on exposure	Not greater than \$1M	TBD	Kiewit	TBD	Term
Total Estimated Annual Premium during Construction Period (2019 Dollars)				\$8,188,750			

Attachment C

Qualifications of Kiewit Infrastructure West Co.



KIEWIT BASICS

THE KIEWIT COMMITMENT

Kiewit's commitment to safety, quality and environmental stewardship is engrained in everything we do. It's visible in our core values, the work that we build and in our people.

Nobody Gets Hurt. To us, nothing is more important than the safety of the men and women on our project sites and the surrounding public.

Right the first time. We stake our reputation on it. Kiewit has a formal quality program that enables us to build work right the first time and focuses on continuous improvement to meet or exceed our clients' expectations.

What we do matters. Our employees know they have a responsibility to build our work as corporate citizens — and with the highest regard to environmental compliance. After all, we build in our own backyards as much as we do yours.

CORE VALUES

People. Integrity. Excellence. Stewardship. Our strong and meaningful values define Kiewit's success and longevity. Kiewit's leaders and workforce ensure that our values remain at the core of everything we do.

Kiewit is owned by **active employees**, creating a level of motivation that keeps the company on top.

HISTORY

Kiewit's roots can be traced back to 1884 when the Kiewit family started its small, local masonry contracting company. Kiewit has since grown to be one of the leading construction and engineering firms across North America.

QUALITY PEOPLE VALUES

Kiewit people take on tough challenges, explore new ideas and perform at their best.

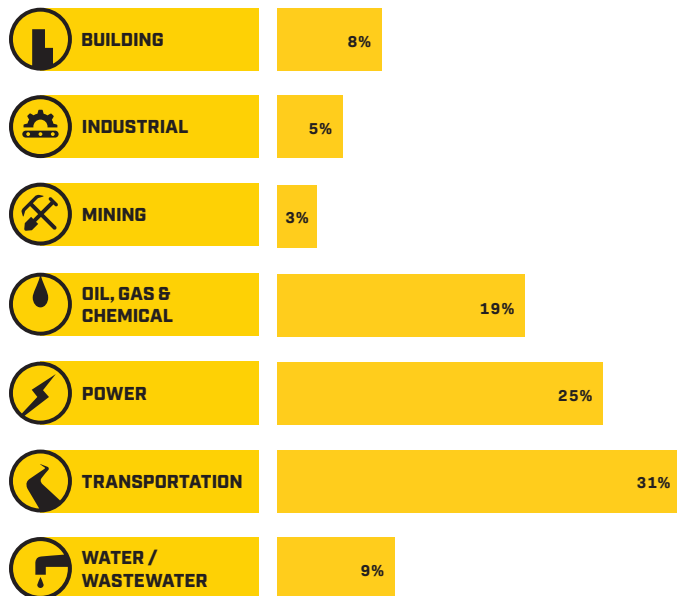
- The Kiewit workforce includes 10,000 core staff and 10,000 skilled craft workers.
- Kiewit careers boast impressive averages for executives and district managers (24 years), project managers (16 years) and superintendents (11 years).
- Kiewit's LEED®-accredited professionals are trained to achieve green objectives and support green designs.

FINANCIAL STABILITY

In 2018, Kiewit had revenues of \$9 billion. With no operational long-term debt, our strong balance sheet offers clients the assurance that their projects will get completed.

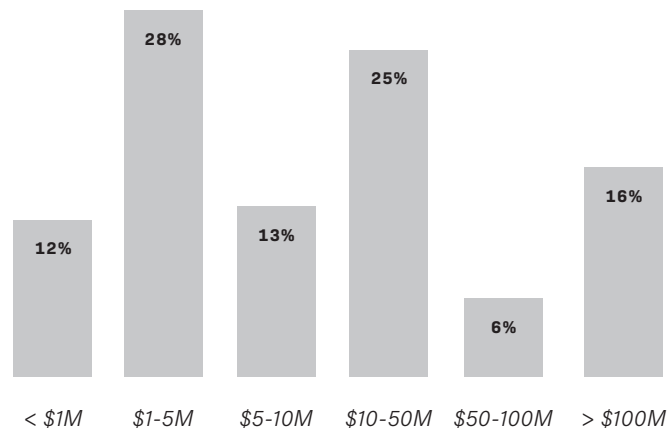
MARKET DIVERSITY

Kiewit offers services in a variety of markets, successfully delivering some of the most challenging projects.



**Based on 2018 construction and design operating revenues as reported to ENR.*

No job is too large or too small. We deliver world-class solutions to projects of every size.



**Based on 2018 contract values and number of contracts.*

RESOURCES

You can't accomplish what we do every day without one of the largest and most modern, privately owned equipment fleets in North America. It boasts 15,000 units with a replacement value of \$2.5 billion.

March 2019



Kiewit's ability to **self-perform** is a fundamental differentiator for many of our clients.





OROVILLE DAM INTERIM SPILLWAY REPAIR Oroville, California

In February of 2017, a severe rainstorm resulted in extensive damage to the Oroville Dam's gated flood control outlet (FCO) and emergency spillways. Built 75 mi. from Sacramento in the 1960s, the dam's compromised condition led authorities to issue mandatory evacuation orders for the surrounding area, while crews worked 24/7 to shore up the spillway. This project, undertaken as an emergency response, demolished and reconstructed the 3,000-ft.-long FCO spillway, installed an RCC apron downstream of the 750-ft.-long emergency spillway, constructed a 1,450-ft.-long underground secant pile wall downhill of the RCC apron, and provided associated site access.

Kiewit worked to repair the spillway which included, foundation preparation, dental excavation, installation of over 1M CY of roller compacted concrete (RCC), and structural and erosion resistant concrete to reconstruct the damaged main spillway. In addition, the project included repair of the emergency spillway by constructing a structural concrete cut-off wall, a secant pile wall, and then placing RCC between the cut-off and secant pile walls to buttress the emergency spillway. This project is on track to be completed on time in January 2019.

Major Quantities:

- Foundation Preparation - 239,000 SY
- Crushed Aggregates – 2,300,000 Tons
- Excavation and Demolition – 1,005,000 CY
- Secant Pile Cut-off Wall – 75,000 SF
- Roller Compacted Concrete – 1,050,000 CY
- Erosion Resistant Concrete – 66,000 CY



START DATE

April 2017

COMPLETION DATE

January 2019

OWNER

California Department of Water Resources

PROJECT VALUE

\$577.2 Million





EAST TOBA-MONTROSE HYDROELECTRIC PROJECTS

Toba Inlet, British Columbia

The Toba Montrose General Partnership, a partnership between Plutonic Power Corporation and GE Energy Financial Services, awarded Kiewit a \$520 Million EPC contract in 2007 to construct the Toba and Montrose run of river hydro projects, along with a 155 km 230 KV transmission line. The project was substantially completed in November 2010 when it began service commencement. Unique challenges of the project included its remote location requiring that all materials be barged or flown to site. Kiewit set up a 280 man camp, shops, fuel depots and warehouses in the Toba Valley. The first year of site construction required Kiewit to re-establish the road network in the Toba and Montrose valleys. Over 55 km of new and re-commissioned road, 11 major bridge crossing, 40 minor crossings and numerous culverts were constructed.

Major quantities of work included over 500,000 m³ of rock and earthworks excavations, 9,000 m of penstock installation, placement of 25,000 m³ of concrete work at the intakes and powerhouses, installation of four turbine generators with a capacity of 200 MW, balance of plant works and the completion of the 230 KV transmission line.

An outstanding feature of the project was the relationships that were developed with the local First Nations. Kiewit exceeded over 200 person-years of FN employment and had an innovative partnership with the Klahoose FN and the Powell River school board to supply the camp catering that also included a significant training component.



Kiewit

START DATE

September 1, 2007

COMPLETION DATE

February 2, 2010

CLIENT

Toba Montrose General Partnership

DESIGNER

Knight Piesold Consulting

PROJECT VALUE

\$520 Million

Hydro-electric dam construction in a challenging remote location





FOLSOM DAM SPILLWAY PHASES II AND IV Folsom, CA

Built in 1955, the Folsom Dam is located in Northern California about 25 miles northeast of Sacramento along the American River. The dam was not capable of releasing water at a rate fast enough to relieve severe flooding upstream. Additional gates, a spillway, and a stilling basin were added to the dam to help manage a future flood event. Kiewit was awarded the contract on Phase II and Phase IV of the project.

Phase II included excavation of 2.5M CY, construction of two in-water embankments, access roads, demolition of existing structures and replacement of 1,800 lf steel pipe that serves as the primary water source for the City of Folsom.

Phase IV of the Project constructed the 4,000-ft-long approach channel and spillway. Major components of the project included the 1,100-ft-long approach channel, the 2,000-ft-long upper spillway channel, the 900-ft-long step chute and the 200-ft-long stilling basin. The USACE and Kiewit partnered to complete the project which entailed batching and placing 187,000 CY of concrete; forming and stripping 700,000 SY of forms in 46 months. The team worked over 1,100,000 manhours to complete the project.

START DATE

Ph II: April 2009

Ph IV: July 2013

COMPLETION DATE

Ph II: January 2011

Ph IV: December 2016

OWNER

US Bureau of Reclamation
(Phase II); USACE (Phase IV)

PROJECT VALUE

Ph II: \$36 Million

Ph IV: \$317.7 Million





KWALSA AND UPPER STAVE HYDROELECTRIC PROJECTS

Harrison, British Columbia

The province of British Columbia and the Douglas First Nations communities in Tipella and Port Douglas were formerly serviced by unreliable, diesel-generated electricity. To provide the communities and the Province with green hydroelectricity, Cloudworks Energy Inc. awarded Kiewit a \$400 million contract to engineer, procure and construct (EPC) six separate run-of the-river hydroelectric projects located in the Kwalisa and Upper Stave regions of British Columbia to produce 156 megawatts (MW) of power.

The project consists of six separate power plants each uniquely designed to optimize the individual characteristics of the independent water shed. Each run of the river project is comprised of an intake diversion structure, a penstock, a powerhouse and a switchyard. A 70 kilometre 138 KV transmission line connects the switchyards to the new British Columbia Transmission Corporation substation. Kiewit self-performed a majority of the work, including all the civil, mechanical, electrical, penstock and turbine installations.

Major quantities included forming and pouring of over 20,000 m³ of reinforced concrete, transport, handling, and welding of 20 kilometres of steel penstocks (1.5 m to 3.7 m in diameter), installation of 14 turbine generators, associated mechanical and electrical, and 800,000 m³ of rock and earth excavation and backfill.

This 3.5 year project was commissioned in early 2010, a full 8 months ahead of the contract schedule.



Kiewit

START DATE
September, 2006

COMPLETION DATE
June, 2010

CLIENT
Cloudworks Energy Inc.

DESIGNER
Knight Piésold Consulting

PROJECT VALUE
\$400 Million

CONTRACT TYPE
Design-Build

Six remote sites all
successfully
coordinated as one
project





KOKISH RIVER HYDROELECTRIC PROJECT Port McNeill, British Columbia

Kwagis Power Limited Partnership, a partnership between Brookfield Renewable Energy Group and the Namgis First Nation, awarded Kiewit a \$160 million dollar fixed price EPC contract for the 44 MW Kokish Hydroelectric Project in 2012. The project will be in operation early in 2014 after Kiewit has commissioned the facility.

Kiewit worked with Kwagis over an 8 year period as the project was developed. Key challenges included the development of a fish ladder design at the intake that would allow Salmon fish passage and the use of fish exclusion screens at the powerhouse that would exclude fish from the tailrace. Kiewit worked with Kwagis on these and other project features to enable the project to receive its environmental permits.

Major quantities of work include the following:

- Over 800,000 m3 of excavation
- Over 175,000 m3 of rock drill and blast
- 7700 m of large diameter steel penstock installation
- 1500 m of Weholite HDPE penstock installation
- 11,000 m3 of cast in place concrete at the intake and powerhouse
- Supply and install of 4 Pelton turbine generators rated at 44 MW
- Supply and install of a switch yard including the transformer and a transmission line
- Supply and install of all mechanical systems including intake gates and turbine valves
- Supply and install of pre-engineered powerhouse building including overhead cranes



Kiewit

START DATE

May 5, 2012

COMPLETION DATE

June 1, 2014

CLIENT

Kwagis Power Limited Partnership (managing partner: Brookfield Renewable Energy Group.)

PROJECT VALUE

\$160 Million

CONTRACT TYPE

Early Contractor Involvement-Fixed Price EPC

Early Contractor
Involvement, similar
to Progressive
Design-Build Delivery
model





Kiewit

- Supply and install of the electrical and protection and control systems
- Commissioning of all equipment, turbine generators, electrical and control systems

One of the major project risks that Kiewit has successfully met is the challenge of constructing a large civil project in the mountains of British Columbia while meeting strict sediment and water quality environmental guidelines.

Early Contractor
Involvement, similar
to Progressive
Design-Build Delivery
model



Attachment D

**Letter from Jamie Wisenbaker, Senior Vice President, Kiewit Infrastructure West Co.
to Laura Hazlett, Chief Financial Officer, Klamath River Renewal Corporation
(July 19, 2019)**



July 19, 2019

Klamath River Renewal Corporation (KRRRC)
2001 Addison Street, Suite 317
Berkeley, CA 94704
Attn: Laura Hazlett, Chief Financial Officer

Dear Laura,

KRRRC has asked Kiewit to provide a preliminary review of the KRRRC's construction budget.

While we have only been in the field for two months and have not had time to complete design work or perform a detailed quantity comparison, we have reviewed AECOM's cost estimate quantities and can confirm that the quantities appear reasonable.

Further, we believe the design can be completed, and we will be able to submit a GMP to complete a scope of work allowing removals and restoration within KRRRC's overall proposed budget.

We look forward to working through the design process with the KRRRC.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Jamie Wisenbaker', is written over a light blue circular stamp.

Jamie Wisenbaker
Senior Vice President

Attachment E

**“Project Agreement for Design, Construction, Demolition and Habitat Restoration Services
in Connection with the Lower Klamath River Project Dams
between
The Klamath River Renewal Corporation
and
Kiewit Infrastructure West Co.”
(Apr. 24, 2019)**

Execution Version

PROJECT AGREEMENT

FOR
DESIGN, CONSTRUCTION, DEMOLITION AND HABITAT RESTORATION SERVICES
IN CONNECTION WITH
THE REMOVAL OF THE LOWER KLAMATH RIVER DAMS

between

THE KLAMATH RIVER RENEWAL CORPORATION

and

KIEWIT INFRASTRUCTURE WEST CO.

Dated

April 24, 2019

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- A. Form of Guaranty Agreement
- B. Form of Performance Bond
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REFERENCE DOCUMENTS

1. Historic Drawings ⁽¹⁾
2. Historic Photos ⁽¹⁾
3. Pre-Dam Topographic Maps and Surfaces ⁽¹⁾
4. Parcel B and Fall Creek Parcels Data ⁽¹⁾
5. Preliminary Design Drawings ⁽¹⁾
6. Definite Plan ⁽¹⁾
7. Water Surface and Other Reservoir Data (Confidential; Subject to NDA) ⁽¹⁾
8. CPUC Funding Agreement ⁽¹⁾
9. OPUC Funding Agreement ⁽¹⁾
10. California Proposition 1 Funding Agreement, as Amended ⁽¹⁾
11. Klamath Hydroelectric Settlement Agreement, as Amended ⁽¹⁾
12. PacifiCorp Operations and Maintenance Agreement ⁽¹⁾
13. Sample Form of KHSA Indemnity Agreement
14. USBR Modeling Files⁽¹⁾

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RELIANCE DOCUMENTS

1. Project Implementation Work Limits ⁽¹⁾
2. Site Base Maps – Topographic and Bathymetric Surveys ⁽¹⁾
3. Geotechnical Data Report ⁽¹⁾
4. Phase 1 Environmental Site Assessment ⁽¹⁾
5. Phase 2 Environmental Site Assessment ⁽¹⁾
6. Draft Biological Existing Conditions Report (from Draft Biological Assessment) ⁽¹⁾
7. Definite Plan – Appendix L – Cultural Resources Plan ⁽¹⁾
8. Property Boundary Survey ⁽¹⁾
9. CAD Drawings Standards ⁽¹⁾
10. Cost Model Guidelines ⁽¹⁾
11. Existing Conditions Assessment Report ⁽²⁾
12. KRRC Native Seed Collection Summary⁽¹⁾

COMPLIANCE DOCUMENTS

1. Environmental Compliance Plan ⁽²⁾
2. Oregon Final Clean Water Act Section 401 Water Quality Certification ⁽²⁾
3. California Draft Clean Water Act Section 401 Water Quality Certification ⁽²⁾
4. Klamath County Memorandum of Agreement ⁽¹⁾
5. Siskiyou County Memorandum of Agreement ⁽¹⁾

**[Note: (1) To be included in the Project Agreement on the Contract Date
(2) To be included in the Project Agreement on the GMP Contract Amendment Date or the Project Implementation Contract Amendment Date]**

HATCHERY WORK AND CITY OF YREKA WATERLINE WORK COMPLETE PLANS, DRAWINGS
AND SPECIFICATIONS

1. Hatchery Work Complete Plans, Drawings and Specifications
2. City of Yreka Waterline Work Complete Plans, Drawings and Specifications

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PROJECT AGREEMENT
FOR
DESIGN, CONSTRUCTION, DEMOLITION AND HABITAT RESTORATION SERVICES
IN CONNECTION WITH
THE REMOVAL OF THE LOWER KLAMATH RIVER DAMS

THIS PROJECT AGREEMENT ("Project Agreement") is made and entered into as of April 24, 2019, between the Klamath River Renewal Corporation (the "KRRC") and Kiewit Infrastructure West Co., a corporation organized and existing under the laws of the State of Delaware and authorized to do business in the State of California and the State of Oregon (the "Project Company").

RECITALS

WHEREAS, PacifiCorp owns four hydroelectric dams on the lower Klamath River operating under Federal Energy Regulatory Commission regulatory jurisdiction.

WHEREAS, in order to implement the terms of the Klamath Hydroelectric Settlement Agreement, the States of California and Oregon caused the KRRC to be formed as a California non-profit corporation on February 29, 2016.

WHEREAS, the KHSA provides primarily for the removal of the four lower Klamath River hydroelectric dams, and related design, construction, demolition and habitat restoration work.

WHEREAS, funding for the project will be provided from (1) \$200 million in surcharges collected from PacifiCorp's Oregon and California utility customers, as authorized by the California Public Utilities Commission and the Oregon Public Utilities Commission, and (2) \$250 million from the proceeds of State of California bonds issued for this project.

WHEREAS, PacifiCorp, in conjunction with KRRC, has applied to FERC for the transfer to the KRRC of the license under which the dams are operated.

WHEREAS, the KRRC has applied to FERC for the surrender of the dams' licensed.

WHEREAS, the KRRC has determined to contract with a private entity on a progressive design-build basis to perform the design, construction, demolition and habitat restoration work necessary to carry out and complete the Project.

WHEREAS, the KRRC issued a request for qualifications on September 18, 2018, in order to shortlist firms whose proposals would be evaluated on a best value basis.

WHEREAS, based on the evaluation of the statements of qualifications submitted in response to the request for qualifications and using the criteria set forth in the request for qualifications, the KRRC shortlisted three firms to submit proposals.

WHEREAS, on December 4, 2018, the KRRC undertook the second phase of the competitive process by issuing to the shortlisted firms a request for proposals for the Project.

WHEREAS, proposals submitted in response to the request for proposals were received in February, 2019 from each of the shortlisted firms.

WHEREAS, the proposals were reviewed by the KRRC based on the evaluation criteria set forth in the request for proposals.

WHEREAS, the KRRC determined that the proposal submitted by the Project Company was the proposal that delivered the best value to the KRRC.

WHEREAS, in April 2019, negotiations were initiated with the Project Company, which negotiations have concluded with this Project Agreement.

WHEREAS, on April 18, 2019, the KRRC's board of directors authorized the execution and delivery of this Project Agreement.

WHEREAS, the governing body of the Project Company has duly authorized the execution and delivery of this Project Agreement.

WHEREAS, the parties intend, but are not obligated, to negotiate and enter into an amendment to this Project Agreement following the advancement of design furnished by the Project Company on a compensated basis, providing for a guaranteed maximum price and a guaranteed schedule for the project implementation work.

WHEREAS, following the expected execution of the definitive guaranteed maximum price amendment and definitive project implementation contract amendment to this Project Agreement and the receipt of all required governmental licenses, permits and approvals, the Project Company will proceed to complete the project design and undertake and complete the project construction, demolition and habitat restoration work.

WHEREAS, the KRRC desires to receive, and the Project Company desires to provide, design, construction, demolition and habitat restoration services under the terms of this Project Agreement.

NOW, THEREFORE, in consideration of the mutual covenants herein contained, the parties hereto, intending to be legally bound, agree as follows:

ARTICLE 1

DEFINITIONS AND INTERPRETATION

SECTION 1.1. DEFINITIONS.

As used in this Project Agreement, the following terms shall have the meanings set forth below:

“Additional Preliminary Services” has the meaning set forth in subsection 5.2(B) (Additional Preliminary Services).

“Adjacent and Related Lands” means the parcels of real property on which ancillary Project Implementation Work, including flood protection measures and downstream sediment removal, is to be performed, as more particularly described in Attachment 1B (Description of Adjacent and Related Lands) to Appendix 1 (Project and Project Site Description), and as to which the KRRC will, by the Project Implementation Contract Amendment Date, have acquired easements or other interests in real property sufficient for the purposes of the Project.

“Affiliate” means, in respect of a person, any other person that, directly or indirectly, through one or more intermediaries, controls, is controlled by, or is under common control with, such first person, where “control” means, with respect to the relationship between or among two or more persons, the possession, directly or indirectly or as trustee, personal representative or executor, of the power to direct or cause the direction of the affairs or management of a person, whether through the ownership of voting securities, as trustee, personal representative or executor, by statute, contract, credit arrangement or otherwise, including the ownership, directly or indirectly, of securities having the power to elect a majority of the board of trustees or similar body governing the affairs of such person.

“Appendix” means any of the Appendices and, as applicable, any attachments thereto, that are appended to this Project Agreement and identified as such in the Table of Contents to this Project Agreement.

“Applicable Law” means (1) any federal, state or local law, statute, code or regulation; (2) any formally adopted and generally applicable rule, requirement, determination, standard, policy, implementation schedule, or other order of any Governmental Body having appropriate jurisdiction; (3) any established interpretation of law or regulation utilized by an appropriate Governmental Body if such interpretation is documented by such Governmental Body and generally applicable; (4) any Governmental Approval; and (5) any consent order or decree, settlement agreement or similar agreement between the KRRC and any Governmental Body, in each case having the force of law and applicable from time to time, over the Project, the Contract Obligations or any other transaction contemplated hereby.

“Approved Subcontractors” means the subcontractors identified in Appendix 10 (Key Personnel and Approved Subcontractors).

“Bankruptcy Law” means the United States Bankruptcy Code, 11 U.S.C. 101 *et seq.*, as amended from time to time and any successor statute thereto. “Bankruptcy Law” shall also include any similar state law relating to bankruptcy, insolvency, the rights and remedies of creditors, the appointment of receivers or the liquidation of companies and estates that are unable to pay their debts when due.

“Base Guaranteed Maximum Price” means the initial amount approved by the KRRC as the Guaranteed Maximum Price pursuant to Appendix 8 (Contract Price).

“Base Guaranteed Maximum Price Adjustment” means any adjustment to the Base Guaranteed Maximum Price made in accordance with and subject to the terms and conditions of this Project Agreement, including Appendix 8 (Contract Price).

“Base Preliminary Services” means those services designated as Base Preliminary Services in Appendix 2 (Preliminary Services).

“Baseline Date” means the Contract Date, except that:

(1) With respect to any Project Implementation Work authorized pursuant to an Early Work Package Amendment, the Baseline Date shall mean the Early Work Package Amendment Date; and

(2) Upon the execution and delivery of the Project Implementation Contract Amendment, the Baseline Date shall mean the Project Implementation Contract Amendment Date.

“Board of Directors” means the board of directors of the KRRC.

“Books and Records” has the meaning set forth in subsection 9.10(A) (Books and Records).

“Business Day” means a day other than a Saturday, Sunday or an official KRRC holiday.

“California Proposition 1 Grant Funding Agreement” means the Funding for Water Quality, Supply, Treatment, and Storage Projects of 2014 (Proposition 1) grant funding agreement effective as of July 1, 2016 between KRRC and the State of California, acting through the California Natural Resources Agency (Agreement Number P11601-0), as amended, set forth as Reference Document 10 (California Proposition 1 Grant Funding Agreement).

“CEQA” refers to the California Environmental Quality Act (Cal. Pub. Res. Code § 21000 *et seq.*).

“CERCLA” means the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. 9601 *et seq.*, and applicable regulations promulgated thereunder, each as amended from time to time.

“Change in Law” means any of the following acts, events or circumstances to the extent that compliance with the change materially expands the scope, interferes with, delays or increases the cost of performing the obligations of the Project Company:

(1) Except as provided below with respect to the exclusions from the definition of “Change in Law”, the adoption, amendment, promulgation, issuance, modification, repeal or written change in administrative or judicial interpretation of any Applicable Law on or after the Baseline Date, unless such Applicable Law was on or prior to the Baseline Date duly adopted, promulgated, issued or otherwise officially modified or changed in interpretation, in each case in final form, to become effective without any further action by any Governmental Body; or

(2) Except as provided below with respect to the exclusions from the definition of “Change in Law”, the order or judgment of any Governmental Body issued on or after the Baseline Date (unless such order or judgment is issued to enforce compliance with Applicable Law which was effective as of the Baseline Date) to the extent such order or judgment is not the result of willful or negligent action, error or

omission or lack of reasonable diligence of the Project Company; provided, however, that the contesting in good faith or the failure in good faith to contest any such order or judgment shall not constitute or be construed as such a willful or negligent action, error or omission or lack of reasonable diligence.

It is specifically understood, however, that none of the following shall constitute a “Change in Law”:

(1) Acts, events and circumstances with respect to Governmental Approvals to the extent the Project Company has assumed the permitting risk under Section 6.6 (Permitting Responsibilities and Schedule);

(2) Any Change in Law relating to Taxes, except for sales or use Taxes imposed in the United States on materials or equipment incorporated into the Project (or equivalent Taxes imposed by an international taxing jurisdiction);

(3) A change in the nature or severity of the actions typically taken by a Governmental Body to enforce compliance with Applicable Law that was in effect as of the Contract Date;

(4) Any increase in any fines or penalties provided for under Applicable Law in effect as of the Baseline Date; or

(5) Any Change in Law (including the enactment of any statute, or the promulgation of any regulation) the terms and conditions of which do not impose more stringent or burdensome requirements on the Project Company than are imposed by the Contract Standards in effect as of the Baseline Date.

“Change Order” means a written order issued by the KRRC and agreed to in writing by the Project Company prior to Project Final Completion making a Project Technical Requirements Change, a Base Guaranteed Maximum Price Adjustment, an adjustment to any Scheduled Milestone Substantial Completion Date or Milestone Longstop Date, or any other change to the terms and conditions of this Project Agreement. A Change Order shall be deemed to constitute a Contract Amendment.

“City of Yreka Waterline Work” means the construction and construction-related work to be performed as part of the Project Implementation Work in accordance with the City of Yreka Waterline Work Complete Plans, Drawings and Specifications prepared by the KRRC.

“City of Yreka Waterline Work Complete Plans, Drawings and Specifications” means the complete plans, drawings and specifications for the City of Yreka Waterline Work prepared on behalf of the KRRC and attached to this Project Agreement and identified as the “City of Yreka Waterline Work Complete Plans, Drawings and Specifications”.
[Note: To be included on the GMP Contract Amendment Date]

“Compliance Documents” means the documents identified as such in the Table of Contents to this Project Agreement.

“Contract Administration Memorandum” has the meaning set forth in subsection 17.4(B) (Contract Administration Memoranda).

“Contract Amendment” has the meaning set forth in subsection 17.5(A) (Amendments Generally).

“Contract Compensation” means the Preliminary Services Fee and the Contract Price.

“Contract Date” means the date this Project Agreement is executed and delivered by the parties hereto.

“Contract Documents” means:

- (1) This Project Agreement and all Appendices;
- (2) Any Early Work Package Amendment, the GMP Contract Amendment and the Project Implementation Contract Amendment;
- (3) Any Change Order, Unilateral Change Directive or other Contract Amendment;
- (4) The Project Technical Requirements;
- (5) Any Notice to Proceed;
- (6) Any Field Order;
- (7) Any Contract Administration Memorandum; and
- (8) The Issued for Project Implementation Specifications.

It is specifically understood, however, that neither the KHSAs nor the Funding Agreements shall constitute “Contract Documents”.

“Contract Obligations” means everything required to be furnished and done by the Project Company for and relating to the Project Work pursuant to the Contract Documents.

“Contract Price” has the meaning set forth in Appendix 8 (Contract Price).

“Contract Representative” means, in the case of the Project Company, the Project Company Contract Representative and, in the case of the KRRC, the KRRC Contract Representative.

“Contract Standards” means the standards, terms, conditions, methods, techniques and practices imposed or required by:

- (1) Applicable Law;
- (2) The Project Technical Requirements;
- (3) Good Dam Removal Practice;
- (4) The Insurance Requirements;
- (5) The Project Plans, as accepted by the KRRC pursuant to the terms and conditions of the Contract Documents; and
- (6) Any other standard, term, condition or requirement specifically provided in the Contract Documents to be observed by the Project Company.

Subsection 1.2(U) (Applicability, Stringency and Consistency of the Contract Standards) shall govern issues of interpretation related to the applicability, stringency and consistency of the Contract Standards.

“Cost Substantiation” means the process of providing evidence of actual costs in accordance with Section 9.8 (Cost Substantiation).

“Counties” means Siskiyou County and Klamath County.

“County Memoranda of Agreement” or **“County MOA’s”** means the Memoranda of Agreement between KRRC and each County relating to the Project, set forth as Compliance Document 4 (Klamath County Memorandum of Agreement) and Compliance Document 5 (Siskiyou County Memorandum of Agreement).

“CPUC” means the California Public Utilities Commission.

“CPUC Funding Agreement” means the agreement dated December 13, 2017 between KRRC and the CPUC providing funding for the Project, set forth as Reference Document 8 (CPUC Funding Agreement).

“Dam Removal and Initial Habitat Restoration Work” means the embankment dam removal; concrete dam and structures removal; the cofferdams construction; demolition of electrical systems; construction of disposal sites; construction of engineered habitat features; site hydroseeding; and invasive vegetation removal, as more particularly described in Sections 4.7 (Embankment Dam Removal), 4.8 (Concrete Dam and Structure Removal), 4.9 (Cofferdams), 4.10 (Electrical), 4.11 (Disposal Sites), 4.12 (Engineered Habitat Features), 4.13 (Plant Materials), 4.14 (Invasive Exotic Vegetation Removal) and 4.15 (Habitat Restoration) of Appendix 4 (Project Technical Requirements).

“Decommissioning” means PacifiCorp’s physical removal from a facility of any equipment and personal property that PacifiCorp determines has salvage value, and physical disconnection of the facility from PacifiCorp’s transmission grid.

“Definite Plan” means the Definite Plan for Facilities Removal, dated June 28, 2018 (titled “Definite Plan for the Lower Klamath Project”), prepared by the KRRC pursuant to Section 7.2.1 of the KHSA, set forth as Reference Document 6 (Definite Plan), as updated or amended from time to time.

“Deliverable Material” means the Preliminary Services Deliverable Material and the Project Implementation Work Deliverable Material.

“Design Professional Services” means that part of the Project Work consisting of the preparation of plans, Drawings and Specifications for the Project by licensed professional engineering, architectural and land surveying firms, as well as all other services required to be performed by licensed design professionals as part of the Preliminary Services and the Project Implementation Work for the design and engineering of the Project, including professional engineering, architectural and land surveying services.

“Design Professional Services Firm” means any person providing Design Professional Services.

“Differing Site Conditions” means (a) subsurface or latent physical conditions at the Project Site which differ materially from those indicated in the Geotechnical Data Report and the Existing Conditions Assessment Report, or (b) unknown physical conditions at the Project Site, of an unusual nature, which differ materially from those ordinarily encountered

and generally recognized as inherent in work of the character required herein; provided, however, that the term “Differing Site Conditions” excludes:

(1) Conditions otherwise reflected in the Contract Documents existing as of the Baseline Date; and

(2) Conditions of which the Project Company had knowledge as of the Baseline Date, including conditions that could reasonably have been known, discovered or revealed as a result of the examinations, investigations, explorations, tests or studies of the Project Site required to be performed by the Project Company as part of the Preliminary Services, including the development of the Existing Conditions Assessment Report and any additional Preliminary Services relating to the Geotechnical Data Report.

“Document Submittal Procedures” means the procedures for the submittal of Project Implementation Design Documents by the Project Company to the KRRC to be developed by the Project Company in accordance with the requirements set forth in Appendix 2 (Preliminary Services) and Appendix 7 (Project Implementation Work Review Procedures).

“Drawings” means drawings, diagrams, illustrations, schedules and other data that show the scope, extent and character of the Project Implementation Work, as prepared by or on behalf of the Project Company.

“Early Work Package” has the meaning set forth in subsection 5.7(A) (Early Work Packages).

“Early Work Package Amendment” has the meaning set forth in subsection 5.7(A) (Early Work Packages).

“Early Work Package Amendment Date” means the date that an Early Work Package Amendment is executed and delivered by the parties.

“Early Work Package Bonds” has the meaning set forth in subsection 16.2(A) (Early Work Package Bonds).

“Early Work Package Price” means the base price established in any Early Work Package for the portion of the Project Implementation Work to be performed thereunder.

“Early Work Package Submittals” has the meaning set forth in subsection 5.7(A) (Early Work Packages).

“Encumbrances” means any Lien, lease, mortgage, security interest, charge, judgment, judicial award, attachment or encumbrance of any kind with respect to the Project.

“Engineer-of-Record” means the professional engineer licensed in the State in which the Project Implementation Work is being performed and in good standing who is designated by the Project Company and acceptable to the KRRC, acting reasonably, as the engineer responsible for the preparation, signing, dating, sealing and issuing of the applicable Project Implementation Design Documents and all other engineering documents relating to all or a portion of the Project Implementation Work.

“Environmental Compliance Plan” means the Project Company’s plan for the management of environmental compliance activities and reporting of such results in accordance with the applicable Governmental Approvals during the Project Implementation

Period, to be developed as part of the Preliminary Services in accordance with the requirements in Appendix 2 (Preliminary Services).

“Environmental Impact Report” or **“EIR”** means the environmental impact report with respect to the Project prepared by the Water Resources Control Board pursuant to CEQA, in draft and final forms as applicable.

“Environmental Mitigation Measures” has the meaning set forth in Section 4.3 (Environmental Review).

“Environmental Site Assessments” means the Phase 1 Environmental Site Assessment and Phase 2 Environmental Site Assessment, set forth as Reliance Document 4 (Phase 1 Environmental Site Assessment) and Reliance Document 5 (Phase 2 Environmental Site Assessment).

“EPA” means the United States Environmental Protection Agency.

“Event of Default” means, with respect to the Project Company, those items specified in Section 12.2 (Events of Default by the Project Company) and, with respect to the KRRRC, those items specified in Section 12.5 (Events of Default by the KRRRC).

“Existing Conditions Assessment Report” means the report so designated to be prepared by the Project Company during performance of the Preliminary Services in accordance with the requirements in Appendix 2 (Preliminary Services).

“Expiration Date” means the last day of the final Warranty Period or the date on which Project Final Completion occurs, whichever is later.

“Extended Warranty Fee” has the meaning set forth in subsection 10.1(C) (Optional Extension of Warranty Periods).

“Facilities” means the following specific hydropower facilities within the jurisdictional boundary of FERC Project No. 14803: J.C. Boyle Dam, Copco No. 1 Dam, Copco No. 2 Dam and Iron Gate Dam, and appurtenant works, structures, improvements, assets, equipment and ancillary facilities constituting part of the KHP licensed to PacifiCorp as of the Contract Date, as more particularly described in Section 1.4 (Facilities) to Appendix 1 (Project and Project Site Description). For the purposes of this Project Agreement, the term “Facilities” is synonymous with “Lower Klamath Project”, as such term is used in the Definite Plan, Transfer Application and Surrender Application.

“Facilities Removal” means physical removal of all or part of each of the Facilities to achieve at a minimum a free-flowing condition and volitional fish passage, site remediation and restoration, including previously inundated lands, measures to avoid or minimize adverse downstream impacts, and all associated permitting for such actions.

“Fees and Costs” means reasonable fees and expenses of employees, attorneys, architects, engineers, expert witnesses, contractors, consultants and other persons, and costs of transcripts, printing of briefs and records on appeal, copying and other reimbursed expenses, and expenses reasonably incurred in connection with investigating, preparing for, defending or otherwise appropriately responding to any Legal Proceeding.

“FERC” means the Federal Energy Regulation Commission.

“FERC License Orders” means the FERC License Transfer Order and the FERC License Surrender Order.

“FERC License Surrender Order” means the final order or orders issued by FERC approving the KRRC’s “Application for Surrender of License for Major Project and Removal of Project Works”, seeking FERC’s approval of an application to surrender the license for the Facilities and to achieve, by implementation of the Definite Plan, a free-flowing condition and volitional fish passage through the portions of the Klamath River that are currently occupied by the Facilities.

“FERC License Transfer Order” means the final order or orders issued by FERC approving the KRRC and PacifiCorp’s “Joint Application for Approval of License Amendment and License Transfer”, seeking a separate license for the Facilities from other PacifiCorp owned facilities and to transfer the license for the Facilities from PacifiCorp to KRRC.

“Final Habitat Restoration Work” means the work necessary after the Dam Removal and Initial Habitat Restoration Work relating to completion of the irrigation system; plant establishment and maintenance; and the establishment of long term monitoring efforts, as more particularly described in Sections 4.15 (Habitat Restoration), 4.16 (Irrigation), 4.17 (Plant Establishment and Maintenance), and 4.18 (Plant Monitoring) of Appendix 4 (Project Technical Requirements).

“Funders” means the CPUC, the OPUC and the State of California.

“Funding Agreements” means the CPUC Funding Agreement, the OPUC Funding Agreement and the California Proposition 1 Grant Funding Agreement.

“Funding Requirements” means the requirements for funding the Project established by the Funders under the Funding Agreements.

“General Conditions Costs” has the meaning set forth in Appendix 8 (Contract Price).

“Geotechnical Data Report” means the geotechnical data report prepared by AECOM and set forth as Reliance Document 3 (Geotechnical Data Report).

“GMP Contract Amendment” has the meaning set forth in subsection 5.9(B) (Negotiation and Execution of the GMP Contract Amendment).

“GMP Contract Amendment Date” has the meaning set forth in subsection 5.9(B) (Negotiation and Execution of the GMP Contract Amendment).

“GMP Project Submittal” has the meaning set forth in Section 5.8 (GMP Project Submittal).

“Good Dam Removal Practice” means those methods, techniques, standards and practices which, at the time they are to be employed and in light of the circumstances known or reasonably believed to exist at such time, are generally recognized and accepted as good design, engineering, construction, demolition and habitat restoration practices as observed for the removal of hydroelectric dam facilities and related structures, improvements and equipment as followed in the States, including those standards set forth in Appendix 4 (Project Technical Requirements).

“Governmental Approvals” means any permit, license, authorization, consent, certification, exemption, ruling, entitlement, variance or approval issued by a Governmental Body of whatever kind and however described, which is required under Applicable Law to be obtained or maintained by any person with respect to the Project Implementation Work,

including the Project Company-Managed Governmental Approvals and the KRRC-Managed Governmental Approvals.

“Governmental Approvals Completion Period” has the meaning set forth in subsection 5.10(A) (Obtaining All Remaining Governmental Approvals).

“Governmental Body” means any federal, State, regional or local legislative, executive, judicial or other governmental board, department, agency, authority, commission, administration, court or other body, or any official thereof, having jurisdiction in any way over or in respect of any aspect of the performance of this Project Agreement or the Project.

“Guaranteed Maximum Price” or **“GMP”** has the meaning set forth in Appendix 8 (Contract Price).

“Guarantor” means Kiewit Infrastructure Group, Inc, a corporation organized and existing under the laws of the State of Delaware.

“Guaranty Agreement” means the Guaranty Agreement from the Guarantor to the KRRC in the form set forth as Transaction Form A (Form of Guaranty Agreement).

“Hatchery Work” means the construction and construction-related work to be performed as part of the Project Implementation Work in accordance with the Hatchery Work Complete Plans, Drawings and Specifications prepared by the KRRC.

“Hatchery Work Complete Plans, Drawings and Specifications” means the complete plans, drawings and specifications for the Hatchery Work prepared on behalf of the KRRC and attached to this Project Agreement and identified as the “Hatchery Work Complete Plans, Drawings and Specifications”. **[Note: To be included on the GMP Contract Amendment Date]**

“Hazardous Material” means any waste, substance, object or material deemed hazardous under Applicable Law, including “hazardous substances” as defined under CERCLA, “hazardous waste” as defined under RCRA and in California Health and Safety Code Section 25117, “hazardous material” as defined under US DOT regulations (49 CFR Parts 100–180), and “hazardous material” as defined in Oregon Administrative Rules 340-142-0001.

“Health and Safety Plan” means the Project Company’s plan for health and safety in implementing the Project Implementation Work, to be developed as part of the Preliminary Services in accordance with the Contract Standards and the requirements in Appendix 2 (Preliminary Services) and Appendix 5 (General Project Implementation Work Requirements).

“Health and Safety Representative” has the meaning set forth in subsection 6.14(A) (Health and Safety Representative).

“Insurance Requirement” means any rule, regulation, code or requirement issued by any insurance company that has issued a policy of Required Insurance under this Project Agreement or by any insurance company that has issued a policy of insurance required to be obtained and maintained by the KRRC in connection with this Project Agreement, compliance with which is a condition to the effectiveness of such policy.

“Intellectual Property” means any trade secrets, proprietary rights, patents, copyrights or trademarks recognized under Applicable Law.

“Issued for Project Implementation Specifications” means the Drawings and Specifications which have been prepared by the Project Company and accepted by the KRRC in accordance with the Document Submittal Procedures as final Drawings and Specifications for the commencement of all or any portion of the Project Implementation Work.

“KHP” means PacifiCorp’s Klamath Hydroelectric Project (FERC No. 2082) constructed between 1911 and 1962, consisting of the following eight hydroelectric developments: (1) East Side; (2) West Side; (3) Keno (non-generating); (4) J.C. Boyle; (5) Copco No. 1; (6) Copco No. 2; (7) Fall Creek; and (8) Iron Gate.

“KHSA” means the Klamath Hydroelectric Settlement Agreement dated February 18, 2010, as amended April 6, 2016 and November 30, 2016, between the United States Department of Interior, the United States Department of Commerce, the State of California, the State of Oregon, Humboldt County, the State of California, the Yurok Tribe, the Karuk Tribe, the Upper Klamath Water Users Association, certain conservation and fishing groups, PacifiCorp, as the licensee for the Klamath Hydroelectric Project, and various other parties, set forth as Reference Document 11 (Klamath Hydroelectric Settlement Agreement, as Amended).

“KHSA Indemnity” means an indemnity agreement or indemnity insurance policy satisfying the requirements of Section 7.1.3 and Appendix L of the KHSA.

“Klamath County” means Klamath County, Oregon.

“Known Regulated Site Conditions” means Regulated Site Conditions disclosed to the Project Company in the Reliance Documents and the Compliance Documents, or otherwise known to the Project Company as of the Baseline Date.

“KRRC” means the Klamath River Renewal Corporation, a not-for-profit corporation organized and existing under the laws of the State of California.

“KRRC Allowance for Base Guaranteed Maximum Price Adjustments” means the amount established by the KRRC for internal budgetary purposes as an allowance for the cost of potential Base Guaranteed Maximum Price Adjustments.

“KRRC Contract Representative” has the meaning set forth in subsection 17.6(B) (KRRC Contract Representative).

“KRRC Fault” means:

- (1) A breach by the KRRC of any of its obligations under this Project Agreement;
- (2) A breach of any representation or warranty by the KRRC under this Project Agreement;
- (3) Willful misconduct of the KRRC or a Project Company Indemnitee; or
- (4) A negligent act or omission of the KRRC or a Project Company Indemnitee.

“KRRC-Managed Governmental Approvals” means those Governmental Approvals for which the KRRC is the application manager and is responsible for obtaining, as designated in Table 3-2 of Appendix 3 (Governmental Approvals).

“KRRC Property” means any structures, improvements, equipment, or other real or personal property owned, leased, operated, maintained, or occupied by the KRRC.

“Legal Proceeding” means every action, suit, litigation, arbitration, administrative proceeding, and other legal or equitable proceeding having a bearing upon this Project Agreement, and all appeals therefrom.

“Lien” means any and every lien against the Project or against any monies due or to become due from the KRRC to the Project Company under this Project Agreement, for or on account of the Contract Obligations, including mechanics’, materialmen’s, laborers’ and lenders’ liens.

“Loss-and-Expense” has the meaning set forth in subsection 15.1(A) (Indemnification-Related Defined Terms).

“Maintenance Bond” means the maintenance bond provided by the Project Company as described in and maintained pursuant to this Project Agreement and in the form set forth in Transaction Form D (Form of Maintenance Bond).

“Maintenance of Facilities Operations Plan” has the meaning set forth in subsection 6.11(A) (Maintenance of Facilities Operations).

“Material Subcontract” means any Subcontract for the Project Implementation Work with a contract value exceeding \$250,000.

“Material Subcontractor” means any Subcontractor or other contract or that is party to a Material Subcontract.

“Milestone Final Completion” means completion of a Project Implementation Work Element in compliance with the Contract Documents and the requirements of Section 7.7 (Milestone Final Completion).

“Milestone Longstop Date” means the date following any Scheduled Milestone Substantial Completion Date applicable to each Project Implementation Work Element set forth in Section 7.2 (Scheduled Milestone Substantial Completion Dates and Milestone Longstop Dates).

“Milestone Punch List” has the meaning set forth in subsection 7.6(A) (Milestone Punch List Requirements).

“Milestone Substantial Completion” means, with respect to each Project Implementation Work Element, achievement of the applicable Milestone Substantial Completion Date Conditions.

“Milestone Substantial Completion Date” means the date, as applicable, on which a Milestone Substantial Completion has been achieved or is deemed to have been achieved under Section 7.3 (Milestone Substantial Completion Date Conditions).

“Milestone Substantial Completion Date Conditions” means the preconditions for the achievement of a Milestone Substantial Completion by the Project Company, as set forth in Section 7.3 (Milestone Substantial Completion Date Conditions).

“Mobilization and Site Access Plan” means the Project Company’s plan for truck access routes and all mobilization activities for the performance of the Project

Implementation Work, to be developed as part of the Preliminary Services in accordance with the requirements in Appendix 2 (Preliminary Services).

“Monthly Progress Report” has the meaning set forth in Section 4.9 (Monthly Progress Reports).

“NEPA Compliance Document” means the environmental impact statement or other compliance document with respect to the FERC License Surrender Order prepared by FERC pursuant to the National Environmental Policy Act, in draft and final forms as applicable.

“Non-Binding Mediation” means the voluntary system of dispute resolution through third-party mediation established by Article 11 (Dispute Resolution) for the resolution of any dispute arising under this Project Agreement.

“Notice of Milestone Final Completion” has the meaning set forth in subsection 7.7(B) (Notice and Report of Milestone Final Completion).

“Notice to Proceed” or **“NTP”** means a written notice issued by the KRRC Contract Representative authorizing the Project Company to commence performing a portion of the Project Work, as specified in the Notice to Proceed.

“OPUC” means the Oregon Public Utilities Commission.

“OPUC Funding Agreement” means the agreement dated January 24, 2017 between KRRC and the OPUC providing funding for the Project, set forth as Reference Document 9 (OPUC Funding Agreement).

“OSHA” means both the California Occupational Safety and Health Act, Chapter 3.2, Division 1, Title 8 of the California Code of Regulations, including all applicable regulations promulgated thereunder, and the Occupational Safety and Health Act of 1970, 29 U.S.C. 650 *et seq.*, including the applicable regulations promulgated thereunder, as amended or superseded from time to time.

“PacifiCorp” means PacifiCorp, a regulated utility company organized and existing under the laws of the State of Oregon.

“PacifiCorp Property” means the parcels of real property on which the core Project Implementation Work, including dam removal, is to be performed by the Project Company, generally constituting the approximately 8,000 acres of “Parcel B Lands” described in the KHSA and more particularly described in Attachment 1A (Description of PacifiCorp Property) to Appendix 1 (Project and Project Site Description).

“PacifiCorp Property Access Agreement” means the property access agreement to be entered into concurrently with the execution and delivery of this Project Agreement between the Project Company and PacifiCorp in the form set forth as Transaction Form E (Form of PacifiCorp Property Access Agreement).

“PacifiCorp Property Transfer Agreement” means the agreement providing for the transfer of fee title to the Project Site and any related real and personal property interests from PacifiCorp to the KRRC. **[Note: To be negotiated and executed on or before the Project Implementation Contract Amendment Date]**

“PacifiCorp Property Transfer Date” has the meaning set forth in subsection 4.4(C) (PacifiCorp Property Transfer Agreement).

“Payment Bond” means the labor and materials payment bond provided by the Project Company to secure the payment obligations of the Project Company for any Project Implementation Work, including any Early Work Packages, as described in and maintained pursuant to this Project Agreement and in the form set forth in Transaction Form C (Form of Payment Bond).

“Payment Request” means a written submission by the Project Company in the form approved by the KRRC and accompanied by all required supporting documentation, requesting payment hereunder of any portion of the Contract Compensation.

“Performance Bond” means the performance bond provided by the Project Company to secure performance of any Project Implementation Work, including any Early Work Packages, as described in and maintained pursuant to this Project Agreement and in the form set forth in Transaction Form B (Form of Performance Bond).

“Permitted Encumbrances” means, as of any particular time, any one or more of the following:

(1) Encumbrances for utility charges, Taxes, rates and assessments not yet delinquent or, if delinquent, the validity of which is being contested diligently and in good faith by the Project Company and against which the Project Company has established appropriate reserves in accordance with generally accepted accounting principles;

(2) Any encumbrance arising out of any judgment rendered that is being contested diligently and in good faith by the Project Company, the execution of which has been stayed or against which a bond or bonds in the aggregate principal amount equal to such judgments shall have been posted with a financially-sound insurer and which does not have a material and adverse effect on (a) the ability of the Project Company to construct the Project in accordance with this Project Agreement, or (b) the ability of the KRRC to operate the Project;

(3) Any encumbrance arising in the ordinary course of business imposed by law dealing with materialmen’s, mechanics’, workmen’s, repairmen’s, warehousemen’s, landlords’, vendors’ or carriers’ encumbrances created by law, or deposits or pledges which are not yet due or, if due, the validity of which is being contested diligently and in good faith by the Project Company and against which the Project Company has established appropriate reserves or bonded against, at the KRRC’s request;

(4) Servitudes, licenses, leases, easements, restrictions, rights-of-way, rights in the nature of easements or similar items which shall not individually or in the aggregate materially and adversely impair (a) the ability of the Project Company to perform the Project Implementation Work in accordance with this Project Agreement, or (b) the operation of the Facilities until their decommissioning;

(5) Applicable zoning and building bylaws and ordinances, municipal bylaws and regulations, and restrictive covenants, which individually or in the aggregate do not materially interfere with and adversely affect (a) the Project Implementation Work by the Project Company in accordance with this Project Agreement, or (b) the operation of the Facilities until their decommissioning;

(6) Encumbrances which are created on or before the Contract Date;

(7) Encumbrances which are created by a Change in Law on or after the Contract Date; and

(8) Any encumbrance created by an act or omission of the KRRC.

“Preliminary Services” means the Base Preliminary Services and any Additional Preliminary Services performed by the Project Company hereunder prior to the Project Implementation Contract Amendment Date.

“Preliminary Services Deliverable Material” means all documents, reports, studies, surveys, computer programs, warranties, manuals, submittals, licenses and other documents and materials required to be delivered by the Project Company to the KRRC in the performance of the Preliminary Services pursuant to this Project Agreement, including the Preliminary Services Design Documents.

“Preliminary Services Design Documents” means the Project Company’s plans, technical Specifications, Drawings and other documents prepared in connection with the Preliminary Services, constituting part of the Project Technical Requirements.

“Preliminary Services Fee” has the meaning set forth in Section 9.1 (Compensation for Preliminary Services) and Appendix 2 (Preliminary Services).

“Preliminary Services Period” means the period between the Contract Date and the Project Implementation Contract Amendment Date.

“Preliminary Services Schedule” has the meaning set forth in Section 5.3 (Preliminary Services Schedule).

“Preliminary Services Tasks” means the tasks specified in Appendix 2 (Preliminary Services).

“Pre-Reservoir Drawdown Work” means the diversion tunnel improvements and gates; the roads, bridges and culverts improvements; the flood control improvements; and the City of Yreka Waterline Work, as more particularly described in Sections 4.3 (Diversion Tunnel Improvements and Gates), 4.4 (Roads, Bridges and Culverts Improvements), and 4.5 (Flood Control Improvements) of Appendix 4 (Project Technical Requirements).

“Procurement Management Plan” means the Project Company’s plan for managing its procurement processes during performance of the Project Implementation Work, to be developed as part of the Preliminary Services in accordance with the requirements in Appendix 2 (Preliminary Services).

“Program Manager” means any individual or firm, or team of individuals or firms, under contract with the KRRC, including subcontractors, and designated by the KRRC from time to time as part of its professional services consulting, engineering or construction oversight team for purposes of administering this Project Agreement on behalf of the KRRC.

“Project” means the performance of the Project Implementation Work, and all other Contract Obligations required to be performed under this Project Agreement.

“Project Agreement” means this Project Agreement for Design, Construction, Demolition and Habitat Restoration Services in connection with the Removal of the Lower Klamath River Dams between the Project Company and the KRRC, including the Appendices and all other Contract Documents.

“Project Company” means Kiewit Infrastructure West Co., a corporation organized and existing under the laws of the State of Delaware.

“Project Company Contingency” has the meaning set forth in Appendix 8 (Contract Price).

“Project Company Contract Representative” has the meaning set forth in subsection 17.6(A) (Project Company Contract Representative and Senior Supervisors).

“Project Company Fault” means:

- (1) A breach by the Project Company of any of its obligations under this Project Agreement;
- (2) A breach of any representation or warranty made by the Project Company under this Project Agreement;
- (3) Willful misconduct of the Project Company or any other Project Company Person; or
- (4) A negligent act or omission of the Project Company or any other Project Company Person.

“Project Company Fee” has the meaning set forth in Appendix 8 (Contract Price).

“Project Company Indemnification Act, Event or Circumstance” has the meaning set forth in subsection 15.1(B) (Indemnification-Related Defined Terms).

“Project Company Indemnatee” has the meaning set forth in subsection 15.1(B) (Indemnification-Related Defined Terms).

“Project Company Indemnity” means the indemnity obligations of the Project Company under Article 15 (Indemnification).

“Project Company-Managed Governmental Approvals” means those Governmental Approvals for which the Project Company is the application manager and is responsible for obtaining, as designated in Table 3-1 of Appendix 3 (Governmental Approvals).

“Project Company Person” means:

- (1) The Project Company;
- (2) Any director, officer, employee or agent of the Project Company in each case acting as such;
- (3) Any Subcontractor and any representative, advisor (including any legal and financial advisor) of the Project Company, in any such person’s capacity as a provider of services directly or indirectly to the Project Company in connection with the Project; and
- (4) Anyone for whose acts any of the foregoing may be legally or contractually liable in connection with this Project Agreement, including officers, directors, employees, representatives, agents, consultants and contractors.

“Project Execution Plan” means the Project Company’s project execution plan for implementing the Project Implementation Work, to be developed as part of the Preliminary Services in accordance with the requirements in Appendix 2 (Preliminary Services).

“Project Final Completion” means completion of the Project Implementation Work in compliance with the Contract Documents and the requirements of Section 7.8 (Project Final Completion)

“Project Final Completion Services” means the Project Implementation Work, primarily involving long term habitat monitoring services, to be performed after Milestone Final Completion has been achieved for each Project Implementation Work Element, as more particularly described in Appendix 4 (Project Technical Requirements).

“Project Final Completion Services List” has the meaning set forth in Section 7.8(A) (Project Final Completion Services Requirements).

“Project Implementation Commencement Date” means the date, following satisfaction of the Project Implementation Commencement Date Conditions by the Project Company, upon which the Project Company shall have the right to proceed with the Project Implementation Work, as determined in accordance with subsection 6.3(A) (Project Implementation Commencement Date Generally).

“Project Implementation Commencement Date Conditions” has the meaning set forth in subsection 6.3(A) (Project Implementation Commencement Date Generally).

“Project Implementation Contract Amendment” has the meaning set forth in subsection 5.11(A) (Project Implementation Contract Amendment Generally).

“Project Implementation Contract Amendment Date” has the meaning set forth in subsection 5.11(A) (Project Implementation Contract Amendment Generally).

“Project Implementation Design Documents” means the Project Company’s plans, technical specifications, drawings, record drawings and other design documents prepared following the Project Implementation Contract Amendment Date (or in connection with an Early Work Package, the applicable Early Work Package Amendment Date) and based on and consistent with the Project Technical Requirements, in connection with the Project Implementation Work (other than the Hatchery Work and the City of Yreka Waterline Work), including:

(1) Specifications, Drawings and all other work product generated through the performance of the Design Professional Services following the establishment of the Project Technical Requirements; and

(2) All technical criteria, written descriptions and design data necessary for obtaining Governmental Approvals and performing Project Implementation Work, such as shop drawings, product data and samples, whether or not such documents are required to be prepared by licensed design professionals.

“Project Implementation Period” means the period beginning on the Project Implementation Contract Amendment Date and ending on the Expiration Date.

“Project Implementation and Quality Management Plan” means the Project Company’s plan for quality assurance and quality control in implementing the Project Implementation Work, to be developed as part of the Preliminary Services in accordance with the requirements set forth in Appendix 2 (Preliminary Services) and Appendix 6 (Project Implementation Work Quality Control Requirements).

“Project Implementation Schedule” means the Project Company’s critical path method completion schedule for the performance of the Project Implementation Work, as set

forth as set forth in Attachment 5A (Initial Project Implementation Schedule) to Appendix 5 (General Project Implementation Work Requirements) on the Project Implementation Contract Amendment Date and as updated and maintained by the Project Company in accordance with subsection 6.2(C) (Project Implementation Schedule and Reports).

“Project Implementation Work” means all Project Work other than the Preliminary Services.

“Project Implementation Work Costs” has the meaning set forth in Appendix 8 (Contract Price).

“Project Implementation Work Deliverable Material” means all documents, reports, studies, surveys, computer programs, warranties, manuals, submittals, licenses and other documents and materials required to be delivered by the Project Company to the KRRC in the performance of the Project Implementation Work pursuant to this Project Agreement, including the Project Implementation Design Documents.

“Project Implementation Work Element” means any or all of the following elements of the Project Implementation Work, as applicable: Hatchery Work; Pre-Reservoir Drawdown Work; Dam Removal and Initial Habitat Restoration Work; and Final Habitat Restoration Work.

“Project Manager” has the meaning set forth in subsection 8.1(A) (Project Manager).

“Project Plans” means the Project Implementation and Quality Management Plan, the Document Submittal Procedures, the Health and Safety Plan, the Maintenance of Facilities Operations Plan, the Project Execution Plan, the Procurement Management Plan, the Related Projects Coordination Protocol, the Security Plan, the Subcontracting Plan, the Mobilization and Site Access Plan, the Environmental Compliance Plan and any sub-plan to the plans listed in this definition.

“Project Schedule” means the overall Project schedule, including the Preliminary Services Schedule and the Project Implementation Schedule.

“Project Site” means the PacifiCorp Property and the Adjacent and Related Lands.

“Project Technical Requirements” means the Specifications, Drawings, and other technical requirements for the performance of the Project Implementation Work set forth in Appendix 4 (Project Technical Requirements) developed by or on behalf of the Project Company through the performance of the Preliminary Services and established in any Early Work Package Amendment and the Project Implementation Contract Amendment, as applicable. **[Note: To be finalized and incorporated into Appendix 4 on the GMP Contract Amendment Date based on the GMP Project Submittal, and confirmed or revised in the Project Implementation Contract Amendment.]**

“Project Technical Requirements Change” means a change in the Project Technical Requirements made by a Change Order pursuant to Section 6.8 (Changes to the Project Technical Requirements at Project Company Request), or pursuant to Section 6.9 (Other Changes to the Project Technical Requirements), or by a Unilateral Change Directive pursuant to Section 6.10 (Unilateral Change Directives), (1) as a result of a Project Company request agreed to by the KRRC, (2) due to Uncontrollable Circumstances, (3) as a result of a term or condition imposed by a Change in Law, or (4) at the direction of the KRRC.

“Project Warranties” has the meaning set forth in subsection 10.1(A) (Project Warranties Defined).

“Project Work” means everything required to be furnished and done by the Project Company for and relating to the Project pursuant to the Contract Documents, including the Design Professional Services and the Project Implementation Work. Project Work includes the employment and furnishing of all labor, materials, equipment, supplies, tools, scaffolding, transportation, Utilities, insurance, temporary facilities and other things and services of every kind whatsoever necessary for the full performance and completion of the Project Company’s design, engineering, permitting, procurement, construction, demolition, removal, habitat restoration and related obligations with respect to the Project under the Contract Documents, including all completed structures, assemblies, fabrications, acquisitions and installations, all facilities demolition and debris and rubble disposal, and all of the Project Company’s administrative, accounting, recordkeeping, notification and similar responsibilities of every kind whatsoever under the Contract Documents pertaining to such obligations, including all work performed pursuant to Early Work Package Amendments, the Preliminary Services, the Project Implementation Work, and the Warranty Work. A reference to Project Work shall mean any part and all of the Project Work unless the context otherwise requires, and shall include all Project Work authorized by Change Order, Unilateral Change Directive or Contract Amendment.

“Proposal” means the proposal submitted by the Project Company on February 12, 2019 in response to the RFP.

“RCRA” means the Resource Conservation and Recovery Act, 42 U.S.C. 6901 *et seq.*, and applicable regulations promulgated thereunder, each as amended from time to time.

“Reference Materials” means the documents identified as such in the Table of Contents to this Project Agreement.

“Regulated Site Condition” means, and is limited to:

- (1) surface or subsurface structures, materials or conditions having historical, archaeological, cultural, religious, scientific or similar significance;
- (2) the presence or habitat of a species that is classified under Applicable Law as endangered, rare, threatened, of special concern, or similarly subject to the protections of Applicable Law;
- (3) the presence anywhere in, on, under or adjacent to the Project Site on the Baseline Date of wells or underground storage tanks for the storage of chemicals, petroleum products or Regulated Substances; and
- (4) the presence of Regulated Substances anywhere in, on or under the Project Site (including presence in surface water, groundwater, soils or subsurface strata), but not including Regulated Substances used, stored or otherwise brought to the Project Site by the Project Company or any Subcontractor as provided in subsection 6.5(A) (Project Company Responsibilities and Indemnity).

“Regulated Substance” means (1) any oil, petroleum or petroleum product and (2) any pollutant, contaminant, hazardous substance, Hazardous Material, toxic substance, toxic pollutant, solid waste, municipal waste, industrial waste or hazardous waste that is defined as such by and is subject to regulation under any Applicable Law; except that de minimis quantities of any of the foregoing that are expressly exempted from regulation or remediation under Applicable Law shall not constitute a Regulated Substance hereunder.

“Related Projects” has the meaning set forth in subsection 6.11(B) (Related Projects Generally).

“Related Projects Coordination Protocol” means the protocol providing the framework for the coordination of the Project with the Related Projects, to be developed as part of the Preliminary Services in accordance with the requirements in Appendix 2 (Preliminary Services).

“Reliance Documents” means the documents identified as such in the Table of Contents to this Project Agreement.

“Relief Request Notice” has the meaning set forth in subsection 14.2(C) (Submittal of Relief Request).

“Request for Qualifications” or **“RFQ”** means the KRRC’s Request for Qualifications for the Klamath River Renewal Project issued on September 18, 2018, as amended.

“Request for Proposals” or **“RFP”** means the KRRC’s Request for Proposals for the Klamath River Renewal Project issued on December 4, 2018, as amended.

“Required Insurance” means the insurance policies and coverage required to be provided by the Project Company under this Project Agreement, as set forth in Section 13.1 (Insurance) and Appendix 9 (Insurance Requirements).

“Reservoir Drawdown Work” means the drawdown of the reservoirs impounded by the Facilities, as more particularly described in Section 4.6 (Reservoir Drawdown) of Appendix 4 (Project Technical Requirements).

“Restricted Person” means any person who (or any member of a group of persons acting together, any one of which):

(1) Is disbarred, suspended, or otherwise disqualified from federal, State, or KRRC contracting for any services similar in nature to the Contract Obligations (including those debarred by the California Division of Labor Standards Enforcement; see www.dir.ca.gov/dlse/debar.html);

(2) Was or is subject to any material claim of the United States, the State or the KRRC in any proceedings (including regulatory proceedings) which have been concluded or are pending at the time at which the determination of whether the person falls within this definition is being made, and which (in respect of any such pending claim, if it were to be successful) would, in the KRRC’s view, in either case, be reasonably likely to materially affect the ability of the Project Company to perform its obligations under this Project Agreement;

(3) In the case of an individual, he or she (or in the case of a legal entity, any of the members of the board of directors or its senior executive managers) has been sentenced to imprisonment or otherwise given a custodial sentence for any criminal offense (other than minor traffic offenses or misdemeanors) less than 5 years prior to the date at which the determination of whether the person falls within this definition is being made;

(4) Has, directly or indirectly, its principal or controlling office in a country that is subject to any economic or political sanctions imposed by the United States for reasons other than its trade or economic policies; or

(5) Has as its primary business the illegal manufacture, sale, distribution or promotion of narcotic substances or arms, or is or has been involved in terrorism.

“Schedule of Values” means the detailed, itemized list of prices and costs that establishes the value of each part or component of the Project Implementation Work, to be developed by the Project Company in accordance with the Contract Standards as part of the GMP Project Submittal and to serve as the basis for progress payments of the Contract Price during the Project Implementation Period.

“Scheduled Milestone Substantial Completion Date” means the date for achieving the Milestone Substantial Completion Date applicable to each Project Implementation Work Element following the Project Implementation Contract Amendment Date, as such date may be adjusted on account of the occurrence of an Uncontrollable Circumstance.

“Security Instruments” means the Guaranty Agreement, the Performance Bond, the Payment Bond and the Maintenance Bond.

“Security Plan” means the Project Company’s plan for security at the Project Site in implementing the Project Implementation Work, to be developed as part of the Preliminary Services in accordance with the Contract Standards and the requirements in Appendix 2 (Preliminary Services) and Appendix 5 (General Project Implementation Work Requirements).

“Senior Supervisors” has the meaning set forth in subsection 17.6(A) (Project Company Contract Representative and Senior Supervisors).

“Separate Contractor” means any person or entity under contract with the KRRC for the performance of work associated with the Related Projects.

“Shared Savings Amount” has the meaning set forth in Appendix 8 (Contract Price).

“Siskiyou County” means Siskiyou County, California.

“Site Base Maps” means the site base maps provided in the RFP and set forth as Reliance Document 2 (Site Base Maps – Topographic and Bathymetric Surveys).

“SLBE Firms” means any small local business enterprise primarily based in Klamath County, Siskiyou County, Del Norte County, Humboldt County, Jackson County, Josephine County, Douglas County, Lake County, Trinity County, Shasta County, Tehama County or Modoc County, with particular preference given to enterprises based in Klamath County, Siskiyou County, Del Norte County, or Humboldt County.

“SLTBE Firms” means the SLBE Firms and the TBE Firms.

“SLTBE Goals” has the meaning set forth in subsection 8.3(H) (SLTBE Goals).

“Specifications” means the documents prepared by or on behalf of the Project Company comprising written technical descriptions of materials, equipment, construction systems, standards, and workmanship for the Project Implementation Work and certain administrative details applicable thereto.

“State”, when used with respect to a matter as to which either of the States has any regulatory, administrative, approval, review or other legal right or powers, means either or both of the States having such right or powers, as applicable.

“States” means both the State of California and the State of Oregon.

“Subcontract” means any contract entered into by the Project Company, or a Subcontractor of the Project Company of any tier, with one or more persons in connection with the carrying out of the Project Company’s obligations under this Project Agreement, whether for the furnishing of labor, materials, equipment, supplies, services or otherwise, including contracts for Project Implementation Work, Design Professional Services and Supplies.

“Subcontracting Plan” means the Project Company’s plan for entering into Subcontracts, to be developed as part of the Preliminary Services in accordance with the requirements in Appendix 2 (Preliminary Services).

“Subcontractor” means any person, other than the Project Company, that enters into a Subcontract, including any subcontractors performing Project Work, Design Professional Services Firms and Suppliers.

“Subcontractor Default Insurance” means a contractor default insurance (CDI) policy insuring against the default of some or all of the Subcontractors.

“Supplier” means a manufacturer, distributor, materialman, fabricator, distributor, vendor or other supplier having a Subcontract to furnish Supplies.

“Supplies” means materials, equipment or other supplies furnished in connection with the Project Implementation Work.

“Surety” means the surety company issuing the Performance Bond, the Payment Bond or the Maintenance Bond, as applicable.

“Surrender Application” means the Application for Surrender of License for Major Project and Removal of Project Works filed with FERC by the KRRC and PacifiCorp on September 23, 2016, seeking FERC’s approval to surrender the license for the Facilities and to achieve, by implementation of the Definite Plan, a free-flowing condition and volitional fish passage through the portions of the Klamath River occupied by the Facilities.

“Tax” means any tax, fee, levy, duty, impost, charge, surcharge, assessment or withholding, or any payment-in-lieu thereof, and any related interest, penalty or addition to tax.

“TBE Firms” means any tribal business enterprise that is at least 51% owned by an Indian tribe or by Indian tribe members. For the purposes of this definition, an “Indian tribe” means any Indian tribe, band, nation or other organized group or community of Indians, which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians or is recognized as such by the State in which the tribe, band, nation or community resides.

“Term” has the meaning set forth in Section 3.1 (Effective Date and Term).

“Termination Date” means the last day of this Project Agreement resulting from a termination under any provision hereof.

“Transaction Form” means any of the transaction forms identified in the Table of Contents to this Project Agreement.

“Transfer Application” means the Joint Application for Approval of License Amendment and License Transfer filed with FERC by the KRRC and PacifiCorp on September

23, 2016, seeking FERC’s approval of a separate license for the Facilities and to transfer the license for the Facilities from PacifiCorp to KRRC.

“Unallowable Costs” has the meaning set forth in Appendix 8 (Contract Price).

“Uncontrollable Circumstance” means, and is limited to, any of the following acts, events or conditions that materially expands the scope, interferes with, delays or increases the cost of performing the Project Company’s obligations under this Project Agreement, to the extent that such act, event or condition is not the result of the willful or negligent act, error or omission, failure to exercise reasonable diligence, or breach of this Project Agreement on the part of the Project Company:

- (1) A Change in Law;
- (2) Errors, omissions or insufficiencies relating to certain information provided to the Project Company by or on behalf of the KRRC, as and to the extent provided in subsection 4.5(B) (Reliance by Project Company on the Reliance Documents);
- (3) The existence of a Differing Site Condition, as and to the extent provided in Section 6.4 (Differing Site Conditions);
- (4) The existence of an Unknown Regulated Site Condition, as and to the extent provided in Section 6.5 (Regulated Site Conditions);
- (5) A delay in the issuance of a Project Company-Managed Governmental Approval, as and to the extent provided in subsection 6.6(G) (Allowable Relief in Connection with Delays in the Issuance of Project Company-Managed Governmental Approvals);
- (6) The imposition of any unanticipated terms and conditions on any Governmental Approvals resulting in a material change to the Project Technical Requirements; as and to the extent provided in subsection 6.9(C) (Changes to Terms and Conditions of Governmental Approvals);
- (7) Acts, events or circumstances associated with the Separate Contractors, as and to the extent provided in subsection 6.11(E) (Interrelated Work);
- (8) Naturally occurring events, including unusually severe and abnormal climatic conditions determined in accordance with Section 14.5 (Unusually Severe and Abnormal Climatic Events), landslides, underground movement, earthquakes, fires, tornadoes, hurricanes, floods, lightning, epidemics and other acts of God;
- (9) Explosion, terrorism, sabotage or similar occurrence, acts of a declared public enemy, extortion, war, blockade or insurrection, riot or civil disturbance;
- (10) Labor disputes, strikes, slowdowns, stoppages, boycotts or disruption affecting a specific trade on a national or regional level, to the extent not caused by Project Company Fault;
- (11) The failure of any Subcontractor (other than the Project Company or any Affiliate of the Project Company) to furnish services, materials or equipment on the dates agreed to, but only if such failure is the result of an event which would constitute an Uncontrollable Circumstance if it affected the Project Company directly, and the

Project Company is not able after exercising all reasonable efforts to obtain timely substitutes;

(12) Any failure of title to the Project or any placement or enforcement of any Encumbrance on the Project not consented to in writing by, or arising out of any action, omission or agreement entered into by, the Project Company, other than Permitted Encumbrances;

(13) The preemption, confiscation, diversion, destruction or other interference in possession or performance of materials or services by a Governmental Body in connection with a public emergency or any condemnation or other taking by eminent domain of any material portion of the Project;

(14) An act, event or circumstance occurring that (1) directly impacts the Suppliers or vendors of the Project Company or with respect to the performance of the Project Implementation Work, respectively, and (2) would otherwise constitute an Uncontrollable Circumstance affecting the Project Company directly, as determined in accordance with Article 14 (Uncontrollable Circumstances);

(15) With respect to the Project Company, any KRRC Fault or Change Order not made due to Project Company Fault; or

(16) Any other act, event or circumstance specifically identified herein as providing a basis for Uncontrollable Circumstance relief.

“Unilateral Change Directive” has the meaning set forth in Section 6.10 (Unilateral Change Directives).

“Unknown Regulated Site Conditions” means Regulated Site Conditions that are not Known Regulated Site Conditions.

“Utilities” means any and all utility services and installations whatsoever (including gas, water, sewer, electricity, telephone, and telecommunications), and all piping, wiring, conduit, and other fixtures of every kind whatsoever related thereto or used in connection therewith.

“Warranty Period” has the meaning set forth in subsection 10.1(B) (Term of the Project Warranties).

“Warranty Work” means all work and services required to be performed or provided by the Project Company pursuant to the Project Warranties in accordance with Article 10 (Project Warranties).

“Water Resources Control Board” means the California State Water Resources Control Board.

SECTION 1.2. INTERPRETATION.

This Project Agreement shall be interpreted according to the following provisions, except to the extent the context or the express provisions of this Project Agreement otherwise require:

(A) **Gender and Plurality.** Words of the masculine gender mean and include correlative words of the feminine and neuter genders and words importing the singular number mean and include the plural number and vice versa.

(B) Persons. Words importing persons include firms, individuals, legal personal representatives, companies, associations, joint ventures, general partnerships, limited partnerships, limited liability corporations, trusts, business trusts, corporations, Governmental Bodies and other legal entities.

(C) Headings. The Table of Contents and any headings preceding the text of the Articles, Sections and Sections of this Project Agreement shall be solely for convenience of reference and shall not affect its meaning, construction or effect.

(D) References Hereto. The terms “hereto”, “hereby”, “hereof”, “herein”, “hereunder” and any similar terms refer to this Project Agreement.

(E) References to Days and Time of Day. All references to days herein are references to calendar days, unless otherwise indicated, such as by reference to Business Days. If the time for doing an act falls or expires on a day that is not a Business Day, the time for doing such act shall be extended to the next Business Day. Each reference to time of day is a reference to Pacific Standard time or Pacific Daylight Saving time, as the case may be.

(F) References to Including. The words “include”, “includes” and “including” are to be construed as meaning “include without limitation”, “includes without limitation” and “including without limitation”, respectively.

(G) References to Statutes. Each reference to a statute or statutory provision includes any statute or statutory provision which amends, extends, consolidates or replaces the statute or statutory provision or which has been amended, extended, consolidated or replaced by the statute or statutory provision and includes any orders, regulations, by-laws, ordinances, codes of practice or instruments made under the relevant statute.

(H) References to the KRRC, Governmental Bodies and Private Persons. Each reference to the KRRC or a Governmental Body is deemed to include a reference to any successor to the KRRC or such Governmental Body or any organization or entity or organizations or entities which has or have taken over the functions or responsibilities of the KRRC or such Governmental Body. Each reference to a private person that is not an individual is deemed to include a reference to its successors and permitted assigns.

(I) References to Documents and Standards. Each reference to an agreement, document, standard, principle or other instrument includes a reference to that agreement, document, standard, principle or instrument as amended, supplemented, substituted, novated or assigned.

(J) References to All Reasonable Efforts. The expression “all reasonable efforts” and expressions of like import, when used in connection with an obligation of either party, means taking in good faith and with due diligence all commercially reasonable steps to achieve the objective and to perform the obligation, including doing all that can reasonably be done in the circumstances taking into account each party’s obligations hereunder to mitigate delays and additional costs to the other party, and in any event taking no less steps and efforts than those that would be taken by a commercially reasonable and prudent person in comparable circumstances.

(K) References to Knowledge. All references to “knowledge”, “knowing”, “know” or “knew” shall be interpreted as references to a party having actual knowledge.

(L) References to Dollar Amounts. All statements of, or references to, dollar amounts or money, including references to “\$” and “dollars”, are to the lawful currency of the

United States of America. All payments required to be made by either party hereunder shall be made in dollars.

(M) References to Promptly. All references to “promptly” shall be interpreted as meaning such action shall occur within a reasonable period of time given the circumstances.

(N) Entire Agreement. This Project Agreement contains the entire agreement between the parties hereto with respect to the transactions contemplated by this Project Agreement. Without limiting the generality of the foregoing, this Project Agreement shall completely and fully supersede all other understandings and agreements among the parties with respect to such transactions, including those contained in the RFQ, the submittal made by the Project Company in response thereto, the RFP, the Proposal, and any amendments or supplements to any such documents.

(O) Standards of Workmanship and Materials. Any reference in the Contract Documents to materials, equipment, systems or supplies (whether such references are in lists, notes, specifications, schedules, or otherwise) shall be construed to require the Project Company to furnish the same in accordance with the grades and standards therefor indicated in the Contract Documents. Where the Contract Documents do not specify any explicit quality or standard for construction materials or workmanship, the Project Company shall use only workmanship and new materials of a quality consistent with that of construction workmanship and materials that are specified elsewhere in the Contract Documents, and the Contract Documents are to be interpreted accordingly.

(P) Technical Standards and Codes. References in the Contract Documents to all professional and technical standards, codes and specifications are to the most recently published professional and technical standards, codes and specifications of the institute, organization, association, authority or society specified, all as in effect as of the Baseline Date. Unless otherwise specified to the contrary, all such professional and technical standards, codes and specifications shall apply as if incorporated in the Contract Documents. If any material revision to such professional and technical standards, codes and specifications occurs after the Baseline Date, and prior to completion of the applicable Project Implementation Work, the KRRC shall have the right, through a Unilateral Change Directive or a Change Order, to direct the Project Company to perform the applicable Project Implementation Work in accordance with the revised professional and technical standard, code, or specification, subject to the Project Company’s rights under this Project Agreement with respect to Unilateral Change Directives and Change Orders at the direction of the KRRC. Nothing in this Section shall limit the Project Company’s obligation to comply with Applicable Law as in effect during the Term.

(Q) Causing Performance. A party shall itself perform, or shall cause to be performed, subject to any limitations specifically imposed hereby with respect to Subcontractors or otherwise, the obligations affirmatively undertaken by such party under this Project Agreement.

(R) Party Bearing Cost of Performance. All obligations undertaken by each party hereto shall be performed at the cost of the party undertaking the obligation or responsibility, unless the other party has explicitly agreed herein to bear all or a portion of the cost either directly, by reimbursement to the other party or through an adjustment to the Guaranteed Maximum Price.

(S) Good Dam Removal Practice. Good Dam Removal Practice shall be utilized hereunder, among other things, to implement and in no event displace or lessen the stringency of, the Contract Standards.

(T) Interpretation of Contract Documents. The Contract Documents are intended to be complementary, and what is set forth in any one document is as binding as if set forth in each document. The parties recognize that Contract Amendments and Change Orders may provide for specific modification to the terms and conditions of other Contract Documents, in which case the modified terms and conditions shall govern, as expressly set forth in the Contract Amendment or Change Order. All terms and conditions of such other Contract Documents that are not expressly modified or deleted by a Contract Amendment or Change Order, however, shall remain in effect. Subject to the foregoing terms in this Section, subsection (U) (Applicability, Stringency and Consistency of Contract Standards) of this Section shall govern matters of interpretation related to the applicability, stringency and consistency of the Contract Documents, the requirements of which are included among the Contract Standards. Matters of interpretation and application of the Contract Documents that are agreed upon by the parties may be reflected in a Contract Administration Memorandum prepared in accordance with Section 17.4 (Contract Administration).

(U) Applicability, Stringency and Consistency of Contract Standards. The Project Company shall be obligated to comply only with those Contract Standards which are applicable in any particular case. Where more than one Contract Standard applies to any particular performance obligation of the Project Company hereunder, each such applicable Contract Standard shall be complied with. In the event there are different levels of stringency among such applicable Contract Standards, the most stringent of the applicable Contract Standards shall govern; provided, however, that Contract Standards established pursuant to the Project Technical Requirements shall have precedence and govern over any more stringent applicable Contract Standard. Except as otherwise provided in the preceding sentence with regard to Contract Standards established pursuant to the Project Technical Requirements, in the event of any inconsistency among the Contract Standards, the KRRC's determination, acting reasonably, as to the applicable standard shall be binding.

(V) Delivery of Documents in Digital Format. In the Contract Documents, the Project Company is obligated to deliver reports, records, designs, plans, Drawings, Specifications, proposals and other documentary submittals in connection with the performance of its duties hereunder. The Project Company agrees that all such documents shall be submitted to the KRRC both in printed form (in the number of copies indicated) and, at the KRRC's request, in digital form. Digital copies shall consist of computer readable data submitted in any standard interchange format which the KRRC may reasonably request to facilitate the administration and enforcement of this Project Agreement. In the event that a conflict exists between the signed or the signed and stamped hard copy of any document and the digital copy thereof, the signed and stamped hard copy shall govern.

(W) Severability. Each provision of this Project Agreement shall be valid and enforceable to the fullest extent permitted by law. If any provision of this Project Agreement is held to be invalid, unenforceable or illegal to any extent, such provision shall be severed and such invalidity, unenforceability or illegality shall not prejudice or affect the validity, enforceability and legality of the remaining provisions of this Project Agreement, unless such continued effectiveness as modified would be contrary to the basic understandings and intentions of the parties as expressed herein. If any provision of this Project Agreement is held to be invalid, unenforceable or illegal, the parties will promptly endeavor in good faith to negotiate new provisions to eliminate such invalidity, unenforceability or illegality and to restore this Project Agreement as nearly as possible to its original intent and effect.

(X) Drafting Responsibility. The parties waive the application of any rule of law which otherwise would be applicable in connection with the construction of this Project Agreement to the effect that ambiguous or conflicting terms or provisions should be construed against the party who (or whose counsel) prepared the executed agreement or any earlier draft of the same.

(Y) No Third-Party Rights; States and PacifiCorp Excepted. This Project Agreement is exclusively for the benefit of the KRRC and the Project Company, and for the States and PacifiCorp, which shall be third party beneficiaries hereof as provided by KHSa Section 7.1.3 and Appendix L and as expressly provided for in Article 15 (Indemnification) and Appendix 9 (Insurance Requirements). The Project Agreement shall not provide any other third parties with any remedy, claim, liability, reimbursement, cause of action or other rights.

(Z) Acting Reasonably and in Good Faith; Discretion. Each party shall act reasonably and in good faith in the exercise of its rights hereunder, except where a party has the right to act in its “discretion” by the express terms hereof. When a party has “discretion”, it means that party has the sole, absolute and unfettered discretion, with no requirement to act reasonably or provide reasons unless specifically required under the provisions of this Project Agreement. When a party does not have “discretion” it means that the party shall act reasonably.

(AA) Counterparts and Delivery by Electronic Mail. This Project Agreement may be executed in any number of original counterparts. All such counterparts shall constitute but one and the same Project Agreement. Any party may deliver an executed copy of this Project Agreement by electronic mail and such counterpart shall be deemed effective upon receipt, but that party will promptly deliver via mail or courier to the other parties an originally executed copy of this Project Agreement.

(BB) Governing Law. This Project Agreement shall be governed by and construed in accordance with the applicable laws of the State of California without regard to the choice of law provisions thereof.

(CC) Defined Terms. The definitions set forth in Section 1.1 (Definitions) shall control in the event of any conflict with any definitions used elsewhere in this Project Agreement.

(DD) Interpolation. If any calculation hereunder is to be made by reference to a chart or table of values, and the reference calculation falls between two stated values, the calculation shall be made on the basis of linear interpolation.

(EE) Accounting and Financial Terms. All accounting and financial terms used herein are, unless otherwise indicated, to be interpreted and applied in accordance with generally accepted accounting principles.

ARTICLE 2

REPRESENTATIONS AND WARRANTIES

SECTION 2.1. REPRESENTATIONS AND WARRANTIES OF THE KRRC

The KRRC represents and warrants that:

(A) Existence and Powers. The KRRC is a not-for-profit corporation organized and existing under and by virtue of the laws of the State of California, with the full legal right, power and authority to enter into and perform its obligations under this Project Agreement.

(B) Due Authorization and Binding Obligation. This Project Agreement has been duly authorized, executed and delivered by all necessary action of the KRRC and constitutes a legal, valid and binding obligation of the KRRC, enforceable against the KRRC in accordance with its terms and Applicable Law, except to the extent that its enforceability may be limited by the Bankruptcy Law or by equitable principles of general application.

(C) KHSA and Funding Agreements. The execution and delivery of this Project Agreement and the performance by the KRRC of its obligations hereunder does not require the consent or approval of any party to the KHSA or the Funding Agreements, except such as have been duly obtained.

(D) No Governmental Approvals Required. No approval, authorization, order or consent of, or declaration, registration or filing with, any Governmental Body is required for the valid execution and delivery of this Project Agreement by the KRRC, except such as have been duly obtained or made.

(E) No Litigation. There is no Legal Proceeding, at law or in equity, before or by any court, arbitral tribunal or other Governmental Body pending or, to the best of the KRRC's knowledge after due inquiry, overtly threatened or publicly announced against the KRRC, in which an unfavorable decision, ruling or finding could reasonably be expected to have a material and adverse effect on the execution and delivery of this Project Agreement by the KRRC or the validity, legality or enforceability of this Project Agreement against the KRRC, or any other agreement or instrument entered into by the KRRC in connection with the transactions contemplated hereby, or on the ability of the KRRC to perform its obligations hereunder or under any such other agreement or instrument.

SECTION 2.2. REPRESENTATIONS AND WARRANTIES OF THE PROJECT COMPANY.

In addition to any other representations and warranties made by the Project Company in this Project Agreement, the Project Company represents and warrants that:

(A) Existence and Powers. The Project Company is a corporation duly organized, validly existing and in good standing under the laws of the State of Delaware and has the authority to do business in the States and in any other state in which it conducts its activities, with the full legal right, power and authority to enter into and perform its obligations under this Project Agreement.

(B) Due Authorization and Binding Obligation. This Project Agreement has been duly authorized, executed and delivered by all necessary corporate action of the Project Company and constitutes a legal, valid and binding obligation of the Project Company,

enforceable against the Project Company in accordance with its terms, except to the extent that its enforceability may be limited by the Bankruptcy Law or by equitable principles of general application.

(C) No Conflict. Neither the execution nor delivery by the Project Company of this Project Agreement nor the performance by the Project Company of its obligations in connection with the transactions contemplated hereby nor the fulfillment by the Project Company of the terms or conditions hereof (1) conflicts with, violates or results in a breach of any constitution, law, governmental regulation, by-laws or certificates of incorporation applicable to the Project Company or (2) conflicts with, violates or results in a breach of any order, judgment or decree, or any contract, agreement or instrument to which the Project Company or any of its Affiliates is a party or by which the Project Company or any of its Affiliates or any of its properties or assets are bound, or constitutes a default under any of the foregoing.

(D) No Commitments Limiting Ability to Perform Contract Obligations. The Project Company has no commitments, obligations, or impediments of any kind that would have a material and adverse impact on the ability of the Project Company to perform the Contract Obligations in accordance with the Contract Standards. The Project Company covenants that it will not enter into any such commitment throughout the Term.

(E) No Approvals Required. No approval, authorization, order or consent of, or declaration, registration or filing with, any Governmental Body is required for the valid execution and delivery of this Project Agreement by the Project Company except as such have been duly obtained or made.

(F) Licensing and Registration Requirements. The Project Company possesses all licenses required under Applicable Law to perform the services required of the Project Company under this Project Agreement and is not in violation of any of the terms or conditions of such licenses. The Project Company is registered with all appropriate Governmental Bodies to the extent necessary to perform all services required of the Project Company under this Project Agreement.

(G) No Litigation. There is no Legal Proceeding, at law or in equity, before or by any court, arbitral tribunal or other Governmental Body pending or, to the best of the Project Company's knowledge after due inquiry, overtly threatened or publicly announced against the Project Company, in which an unfavorable decision, ruling or finding could reasonably be expected to have a material and adverse effect on the execution and delivery of this Project Agreement by the Project Company or the validity, legality or enforceability of this Project Agreement against the Project Company, or any other agreement or instrument entered into by the Project Company in connection with the transactions contemplated hereby, or on the ability of the Project Company to perform its obligations hereunder or under any such other agreement or instrument.

(H) Claims and Demands. There are no material and adverse claims or demands based in environmental, contract or tort law pending or threatened against the Project Company or any of its Affiliates with respect to any facilities designed or constructed by the Project Company or any of its Affiliates that would have a material and adverse effect upon the ability of the Project Company to perform the Contract Obligations.

(I) Applicable Law Compliance. To the best of its knowledge after due inquiry, the Project Company and its Affiliates are not in material violation of any law, order, rule or regulation with respect to any facilities designed or constructed by the Project Company or any of its Affiliates.

(J) Information Supplied by the Project Company. The information supplied and representations and warranties made by the Project Company in all submittals made in response to the RFQ and RFP with respect to the Project Company (and to its knowledge after due inquiry, all information supplied in such submittals with respect to any Affiliate or Subcontractor) are true, correct and complete in all material respects.

(K) Intellectual Property. The Project Company owns, or has sufficient rights to use, all Intellectual Property necessary for the Project without any material conflict with the rights of others.

(L) Practicability of Performance. Subject to, and in accordance with, the terms of this Project Agreement, the Project Company assumes the risk of the practicability and possibility of performance of the Contract Obligations in compliance with the requirements of the Contract Standards on the scale, within the time for completion, and in the manner required hereunder, and agrees that sufficient consideration for the assumption of such risk is included in the Contract Compensation.

ARTICLE 3

TERM

SECTION 3.1. EFFECTIVE DATE AND TERM.

(A) Term. This Project Agreement shall become effective, and the term hereof (the “**Term**”) shall commence, on the Contract Date. The Term shall continue to the Expiration Date or, if this Project Agreement is earlier terminated by either party in accordance with their respective termination rights under Article 12 (Breach, Default, Remedies and Termination), to the Termination Date.

(B) Accrued Rights. No termination of this Project Agreement shall:

(1) Limit or otherwise affect the respective rights and obligations of the parties hereto accrued prior to the date of such termination; or

(2) Preclude either party from impleading the other party in any Legal Proceeding originated by a third party as to any matter occurring during the Term.

SECTION 3.2. SURVIVAL.

Notwithstanding any other provision of this Project Agreement, this Section and the following provisions hereof shall survive the expiration or any earlier termination of this Project Agreement:

(1) Article 2 (Representations and Warranties);

(2) Section 4.8 (Deliverable Material);

(3) Subsection 5.9(I) (Elective Continuance of the Project by the KRRC on Other Bases Using the Lead Design Subcontractor);

(4) Subsection 5.9(J) (Elective Continuance of the Project by the KRRC with Other Contractors)

(5) Section 9.9 (Interest on Overdue Obligations);

(6) Section 9.10 (Retention and Audit of Books and Records);

(7) Section 10.3 (Project Warranties Not Exclusive);

(8) Article 11 (Dispute Resolution);

(9) Article 12 (Breach, Default, Remedies and Termination), as applicable to the obligations of the parties following the Termination Date;

(10) Article 15 (Indemnification), including all of the indemnities, limitations and releases set forth therein;

(11) Section 17.7 (Property Rights);

(12) Attachment 8C (Schedule of Values and Project Company Contingency) of Appendix 8 (Contract Price) regarding Subcontractor and Surety recoveries;

(13) Appendix 9 (Insurance Requirements);

(14) All provisions of this Project Agreement with respect to payment obligations of the Project Company or the KRRC accrued prior to the Termination Date;

(15) Any other provisions which either expressly or by their context or inherent character should survive expiration or early termination of this Project Agreement or the completion of the Contract Obligations; and

(16) Any provisions necessary to give effect to the provisions referenced or described in this Section.

ARTICLE 4

GENERAL PERFORMANCE REQUIREMENTS

SECTION 4.1. PROJECT SCOPE.

(A) Project Scope Generally. The Project and the Project Site are generally described in Appendix 1 (Project and Project Site Description). The Project Company recognizes that the Project will ultimately be defined by the Project Technical Requirements, which will be developed by the Project Company as part of the Preliminary Services and included in this Project Agreement as Appendix 4 (Project Technical Requirements) as part of the GMP Contract Amendment. The Project Company further recognizes that the KRRC may provide for the design and construction of certain Related Projects through Separate Contractors, and such Related Projects are not included within the scope of the Project Implementation Work, except as specifically provided in Section 6.11 (Interface and Coordination).

(B) Pricing Established on the Contract Date. The parties acknowledge and agree that the Project Company Fee and the maximum limit on the price payable for the Preliminary Services, were proposed by the Project Company as part of the Proposal, negotiated by the parties prior to the Contract Date and included in this Project Agreement as executed on the Contract Date, and shall not be the subject of: (1) any Early Work Package Submittal or any Early Work Package Amendment; (2) the GMP Project Submittal or the GMP Contract Amendment; or (3) the Project Implementation Contract Amendment.

(C) Pricing to be Established Subsequent to the Contract Date. The parties further acknowledge and agree that all other elements of pricing provided for in this Project Agreement are to be negotiated by the parties subsequent to the Contract Date, based in part on the information in the Proposal, in connection with establishing an Early Work Package Amendment, the GMP Contract Amendment and the Project Implementation Contract Amendment in accordance with the terms and conditions of this Project Agreement. These elements include any Base Early Work Package Price and the Base Guaranteed Maximum Price, which is to be: (1) negotiated and included in the GMP Contract Amendment based on the estimates and assumptions set forth with respect thereto in the Proposal, as modified by the Project cost model updates made during the performance of the Preliminary Services; and (2) modified, if necessary, in the Project Implementation Contract Amendment.

(D) Expected Amendments to this Project Agreement Prior to Commencement of the Project Implementation Work. As of the Contract Date, the parties expect (but without obligation) to enter into the following Contract Amendments to this Project Agreement prior to the commencement of the Project Implementation Work:

- (1) an Early Work Package Amendment, providing for the purchase of gates necessary to be installed as part of the Pre-Reservoir Drawdown Work;
- (2) the GMP Contract Amendment, establishing the Base Guaranteed Maximum Price, the Scheduled Milestone Substantial Completion Dates and the Milestone Longstop Dates, following the negotiation of the GMP Project Submittal; and
- (3) the Project Implementation Contract Amendment, following the receipt of all Governmental Approvals necessary to commence the Project Implementation Work.

Other Contract Amendments may also be entered into by agreement of the parties as appropriate.

(E) Estimated Guaranteed Maximum Price. As of the Contract Date, the estimated Base Guaranteed Maximum Price is \$250,000,000. This estimate is based on all relevant information available to the parties as of the Contract Date, including the cost estimating information contained in the Reference Documents and discussions between the parties as to the assumptions and qualifications contained therein. It does not reflect estimates as to potential Base Guaranteed Maximum Price Adjustments, which will be estimated by the parties and determined and accounted for by the KRRC in connection with the GMP Contract Amendment and the Project Implementation Contract Amendment. The estimated Guaranteed Maximum Price as set forth in this subsection is for planning purposes only, as of the Contract Date.

(F) Estimated Scheduled Milestone Substantial Completion Dates. As of the Contract Date, the estimated Scheduled Milestone Substantial Completion Dates, based on (1) the issuance of the FERC Surrender Order in the first quarter of 2021, and (2) an estimated Preliminary Services Period (including the negotiation of the GMP Contract Amendment and Project Implementation Contract Amendment) concluding no later than April 15, 2021 are:

Project Implementation Work Element	Estimated Scheduled Milestone Substantial Completion Dates	Estimated Milestone Longstop Dates
1. Hatchery Work	August 15, 2021	September 15, 2021
2. Pre-Reservoir Drawdown Work	October 31, 2021	November 30, 2021
3. Reservoir Drawdown Work	February 15, 2022	March 15, 2022
4. Dam Removal Work and Initial Habitat Restoration Work	October 31, 2022	November 30, 2022
5. Final Habitat Restoration Work	October 31, 2023	November 30, 2023

The estimated Scheduled Milestone Substantial Completion Dates and estimated Milestone Longstop Dates set forth in this subsection are for planning purposes only, as of the Contract Date.

(G) Estimate Updates. The Project Company shall be responsible for updating and refining the estimated Guaranteed Maximum Price, estimated Scheduled Milestone Substantial Completion Dates and estimated Milestone Longstop Dates as part of the Preliminary Services. Ultimately, the parties intend to negotiate and agree on the definitive Scheduled Milestone Substantial Completion Dates and definitive Milestone Longstop Dates in accordance with Section 7.2 (Scheduled Milestone Substantial Completion Dates and Milestone Longstop Dates), and to incorporate the agreed-upon Base Guaranteed Maximum Price, Scheduled Milestone Substantial Completion Dates and Milestone Longstop Dates in the GMP Contract Amendment, to be confirmed or revised in the Project Implementation Contract Amendment.

(H) KHSA Indemnity. The parties acknowledge that the KHSA requires that the KRRC provide a special indemnity of the Project Company Indemnitees by a corporate indemnitor, that the Project Company Indemnity provided hereunder does not constitute such KHSA indemnity, and that the provision of such KHSA indemnity will be required as a condition to entering into the Project Implementation Contract Agreement. The Project Company shall reasonably assist the KRRC in meeting its obligations to provide the KHSA indemnity agreement.

SECTION 4.2. PROJECT COMPANY RESPONSIBILITIES GENERALLY.

(A) Reliance. The Project Company acknowledges and agrees that the KRRC is entering into this Project Agreement in reliance on the Project Company's expertise with respect to the performance of the Contract Obligations. The Project Company recognizes that the Project will serve an essential public service and is critically important in order to enable the KRRC to continue to meet its corporate obligations, including its obligations under the KHSA, the Funding Agreements and the FERC License Orders. The Project Company agrees that it will be relieved of its performance obligations under this Project Agreement solely to the extent provided in Section 14.1 (Uncontrollable Circumstances Generally) with respect to the occurrence of Uncontrollable Circumstances.

(B) Scope of the Contract Obligations. The Contract Obligations are divided into the Preliminary Services, the Project Implementation Work and the Warranty Work, each as more particularly described in Article 5 (Preliminary Services and Early Work Packages), Article 6 (Project Implementation Work), and Article 10 (Project Warranties). The Project Company recognizes that, notwithstanding this division, the Contract Obligations may overlap and agrees to perform all Contract Obligations in accordance with the Contract Standards. In no event shall the Project Company commence the Project Implementation Work prior to the Project Implementation Contract Amendment Date and the issuance of a Notice to Proceed with Project Implementation Work in accordance with Section 6.3 (Project Implementation Commencement Date) or, in respect of any Early Work Package, the execution of an Early Work Package Amendment and the issuance of the associated Notice to Proceed in accordance with subsection 5.7(I) (Commencement of Early Work Package). As of the Contract Date, the complete Project Technical Requirements have not yet been developed. The Project Company shall have responsibility for the further development and finalization of the Project Technical Requirements as part of the Preliminary Services. Following the issuance of a Notice to Proceed with the Project Implementation Work, the Project Company shall be solely responsible for undertaking and completing the Project Implementation Work in accordance with the Contract Documents, including supervision, coordination and administration of all Design Professional Services, and all other work reasonably inferable from the Contract Documents.

(C) Compliance with Funding Requirements. The Project Company shall comply with all applicable Funding Requirements, prevailing wage requirements, and State audit requirements. The Project Company shall include the applicable Funding Requirements in all Subcontracts in a manner that effectively establishes the right of the Funders to enforce such requirements. In the event of a change in applicable Funding Requirements (including any change in prevailing wage or other requirements) effective following the Project Implementation Contract Amendment Date, the Project Company shall be entitled to a Base Guaranteed Maximum Price Adjustment to account for any additional cost of compliance. The Project Company shall, upon request, provide the KRRC with an acknowledgement of compliance with any Funding Requirement, together with appropriate supporting documentation not already in the KRRC's possession.

(D) Cooperation. The Project Company agrees to cooperate with the KRRC and any other contractor engaged by the KRRC in connection with the work to be performed toward completion of the Project and any Related Project, including the Program Manager and any Separate Contractor. The Project Company recognizes that a cooperative and collaborative environment among all persons engaged in performing such work is essential to the successful implementation of the Project and agrees to use all reasonable efforts to work with all such other persons toward fostering such an environment.

(E) Responsibility for Personnel and Subcontractors. All obligations of the Project Company under this Project Agreement shall be performed by Project Company employees, agents or Subcontractors (subject to the limitations set forth in Article 8 (Management, Labor and Subcontractors)) who are qualified to perform the specific services and meet all licensing and certification requirements of Applicable Law. The Project Company shall be fully responsible, in accordance with the terms and conditions of this Project Agreement, for all Contract Obligations performed by its employees, agents or Subcontractors.

SECTION 4.3. ENVIRONMENTAL REVIEW.

(A) EIR. As of the Contract Date, a draft EIR is being prepared with respect to the Project by the Water Resources Control Board under CEQA. The parties acknowledge and agree that the finalization and certification of the EIR is a condition to the occurrence of the Project Implementation Contract Amendment Date.

(B) NEPA Compliance Document. As of the Contract Date, applications for the FERC License Orders have been filed. The parties acknowledge and agree that the issuance of the FERC License Surrender Order will require the preparation of a NEPA Compliance Document, and that the finalization of a NEPA Compliance Document and the FERC License Surrender Order are conditions to the occurrence of the Project Implementation Contract Amendment Date.

(C) Assistance with Environmental Review. Pursuant to Section 2.7 (Potential Additional Preliminary Services) of Appendix 2 (Preliminary Services), the KRRC shall have the option to request that the Project Company, as an Additional Preliminary Services Service, perform services related to the preparation of the EIR and the NEPA Compliance Document.

(D) EIR and NEPA Compliance Document Environmental Mitigation Measures. The parties acknowledge and agree that the environmental mitigation measures required under the certified EIR and the NEPA Compliance Document shall be incorporated in the Environmental Compliance Plan constituting a Compliance Document as part of the GMP Contract Amendment, and confirmed or revised as part of the Project Implementation Contract Amendment.

SECTION 4.4. ACCESS TO AND SUITABILITY OF THE PROJECT SITE.

(A) Familiarity with the Project Site. Following the Contract Date and prior to the Project Implementation Contract Amendment Date, the Project Company's agents and representatives, as part of the Preliminary Services, shall inspect and become familiar with the Project Site (and any Related Projects), its physical condition relevant to the obligations of the Project Company pursuant to this Project Agreement, including surface conditions, normal and usual soil conditions, roads, Utilities, topographical conditions and air and water quality conditions and shall review the Geotechnical Data Report, conduct additional geotechnical investigations and develop the Existing Conditions Assessment Report. As of the Project Implementation Contract Amendment Date, the Project Company shall be familiar with all local and other conditions which may be material to the Project Company's performance of the Project Implementation Work (including transportation; seasons and climate; access, availability, disposal, handling and storage of materials and equipment; and availability and quality of labor and Utilities); the Project Company shall have received and reviewed all information regarding the Project Site provided to or developed by it in connection with the Preliminary Services pursuant to this Project Agreement; and the Project Company shall have made all other site investigations that it deems necessary to make a determination as to the

suitability of the Project Site and to submit its GMP Project Submittal to the KRRC in accordance with Section 5.8 (GMP Project Submittal). Subject to and in accordance with subsection 5.9(K) (Project Company Representations in a GMP Contract Amendment), the Project Company's GMP Project Submittal shall serve as a representation by the Project Company that, based on the foregoing and in its capacity as a Project Implementation Work Services provider, that the Project Site constitutes an acceptable and suitable site for the Project Implementation Work in accordance herewith, and that the Project Implementation Work can be performed on the Project Site within the Guaranteed Maximum Price and in accordance with the Contract Standards, including the schedule requirements of this Project Agreement.

(B) Independent Verification of KRRC-Provided Project Site Information. The Project Company acknowledges that, except as otherwise provided in subsection 4.5(B) (Reliance by Project Company on the Reliance Documents), it is responsible for the independent verification and confirmation of any Project Site information, supplied to it by or on behalf of the KRRC, and upon which it elects to rely in connection herewith. Except to the extent specifically provided in Section 4.5 (Information Provided by or on Behalf of the KRRC), Section 6.4 (Differing Site Conditions) and Section 6.5 (Regulated Site Conditions), no error or omission in any Project Site information supplied to the Project Company by or on behalf of the KRRC shall constitute an Uncontrollable Circumstance, or relieve the Project Company from the Contract Obligations or entitle the Project Company to any increase in compensation hereunder. Notwithstanding any factual statement, conclusion, or any language or recommendation contained in any information supplied to the Project Company by or on behalf of the KRRC, the Project Company assumes full responsibility for inspecting the Project Site and for the means and methods of construction, demolition and habitat restoration that it employs when performing the Project Implementation Work.

(C) PacifiCorp Property Transfer Agreement. As of the Contract Date, the KRRC and PacifiCorp are negotiating the terms of the PacifiCorp Property Transfer Agreement. The parties acknowledge and agree that the execution and delivery of the PacifiCorp Property Transfer Agreement sufficient for the purposes of this Project Agreement is a condition to the occurrence of the Project Implementation Contract Amendment Date, and that the execution and delivery of the PacifiCorp Property Transfer Agreement is expected to occur following the issuance of the FERC License Transfer Order.

(D) Access to the PacifiCorp Property Prior to the PacifiCorp Property Transfer Date. Prior to the PacifiCorp Property Transfer Date, the PacifiCorp Property and the Facilities will be owned by PacifiCorp. The Project Company shall, within 15 days following the Contract Date, execute the PacifiCorp Property Access Agreement for the purpose of performing the Preliminary Services through the PacifiCorp Property Transfer Date and shall comply with its terms through the PacifiCorp Property Transfer Date and thereafter as provided therein.

(E) Access to the Adjacent and Related Lands Prior to and Following the PacifiCorp Property Transfer Date. Prior to and following the PacifiCorp Property Transfer Date, the Project Company shall have access to the Adjacent and Related Lands to the extent and on such terms as such access is allowed under access agreements negotiated with the owners of the Adjacent and Related Lands in furtherance of the Project.

(F) Access to the Project Site Following the PacifiCorp Property Transfer Date. The execution of this Project Agreement shall be deemed to constitute the granting of a license to the Project Company to access the Project Site, following the PacifiCorp Property Transfer Date, for the purposes of performing the Contract Obligations, including such additional surface, subsurface and geotechnical studies or tests required to be performed as

part of the Preliminary Services and as deemed necessary by the Project Company prior to the commencement of Project Implementation Work in accordance with Good Dam Removal Practice. Such access shall be subject to the KRRC's prior approval, which shall not be unreasonably withheld, as to time and scope, and shall be subject to all KRRC procedures and requirements regarding Project Site security. The Project Company shall perform all such activities in accordance with the Contract Standards, including the specific requirements set forth in Appendix 2 (Preliminary Services) and Appendix 5 (General Project Implementation Work Requirements), and shall provide the KRRC with all reports or analyses generated by such activities promptly after such reports or analyses are generated. Except to the extent provided in Section 6.5 (Regulated Site Conditions) with respect to Regulated Site Conditions, the Project Company shall assume all risks associated with such activities and shall indemnify, defend and hold harmless the Project Company Indemnitees in accordance with and to the extent provided in Article 15 (Indemnification) from and against all Loss-and-Expense resulting therefrom. Following the issuance of a Notice to Proceed for an Early Work Package in accordance with subsection 5.7(I) (Commencement of Early Work Package) and the Notice to Proceed with the Project Implementation Work in accordance with Section 6.3 (Project Implementation Commencement Date) and for the duration of the Term, the Project Company shall have all Project Site access rights as are necessary for the performance of the Project Implementation Work in accordance with the Contract Documents and such access rights shall not be subject to prior KRRC approval. Notwithstanding any of the foregoing, the Project Company shall at all times comply with the Project Site access requirements and restrictions set forth in the Contract Documents, including Appendix 5 (General Project Implementation Work Requirements) and, when applicable, the PacifiCorp Property Access Agreement attached hereto as Transaction Form E (Form of PacifiCorp Property Access Agreement), and shall coordinate the Project Implementation Work and interface with all Separate Contractors in accordance with Section 6.11 (Interface and Coordination).

SECTION 4.5. INFORMATION PROVIDED BY OR ON BEHALF OF THE KRRC.

(A) Generally. The KRRC makes no representation or warranty with respect to any information provided to the Project Company by or on behalf of the KRRC in connection with this Project Agreement except as specifically provided in subsection (B) (Reliance by Project Company on the Reliance Documents) of this Section. Except (1) for information set forth in Reliance Documents, and (2) as set forth in the Contract Documents (including in relation to relief for Uncontrollable Circumstances), the Project Company shall assess all risks related to the Project and independently verify and confirm all information supplied to it by or on behalf of the KRRC and upon which the Project Company elects to rely in connection herewith. Except as otherwise provided in subsection (B) (Reliance by Project Company on the Reliance Documents) of this Section and as may reasonably be requested by the Project Company, agreed upon by the KRRC in its discretion, and expressly established in the GMP Contract Amendment, the Project Implementation Contract Amendment or any Early Work Package Amendment, the Project Company shall have no right to relief hereunder or to make any claim against the KRRC, or to seek any adjustment to the Contract Compensation or the Scheduled Milestone Substantial Completion Dates as the result of any error, omission or insufficiency relating to any information provided to the Project Company by or on behalf of the KRRC in connection with this Project Agreement.

(B) Reliance by Project Company on the Reliance Documents. The Project Company shall be entitled to the reasonable use of the information contained in the Reliance Documents in performing the Contract Obligations, shall not be required to re-perform the work required to develop such information, and shall be entitled to rely on the Reliance Documents as provided in this Section. If the Project Company establishes that any error, omission or insufficiency in the information contained in the Reliance Documents has a

material and adverse impact on the Project Company's cost or time for performance under this Project Agreement, then the Project Company shall be entitled to Uncontrollable Circumstance relief as and to the extent provided in Article 14 (Uncontrollable Circumstances).

SECTION 4.6. COMPLIANCE WITH APPLICABLE LAW.

(A) Compliance with Applicable Law Generally. The Project Company shall, and shall cause all Subcontractors to, perform the Contract Obligations in accordance with Applicable Law, including the Governmental Approvals, and all other applicable Contract Standards. The Project Company shall provide all notices required by Applicable Law and the Contract Standards. The incorporation, reference or citation of specific statutes or other parts of Applicable Law in the Contract Documents is not intended, nor shall it be construed, to limit the generality of the Project Company's and all Subcontractors' obligations to comply with Applicable Law (whether or not specifically incorporated or referenced in the Contract Documents).

(B) Compliance with the Terms and Conditions in Governmental Approvals. The Project Company shall comply with all terms, conditions and requirements of all Governmental Approvals required to be made, obtained or maintained under Applicable Law in connection with the performance of the Contract Obligations, including the KRRC-Managed Governmental Approvals. The Project Company shall report to the KRRC, immediately upon obtaining knowledge thereof, all violations of the terms and conditions of any Governmental Approval or Applicable Law pertaining to the Project. The KRRC, in its capacity as the counterparty to the Project Company under this Project Agreement, shall have the right independently to enforce compliance with this Project Agreement regarding the requirements of any Governmental Approval regardless of whether a concurrent or different regulatory enforcement action has been undertaken by any other Governmental Body. Except to the extent caused by an Uncontrollable Circumstance, any violations of or noncompliance with any Governmental Approval caused by the Project Company violating or not being in compliance with a Governmental Approval shall be at the sole risk of the Project Company.

(C) Fines, Penalties, Indemnification and Remediation. In the event that the Project Company or any Subcontractor fails at any time to comply with Applicable Law (including the FERC License Orders and all other Governmental Approvals) with respect to the Project Implementation Work, the Project Company shall: (1) promptly respond to any notice of non-compliance, warning letter, notice of violation or other enforcement action and seek amicable resolution of the issues; (2) immediately correct such failure and resume compliance with Applicable Law; (3) pay any resulting fines, assessments, levies, impositions, penalties or other charges; (4) indemnify, defend and hold harmless the Project Company Indemnitees in accordance with and to the extent provided in Article 15 (Indemnification) from and against all Loss-and-Expense resulting therefrom; (5) make all changes in performing the Contract Obligations which are necessary to ensure that the failure of compliance with Applicable Law will not recur; and (6) comply with any corrective action plan filed with or mandated by any Governmental Body in order to remedy a failure of the Project Company to comply with Applicable Law.

(D) Assignment of Anti-Trust Claims. In accordance with California Public Contract Code Section 7103.5, in entering into this Project Agreement, the Project Company offers and agrees to assign to the KRRC all rights, title and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. § 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the California Business and Professions Code), arising from purchases of goods, services or materials pursuant to this Project Agreement. The assignment shall be made and become effective at the

time the Agency tenders final payment to the Project Agreement for the Project Implementation Work, without further acknowledgement by the parties.

SECTION 4.7. ENGAGEMENT OF THE PROGRAM MANAGER AND OTHER KRRC REPRESENTATIVES.

The Project Company shall fully cooperate with the Program Manager and any other representative designated by the KRRC from time to time. The services of the Program Manager and other KRRC-designated representatives may include the following:

- (1) Reviewing Drawings, plans and Specifications for compliance with the Contract Documents;
- (2) Reviewing proposed changes to the Project Technical Requirements;
- (3) Determining the completion of specified portions of the Project Implementation Work and reviewing the release of funds to the Project Company pursuant hereto;
- (4) Reviewing and monitoring Project Implementation Work progress, scheduling, payments and procedures;
- (5) Inspecting Project Implementation Work undertaken by the Project Company to determine whether any Project Design Requirement has been satisfied;
- (6) Assisting the KRRC in reviewing the validity of the Project Company's written notice that an Uncontrollable Circumstance has occurred; and
- (7) Reviewing and advising the KRRC with respect to material changes to the Project during the Term.

It is understood that the services intended to be provided by the Program Manager shall be of an observational and review nature only, and that the Program Manager shall not have authority to interfere with, halt or delay in any way the Project Implementation Work or to require or approve changes to the Project Technical Requirements or the Project Company's plans, Drawings and Specifications made in accordance therewith. Any fees of the Program Manager shall be paid by the KRRC. Nothing in this Section shall be construed to limit the right of any KRRC personnel or representative having the authority to protect the health and safety from inspecting the Project or otherwise exercising any power permitted under Applicable Law.

SECTION 4.8. DELIVERABLE MATERIAL.

(A) KRRC Ownership and Use of Deliverable Material. The Project Company hereby assigns to the KRRC all right, title, and interest, including any copyrights, patents, or any other Intellectual Property rights in all Deliverable Material and all ideas, methods or information specifically developed for such Deliverable Material. All such documents and information, including all ideas or methods represented by such information, may be used as the KRRC determines and shall be delivered to the KRRC at no additional cost to the KRRC as required hereunder, upon request, upon Project Final Completion or upon termination of this Project Agreement. The KRRC's use of any such Deliverable Material (including drafts, working copies, and incomplete documents or information such as ideas or methods or information) for

any purpose other than the Project, shall be at the KRRC's own risk, and the Project Company shall have no liability therefor.

(B) Project Company Use of Deliverable Material. The Project Company may make and retain copies of the Contract Documents and Deliverable Material for information, reference and use by Project Company Persons solely with respect to the performance of the Project Implementation Work. No Project Company Person may use the Contract Documents or Deliverable Material for any other purpose without the prior written consent of the KRRC. No conference presentations or other marketing materials (which do not include information the Project Company may utilize in response to solicitations for future contracts or work) regarding the Project shall be made by any Project Company Person without the prior written consent of KRRC.

SECTION 4.9. MONTHLY PROGRESS REPORTS.

The Project Company shall provide the KRRC and the Program Manager with monthly written reports ("**Monthly Progress Report**") during the Term prepared in accordance with the Contract Standards, covering the Project and addressing work performed during the past month, percentage of work completion and compliance with the Project Schedule. The Project Company shall describe Project issues, problems or concerns that the KRRC should be made aware of and how the Project Company proposes to address them in each Monthly Progress Report. The Monthly Progress Report shall include a description of the work planned for the next three months and an update on the Project Company's progress in meeting the SLTBE Goals. The KRRC's and the Program Manager's receipt or acceptance of the Monthly Progress Report (or any revised Monthly Progress Report) shall not bind the KRRC in any manner. Thus, the KRRC's and the Program Manager's receipt or acceptance of the Monthly Progress Report (or any revised Monthly Progress Report) shall not imply KRRC approval or consent to any of the matters set forth therein and shall not limit or otherwise affect the Project Company's obligations to achieve each Milestone Substantial Completion by the Scheduled Milestone Substantial Completion Dates and each Milestone Final Completion by the date specified in Section 7.7 (Milestone Final Completion).

ARTICLE 5

PRELIMINARY SERVICES, EARLY WORK PACKAGES AND GMP
AND PROJECT IMPLEMENTATION CONTRACT AMENDMENTSSECTION 5.1. SCOPE OF THE PRELIMINARY SERVICES.

(A) Generally. The Project Company shall render and perform the Preliminary Services to and for the KRRC in accordance with Appendix 2 (Preliminary Services) and the terms and conditions of this Project Agreement. The Project Company's responsibility to perform the Preliminary Services shall include the employment of or the subcontracting for all necessary professionals, technicians and engineers, properly qualified, licensed and skilled in the various aspects of the Preliminary Services, and the performance of all services reasonably inferable from this Project Agreement. All Preliminary Services shall be performed in accordance with the Contract Standards, as applicable.

(B) Preliminary Services Tasks; Notices to Proceed. The Project Company acknowledges that the Preliminary Services are divided into discrete Preliminary Services Tasks associated with the advancement of the Preliminary Services. The Project Company shall commence performing the Preliminary Services only upon the issuance by the KRRC of a Notice to Proceed with the Preliminary Services. Upon the issuance of such Notices to Proceed, the Project Company shall proceed to complete the Preliminary Services in coordination with the KRRC and shall perform work among Preliminary Services Tasks on a concurrent basis as appropriate in order to achieve the Preliminary Services Schedule objectives. The KRRC may at its discretion, and currently intends to, issue multiple Notices to Proceed simultaneously. The Project Company shall be compensated for Preliminary Services in accordance with Section 9.1 (Compensation for Preliminary Services). In no event shall the Project Company be entitled to compensation for the performance of the Preliminary Services prior to the issuance by the KRRC of a Notice to Proceed with the Preliminary Services.

(C) PacifiCorp Property Access Agreement. The parties acknowledge and agree that the execution, delivery and effectiveness of the PacifiCorp Property Access Agreement is a condition to the ability of the Project Company to perform a substantial majority of the Preliminary Services Tasks. The parties further acknowledge and agree that the Preliminary Services Schedule assumes (1) that the issuance of the first Preliminary Services Notice to Proceed will occur on the Contract Date and that such Notice to Proceed will include authorization for portions of work contemplated by Task Orders #1, #2, #3, #4, #5 and #6 in order to do critical preparatory work for the FERC License Orders; and (2) that the PacifiCorp Property Access Agreement will be effective within 14 days following the Contract Date, so that the work contemplated by the first Preliminary Services Task Notice to Proceed can be completed in accordance with the Preliminary Services Schedule. The parties agree to work together to cause the PacifiCorp Property Access Agreement to be negotiated, completed and effective consistent with the Preliminary Services Schedule and establish terms and conditions that are reasonably necessary for the timely performance of the Preliminary Services. In the event of a delay of the effectiveness of the PacifiCorp Property Access Agreement beyond the effective date assumed in this subsection, the relief provisions set forth in subsection (D) (Uncontrollable Circumstances Relief Inapplicable During the Preliminary Services Period) of this Section shall apply.

(D) Uncontrollable Circumstance Relief Inapplicable During the Preliminary Services Period. The Uncontrollable Circumstance relief provisions of this Project Agreement apply only during the Project Implementation Period, except to the extent that an Early Works Package is entered into. Preliminary Services to be provided hereunder are in the nature of professional services being provided on a time and materials basis subject to a not-to-exceed

limit. In the event that any circumstance expands or limits the Preliminary Services workscope or extends or reduces the expected time frame for its completion, the parties shall negotiate appropriate adjustments to the Preliminary Services schedule and compensation provided for in Appendix 2 (Preliminary Services) to this Project Agreement.

(E) Adjustments to the Preliminary Services Fee for Restoration Work. The parties acknowledge and agree that the Project Company's Preliminary Services Fee includes an allocation of \$6,000,000 for Preliminary Services relating to habitat restoration work. The parties currently expect the Project Company, at the KRRC's request, to execute a subcontract with Resource Environmental Services, LLC for the performance of such habitat restoration work. To the extent that the Preliminary Services to be provided by Resource Environmental Services, LLC exceeds the allocation described in this subsection, the parties will negotiate an appropriate adjustment to the Preliminary Services Fee.

(F) KRRC to Provide Assurance of Funding. In order to assure the Project Company that the Funders are funding the KRRC in a manner consistent with the KRRC's payment obligations to the Project Company during the Preliminary Services Period, the KRRC shall, when requested by the Project Company, provide bank or other asset balance statements. The KRRC shall not be required to provide such bank or other asset balance statements more than once a month.

SECTION 5.2. CHANGES TO THE SCOPE OF THE PRELIMINARY SERVICES.

(A) Generally. The KRRC shall have the right to make changes to the scope of the Preliminary Services set forth in Appendix 2 (Preliminary Services) at any time, in its discretion, by written notice to the Project Company, subject to the terms and conditions of this Section. Changes to the scope of the Preliminary Services may be made by the KRRC to account for an Uncontrollable Circumstance or any other reason determined by the KRRC.

(B) Additional Preliminary Services. Except as otherwise specifically provided in this Section, the Project Company shall be entitled to an equitable adjustment to the Preliminary Services Fee and the Preliminary Services Schedule in the event of any expansion of the scope of the Base Preliminary Services pursuant to this Section (the "**Additional Preliminary Services**"). Any expansion of the scope of the Base Preliminary Services under this Section and the corresponding equitable adjustment to the Preliminary Services Fee and the Preliminary Services Schedule shall be reflected in a Change Order or a Contract Amendment. The Project Company shall not be entitled to compensation for any Additional Preliminary Services beyond the scope of the Base Preliminary Services unless, prior to the performance of any such Additional Preliminary Services, the Project Company shall have received express written authorization from the KRRC to perform the Additional Preliminary Services. In the absence of any KRRC-directed change to the scope of the Base Preliminary Services reflected in a Change Order or a Contract Amendment, the Project Company shall have no obligation to perform work outside the scope of the Base Preliminary Services.

(C) Additional Preliminary Services Resulting From Delay. Extra costs resulting from delays caused by Uncontrollable Circumstances shall be deemed to be costs resulting from Additional Preliminary Services, as and to the extent provided in Article 14 (Uncontrollable Circumstances) if the Project Company demonstrates that the costs claimed (1) resulted from time or expenses actually incurred in performing the Preliminary Services, (2) were incurred by Project Company as a direct result of the delay and not otherwise within the

scope of the Preliminary Services, and (3) are documented to the KRRC's reasonable satisfaction.

(D) Exclusions from Additional Preliminary Services. Additional Preliminary Services shall not include work or services necessary during the Preliminary Services because of negligent errors, omissions or conflicts of any type in the Project Company's Preliminary Services Deliverable Material. All such work or services shall constitute Base Preliminary Services and shall be performed at no cost to the KRRC, and shall include any required corrections or revisions to the Preliminary Services Deliverable Material.

(E) Changes that Reduce the Scope of the Preliminary Services. The KRRC shall have the right to reduce the scope of the Preliminary Services at any time by written notice to the Project Company. Changes to the Preliminary Services that reduce the scope of the Preliminary Services shall be effective upon the delivery of the written notice by the KRRC pursuant to this Section. Any reduction in the scope of the Preliminary Services shall result in an appropriate reduction in the Preliminary Services Fee and an adjustment to the Preliminary Services Schedule, as appropriate, which shall be reflected in a Change Order or a Contract Amendment.

SECTION 5.3. PRELIMINARY SERVICES SCHEDULE.

The Preliminary Services Schedule is set forth in Attachment 2A (Preliminary Services Schedule) of Appendix 2 (Preliminary Services) and shall be updated as provided in Appendix 2 (Preliminary Services). The Project Company agrees to complete the Preliminary Services in a diligent, efficient and timely manner in accordance with the Preliminary Services Schedule. The Project Company acknowledges and agrees that any delays in the Project Company's completion of its Preliminary Services under this Project Agreement or performance beyond the number of days agreed to herein for completion of a Preliminary Services Task will cause injury and damage to the KRRC. The KRRC reserves the right to extend the Preliminary Services Schedule as the KRRC deems necessary or appropriate. The parties acknowledge and agree, however, that the Preliminary Services Fee as of the Contract Date assumes that the Preliminary Services will be completed by April 15, 2020 and any Preliminary Services to be performed subsequent to that date shall result in an appropriate adjustment to the Preliminary Services Fee to be negotiated by the KRRC and the Project Company.

SECTION 5.4. SUSPENSION OF PRELIMINARY SERVICES.

The KRRC may, for any reason through a written notice executed by the KRRC Contract Representative, order the Project Company to suspend performance of the Preliminary Services. Prior to any resumption of work at the KRRC's direction, the Project Company shall notify the KRRC Contract Representative of any additional time and costs the Project Company believes it is entitled to within 30 days of its receipt of the request to resume suspended work or for additional Preliminary Services Deliverable Material outside the scope of the Preliminary Services or changes in the scope of the Preliminary Services, or such claim shall conclusively be deemed to have been waived. If the Project Company establishes that the suspension of the Preliminary Services had a material and adverse effect on the Project Company's time or costs for the performance of the Preliminary Services, the Project Company shall be entitled to time and cost relief, as appropriate and determined by the KRRC acting reasonably and subject to the Project Company's duty to mitigate in Section 17.8 (General Duty to Mitigate).

SECTION 5.5. COORDINATION WITH THE KRRC.

(A) Meetings and Reports Generally. The Project Company shall hold periodic meetings and conferences with the KRRC during the Preliminary Services to verify and confirm that the development of the Project (1) has the full benefit of the KRRC's experience and knowledge of existing needs and facilities, (2) is consistent with the KRRC's current policies and standards, and (3) is proceeding in accordance with the Preliminary Services Schedule. The Project Company shall also keep the KRRC regularly informed as to the progress of the Preliminary Services through the submittal of Monthly Progress Reports in accordance with the requirements set forth in Section 4.9 (Monthly Progress Reports) and Appendix 2 (Preliminary Services). The Monthly Progress Report shall present Project budget information and indicate amounts billed by Preliminary Services Task by the Project Company for the past month, cumulatively to date and the amount of funds remaining. The Monthly Progress Report shall include a section on the progress of the design and list any concerns, actions, changes, and reviews and approvals from the KRRC that the Project Company requires. The Project Company shall indicate any Governmental Body or Utility requirements and issues that the KRRC should be aware of, and if there are KRRC requirements for interacting with such Governmental Bodies, Utilities or other groups.

(B) Information Provided by the KRRC. The KRRC shall make available for the Project Company's use in the performance of the Preliminary Services all existing plans, maps, field notes, statistics, computations, and other data in the KRRC's possession relating to the Project, as reasonably requested in writing by the Project Company, at no cost to the Project Company. Except as otherwise provided in Section 4.5 (Information Provided by or on Behalf of the KRRC), all such information is provided to the Project Company for the sole purpose of the Project Company's convenience and for use in relation to the performance of the Preliminary Services and may not be relied upon by the Project Company. The Project Company shall promptly notify the KRRC in writing when it reasonably believes or suspects that information provided by the KRRC is not accurate or cannot be checked. Any and all information provided by the KRRC shall remain the property of the KRRC and shall be returned promptly to the KRRC upon written request.

(C) Required Design Information. Notwithstanding the provisions of subsection (B) (Information Provided by the KRRC) of this Section and except as provided in Section 4.5 (Information Provided by or on Behalf of the KRRC), the Project Company shall be responsible for obtaining and verifying all information required as further described in Appendix 2 (Preliminary Services) in order to properly design the Project so that it is designed, constructed and performs in accordance with Applicable Law and the Contract Standards.

SECTION 5.6. PROJECT DESIGN.

(A) Design Considerations. The design for the Project undertaken and performed by the Project Company shall:

(1) Be undertaken by a design team exercising such degree of care, skill and diligence as would reasonably be expected from consultants qualified to perform services similar in scope, nature and complexity to the design, as of the date of this Project Agreement, and the Project Company shall appoint a design team that:

(a) Is so qualified;

(b) Includes (as required by Applicable Law) licensed or registered professional engineers and architects; and

(c) Has sufficient expertise and experience to expeditiously and efficiently perform all of the design in a proper and professional manner to the standard set out in this Project Agreement; and

(2) Include specific consideration of constructability, demolition and debris removal, and habitat restoration cost issues at all stages of design, as appropriate.

(B) Project Company Assumption of Full Design Liability. The Project Company acknowledges and agrees that, as provided in Section 6.7 (Final Design Responsibilities and Risk Assumption), if and when a GMP Contract Amendment and a Project Implementation Contract Amendment are executed by the parties (and with respect to any Early Work Package work, when an Early Work Package Amendment is executed by the parties), the Project Company will have the sole and exclusive responsibility and liability for the performance of the Project Implementation Work (except for the design of the Hatchery Work and the City of Yreka Waterline Work, which have been furnished by the KRRC) in accordance with and subject to the terms and conditions of the Contract Documents. Accordingly, the Project Company shall not propose or agree to any element of the Project Technical Requirements or other work product to be incorporated in any GMP Contract Amendment, Project Implementation Contract Amendment or Early Work Package Amendment that would, in its reasonable judgment, be inconsistent with the assumption of such responsibility and liability.

SECTION 5.7. EARLY WORK PACKAGES.

(A) Early Work Packages. The parties anticipate that there may be one or more elements of the Project Implementation Work that are ready for commencement before it is appropriate to arrive at an overall agreed-upon Base Guaranteed Maximum Price in accordance with Section 5.8 (GMP Project Submittal). The Project Company shall recommend such phases or elements of the Project Implementation Work ("**Early Work Packages**") to the KRRC Contract Representative, as appropriate, through the performance of the Preliminary Services, based on Early Work Package submittals ("**Early Work Package Submittals**"). The KRRC shall have the discretion to authorize the commencement of Project Implementation Work associated with an Early Work Package pursuant to this Section. The agreement of the parties as to an Early Work Package shall be effectuated through a Contract Amendment authorizing the Project Implementation Work associated with the Early Work Package and specifying the terms and conditions of compensation payable to the Project Company and the completion dates associated with such Project Implementation Work (an "**Early Work Package Amendment**"). All work performed pursuant to an Early Work Package Amendment shall constitute Project Implementation Work hereunder and shall be performed in accordance with the Contract Standards. Neither the KRRC nor the Project Company shall have any obligation to enter into an Early Work Package Amendment. All Early Work Package Amendments agreed upon in accordance with this Section shall be taken into consideration in the preparation of the GMP Project Submittal submitted in accordance with Section 5.8 (GMP Project Submittal). The Project Company shall furnish Early Work Package Bonds with penal sums equal to the Early Work Package Price applicable to the Early Work Package, in compliance with the requirements set forth in Section 16.2 (Bonds) prior to the KRRC's issuance of a Notice to Proceed for the Early Work Package in accordance with subsection (I) (Commencement of Early Work Package) of this Section.

(B) Early Work Package Submittals. An Early Work Package Submittal shall include and be based upon the applicable Project Technical Requirements, and all other specifications, information, analysis, findings and reports developed by the Project Company

during the performance of the Preliminary Services as developed to the date of submittal, and shall be prepared in accordance with the Contract Standards. An Early Work Package Submittal shall include the following:

Price Submittal:

(1) A proposed lump sum or guaranteed maximum Early Work Package Price, as authorized by the KRRC, including the terms and conditions of payment, focused solely on the Project Implementation Work associated with the Early Work Package and prepared in accordance with subsection (F) (Complete Early Work Package Pricing) of this Section, together with a description of how such Early Work Package Price will impact overall Project costs;

(2) A proposed lump sum fee attributable to profit, mark-up and general and indirect overhead with respect to the Project Implementation Work associated with the Early Work Package, based upon the percentages set forth in Section 8.5 (Project Company Fee) of Appendix 8 (Contract Price);

(3) A proposed schedule of values developed in accordance with the Contract Standards (including Attachment 8C (Schedule of Values and Project Company Contingency) to Appendix 8 (Contract Price)), to be negotiated and incorporated in the Early Work Package Amendment;

(4) A cash flow forecast based on the schedule for completion of the Project Implementation Work associated with the Early Work Package and the schedule of values proposed for the Early Work Package, to be negotiated and incorporated in the Early Work Package Amendment; and

(5) If applicable and requested by the KRRC, a list of any proposed allowance items, alternate prices and unit prices;

Technical Submittal:

(1) Proposed Project Technical Requirements to be negotiated and incorporated in the Early Work Package Amendment;

(2) A detailed description of the Project Implementation Work associated with the Early Work Package Submittal and the associated Project Technical Requirements; and

(3) The final and complete list of required Governmental Approvals for the Early Work Package, including application dates and assumed issuance dates, to be negotiated and incorporated in the Early Work Package Amendment.

Commercial Terms Submittal:

(1) A proposed schedule for completion of the Project Implementation Work associated with the Early Work Package, together with a description of how such work will impact the Project Schedule;

(2) The proposed scheduled completion dates (expressed as the number of calendar days following the Early Work Package Amendment Date) by which completion

of the Project Implementation Work associated with the Early Work Package shall occur, to be negotiated and included in the Early Work Package Amendment;

(3) A proposed delay liquidated damages amount, to be negotiated and included in the Early Work Package Amendment; and

(4) The proposed longstop dates (expressed as the number of calendar days following the proposed scheduled completion date), after which an event of default of the Project Company shall occur if the Project Implementation Work associated with the Early Work Package shall not have been completed, to be negotiated and included in the Early Work Package Amendment;

Additional Information Submittal:

(1) A proposed Subcontracting Plan and a Procurement Management Plan for the Early Work Package;

(2) The names of additional proposed Subcontractors (other than any existing Approved Subcontractors) and descriptions of their roles for approval by the KRRC as Approved Subcontractors;

(3) A letter from a Surety qualified under Section 16.2 (Bonds) confirming the intent of the Surety to provide the Early Work Package Bonds required under such Section on the Early Work Package Amendment Date;

(4) A list of any assumptions, clarifications or qualifications made by the Project Company in providing the Early Work Package Submittal that are material to any part thereof, including a statement as to what information supplied by the KRRC (if any) the Project Company proposes to use as the basis of any portion of its Early Work Package Submittal; and

(5) Any other information reasonably requested by the KRRC prior to the due date for the Early Work Package Submittal as necessary or appropriate to negotiate and complete the Early Work Package Amendment.

(C) Early Work Package Submittal Revisions. The Project Company shall provide the KRRC with at least seven days' notice prior to submitting an Early Work Package Submittal for review. The KRRC shall act reasonably in considering any proposed Early Work Package in light of the schedule requirements under this Project Agreement. In the event the Early Work Package Submittal does not comply with the Contract Standards, the KRRC may provide written notice to the Project Company of any additions, corrections or revisions required to achieve such compliance. In such event, the Project Company, without any increase in the Preliminary Services Fee, shall promptly take all necessary rectification action, making multiple re-submittals if required.

(D) Negotiation and Execution. If the KRRC agrees to authorize the commencement of a portion of the Project Implementation Work under an Early Work Package Submittal, the Project Company and the KRRC shall negotiate and enter into an Early Work Package Amendment. An Early Work Package Amendment at a minimum shall incorporate and definitively address all of the items identified in subsection (B) (Early Work Package Submittals) of this Section, and shall contain any other commercial terms and conditions specific to the Early Work Package, including the rights of the KRRC to terminate the work

being performed pursuant to the Early Work Package Amendment and the right of the KRRC to direct the Project Company to continue performance of the Early Work Package in the event the parties do not enter into a GMP Contract Amendment or a Project Implementation Contract Amendment. Early Work Packages may be structured in a manner that provides for the commencement of the related Project Implementation Work at any time determined by the parties.

(E) Compensation for Early Work Package Submittal and Finalization of Early Work Package Amendment. The Preliminary Services are anticipated to include the preparation of one Early Works Package Submittal as described in subsection (J) (Expected Early Work Package). Accordingly, the Project Company shall be entitled to receive the Preliminary Services Fee for the Preliminary Services performed in connection with the preparation of such Early Work Package Submittal. For any other Early Work Package Submittals that may be requested by the KRRC, however, the Project Company shall be entitled to be reimbursed for the cost of preparing such additional Early Work Package Submittals, as such costs will constitute costs of performing Additional Preliminary Services. The Project Company shall not, however, be entitled to compensation for discussing, refining, negotiating and finalizing any Early Work Package Amendment.

(F) Complete Early Work Package Pricing. It is the intention of the parties that each Early Work Package Submittal, and any associated Early Work Package Amendment, include complete pricing for the Project Implementation Work to be performed thereunder, including: (1) a reasonable lump sum fee attributable to profit, mark-up and general and indirect overhead with respect to such Project Implementation Work based upon the percentages set forth in Section 8.5 (Project Company Fee) of Appendix 8 (Contract Price); and (2) pricing based on a contingency amount for such Project Implementation Work, to be administered in the same manner as the Project Company Contingency.

(G) Compensation Payable in Connection with Early Work Packages. The KRRC shall pay the Early Work Package Price to the Project Company for Project Implementation Work properly performed and completed pursuant to the terms of the Early Work Package Amendment in accordance with, and subject to the limitations contained in Appendix 8 (Contract Price), notwithstanding the fact that no GMP Contract Amendment or Project Implementation Contract Amendment will be in effect at the time the parties execute an Early Work Package Amendment.

(H) Project Company Representations in an Early Work Package Amendment. The execution of any Early Work Package Amendment will be deemed to constitute representations by the Project Company, with respect to the Early Work Package, to the same effect as the representations made in subsection 5.9(K) (Project Company Representations in a GMP Contract Amendment) with respect to the GMP Contract Amendment, with references to Project Implementation Work referring to the Early Work Package and references to the Base Guaranteed Maximum Price referring to the Early Work Package Price.

(I) Commencement of Early Work Package. If the parties agree to an Early Work Package Amendment, the KRRC shall issue a limited Notice to Proceed with the Project Implementation Work associated with the Early Work Package, subject to this Section. Notwithstanding the issuance of a limited Notice to Proceed with an Early Work Package, the Project Company shall not commence any Project Implementation Work at the Project Site in connection with such Early Work Package until the Project Company has satisfied the following requirements:

(1) The Project Company shall have provided Early Work Package Bonds for the Early Work Package, and certified that such Early Work Package Bonds are in full force and effect and in compliance with the requirements set forth in Section 16.2 (Bonds).

(2) The Project Company shall have provided the KRRC with certificates for all Required Insurance in accordance with Section 13.1 (Insurance) and certified that all such policies are in full force and effect and in compliance with the requirements of Section 13.1 (Insurance) and Appendix 9 (Insurance Requirements).

(3) The Project Company shall have provided the KRRC with a Subcontracting Plan and a Procurement Management Plan for the Early Work Package, which plans shall be subject to the KRRC's approval, acting reasonably.

(4) The Project Company shall have satisfied all requirements of Applicable Law with respect to the commencement of Project Implementation Work and shall have obtained all Governmental Approvals required for the commencement of the Project Implementation Work of the Early Work Package and provided copies of such Governmental Approvals to the KRRC. All such Governmental Approvals shall be in full force and effect.

(5) The Project Company shall have provided the KRRC with the final, approved Health and Safety Plan in accordance with the Contract Standards.

The foregoing requirements are in addition to any other preconditions to the commencement of Project Implementation Work established by the Contract Documents.

(J) Expected Early Work Package. As of the Contract Date, the parties expect that the only Early Work Package that will be required will be an Early Work Package relating to the design, fabrication and delivery of the new gates that are required to be installed to allow for Reservoir Drawdown Work.

SECTION 5.8. GMP PROJECT SUBMITTAL.

(A) Preliminary Services and GMP Project Submittal. As part of the Preliminary Services, the Project Company is obligated to develop the design of the Project to a level sufficient to make the GMP Project Submittal. The GMP Project Submittal shall be completed and submitted to the KRRC on a timely basis as required under Appendix 2 (Preliminary Services), and shall remain a firm offer by the Project Company for at least 90 days. As provided in Appendix 2 (Preliminary Services), the parties may agree to have a GMP Project Submittal at an earlier or later stage of design development than as contemplated in Appendix 2 (Preliminary Services). The GMP Project Submittal shall include and be based upon the Project Technical Requirements and all other information, analysis, findings and reports developed by the Project Company during the performance of the Preliminary Services, and shall be prepared in accordance with the Contract Standards. The GMP Project Submittal shall exclude the Project Company Fee which was proposed in the Proposal, negotiated and included in this Project Agreement on the Contract Date. Without limiting the requirements of Appendix 2 (Preliminary Services), the GMP Project Submittal shall include a price submittal, a technical submittal, a commercial terms submittal and an additional information submittal, as follows:

Price Submittal:

(1) A proposed Base Guaranteed Maximum Price, to be negotiated and incorporated in Section 8.6.2 (Base Guaranteed Maximum Price) of Appendix 8 (Contract Price), together with all supporting information required by subsection (B) (Derivation of Proposed Base Guaranteed Maximum Price) of this Section;

(2) The proposed General Conditions Costs, which will be part of the proposed Project Implementation Work Costs. The proposed General Conditions Costs shall be prepared with reference to the estimated general conditions costs set forth in the Project Company's Proposal;

(3) A proposed professional personnel rate schedule for inclusion as Attachment 8B (Professional Personnel Rate Schedule).

(4) A proposed Schedule of Values and a proposed Project Company Contingency (including the maximum percentage thereof available for the correction of defective, damaged, or non-conforming Project Implementation Work and damaged KRRRC Property or private property and for design errors or omissions), to be prepared in accordance with, negotiated and incorporated as part of Attachment 8C (Schedule of Values and Project Company Contingency) to Appendix 8 (Contract Price);

(5) A cash flow forecast based on the Project Implementation Schedule, Schedule of Values and proposed Base Guaranteed Maximum Price, to be negotiated and incorporated in Appendix 8 (Contract Price);

(6) If applicable and requested by the KRRRC, a list of any proposed allowance items, alternate prices and unit prices; and

(7) A recommended KRRRC Allowance for Base Guaranteed Maximum Price Adjustments.

Technical Submittal:

(1) Proposed Project Technical Requirements, to be negotiated and incorporated in and to constitute Appendix 4 (Project Technical Requirements) of this Project Agreement;

(2) The final and complete list of required Governmental Approvals (both for KRRRC-Managed Governmental Approvals and Project Company-Managed Governmental Approvals) for the Project (including Governmental Approval Application Dates and Assumed Approval Issuance Dates, all as required by subsection 6.6(A) (Preliminary Services Relating to Permitting), to be negotiated and incorporated in Appendix 3 (Governmental Approvals);

(3) A description of any Change in Law that has occurred between the Contract Date and the date of the GMP Project Submittal;

(4) A proposed Maintenance of Facilities Operations Plan prepared in accordance with the requirements of subsection 6.11(A) (Maintenance of Facilities Operations) and Appendix 5 (General Project Implementation Work Requirements), to be

negotiated and incorporated in Attachment 5C (Maintenance of Facilities Operations Plan) to Appendix 5 (General Project Implementation Work Requirements); and

- (5) An updated and finalized description of the Project Site.

Commercial Terms Submittal:

(1) Proposed Scheduled Milestone Substantial Completion Dates, to be negotiated and included in Section 1.1 (Definitions);

(2) A proposed Project Implementation Schedule, to be negotiated and included in Attachment 5A (Initial Project Implementation Schedule) to Appendix 5 (General Project Implementation Work Requirements);

(3) A proposed penal sum of the Maintenance Bond (expressed as a percentage of the Guaranteed Maximum Price), to be negotiated and inserted in subsection 16.2(F) (Maintenance Bond); and

(4) Any proposed changes to the Required Insurance described in Section 9.3 (Insurance During the Project Implementation Period) for the KRRC and its insurance advisor to consider.

Additional Information Submittal:

(1) In the event that any Early Work Package Amendments have been executed prior to the date of the GMP Project Submittal, a proposal as to the manner in which the technical, price, schedule and other terms and conditions contained in the Early Work Package Amendments will be incorporated and taken account of in the GMP Contract Amendment, with the objective that the GMP Contract Amendment will contain and supersede all of the terms and conditions of any Early Work Package Amendments;

(2) The names of additional proposed Subcontractors (other than any existing Approved Subcontractors) and descriptions of their roles for approval by the KRRC as Approved Subcontractors;

(3) A letter from a Surety qualified under Section 16.2 (Bonds) confirming the intent of the Surety to amend the existing Early Work Package Bonds or provide a new Performance Bond and Payment Bond as required under such Section on the GMP Contract Amendment Date;

(4) A list of any assumptions, clarifications or qualifications made by the Project Company in providing its GMP Project Submittal that are material to any part thereof, including a statement as to what information supplied by the KRRC (if any) the Project Company proposes to use as the basis of any portion of its GMP Project Submittal; and

(5) Any other information reasonably requested by the KRRC prior to the due date for the GMP Project Submittal as necessary or appropriate to negotiate and complete the GMP Contract Amendment.

(B) Derivation of Proposed Base Guaranteed Maximum Price. The GMP Project Submittal shall include a detailed and comprehensive description of how the proposed Base Guaranteed Maximum Price was derived and the material factors on which it was based, including any Early Work Packages, all in compliance with the requirements for establishing the Base Guaranteed Maximum Price set forth in Appendix 2 (Preliminary Services), together with any other related information required pursuant to this Section. All costs, bids, quotes, estimates and other information supporting the GMP Project Submittal shall be made available to the KRRC upon request. The proposed Base Guaranteed Maximum Price and the other elements of the GMP Project Submittal shall be based upon the risk allocation established by this Project Agreement as of the Contract Date.

(C) Continuance of Preliminary Services Following GMP Project Submittal. Following submittal of the GMP Project Submittal and prior to the GMP Contract Amendment Date, it is the expectation of the parties that the Preliminary Services will continue and the terms of continuance of such work will be determined by the parties on or about the date of the GMP Project Submittal. In such event, the Project Company shall be entitled to receive the Preliminary Services Fee for the Preliminary Services performed following submittal of the GMP Project Submittal through the GMP Contract Amendment Date. It is the further expectation of the parties that, as provided in subsection Section 5.10(A) (Obtaining All Remaining Governmental Approvals), the Preliminary Services will continue to be performed following the GMP Contract Amendment Date through the Governmental Approvals Completion Period.

(D) Early Definitive Project Submittal. The parties may agree, each in its discretion, that the GMP Project Submittal may be made, and the GMP Contract Amendment negotiated, prior to the 60% design stage.

SECTION 5.9. GMP CONTRACT AMENDMENT.

(A) Non-Compliant GMP Project Submittal. In the event the GMP Project Submittal does not comply with the requirements of this Project Agreement, the KRRC shall provide written notice to the Project Company of any additions, corrections or revisions required to achieve such compliance. In such event, the Project Company, at its cost and expense and without any increase in the Preliminary Services Fee, shall promptly take all necessary rectification action, making multiple re-submittals if required. The failure of the Project Company to furnish the Preliminary Services and provide the GMP Project Submittal in accordance with the Contract Standards shall be a material breach of this Project Agreement.

(B) Negotiation and Execution of the GMP Contract Amendment. The KRRC and the Project Company acknowledge and agree that each intends to negotiate and enter into a Contract Amendment for the performance of all Project Implementation Work necessary to achieve Project Final Completion (the “**GMP Contract Amendment**”) based on the GMP Project Submittal and the completion of the other Preliminary Services. The principles for negotiating the Base Guaranteed Maximum Price are set forth in subsection (E) (Base Guaranteed Maximum Price Negotiating Principles) of this Section. The GMP Contract Amendment at a minimum shall incorporate and definitively address all of the items identified in subsection 5.8(A) (Preliminary Services and GMP Project Submittal). In the event the parties elect to execute the GMP Contract Amendment, the date of execution and delivery thereof shall constitute the “**GMP Contract Amendment Date**” hereunder, and thereupon the Project Implementation Period shall commence.

(C) Potential Lump Sum Pricing. The parties acknowledge and agree that they may elect to enter into a GMP Contract Amendment that is based upon a fixed lump sum

price for completion of the Project Implementation Work in lieu of a Base Guaranteed Maximum Price, and that such GMP Contract Amendment shall include modifications to the terms and conditions specified herein necessary to effectuate payment for Project Implementation Work based upon the fixed lump sum price.

(D) Consideration of Early Work Package Amendments in Negotiating the GMP Contract Amendment. In the event that any Early Work Package Amendments have been executed prior to the date of the GMP Contract Amendment Date, it is the intent of the parties that in negotiating and executing the GMP Contract Amendment, the GMP Contract Amendment will take account of and supersede all of the terms and conditions of any Early Work Package Amendments, so that the entirety of the agreement between the parties is contained in a single GMP Contract Amendment that specifies all terms and conditions for the Project. In negotiating the GMP Contract Amendment, the KRRC shall duly consider the proposal of the Project Company contained in the GMP Project Submittal relating to the incorporation of any Early Work Package Amendments into the GMP Contract Amendment.

(E) Base Guaranteed Maximum Price Negotiating Principles. Each party acknowledges that it intends to negotiate the Base Guaranteed Maximum Price taking into account the following:

(1) Cost to Complete. The reasonably estimated costs of completing the Project Implementation Work and achieving Milestone Substantial Completion by the Scheduled Milestone Substantial Completion Dates and Project Final Completion in accordance with the Contract Standards and the cost elements set forth in Appendix 2 (Preliminary Services). Considerations of risk shall be taken into account separately, pursuant to item (2) below. Such costs shall be the basis of the items constituting the Schedule of Values.

(2) Indeterminable Costs Associated with Risks Transferred to the Project Company. An amount reasonably attributable to indeterminable costs that, considered individually and valued in the aggregate based on agreed-upon probability-of-occurrence models adapted specifically to the Project, may be incurred by the Project Company should the risks assumed by the Project Company in performing the Project Implementation Work occur. Such risks shall exclude the risk of Uncontrollable Circumstances, which have been retained by the KRRC hereunder, and for which the Project Company will receive additional compensation as well as schedule and performance relief under Article 14 (Uncontrollable Circumstances) should such risks occur. The projected cost of any such risks assumed by the Project Company shall be the basis of establishing the Project Company Contingency, and such risks shall be identified in the risk register prepared as part of the Preliminary Services. These include:

- (a) The risk of Subcontractor delay or non-performance;
- (b) The risk of having to correct Project Implementation Work that does not conform with the Contract Standards;
- (c) Changes in the scope or cost of Project Implementation Work that may occur as the design is advanced from the level set forth in the Project Technical Requirements to a fully complete level;

(d) The risk that inflation in the cost of commodities, materials, equipment, labor and services necessary for the completion of the Project Implementation Work will exceed the level assumed by the parties in establishing the Base Guaranteed Maximum Price under item (1) above;

(e) The risk that it may be necessary to incur additional expenses in order to comply with the Project Technical Requirements and achieve Milestone Substantial Completion by the Scheduled Milestone Substantial Completion Dates; and

(f) Any other risk specifically referred to herein as a risk to be borne by the Project Company in performing the Project Implementation Work.

(F) Obligations of the Project Company Relating to the GMP Contract Amendment. In connection with a potential GMP Contract Amendment, the Project Company shall be obligated (1) to make a complete bona fide GMP Project Submittal in accordance with this Section and Section 5.8 (GMP Project Submittal), and (2) to negotiate in good faith toward a GMP Contract Amendment based on the GMP Project Submittal, if and to the extent the KRRC elects pursuant to subsection (H) (No Obligation of the KRRC to Enter into a GMP Contract Amendment) of this Section to enter into and continue such negotiations.

(G) Compensation for GMP Project Submittal and Finalization of GMP Contract Amendment. The Preliminary Services include the preparation of a GMP Project Submittal in accordance with Section 2.9 (Preliminary Services Task #8 – GMP Project Submittal and Supporting Cost Estimates) of Appendix 2 (Preliminary Services) and for the refinement and finalization of the GMP Contract Amendment in accordance with this Section. Accordingly, the Project Company shall be entitled to receive the Preliminary Services Fee for the Preliminary Services performed in connection with the preparation of the GMP Project Submittal. The Project Company shall not, however, be entitled to compensation for discussing, refining, negotiating and finalizing the GMP Contract Amendment.

(H) No Obligation of the Parties to Enter into a GMP Contract Amendment. Notwithstanding the intent of the parties as expressed in subsection (B) (Negotiation and Execution of the GMP Contract Amendment) of this Section, neither the KRRC nor the Project Company has any obligation whatsoever to negotiate with the other party to enter into a GMP Contract Amendment. The KRRC and the Project Company, each in its discretion, may elect not to commence or continue negotiations and not to enter into and execute a GMP Contract Amendment for any reason. Except for payment of that portion of the Preliminary Services Fee that has been earned by the terms hereof but not yet paid by the KRRC, the Project Company acknowledges and agrees that no failure by the KRRC to negotiate or to enter into the GMP Contract Amendment shall entitle the Project Company to make any claim for damages or other compensation as a result of any such failure, and all such claims are hereby waived and released by the Project Company. The Project Company acknowledges and agrees that neither the intent of the parties to negotiate and enter into the GMP Contract Amendment, nor the conduct or discontinuance of any such negotiations, shall be construed to limit or affect the KRRC's right to terminate this Project Agreement for its convenience at any time as provided in Section 12.6 (KRRC Convenience Termination Rights).

(I) Elective Continuance of the Project by the KRRC on Other Bases Using the Lead Design Subcontractor. The KRRC, upon termination of this Project Agreement or upon any failure by the parties to execute a GMP Contract Amendment, may elect to require the Project Company to either:

(1) Continue to perform the Preliminary Services to advance the design of the Project, either partially or to the fully complete level (or, if applicable, cause its lead design Subcontractor acting as Engineer-of-Record to perform such services) pursuant to this Project Agreement, so that the Project may be procured and implemented on a design-bid-build basis or on another alternative delivery basis; or

(2) Cause its lead design Subcontractor to make a bona fide proposal to perform all Design Professional Services to advance the design of the Project, either partially or to the fully complete level, and to enter into such services on terms and conditions substantially identical to the terms and conditions of this Project Agreement pertaining to the Design Professional Services element of the Preliminary Services and to negotiate in good faith to enter into a separate agreement with the KRRC to provide such services.

(J) Elective Continuance of the Project by the KRRC with Other Contractors. The KRRC shall have the right at any time in its discretion to proceed to develop and implement the Project with other contractors and service providers. The KRRC may exercise such right during the performance of the Preliminary Services, upon termination of this Project Agreement or upon any failure of the parties to execute a GMP Contract Amendment. The KRRC shall have the further right in connection therewith, based on its ownership of the Preliminary Services Deliverable Material as provided in Section 4.8 (Deliverable Material), to use any Preliminary Services Deliverable Material in any manner it chooses to complete the Project Implementation Work; provided, however, that the Project Company shall only be liable for negligent errors or omissions in the Preliminary Services Deliverable Material in the event that the Project Company continues to perform, or causes its lead design Subcontractor to continue to perform, the Preliminary Services pursuant to this Project Agreement and advances the design of the Project to the fully complete level at the election of the KRRC in accordance with subsection (I)(1) (Elective Continuance of the Project by the KRRC on Other Bases Using the Lead Design Subcontractor) of this Section. The Project Company acknowledges and agrees that such limitation will have no applicability if the parties enter into the GMP Contract Amendment and proceed with the Project Implementation Work on the design-build basis contemplated by this Project Agreement.

(K) Project Company Representations in a GMP Contract Amendment. In the event the parties execute a GMP Contract Amendment, the GMP Contract Amendment shall be deemed to constitute a representation by the Project Company that:

(1) It has examined, carefully studied, and thoroughly understands the Contract Documents associated with the Project Implementation Work;

(2) It has thoroughly reviewed and verified all information provided to or obtained by the Project Company through the performance of the Preliminary Services, including:

(a) Reports of explorations and tests of subsurface conditions at or contiguous to the Project Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Project Site which have been identified or made available by the KRRC; and

(b) Reports as to Regulated Substances, if any, at the Project Site which have been identified or made available by the KRRC;

(3) It has become familiar with and is satisfied as to the general, local, and Project Site conditions that may affect cost, progress, and performance of the Project Implementation Work;

(4) It is familiar with and is satisfied as to all Applicable Law (including the terms and conditions of all Governmental Approvals) that may affect cost, progress, and performance of the Project Implementation Work;

(5) It is aware of the nature of the Related Projects and is satisfied that the Project Implementation Work can be performed in accordance with the requirements concerning the Related Projects, as set forth in the Contract Documents;

(6) It has considered the information known to the Project Company, including information commonly known to designers and contractors doing business in the localities of the Project Site; information and observations obtained from visits to the Project Site; and the Project Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on:

(a) The cost, progress, and performance of the Project Implementation Work;

(b) The means, methods, techniques, sequences, and procedures of construction to be employed by the Project Company, including any specific means, methods, techniques, sequences, and procedures of construction, demolition and habitat restoration expressly required by the Contract Documents; and

(c) Project Company's health and safety precautions and programs;

(7) Based on all of the foregoing and the performance of the Preliminary Services, the Project Site constitutes an acceptable and suitable site for the performance of the Project Implementation Work;

(8) It does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for it to enter into the GMP Contract Amendment for the performance of the Project Implementation Work for the Base Guaranteed Maximum Price on or before the applicable Scheduled Milestone Substantial Completion Dates, and in accordance with the other terms and conditions of this Project Agreement;

(9) The Project Technical Requirements are sufficient to enable the Project Company to determine the Base Guaranteed Maximum Price; and

(10) Subject to the terms and conditions of this Project Agreement, the Project Implementation Work can be completed in accordance with the Contract Standards for the Base Guaranteed Maximum Price by the applicable Scheduled Milestone Substantial Completion Date.

(L) Effect of GMP Contract Amendment. The execution and delivery of the GMP Contract Amendment shall establish the Base Guaranteed Maximum Price, the Milestone Substantial Completion Dates, the Milestone Longstop Dates, and the other basic terms and

conditions of this Project Agreement which were not established at the Contract Date. The parties expect, however, that not all of the Governmental Approvals required for the commencement of the Project Implementation Work will have been obtained by the GMP Contract Amendment Date. Accordingly, the execution and delivery of the GMP Contract Amendment shall not authorize the Project Company to commence Project Implementation Work, nor obligate the parties in any manner with respect to the Project Implementation Work until a Project Implementation Contract Amendment is executed.

(M) Governmental Approvals Not Yet Obtained. In negotiating and agreeing on a Base Guaranteed Maximum Price, the Milestone Substantial Completion Dates and the Milestone Longstop Dates, the parties intend to take into account the terms and conditions of the Governmental Approvals that have been obtained on or before the GMP Contract Amendment Date, and any draft terms and conditions that have been developed by the Governmental Body responsible for issuing any Governmental Approvals not yet obtained as of the GMP Contract Amendment Date. The parties acknowledge and agree that the effect on the Base Guaranteed Maximum Price, the Milestone Substantial Completion Dates, the Milestone Longstop Dates and any other material term of this Project Agreement that may be materially affected by the final terms and conditions of any such Governmental Approvals shall be taken into account in the negotiation of the Project Implementation Contract Amendment.

SECTION 5.10. GOVERNMENTAL APPROVALS COMPLETION PERIOD.

(A) Obtaining All Remaining Governmental Approvals. Promptly following the GMP Contract Amendment Date, the parties shall resume and continue to completion the performance of their respective obligations to obtain the Project Company-Managed Governmental Approvals and the KRRC-Managed Governmental Approvals. The work of the Project Company in this regard shall constitute Preliminary Services, not Project Implementation Work, and the Project Company shall be compensated on such basis. The parties shall cooperate and keep each other apprised of progress in meeting their respective obligations with respect to obtaining all required Governmental Approvals, and any potential cost or schedule impacts of proposed terms and conditions in Governmental Approval drafts. The period between the GMP Contract Amendment Date and the Project Implementation Contract Amendment Date shall constitute the **“Governmental Approvals Completion Period”**.

(B) Effect of Final Terms and Conditions of Remaining Governmental Approvals. When all Governmental Approvals required for the commencement of the Project Implementation Work have been obtained, the parties intend to negotiate and agree upon any amendments required to be made to this Project Agreement, as amended by the GMP Contract Amendment.

(C) Estimated Project Implementation Contract Amendment Date. As of the Contract Date, the Project Implementation Contract Amendment Date is estimated to occur in April 2021. This estimate is for planning purposes only, as of the Contract Date.

SECTION 5.11. PROJECT IMPLEMENTATION CONTRACT AMENDMENT.

(A) Project Implementation Contract Amendment Generally. The KRRC and the Project Company acknowledge and agree that each intends (without obligation) to negotiate and enter into a further Contract Amendment (the **“Project Implementation Contract Amendment”**) at the conclusion of the Governmental Approvals Completion Period. The Project Implementation Contract Amendment is expected to be entered into for the purpose of

amending, if and to the extent required, the Base Guaranteed Maximum Price, Scheduled Milestone Substantial Completion Dates, Milestone Longstop Dates or any other provision of this Project Agreement that may be materially affected by (1) the terms and conditions of the KHS-A-Managed Governmental Approvals as finally issued, (2) the length of the Governmental Approvals Completion Period, or (3) any other material fact or circumstance occurring during the Governmental Approvals Completion Period.

(B) Project Implementation Contract Amendment Submittal. The Project Company shall, in connection with any potential Project Implementation Contract Amendment and at the request of the KRRC, make a submittal to the KRRC with facts and analysis supporting its position with respect to any proposed term or condition for the Project Implementation Contract Amendment. The submittal shall, as and to the extent applicable and appropriate, be consistent with the submittal requirements for the GMP Project Submittal, and the parties shall negotiate the Project Implementation Contract Amendment under the same principles and terms described in subsections (D), (E) and (F) of Section 5.9 (GMP Contract Amendment) as if written expressly to apply to a potential Project Implementation Contract Amendment. In negotiating the Project Implementation Contract Amendment, the KRRC does not intend to agree to any modification of the Base Guaranteed Maximum Price, the Scheduled Milestone Substantial Completion Dates or the Milestone Longstop Dates, in the absence of any change in material facts or circumstance affecting the Project Implementation Work or occurring during the Governmental Approvals Completion Period.

(C) Expected Conditions to the Execution of the Project Implementation Contract Amendment. The KRRC does not expect to enter into a Project Implementation Contract Amendment unless, on or before the Project Implementation Contract Amendment Date:

(1) Environmental Impact Report. A final Environmental Impact Report has been prepared, issued and certified.

(2) NEPA Compliance Document. A final NEPA Compliance Document has been prepared with respect to the FERC License Surrender Order by FERC under the Natural Environmental Policy Act.

(3) FERC License Orders. The FERC License Orders have been issued and are in full force and effect.

(4) PacifiCorp Property Transfer Agreement. The PacifiCorp Property Transfer Agreement has been executed and is in full force and effect, and the KRRC owns fee title to the PacifiCorp Property.

(5) Adjacent and Related Lands. The KRRC has acquired easements or other interests in real property with respect to the Adjacent and Related Lands sufficient for the purposes of performing the Project Implementation Work.

(6) KRRC-Managed Governmental Approvals. The KRRC-Managed Governmental Approvals have been obtained, are in full force and effect, and provide all authority required under Applicable Law to commence, carry out and continue to completion the Project Implementation Work. **[Note: If any KRRC-Managed Governmental Approvals have not been obtained or are not yet in full force and effect and the parties nonetheless elect to execute and**

deliver the Project Implementation Contract Amendment, the parties shall negotiate in good faith, as part of the Project Implementation Contract Amendment, the allocation of risk for such outstanding KRRC-Managed Governmental Approvals in subsections 6.6(I) (Delays in the Issuance of KRRC-Managed Governmental Approvals) and 6.9(C) (Changes to Terms and Conditions of Governmental Approvals).]

(7) Project Company-Managed Governmental Approvals. All Project Company-Managed Governmental Approvals required to commence the Project Implementation Work have been obtained and are in full force and effect.

(8) KHSA Indemnity. The KHSA Indemnity has been executed and delivered or has been issued, and is in full force and effect.

(9) County MOA's. The County MOA's have been executed and delivered, and are in full force and effect.

(10) Legal Proceedings. There is no Legal Proceeding pending or threatened that seeks to enjoin the performance of the Project Implementation Work or in which an unfavorable decision, ruling or finding could reasonably be expected to have a material and adverse effect on the validity or enforceability of the FERC License Orders, the Governmental Approvals, the Funding Agreements, the EIR, the NEPA Compliance Document or any other action taken by any person required to commence and carry the performances of the Project Implementation Work.

(11) Funding Assurances. The KRRC and the Project Company have established a process for the Project Implementation Period, which assures the Project Company that the Funders are funding the KRRC in a manner consistent with the KRRC's payment obligations to the Project Company pursuant to this Project Agreement.

(D) No Obligation to Enter into Project Implementation Contract Amendment. Neither the KRRC nor the Project Company shall have any obligation to enter into a Project Implementation Contract Amendment, and the provisions of Section 5.9 (GMP Contract Amendment), subsections (G), (H), (I) and (J), relating to a potential GMP Contract Amendment, shall apply in full during the Governmental Approvals Completion Period as if written expressly to apply to a potential Project Implementation Contract Amendment.

(E) Performance Bond and Payment Bond. The Project Company shall provide the KRRC with either amended Early Work Package Bonds or a new Performance Bond and a new Payment Bond concurrently with the execution of the Project Implementation Contract Amendment, as required by and in accordance with Section 16.2 (Bonds).

ARTICLE 6

PROJECT IMPLEMENTATION WORK

SECTION 6.1. SCOPE OF THE PROJECT IMPLEMENTATION WORK.

(A) Project Implementation Work Generally. The Project Implementation Work shall commence on the Project Implementation Commencement Date and be performed in accordance with and subject to the terms and conditions of this Project Agreement.

(B) Compensation for Project Implementation Work. The Project Company shall be paid the Contract Price pursuant to Article 9 (Compensation) for the Project Implementation Work as its entitlement to payments of portions of the Contract Price arise thereafter. The Contract Price shall be subject to the Guaranteed Maximum Price.

(C) Elements of the Project Implementation Work. In performing the Project Implementation Work (including any Project Implementation Work associated with any Early Work Package Amendment, as applicable) generally, the Project Company shall, in accordance with the Contract Standards:

- (1) Apply for, obtain and maintain the Project Company-Managed Governmental Approvals, and assist the KRRC in obtaining KRRC-Managed Governmental Approvals;
- (2) Complete the Design Professional Services;
- (3) Perform the Hatchery Work;
- (4) Perform the Pre-Reservoir Drawdown Work;
- (5) Perform the Reservoir Drawdown Work;
- (6) Perform the Dam Removal Work and the Initial Habitat Restoration Work;
- (7) Perform the Final Habitat Restoration Work; and
- (8) Achieve Milestone Substantial Completion by the applicable Scheduled Milestone Substantial Completion Date.

SECTION 6.2. PROJECT IMPLEMENTATION WORK GENERALLY.

(A) Sequencing and Staging of Project Implementation Work. The Project Company shall not be limited in the sequencing or staging of the Project Implementation Work, except to the extent that the Contract Standards impose limitations. The KRRC understands and acknowledges that the Project Company intends to complete the Project Implementation Work in stages, whereby particular segments of the Project Implementation Work will be designed and implemented prior to the completion of the design and implementation of the Project as a whole. Although this Project Agreement does not require the Project Company to fully complete the entire design of the Project prior to proceeding with particular segments of the Project Implementation Work, the Project Company shall comply with all requirements of Applicable Law in performing the Project Implementation Work and shall further comply with the design submittal requirements set forth in subsection 6.7(D) (KRRC Review and Comment on Project Implementation Design Documents).

(B) Laydown Areas. Laydown and staging areas for construction, demolition and habitat restoration materials and supplies required for the Project Implementation Work shall be located on the Project Site or at other locations approved by the KRRC, and shall be identified in the Project Technical Requirements.

(C) Project Implementation Schedule and Reports. The initial Project Implementation Schedule shall be prepared during performance of the Preliminary Services, and shall be negotiated and agreed upon by the parties as part of the GMP Contract Amendment and updated as part of the Project Implementation Contract Amendment. Throughout the Project Implementation Work, the Project Company shall further update and maintain the Project Implementation Work Schedule in accordance with Appendix 5 (General Project Implementation Work Requirements). The Project Company shall submit Monthly Progress Reports, which shall include updates to the Project Implementation Schedule, in accordance with the requirements set forth in Section 4.9 (Monthly Progress Reports) and Appendix 5 (General Project Implementation Work Requirements). The Project Company acknowledges and agrees that it has a material obligation to provide the KRRC with, and to update, maintain and revise, the Project Implementation Schedule throughout the Project Implementation Period in accordance with the Contract Standards.

(D) On-Site Meetings and Design and Project Implementation Work Review. During the Project Implementation Period, the Project Company, the KRRC and the Program Manager shall conduct regular progress and management meetings as set forth in Appendix 5 (General Project Implementation Work Requirements). Such meetings shall take place at the Project Site in a field office to be provided by the Project Company in accordance with Appendix 5 (General Project Implementation Work Requirements) or as otherwise directed by the KRRC. The Monthly Progress Report shall be prepared by the Project Company and provided to the KRRC and the Program Manager at least five days prior to each monthly meeting.

(E) Utilities. The Project Company shall provide, make all arrangements necessary to secure the availability of, and construct all connections for, all Utilities necessary for the performance of the Project Implementation Work and shall be responsible for modifying all existing Utilities at the Project Site in order to support the Project Implementation Work, in the capacities required hereunder in accordance with the specific requirements that shall be set forth in the Project Technical Requirements.

(F) Quality Assurance and Quality Control. The Project Company shall have full responsibility for quality assurance and quality control for the Project Implementation Work, including compliance with the Project Implementation and Quality Management Plan. Without limiting any other requirement hereunder, the Project Company shall perform quality control inspection and testing services to ensure compliance with the Contract Standards. Sampling and testing of materials, laboratory inspection of materials and processes for quality control purposes shall be performed in compliance with the requirements set forth in subsection 6.16(C) (Project Company Tests).

(G) Sales Tax. The Project Company shall pay all sales, consumer, use, and similar taxes required by the law of the place where the Project Implementation Work is performed and such taxes shall constitute Project Implementation Work Costs. Without limiting any of the foregoing, in the event the KRRC seeks to obtain any available exemption under Applicable Law from sales, consumer, use, and similar taxes for the Project, the Project Company will cooperate with the KRRC in seeking such an exemption, and will utilize (and cause its Subcontractors to utilize) any such exemption to the extent available in performance of the Project Implementation Work. In such circumstances, the KRRC will provide the Project Company with an appropriate certification, letter or other reasonably required materials setting

forth any such exemption that is obtained by the KRRC for the Project. Notwithstanding anything to the contrary in this Section, in the event the Project Company or the KRRC obtain an exemption from any sales, consumer, use, and similar taxes for the Project, any taxes for which such an exemption is available shall constitute Unallowable Costs.

(H) Title and Risk of Loss. Title to the structures, improvements, fixtures, machinery, equipment and materials constituting the Project shall pass to the KRRC upon incorporation in the Project or payment therefor by the KRRC, whichever first occurs, free and clear of all Encumbrances as provided in subsection (I) (Encumbrances) of this Section. Except to the extent provided in subsection 6.18(E) (Payment for Restoration Work and Uninsured Costs), however, the Project Company shall bear all risk of loss concerning such structures, improvements, fixtures, machinery, equipment and materials until the applicable Milestone Substantial Completion Date, regardless of the extent to which the loss was insured or the availability of insurance proceeds. The procedures set forth in Section 6.18 (Property Damage) shall be applicable in the event of any damage to, loss or the destruction of the Project Implementation Work at the Project Site. Notwithstanding anything set forth in this Section or Section 6.18 (Property Damage), the Project Company shall bear all risk of loss concerning any structures, improvements, fixtures, machinery, equipment or materials required for the Project Implementation Work and stored at any location other than the Project Site, regardless of whether the KRRC has paid for any such structures, improvements, fixtures, machinery, equipment or materials.

(I) Encumbrances. The Project Company shall not directly or indirectly create or permit to be created or to remain, and shall promptly discharge or bond any Encumbrance or Lien (other than Permitted Encumbrances) arising in relation to the Project or the Project Implementation Work. The Project Company's Subcontracts with all materialmen, suppliers, and Subcontractors shall provide that the sole recourse for such materialmen, suppliers, and Subcontractors for non-payment shall be against the Payment Bond.

(J) Notice of Default. The Project Company shall provide to the KRRC, promptly following the receipt thereof, copies of any notice of default, breach or non-compliance received under or in connection with any Governmental Approval, Subcontract, Security Instrument or other transaction agreement pertaining to the Contract Obligations.

(K) Required Engineer-of-Record Certification. Any notice, certification, report or application delivered by the Project Company to the KRRC in connection with the Project Implementation Work, or payment therefor, under this Article, Article 9 (Compensation) or any Appendix relating to the performance of the Project Implementation Work shall be accompanied by a signed certificate of the Engineer-of-Record affirming the accuracy thereof to the best of his or her knowledge.

(L) Temporary Project Site Facilities. The Project Company shall be responsible for ensuring that adequate temporary facilities are provided as necessary to enable all personnel, including all Subcontractor personnel, to perform their work and that provisions have been made for all Project Site facilities necessary for the Project Company to manage, inspect and supervise the Project Implementation Work, including all facilities and services the cost of which constitutes a General Conditions Cost.

SECTION 6.3. PROJECT IMPLEMENTATION COMMENCEMENT DATE.

(A) Project Implementation Commencement Date Generally. Except with respect to Early Work Packages as provided in Section 5.7 (Early Work Packages), in no event shall the Project Company commence the Project Implementation Work prior to the “**Project Implementation Commencement Date**” established pursuant to this Section. The Project

Implementation Commencement Date shall not occur prior to the satisfaction of the following **“Project Implementation Commencement Date Conditions”**, each of which must be and remain satisfied as of the Project Implementation Commencement Date:

- (1) The Project Implementation Contract Amendment Date shall have occurred;
- (2) All Governmental Approvals required to commence the Project Implementation Work have been issued and are in full force and effect;
- (3) The Project Company shall have certified that it has completed all pre-Project Implementation Work requirements set forth in Appendix 5 (General Project Implementation Work Requirements) and shall have provided the KRRC with an updated Project Implementation Schedule in accordance with in Appendix 5 (General Project Implementation Work Requirements) and a final, approved (a) Maintenance of Facilities Operations Plan, (b) Health and Safety Plan, and (c) Security Plan;
- (4) The Project Company shall have satisfied all requirements of Applicable Law with respect to the commencement of Project Implementation Work and shall have obtained all Governmental Approvals (other than KRRC-Managed Governmental Approvals) required for the commencement of the Project Implementation Work and provided copies of such Governmental Approvals to the KRRC. All such Governmental Approvals shall be in full force and effect;
- (5) The KRRC shall have provided the Project Company with certificates for all Required Insurance which is to be provided by the KRRC in accordance with Section 13.1 (Insurance) and certified that all such policies are in full force and effect and in compliance with the requirements of Section 13.1 (Insurance) and Appendix 9 (Insurance Requirements);
- (6) The KRRC shall have provided the Project Company with certificates for all Required Insurance which is to be provided by the KRRC in accordance with Section 13.1 (Insurance) and certified that all such policies are in full force and effect and in compliance with the requirements of Section 13.1 (Insurance) and Appendix 9 (Insurance Requirements);
- (7) The Project Company shall have submitted the Document Submittal Procedures in accordance with the requirements of Appendix 7 (Project Implementation Work Review Procedures) and shall have complied with the design submittal requirements set forth in subsection 6.7(D) (KRRC Review and Comment on Project Implementation Design Documents) to the extent necessary to commence with the Project Implementation Work; and
- (8) The Project Company shall have held a work commencement conference with the KRRC and its representatives in accordance with Appendix 7 (Project Implementation Work Review Procedures).

The foregoing requirements are in addition to any other preconditions to the commencement of Project Implementation Work established by the Contract Documents.

(B) Establishment of the Project Implementation Commencement Date. In no event shall the Project Implementation Commencement Date be established prior to the satisfaction by the Project Company and the KRRC of the Project Implementation Commencement Date Conditions. The Project Company shall provide 10 days' written notice to

the KRRC as to the satisfaction of its Project Implementation Commencement Date Conditions and the date it proposes to establish as the Project Implementation Commencement Date hereunder. The KRRC shall issue a Notice to Proceed with Project Implementation Work on the Project Implementation Commencement Date proposed by the Project Company upon satisfaction of the Project Implementation Commencement Date Conditions. In the event the KRRC determines that the Project Company has not satisfied the Project Implementation Commencement Date Conditions, notwithstanding the Project Company's notice pursuant to this Section, the KRRC Contract Representative, by written notice to the Project Company delivered not later than three days prior to the Project Implementation Commencement Date proposed by the Project Company, shall notify the Project Company of the KRRC's determination and state which conditions the Project Company has failed to satisfy. The Project Company shall satisfy all such conditions prior to the establishment of the Project Implementation Commencement Date. Without limiting any of the foregoing, the KRRC, in its discretion, may issue a limited Notice to Proceed with Project Implementation Work pending satisfaction by the Project Company of all Project Implementation Commencement Date Conditions and the specific terms and conditions under which the Project Company is authorized to proceed with Project Implementation Work shall be specified in such Notice to Proceed.

(C) Effect of the Establishment of the Project Implementation Commencement Date. Upon the issuance by the KRRC of the Notice to Proceed establishing the Project Implementation Commencement Date, the Project Company shall have the right and the obligation to proceed with the Project Implementation Work. Absent the occurrence of Uncontrollable Circumstances as and to the extent provided in this Project Agreement, no delay in the establishment of the Project Implementation Commencement Date shall entitle the Project Company to any price, schedule or performance relief hereunder.

SECTION 6.4. DIFFERING SITE CONDITIONS.

(A) Preliminary Services Relating to Differing Site Conditions. The Project Company shall review all available information, including the Geotechnical Data Report, and undertake all soils and other site conditions investigations required with respect to the Project Site during performance of the Preliminary Services as required pursuant to Appendix 2 (Preliminary Services), and shall furnish the KRRC with the Existing Conditions Assessment Report as provided therein.

(B) Commencing Subsurface Excavations. Prior to commencing any trenching or excavations, the Project Company shall, taking into account the information in the Geotechnical Data Report and the Existing Conditions Assessment Report and in compliance with Good Dam Removal Practice, conduct further site investigations in accordance with Appendix 5 (General Project Implementation Work Requirements), including exploratory excavations and further borings, to confirm the location and type of underground structures that could be damaged as a result of the excavations or impede performance of the Project Implementation Work. Such underground structures include all sewer, water, gas, and other piping, and manholes, chambers, electrical conduits, wires, tunnels, foundations, substructures and other existing subsurface work located within or adjacent to the Project Site. The Project Company shall carefully sustain in their places and support, or if necessary relocate, all underground and surface structures located within or adjacent to the Project Site and as required by the party owning or controlling such structure. The Project Company shall communicate with any Utilities listed on the Project Technical Requirements, call for locations and subsequently visit the Project Site with a qualified representative of each such Utility. Existing surface facilities which are temporarily removed to facilitate installation of the Project Implementation Work shall be replaced and restored to their original condition. The Project Company shall notify the KRRC seven days in advance of any work that might impact utilities

of business or residents in the area surrounding the Project Site so that the KRRC can notify such businesses or residents of such work.

(C) Discovery of Differing Site Conditions. Upon discovering a Differing Site Condition and before the condition is further disturbed, the Project Company shall immediately, after taking appropriate measures to secure the affected Project Implementation Work: (1) stop work in and secure the affected area; and (2) notify the KRRC Contract Representative of the alleged Differing Site Condition in accordance with this Section. The Project Company's initial notice to the KRRC Contract Representative shall be issued by telephone or in person and followed thereafter by written notice provided in accordance with Section 14.2 (Uncontrollable Circumstance Claim Procedures). The written notice shall describe the specific differing conditions encountered, a brief description of why the condition encountered is considered a Differing Site Condition and the measures taken to deal with the differing conditions. To the extent the existence of a Differing Site Condition causes or is reasonably expected to cause an increase in the cost or time required for performance of the Project Implementation Work, the Project Company shall be entitled to a Change Order as and to the extent provided in subsection (D) (Relief for Differing Site Conditions) of this Section. Notwithstanding anything set forth in subsection (D) (Relief for Differing Site Conditions) of this Section or in Article 14 (Uncontrollable Circumstances), no Uncontrollable Circumstance relief shall be allowed for any alleged Differing Site Condition unless the Project Company provides the KRRC with notice in accordance with this Section.

(D) Relief for Differing Site Conditions. If the Project Company establishes that the actual conditions encountered during Project Implementation Work meet the criteria for a Differing Site Condition then the Project Company shall be entitled to Uncontrollable Circumstance relief as and to the extent provided in Section 14.1 (Uncontrollable Circumstances Generally).

SECTION 6.5. REGULATED SITE CONDITIONS.

(A) Project Company Responsibilities and Indemnity. In performing the Project Implementation Work, the Project Company shall exercise due care, in light of all relevant facts and circumstances, to avoid exacerbating any Regulated Site Condition after the location and existence of such Regulated Site Condition has been disclosed to the Project Company or becomes actually known by the Project Company through physical observation. Notwithstanding anything to the contrary in this Section, the Project Company shall bear full responsibility for the handling, treatment, storage, removal, remediation, avoidance, or other appropriate action (if any), with respect to:

(1) Any Regulated Substance present at, on, in or under, or migrating or emanating to or from the Project Site, that were generated by or brought or caused to be brought on the Project Site by any act or omission of the Project Company or any Subcontractor; and

(2) The creation of any Regulated Site Condition due to Project Company Fault, or the exacerbation of any Regulated Site Condition due to Project Company Fault once the location and existence of such Regulated Site Condition becomes actually known to the Project Company.

All remediation costs resulting from Regulated Substances or Regulated Site Conditions for which the Project Company bears responsibility pursuant to this Section shall constitute Unallowable Costs borne solely by the Project Company. The Project Company shall indemnify, defend and hold harmless the Project Company Indemnitees in accordance with and to the extent provided in Article 15 (Indemnification) from and against all Loss-and-Expense resulting

from Regulated Substances or Regulated Site Conditions for which the Project Company bears responsibility pursuant to this Section.

(B) Known Regulated Site Conditions. The Project Company acknowledges that the Known Regulated Site Conditions, and all cost, schedule and performance impacts relating to the Project Company's responsibility to handle, remediate and otherwise deal with such Known Regulated Site Conditions in compliance with Applicable Law, have been fully taken into account in entering into this Project Agreement and in establishing the Project Implementation Schedule, the Scheduled Milestone Substantial Completion Dates, the Base Guaranteed Maximum Price, and all of the terms and conditions of this Project Agreement. Accordingly, Known Regulated Site Conditions and any requirements to handle, remediate and otherwise deal with Known Regulated Site Conditions shall not constitute an Uncontrollable Circumstance.

(C) Unknown Regulated Site Conditions. If the Project Company encounters any Unknown Regulated Site Conditions at the Project Site, it shall stop work immediately in the affected part of the Project Implementation Work to the extent required to avoid any safety or health hazard or comply with Applicable Law until it has taken such action as is necessary, in accordance with Applicable Law, to protect the interests of any affected party. The Project Company shall, immediately upon encountering any Unknown Regulated Site Condition at the Project Site, notify the KRRC and, if required by Applicable Law, all Governmental Bodies with jurisdiction over the Project or Project Site.

(D) Remediation of Unknown Regulated Site Conditions. The Project Company shall take, or cause a Subcontractor to take, subject to subsections (E) (Relief for Unknown Regulated Site Conditions) and (F) (Articles of Historic or Scientific Value) of this Section, all necessary measures required to ensure that Unknown Regulated Site Conditions are remediated, rendered harmless or otherwise handled in accordance with Applicable Law. The Project Company shall, prior to proceeding with any such work: (1) obtain all environmental site assessments of the affected property and submit copies of such assessments to the KRRC for its approval; (2) develop remediation plans for the Unknown Regulated Site Condition, subject to the KRRC's approval; and (3) obtain all applicable Governmental Approvals to implement such plans. During the period of any investigation and remediation efforts, the Project Company shall take all necessary measures to isolate and contain such Unknown Regulated Site Condition from the unaffected parts of the Project Implementation Work, and shall continue the Project Implementation Work to the maximum extent possible on unaffected parts of the Project Implementation Work.

(E) Relief for Unknown Regulated Site Conditions. Except for those Regulated Site Conditions (1) identified in subsection (A) (Project Company Responsibilities and Indemnity) of this Section and without limiting the Project Company's obligations under subsection (D) (Remediation of Unknown Regulated Site Conditions) of this Section, and (2) constituting Known Regulated Site Conditions, if the Project Company establishes that the actual conditions encountered during Project Implementation Work meet the criteria for Unknown Regulated Site Conditions and materially and directly impact the Project Company's cost or time of performance, then the Project Company shall be entitled to Uncontrollable Circumstance relief as and to the extent provided in Article 14 (Uncontrollable Circumstances).

(F) Articles of Historic or Scientific Value. All articles of historical, archaeological, religious, scientific or similar value, including coins, fossils and articles of antiquity, which are known to exist at the Project Site as of the Project Implementation Contract Amendment Date or which may be uncovered by the Project Company during the progress of the Project Implementation Work shall become the KRRC's property. Such findings

shall be reported immediately to the KRRC, who will determine in consultation with the Project Company, the method of removal, where necessary, and the final disposition thereof.

(G) Generator Liability. Nothing contained herein is intended to identify the Project Company as the generator of any pre-existing Hazardous Material. Except with respect to those Hazardous Materials identified in subsection (A) (Project Company Responsibilities and Indemnity) of this Section as to which the Project Company bears responsibility, the KRRC shall execute, as generator, Hazardous Materials manifests required in order for the Project Company to fulfill its obligations under this Section, as and to the extent required under Applicable Law.

SECTION 6.6. PERMITTING RESPONSIBILITIES AND SCHEDULE.

(A) Preliminary Services Relating to Permitting. Appendix 3 (Governmental Approvals) sets forth, as of the Contract Date, the Governmental Approvals expected to be required for the performance of the Project Implementation Work, and the division of responsibility between the parties for managing the application process and obtaining each such Governmental Approvals. During the performance of the Preliminary Services, the Project Company shall review and confirm all Governmental Approvals that are required for the Project Implementation Work, identifying the permit name, issuing agency and permittee or approval holder. The Preliminary Services Fee is the only compensation payable for such services. Based on such services and negotiation between the parties, any necessary revisions to Appendix 3 (Governmental Approvals) shall be made on the GMP Contract Amendment Date, and updated as part of the Project Implementation Contract Amendment.

(B) Project Company Governmental Approvals Responsibility Generally. The Project Company shall obtain and maintain all Governmental Approvals necessary to commence, continue and complete the Project Implementation Work and achieve Milestone Substantial Completion, other than the KRRC-Managed Governmental Approvals. The Project Schedule sets forth the dates on which all such Governmental Approvals are expected to be applied for and obtained during the Preliminary Services Period. The Project Company shall use all reasonable efforts to adhere to such schedule and in any event to obtain, and assist the KRRC in obtaining, all Governmental Approvals required to commence the Project Implementation Work as soon as practicable. The Project Company-Managed Governmental Approvals expected to be required as of the Contract Date are set forth in Table 1 of Appendix 3 (Governmental Approvals). In connection therewith, the Project Company shall:

- (1) Prepare and complete all required filings, applications and reports;
- (2) Develop and furnish all necessary data, information, plans, documentation and supporting material;
- (3) Familiarize itself with all applicable terms and conditions;
- (4) Attend all required meetings and hearings;
- (5) Cooperate with and assist the KRRC in carrying out any of the KRRC's responsibilities hereunder with respect to the KRRC-Managed Governmental Approvals as and to the extent provided in subsection (E) (Project Company Responsibilities in Connection with KRRC-Managed Governmental Approvals) of this Section;
- (6) Pay all required permit and filing fees;

(7) Perform all activities that are the responsibility of the Project Company as set forth in Appendix 3 (Governmental Approvals);

(8) Take all other action necessary, as soon as practicable in the performance of the Preliminary Services and Project Implementation Work to, as applicable, obtain, maintain, renew and extend all Governmental Approvals other than KRRC-Managed Governmental Approvals; and

(9) Comply with the terms and conditions of all Governmental Approvals.

The Project Company shall be responsible for identifying, obtaining and maintaining any Governmental Approvals required for the performance of the Project Implementation Work that are not KRRC-Managed Governmental Approvals, whether or not the Governmental Approval is listed in Table 1 of Appendix 3 (Governmental Approvals).

(C) Application Process. The KRRC shall be notified by the Project Company prior to any application, data submittal, or other communication by the Project Company with any Governmental Body regarding Governmental Approvals. The Project Company shall not knowingly take any action in any application, data submittal or other communication with any Governmental Body regarding Governmental Approvals or the terms and conditions thereof that would impose any unreasonable cost or unreasonable burden on the KRRC or that would materially contravene any KRRC policies with respect to the matters contained therein. The KRRC reserves the right, after reasonable notification and consultation with the Project Company, to modify, alter, amend, delete or supplement any information supplied, or term or condition proposed, by the Project Company which would have the effect described in the preceding sentence. The final terms and conditions of any Governmental Approval shall be subject to the KRRC's approval, which approval shall not be unreasonably withheld or delayed. The Project Company shall deliver to the KRRC, promptly after the Project Company's receipt, a copy of each Governmental Approval, and shall provide a listing of the status of all Governmental Approvals in its Monthly Progress Report.

(D) KRRC Responsibilities in Connection with Governmental Approvals. The KRRC shall:

(1) Be responsible for applying for and obtaining the KRRC-Managed Governmental Approvals, subject to the Project Company's obligations under subsection (E) (Project Company Responsibilities in Connection with KRRC-Managed Governmental Approvals) of this Section;

(2) Perform all activities that are the responsibility of the KRRC as set forth in Appendix 3 (Governmental Approvals);

(3) Cooperate with and, upon the reasonable request of the Project Company, provide reasonable assistance to the Project Company in obtaining from Governmental Bodies the Project Company-Managed Governmental Approvals (including any modifications, renewals and extensions of existing Project Company-Managed Governmental Approvals from Governmental Bodies);

(4) Where necessary to obtain, renew, replace, extend the validity of, or arrange necessary amendments to any Governmental Approval and within a reasonable period of time after being requested to do so by the Project Company:

(a) Execute Governmental Approval applications and related documents, either in its own name or jointly with the Project Company, as and

to the extent required under Applicable Law or the administrative practices of the applicable Governmental Body;

(b) Provide for attendance by appropriate KRRC staff at public hearings and meetings of applicable Governmental Bodies; and

(c) Provide the Project Company with existing relevant data and documents that are within the KRRC's custody or control or are reasonably obtainable by the KRRC and which are reasonably required for such purpose.

To the extent Applicable Law or the administrative practice of the applicable Governmental Body requires that Governmental Approvals that are required to be obtained by the Project Company pursuant to this Section be applied for or issued in the KRRC's name or that the KRRC directly coordinate with such Governmental Bodies, the Project Company shall provide all necessary support and efforts to apply for and obtain such Governmental Approvals, including preparing all application and related documents for execution by the KRRC. The KRRC's obligation to assist and cooperate pursuant to this Section shall be subject to the Project Company's obligations under this Section and shall not require the KRRC to:

(1) Staff the Project Company's permitting or development efforts, to undertake any new studies or investigations with respect to the Project, or to affirmatively seek to obtain the issuance of the Governmental Approvals required to be obtained by the Project Company hereunder;

(2) Take a position which it believes to be inconsistent with the Contract Documents, the Contract Standards, or KRRC policy (except policies that are incompatible with the contracting methodology associated with this Project Agreement or are inconsistent with the express obligations of the KRRC hereunder); or

(3) Refrain from concurring with a position taken by a Governmental Body if the KRRC believes that position to be correct.

(E) Project Company Responsibilities in Connection with KRRC-Managed Governmental Approvals. In connection with the KRRC-Managed Governmental Approvals, the Project Company shall cooperate with and assist the KRRC in carrying out any of the KRRC's responsibilities hereunder with respect to the KRRC-Managed Governmental Approvals, including:

(1) Assisting the KRRC in preparing and completing all required filings, applications and reports;

(2) Developing and furnishing all necessary data, information, plans, documentation and supporting material;

(3) Familiarizing itself with all applicable terms and conditions;

(4) Attending all required meetings and hearings;

(5) Taking all other actions reasonably necessary in accordance with Good Dam Removal Practice to assist the KRRC in obtaining, maintaining, renewing, and extending all KRRC-Managed Governmental Approvals; and

(6) As provided in subsection 4.6(C) (Fines, Penalties, Indemnification and Remediation), comply with the KRRC-Managed Governmental Approvals, all other

Governmental Approvals and all Applicable Laws, and indemnify, defend and hold harmless the Project Company Indemnitees from and against all Loss-and-Expense resulting from any failure of compliance.

(F) Delays in the Issuance of Project Company-Managed Governmental Approvals in General. Except as provided in subsection (G) (Allowable Relief in Connection with Delays in the Issuance of Project Company-Managed Governmental Approvals) of this Section, to the extent any Project Company-Managed Governmental Approval has not been obtained as of the Project Implementation Contract Amendment Date because it was not required in order to commence the Project Implementation Work, the Project Company shall bear the risk of any delays in obtaining such remaining Governmental Approvals and of complying with any of the terms and conditions contained in such Governmental Approvals, irrespective of the cause of any such delay or of the imposition of any such term or condition. No such delay or term or condition shall constitute an Uncontrollable Circumstance, or entitle the Project Company to any price, schedule or performance relief hereunder.

(G) Allowable Relief in Connection with Delays in the Issuance of Project Company-Managed Governmental Approvals. To the extent any Project Company-Managed Governmental Approval cannot be obtained as of the Project Implementation Contract Amendment Date but must be obtained after the Project Implementation Contract Amendment Date in order to complete the Project Implementation Work, the Project Company may claim Uncontrollable Circumstance relief if the following requirements are met:

(1) the Project Company, in a manner consistent with the overall Project Schedule, has submitted all applications, data, studies, reports, responses and other information required under Applicable Law and the adopted administrative practice of the Governmental Body;

(2) the Project Company has consistently maintained a fully responsive, engaged and respectful professional relationship with the staff and management of the Governmental Body in a manner that, while not expressly required under Applicable Law, is generally recognized among regular practitioners in the permitting field to facilitate the securing of similar approvals in a timely manner in light of the discretion accorded Governmental Bodies under administrative law;

(3) the Governmental Body issuing the Project Company-Managed Governmental Approval, fails to issue such Project Company-Managed Governmental Approval by the date assumed in the Project Schedule;

(4) the delay in the issuance of the Project-Company Governmental Approval by the Governmental Body causes an undue delay on the Project Schedule;

(5) the Project Company demonstrates that it has complied with the requirements of this Project Agreement and has in all respects used its commercially reasonable efforts to obtain the Project Company-Managed Governmental Approval in a timely manner and consistent with the Project Schedule; and

(6) the Project Company satisfies all requirements and makes all demonstrations specified in Article 14 (Uncontrollable Circumstances).

(H) Allowable Relief in Connection with Changes in Terms and Conditions. Section 6.9(C) (Changes to Terms and Conditions of Governmental Approvals) addresses allowable relief in connection with changes to the terms and conditions of Governmental Approvals issued after the Project Implementation Contract Amendment Date.

(I) Delays in the Issuance of KRRC-Managed Governmental Approvals. The parties acknowledge and agree that all KRRC-Managed Governmental Approvals must be obtained and in full force and effect on or prior to, and as a condition to the occurrence of, the Project Implementation Contract Amendment Date. Accordingly, delays in the issuance of any KRRC-Managed Governmental Approval shall operate to delay the occurrence of the Project Implementation Contract Amendment Date but, once the Project Implementation Contract Amendment Date occurs, shall not constitute an Uncontrollable Circumstance, operate to provide the Project Company any schedule relief, or be the basis of any extension of the Scheduled Milestone Substantial Completion Dates or the Milestone Longstop Dates. **[Note: See note in subsection 5.11(C)(6), regarding the establishment of the Project Implementation Contract Amendment where not all KRRC-Managed Governmental Approvals have been obtained.]**

SECTION 6.7. FINAL DESIGN RESPONSIBILITIES AND RISK ASSUMPTION.

(A) Performance of the Design Work. Following the issuance of the Notice to Proceed with the Project Implementation Work pursuant to Section 6.3 (Project Implementation Commencement Date), the Project Company agrees to undertake, perform, and complete the designs and plans for the Project in accordance with the Contract Standards and to prepare all Project Implementation Design Documents necessary or appropriate to carry out and complete the Project Implementation Work. All Project Company working design documents and final Project Implementation Design Documents shall comply with the Project Technical Requirements and shall ensure that the Project Implementation Work is performed to a standard of quality, integrity, durability and reliability which is equal to or better than the standard established by the Project Technical Requirements. The Project Company shall be responsible for the professional quality, technical accuracy, timely completion and coordination of all Project Implementation Design Documents and shall, without additional compensation, correct or revise any negligent errors, omissions or other deficiencies in the Project Technical Requirements or the Project Implementation Design Documents.

(B) Sole Design Responsibility and Liability; Exception for Hatchery Work and City of Yreka Waterline Work. The Project Company shall have the sole and exclusive responsibility and liability for the design of the Project and the execution and completion of the Project Implementation Work hereunder in accordance with the Contract Standards, notwithstanding (1) the fact that the RFP included certain design criteria, technical requirements and performance standards for the Project Implementation Work, and (2) the KRRC's role in defining the nature and extent of the Preliminary Services, reviewing and commenting on the Preliminary Services Deliverable Material, and negotiating and agreeing upon the GMP Contract Amendment and the Project Implementation Contract Amendment. Without limiting the Project Company's right to claim relief in the event of Uncontrollable Circumstances as and to the extent provided in this Project Agreement, all risks relating to the design of the Project and the execution and completion of the Project Implementation Work, including all risks of design defects, constructability, demolition and removal, and habitat restoration, have been transferred to the Project Company under this Project Agreement. The provisions set forth in this subsection are subject to subsection (C) (Design Responsibility and Liability for Hatchery Work and City of Yreka Waterline Work Retained by the KRRC) of this Section relating to the design of the Hatchery Work and the City of Yreka Waterline Work.

(C) Design Responsibility and Liability for Hatchery Work and City of Yreka Waterline Work Retained by the KRRC. The KRRC has furnished the Hatchery Work Complete Plans, Drawings and Specifications and the City of Yreka Waterline Work Complete Plans, Drawings and Specifications as part of this Project Agreement. The obligation of the Project Company to perform the Hatchery Work element and the City of Yreka Waterline Work element of the Project Implementation Work shall be limited to construction and construction-related services, which shall be performed based on the Hatchery Work Complete Plans, Drawings and Specifications and the City of Yreka Waterline Work Complete Plans, Drawings and Specifications furnished by the KRRC. The Project Company shall have no responsibility or liability with respect to the design of the Hatchery Work or the City of Yreka Waterline Work, and the risks and responsibility relating to the design of the Hatchery Work and the City of Yreka Waterline Work shall be borne by the KRRC.

(D) KRRC Review and Comment on Project Implementation Design Documents. The Project Company shall provide the KRRC with the Document Submittal Procedures in accordance with the specific requirements set forth in Appendix 7 (Project Implementation Work Review Procedures). The KRRC shall have the right to review and comment on all Project Implementation Design Documents within the time frames specified in Appendix 7 (Project Implementation Work Review Procedures) in order to confirm the compliance and consistency of the Project Implementation Design Documents with the Contract Documents. In no event shall the Project Company proceed with the Project Implementation Work of any particular segment of the Project Implementation Work without first complying with the requirements of the Document Submittal Procedures and Appendix 7 (Project Implementation Work Review Procedures). The Project Company shall give due consideration and provide written responses, in the time and manner provided in Appendix 7 (Project Implementation Work Review Procedures), to any comments delivered by the KRRC or its representatives as to the Project Company's design submittals. Neither compliance by the Project Company with the Project Technical Requirements, nor review and comment by the KRRC or the Program Manager on the Project Company's Preliminary Services Design Documents or Project Implementation Design Documents, nor any failure by the KRRC or the Program Manager to comment on any design submittals shall in any way relieve the Project Company of full responsibility for the design and completion of the Project Implementation Work in accordance with the Contract Standards. The parties acknowledge and agree that the review and comment rights of the KRRC under this Section are intended for the informational purposes of the KRRC and for the KRRC to determine whether the Project Implementation Design Documents comply with the Project Technical Requirements. Without limiting the KRRC's review and comment rights under this Section, the KRRC's approval of any Project Implementation Work Design Document shall not be required in order for the Project Company to proceed with the performance of the Project Implementation Work.

(E) Documents at the Project Site. The Project Company shall maintain at the Project Site in a location approved by the KRRC all Project Implementation Design Documents, including a complete set of record Drawings, in accordance with the Contract Standards. These documents shall be available to the KRRC for reference, copying and use, and a complete set thereof shall be delivered to the KRRC upon completion of the Project Implementation Work.

SECTION 6.8. CHANGES TO THE PROJECT TECHNICAL REQUIREMENTS AT PROJECT COMPANY REQUEST.

(A) KRRC Consent Required. The Project Company acknowledges the KRRC's material interest in each provision of the Project Technical Requirements, and agrees that, subject to Section 6.9 (Other Changes to the Project Technical Requirements), no material change to the Project Technical Requirements shall be made after the Project Implementation

Contract Amendment Date except with the consent of the KRRC, which may be withheld or conditioned in its discretion after a good faith review is made of such proposed change; provided, however, that the KRRC shall provide a written explanation in reasonable detail to the Project Company as to its reasoning for declining to make any such change. Any change accepted by the KRRC, together with all related approved terms and conditions, shall be set forth in a Contract Administration Memorandum, a Contract Amendment or a Change Order, as applicable.

(B) Notice and Information as to Proposed Change. The Project Company shall give the KRRC written notice of, and reasonable opportunity to review and approve, any Project Technical Requirements Change proposed to be made at the Project Company's request. The notice shall contain sufficient information for the KRRC to determine that the proposed Project Technical Requirements Change:

- (1) Does not diminish the capacity of the Project Implementation Work to be performed so as to meet the Contract Standards;
- (2) Does not impair the quality, integrity, durability and reliability of the Project Implementation Work;
- (3) Is reasonably necessary or is advantageous for the Project Company to fulfill its obligations under this Project Agreement; and
- (4) Is feasible.

SECTION 6.9. OTHER CHANGES TO THE PROJECT TECHNICAL REQUIREMENTS.

(A) Changes Made Due to Uncontrollable Circumstances. Upon the occurrence of an Uncontrollable Circumstance after the Project Implementation Contract Amendment Date, the Project Company shall promptly proceed, subject to the terms, conditions and procedures set forth in Article 14 (Uncontrollable Circumstances) and subject to the KRRC's approval, to make or cause to be made all Project Technical Requirements Changes reasonably necessary to address the Uncontrollable Circumstance. The Project Company shall consult with the KRRC concerning possible means of addressing and mitigating the effect of any Uncontrollable Circumstance. The parties shall use all reasonable efforts to address Project Technical Requirements Changes required due to Uncontrollable Circumstances in a manner that will not impact the critical path of planned Project Implementation Work associated with any construction or demolition milestone in the Project Implementation Schedule. The Project Company shall be entitled to schedule and price relief resulting from any such Project Technical Requirements Change to the extent provided in Article 14 (Uncontrollable Circumstances). Without limiting the right of the KRRC to issue a Unilateral Change Directive under Section 6.10 (Unilateral Change Directives), any Project Technical Requirements Change made on account of Uncontrollable Circumstances, and any related change in the terms and conditions of the Contract Documents shall be set forth in a Change Order.

(B) Changes Required by a Change in Law Governmental Bodies. The parties recognize that a Change in Law after the Project Implementation Contract Amendment Date may require a Project Technical Requirements Change. In the event of the imposition of any such additional terms and conditions imposed through a Change in Law, the Project Company shall promptly proceed, subject to the KRRC's approval, to make or cause to be made all Project Technical Requirements Changes reasonably necessary to comply with such additional terms and conditions. The Project Company shall be entitled to schedule and price

relief resulting from any such Project Technical Requirements Change, to the extent provided in Article 14 (Uncontrollable Circumstances). Without limiting the right of the KRRC to issue a Unilateral Change Directive under Section 6.10 (Unilateral Change Directives), any such Project Technical Requirements Change and any related change in the terms and conditions of the Contract Documents shall be set forth in a Change Order.

(C) Changes to Terms and Conditions of Governmental Approvals. As provided in Section 5.11 (Project Implementation Contract Amendment), the Project Implementation Contract Amendment will not be entered into until all Governmental Approvals necessary to commence, carry out and complete the Project Implementation Work have been issued and are in full force and effect. Accordingly, the terms and conditions of all such Governmental Approvals will have been established in final form, not subject to change, on or before the Project Implementation Contract Amendment Date. The parties acknowledge that certain Project Company-Managed Governmental Approvals, not required to commence the Project Implementation Work, will need to be obtained subsequent to the Project Implementation Contract Amendment Date in order to carry out and complete the Project Implementation Work once commenced. The risk of any material changes to the Project Technical Requirements that may be required to be made by any such Project Company-Managed Governmental Approvals and the imposition of any unanticipated terms and conditions that require any such changes shall constitute an Uncontrollable Circumstance only if and to the extent the following requirements are met:

(1) the Project Company satisfies all requirements and makes all demonstrations specified in Article 14 (Uncontrollable Circumstances);

(2) the Project Company demonstrates that it has complied with the requirements of this Project Agreement and has in all respects used its commercially reasonable efforts to obtain the Governmental Approval with terms and conditions that would not require material changes to the Project Technical Requirements;

(3) the Project Company has submitted all applications, data, studies, reports, responses and other information required under Applicable Law and the adopted administrative practice of the Governmental Body in order to obtain the Governmental Approval with terms and conditions that would not require material changes to the Project Technical Requirements; and

(4) the Project Company has consistently maintained a fully responsive, engaged and respectful professional relationship with the staff and management of the Governmental Body in a manner that, while not expressly required under Applicable Law, is generally recognized among regular practitioners in the permitting field as necessary on a practical level to secure similar approvals in a timely manner in light of the discretion accorded Governmental Bodies under administrative law.

(D) Changes Required by the KRRC. The KRRC shall have the right to require the Project Company to make Project Technical Requirements Changes at any time prior to Project Final Completion in its discretion for any reason whatsoever, whether and however the exercise of such rights affects this Project Agreement so long as the Project Company's rights are protected as provided in this Section. The Project Company shall be entitled to a Change Order providing appropriate price, schedule, performance and other relief in the event of a Project Technical Requirements Change made at the direction of the KRRC under this Section; provided, however, that the Project Company shall not be entitled to any such price, schedule, performance or other relief to the extent that any such Project Technical

Requirements Change is required due to Project Company Fault. The KRRC shall have no obligation to make any Project Technical Requirements Change on account of its rights under this Section.

SECTION 6.10. UNILATERAL CHANGE DIRECTIVES.

(A) KRRC Right to Issue. The parties intend to negotiate the terms of any Change Order providing for a Project Technical Requirements Change pursuant to Section 6.9 (Other Changes to the Project Technical Requirements) prior to the Project Company incurring any costs with respect to any such change or adjustment. The Project Company shall consult with the KRRC concerning possible means of addressing any proposed Project Technical Requirements Change pursuant to Section 6.9 (Other Changes to the Project Technical Requirements) and, without limiting any of the rights of the KRRC under Section 6.8 (Changes to the Project Technical Requirements at Project Company Request), the Project Company and the KRRC shall cooperate in order to minimize any delay and lessen any additional cost in light of such proposed Project Technical Requirements Change. Notwithstanding the foregoing, however, the KRRC shall have the right to issue a written order directing a change in scope of the Project Implementation Work, including Project Technical Requirements Changes, pursuant to this Section, which order shall specify any appropriate price, performance or schedule relief, if any, associated with the change in scope of the Project Implementation Work (a “**Unilateral Change Directive**”). A Unilateral Change Directive may be issued to address any inability of the parties to reach agreement as to the terms and conditions of a Change Order, or to direct changes in the Project Implementation Work in circumstances where the Project Company has no entitlement to an increase in compensation, schedule adjustment or other performance relief hereunder, including changes required due to Project Company Fault. No Unilateral Change Directive shall be made that would be contrary to Applicable Law. Upon receipt of a Unilateral Change Directive, the Project Company shall promptly proceed with the performance of any change in the Project Implementation Work as instructed and shall promptly advise the KRRC in writing of the Project Company’s agreement (or disagreement in accordance with subsection (B) (Disagreement with Terms of a Unilateral Change Directive) of this Section) with any price, performance or schedule relief, if any, as may be proposed by the KRRC in the Unilateral Change Directive. If the Project Company receives a written communication signed on behalf of the KRRC, which the Project Company believes is a Unilateral Change Directive that is not so identified, or a verbal communication which the Project Company believes is a Unilateral Change Directive, it shall not proceed with the purported change in the Project Implementation Work until it receives written confirmation from the KRRC that such communication is in fact a Unilateral Change Directive. A Unilateral Change Directive that is signed by the Project Company and approved by the KRRC in accordance with its procurement rules and regulations, reflecting the scope of work and any price, schedule and performance relief, if any, shall be deemed a Change Order.

(B) Disagreement with Terms of a Unilateral Change Directive. If the Project Company disagrees with the suggested price, schedule or performance relief, if any, set out in the Unilateral Change Directive, the Project Company shall notify the KRRC Contract Representative in writing within 20 Business Days after receipt of the Unilateral Change Directive. Within 30 days after providing the notice required in the preceding sentence, the Project Company shall document its position in writing, delivered to the KRRC Contract Representative, specifying the reasons the Project Company believes it is entitled to any requested price, performance or schedule relief under this Project Agreement. Failure of the Project Company to notify the KRRC Contract Representative within seven days after receipt of the Unilateral Change Directive or to provide written documentation of the Project Company’s position within the time prescribed in this Section shall constitute an abandonment of all entitlement to any relief under this Project Agreement and waiver by the Project Company of any further right to object to the Unilateral Change Directive. Any agreement by the KRRC and

the Project Company to any price, performance or schedule relief pursuant to this Section and any related change in the terms and conditions of the Contract Documents, shall be set forth in a Change Order. If the Project Company is unable to reach agreement with the KRRC with regard to any price, performance or schedule relief under this Section, the Project Company may elect to initiate dispute resolution procedures in accordance with Section 11.1 (Dispute Resolution Procedures). In such case, the Project Company shall proceed with the performance of the Project Implementation Work in accordance with the Unilateral Change Directive and shall keep and present, in such form as the KRRC may request, an itemized accounting to go with the appropriate supporting data with respect to the Project Company's position, including all information necessary to support Cost Substantiation.

SECTION 6.11. INTERFACE AND COORDINATION.

(A) Maintenance of Facilities Operations. The Project Company shall undertake and execute the Project Implementation Work in a manner which does not interfere with or impair any ongoing operations of the Facilities until decommissioning. As part of the Preliminary Services, the Project Company shall provide, for the KRRC's review and approval, a plan for the maintenance of Facilities operations during performance of the Project Implementation Work (the "**Maintenance of Facilities Operations Plan**"), prepared in accordance with this Section and Appendix 2 (Preliminary Services) and Appendix 5 (General Project Implementation Work Requirements). The Project Company shall provide a final Maintenance of Facilities Operations Plan, approved by the KRRC, as a precondition to the establishment of the Project Implementation Commencement Date under Section 6.3 (Project Implementation Commencement Date). The Project Company shall coordinate all Project Implementation Work with the KRRC in accordance with the Contract Standards, including the approved Maintenance of Facilities Operations Plan. The Project Company acknowledges that the operation of the Facilities may require a stoppage of Project Implementation Work on all or a portion of the Project Site from time-to-time, subject to Section 6.12 (Suspension of Work). The Project Company assumes the risk that the Project Implementation Work can be accomplished in accordance with the Contract Standards in the manner required by this Section.

(B) Related Projects Generally. The Project Company acknowledges that the KRRC will be undertaking several other projects at and in the vicinity of the Project Site and, without limiting any other obligation under this Project Agreement, agrees to reasonably coordinate the Project Implementation Work (including making reasonable adjustments to its Project Implementation Schedule and activities) to minimize conflicts with the work associated with such other projects in accordance with the Contract Standards. Any other project the KRRC may undertake at or in the vicinity of the Project Site are referred to herein as the "**Related Projects**". As part of the Preliminary Services, the Project Company shall provide, for the KRRC's review and comment, a Related Projects Coordination Protocol, prepared in accordance with the Contract Standards. Nothing in this Project Agreement shall be interpreted as granting the Project Company exclusive occupancy of the Project Site. The Project Company must ascertain to its own satisfaction the scope of the Project and the nature of any other contracts that have been or may be awarded by the KRRC in relation to its overall capital improvement program. The Project Company shall cause the Project Implementation Work to be performed without damaging the work or property of any Separate Contractor and, to the maximum reasonable extent, so as not to cause any unnecessary hindrance or delay to any Separate Contractors working at the Project Site. The Project Company agrees to reasonably cooperate and coordinate its activities with those of the KRRC and all Separate Contractors so that the Project and any Related Project can be completed in an orderly and coordinated manner without unreasonable disruption. Without limiting any of the foregoing, the Project Company shall comply with the Related Projects Coordination Protocol, which is intended to establish a management framework for creating a cooperative and collaborative

project environment among the Project Company and the Separate Contractors. Notwithstanding anything to the contrary in the Related Projects Coordination Protocol or this Project Agreement, the Project Company's agreement to comply with the Related Projects Coordination Protocol shall not be construed to: (1) confer upon the Project Company any liability for the acts or omissions of the Separate Contractors; (2) impose upon the Project Company joint or several liability for the acts or omissions of the Separate Contractors; (3) create a partnership, consortium or joint venture relationship among the Project Company and any Separate Contractor; or (4) expand the Project Company's liabilities beyond those set forth in this Project Agreement. The Project Company agrees that it shall not be entitled to any price, performance or other Uncontrollable Circumstance relief hereunder due to any delay or hindrance to the extent caused by a failure of any Project Company Person to reasonably cooperate or coordinate its work with the work of any Separate Contractor in accordance with this Section. **[Note: As part of the GMP Contract Amendment process, the parties shall negotiate in good faith the extent to which the Project Company shall be entitled to Uncontrollable Circumstance relief on account of (1) any Separate Contractor's work (including delays) and (2) PacifiCorp's continued operation and maintenance of the Facilities between the Project Implementation Contract Amendment Date and Decommissioning, as defined in the KHSa. Any specific work to be performed by Separate Contractors or PacifiCorp will be identified during the Preliminary Services Period, and its potential effect on the Project Implementation Work will be taken account of in the negotiation of the GMP Contract Amendment and confirmed or modified, as appropriate, in the Project Implementation Contract Amendment. Conforming changes to the definition of Uncontrollable Circumstances shall also be made, as necessary.]**

(C) Coordination Meetings. The KRRC intends to have coordination meetings among the KRRC, the Project Company and the various Separate Contractors in an effort to manage the overall program associated with the work being performed at or in the vicinity of the Project Site and to avoid or mitigate cost and time impacts to the overall capital improvements program. The Project Company agrees that it will attend and participate in these logistics meetings and shall cooperate with the KRRC and the Separate Contractors to the extent reasonably necessary for the performance by such Separate Contractors of their work.

(D) Equipment and Materials Storage at Project Site. The Project Company shall afford the KRRC and any Separate Contractors reasonable opportunity for the introduction and storage of their equipment and materials and the execution of their work at and in the vicinity of the Project Site. Subject to subsection 6.2(B) (Laydown Areas), the Project Company shall coordinate with the KRRC and any Separate Contractors to store apparatus, materials, supplies and equipment in such orderly fashion at the Project Site as will not unduly interfere with the progress of the Project Implementation Work or the work of the KRRC or any Separate Contractor.

(E) Interrelated Work. If part of the Project Implementation Work depends on proper execution of construction or operations by the KRRC or a Separate Contractor, the Project Company shall, prior to proceeding with that portion of the Project Implementation Work, inspect the other work and promptly report to the KRRC Contract Representative any apparent discrepancies or defects in the other construction that would render it unsuitable for the proper execution of the Project Implementation Work. The Project Company shall be entitled to Uncontrollable Circumstance relief as and to the extent provided in Article 14 (Uncontrollable Circumstances) in the event that defects in the work of the KRRC or any Separate Contractor render the work unsuitable for the proper execution or result of any part of the Project Implementation Work. However, failure of the Project Company to report apparent discrepancies or defects in the other construction shall constitute acknowledgement

that the KRRC's or the Separate Contractor's completed or partially completed construction is fit and proper to receive the Project Implementation Work, except as to discrepancies or defects not then reasonably discoverable pursuant to Good Dam Removal Practice.

(F) Disputes Associated with Separate Work. If the performance of any work by the KRRC or a Separate Contractor is likely to be interfered with by the simultaneous performance of some other contract or contracts, the KRRC shall decide which contractor shall cease work temporarily and which contractor shall continue or whether the work under the contracts can be coordinated so that the contractors may proceed simultaneously. Any decision by the KRRC to halt or delay the performance of the Project Implementation Work by the Project Company pursuant to this Section shall be made in accordance with Section 6.12 (Suspension of Work), and the Project Company shall be entitled to Uncontrollable Circumstance relief as and to the extent provided therein.

SECTION 6.12. SUSPENSION OF WORK.

(A) KRRC Right to Suspend Work. The KRRC may, through a written notice executed by the KRRC Contract Representative, order the Project Company to suspend, delay or interrupt all or any part of the Project Implementation Work for such period of time as the KRRC Contract Representative may determine to be appropriate for the coordination of the Related Projects or otherwise for the convenience of the KRRC.

(B) Uncontrollable Circumstance Relief. In the event the KRRC exercises its right to suspend, delay or interrupt all or any part of the Project Implementation Work pursuant to this Section, the Project Company shall be entitled to Uncontrollable Circumstance relief as and to the extent provided in Article 14 (Uncontrollable Circumstances). No adjustment will be made pursuant to this Section or Article 14, however, for any suspension, delay or interruption to the extent caused by Project Company Fault, including any failure of the Project Company to comply with the Maintenance of Facilities Operations Plan or suspension under subsection 6.14(E) (Health and Safety Compliance Requirements). Any adjustment under this subsection shall be subject to the terms and conditions of Article 14 (Uncontrollable Circumstances), including, in particular, subsection 14.1(A) (Extent of Relief Available to the Project Company), so that the Project Company shall not be entitled to any relief pursuant to this Section absent the required demonstration of the impact of the suspension, delay or interruption on the critical path of the Project Implementation Schedule.

SECTION 6.13. CONSTRUCTION, DEMOLITION AND HABITAT RESTORATION PRACTICE.

(A) Exclusive Responsibility of Project Company. The Project Company shall have exclusive responsibility for all construction, demolition and habitat restoration means, methods, techniques, sequences, and procedures necessary or desirable for the correct, prompt, and orderly performance and completion of the Project Implementation Work as required by the Contract Documents. The responsibility to provide the construction, demolition and habitat restoration means, methods, techniques, sequences and procedures referred to above shall include the obligation of the Project Company to provide the following construction, demolition and habitat restoration requirements: supervision, tools, implements, machinery, labor, materials and accessories necessary and proper for the purpose; installation, periodic inspection, and removal of temporary site lighting, including specific task lighting and emergency lighting; temporary offices and construction, demolition and habitat restoration trailers; installation, daily inspection, and removal of miscellaneous temporary barricades, fencing, partitions, and other means of temporary separation/isolation on the site during construction, demolition and habitat restoration, including any temporary covered wooden walkways for sidewalks; required design certifications; required approvals; weather protection;

dust control; noise abatement, barriers, etc.; miscellaneous de-watering requirements; clean-up and housekeeping of the Project Site; construction, demolition and habitat restoration trade management; temporary parking; vehicle traffic; health, safety and first aid facilities and equipment; correction of defective work or equipment; Subcontractors' insurance; storage areas; workshops and warehouses; temporary fire protection; security of the Project Site; temporary Utilities; Utility relocations necessary or convenient to its performance of the Project Implementation Work; potable water; sanitary services; Subcontractor and vendor qualification; receipt and unloading of delivered materials and equipment; erection rigging; temporary supports; and construction, demolition and habitat restoration coordination.

(B) Project Site Debris, Trash and Waste. The Project Company shall keep the Project Site reasonably free from debris, trash and construction, demolition and habitat restoration wastes to permit the Project Company to perform its Project Implementation Work efficiently, safely and without interfering with the use of adjacent land areas and without causing complaints from Separate Contractors, adjacent property owners, local public officials or members of the public. The Project Company shall be responsible for the maintenance of grass, shrubbery and trees located on the Project Site. Upon the Milestone Substantial Completion for the Final Habitat Restoration Work and prior to the Final Habitat Restoration Work's Milestone Final Completion, the Project Company shall remove all debris, trash, construction, demolition and habitat restoration wastes, materials, equipment, machinery and tools arising from the Project Implementation Work or applicable portions thereof (and not otherwise incorporated into the Project in accordance with the Contract Documents) to permit the KRRC to occupy the Project for its intended use.

SECTION 6.14. RESPONSIBILITY FOR HEALTH AND SAFETY.

(A) Health and Safety Representative. The Project Company assumes responsibility for implementing and monitoring all health and safety precautions and programs related to the performance of the Project Implementation Work. The Project Company shall, prior to commencing Project Implementation Work, designate an individual with the qualifications and experience necessary under Good Dam Removal Practice to supervise the implementation and monitoring of all health and safety precautions and programs related to the Project Implementation Work (the "**Health and Safety Representative**"). The Health and Safety Representative shall be an individual stationed at the Project Site who shall have no other responsibilities with respect to the Project other than supervising the implementation and monitoring of all health and safety precautions and programs related to the Project Implementation Work.

(B) Precautions and Protection. The Project Company shall take all reasonable precautions for the health and safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:

(1) All employees on the Project Site and all other persons who may be affected thereby;

(2) All the Project Implementation Work, whether in storage on or off the Project Site, under the care, custody or control of Project Company or any of its Subcontractors. Machinery and equipment shall have proper guards in place and all hazards shall be eliminated in accordance with the latest health and safety provisions of the OSHA Construction Industry Regulations 29 CFR Parts 1910 and 1926; and

(3) Other property at the Project Site or adjacent thereto, including plant facilities, trees, shrubs, lawns, walks, pavements, roadways, structures and Utilities not

designated for removal, relocation or replacement in the course of Project Implementation Work.

(C) Health and Safety Inspections and Meetings. The Project Company is solely responsible to inspect, survey, and assess the Project Site and identify the existence of all permit-required confined spaces and non-permit confined spaces and comply with applicable OSHA regulations and standards. The Project Company's Project Site assessment shall begin upon the initiation of Project Implementation Work and continue throughout the duration of the Project Implementation Period. The Project Company shall comply with all health and safety requirements imposed by Applicable Law in the performance of the Project Implementation Work. The Health and Safety Representative shall make routine daily inspections of the Project Site and shall hold weekly health and safety meetings with the Project Company's personnel, Subcontractors and others, as applicable. The Project Company shall provide minutes of each health and safety meeting to the KRRC within five days of such meeting.

(D) Health and Safety Plan. The Project Company shall, as part of the Preliminary Services, provide, for the KRRC's review and comment, a Health and Safety Plan, prepared in accordance with the Contract Standards. The Health and Safety Plan shall include, but not be limited to, electrical safety, lock-out/tag-out, arc flash safety personal protection equipment while working in vicinity of energized electrical equipment, hazard communication, fire protection plan, emergency access plan, health and safety inspections of mechanized equipment, machinery, hoists, cranes, scaffolding, excavations, shoring, and related items. The Project Company shall not perform any Project Implementation Work-related activity until the KRRC has had an opportunity to review and comment on the Health and Safety Plan. The Project Company shall provide a final Health and Safety Plan, having addressed any comments provided by the KRRC, as a pre-condition to the establishment of the Project Implementation Commencement Date under Section 6.3 (Project Implementation Commencement Date).

(E) Health and Safety Compliance Requirements. The Project Company shall, and shall cause all Subcontractors to, comply with: (1) all Applicable Law relating to safety; (2) the Health and Safety Plan; and (3) any KRRC-specific health and safety requirements provided to the Project Company. The Project Company shall immediately report (no later than within 12 hours after its occurrence), in writing, any health and safety-related injury, loss, damage, accident or near miss arising from the Project Implementation Work to the KRRC and, to the extent mandated by Applicable Law, to all Governmental Bodies having jurisdiction over health and safety-related matters involving the Project. The KRRC, through the KRRC Contract Representative, shall have the right to suspend any or all Project Implementation Work if the Project Company fails to comply with its obligations hereunder without any requirements of providing the Project Company with Uncontrollable Circumstance relief hereunder.

(F) Emergencies. The Project Company shall develop an emergency response plan in accordance with the requirements set forth in Appendix 5 (General Project Implementation Work Requirements). The emergency response plan shall be subject to the approval of the KRRC and shall establish the protocols for the Project Company in dealing with emergencies impacting the performance of the Project Implementation Work. In case of an emergency which threatens immediate loss or damage to property or health and safety of life, the Project Company shall act immediately to prevent threatened loss, damage, injury or death. The Project Company shall notify the KRRC of the situation and all actions taken immediately thereafter. If, in the opinion of the Project Company, immediate action is not required, the Project Company shall notify the KRRC of the emergency situation and proceed in accordance with the KRRC's instructions. However, if any loss, damage, injury or death occurs that could

have been prevented by the Project Company's prompt and immediate action, Project Company shall be fully liable for all costs, damages, claims, actions, suits, attorneys' fees and all other expenses arising therefrom or relating thereto. Prior to commencing its Project Implementation Work and at all times during the performance of the Project Implementation Work, the Project Company shall provide the KRRC with two 24-hour emergency phone numbers where its representatives can be contacted. When the KRRC has been notified of emergency situations requiring, in the KRRC Contract Representative's reasonable opinion, immediate attention and rectification, the Contract KRRC Representative will so notify the Project Company. In the event the Project Company fails to commence actions to prevent threatened loss, damage, injury or death within one hour after notification from the KRRC Contract Representative, the KRRC may take all appropriate rectification actions and deduct the costs thereof from monies owed to the Project Company.

SECTION 6.15. SECURITY.

(A) Security Generally. The Project Company, in accordance with the Contract Standards, shall be responsible for the security and protection of the Project and the Project Site, including any requirements set forth in Appendix 5 (General Project Implementation Work Requirements). The Project Company shall guard against all damage or injury to such properties caused by trespass, negligence, vandalism or malicious mischief of third parties, and shall operate, maintain, repair and replace all surveillance and other security equipment and assets constituting fixtures of the Project in accordance with the Contract Standards. The Project Company shall comply with, and cause all Subcontractors to comply with, all terms and conditions set forth in subsection 4.4(E) (Access to the Project Site Following the PacifiCorp Property Transfer Date).

(B) Security Plan. The Project Company shall, as part of the Preliminary Services, provide, for the KRRC's review and comment, a Security Plan, prepared in accordance with the Contract Standards. The Project Company shall not perform any Project Implementation Work-related activity (including any activity that disturbs the Project Site) until the KRRC has had an opportunity to review and comment on the Security Plan. The Project Company shall provide a final Security Plan, having addressed any comments provided by the KRRC, as a pre-condition to the establishment of the Project Implementation Commencement Date under Section 6.3 (Project Implementation Commencement Date).

SECTION 6.16. MONITORING, OBSERVATIONS, TESTING AND UNCOVERING OF PROJECT IMPLEMENTATION WORK.

(A) Observations and Project Implementation Work Review Protocol. During the progress of the Project Implementation Work through Project Final Completion, the Project Company shall at all times during normal working hours afford the KRRC, any Governmental Body and Utility (including PacifiCorp) having lawful jurisdiction, and any of their authorized representatives, including the Program Manager, every reasonable opportunity for observing all Project Implementation Work at the Project Site, and shall comply with the Project Implementation Work review procedures set forth in Appendix 7 (Project Implementation Work Review Procedures). During any such observation and inspection, all representatives of the KRRC, including the Program Manager, shall comply with all reasonable health and safety and other rules and regulations applicable to presence in or upon the Project Site, and shall in no material way interfere with the Project Company's performance of any Project Implementation Work. The right of access provided for under this Section shall extend to all storage facilities associated with the Project Implementation Work, whether located on or off the Project Site.

(B) Factory Fabrication, Inspection and Testing. The KRRC reserves the right to have its designated representatives, including the Program Manager, witness any

factory fabrication, inspection or testing. The Project Company shall provide the KRRC with its anticipated schedule for such fabrication, inspection and testing at the initial Project meeting and shall provide 15 days' advance written notice of any actual factory fabrication, inspection or test. The KRRC shall provide the Project Company with reasonable advance notice (at least seven days) of its intention to witness any factory fabrication, inspection or test pursuant to this Section, which notice shall indicate the identity and number of designated representatives of the KRRC who will witness the fabrication, inspection or test.

(C) Project Company Tests. The Project Company shall conduct all tests of the Project Implementation Work or inspections required by the Contract Standards (including shop tests and all testing and special inspections required under the 2015 International Building Code through independent approved agency testing firms). The Project Company shall give the KRRC and the Program Manager reasonable advance written notice (at least two days in advance or otherwise as consistent with the approved Project Implementation and Quality Management Plan prepared in accordance with Appendix 6 (Project Implementation Work Quality Control Requirements)) of tests or inspections required by the Contract Standards prior to the conduct thereof. In no event shall the inability, failure, or refusal of the KRRC or any of its representatives to attend or be present at or during any such test or inspection delay the conduct of such test or inspection, delay the performance of the Project Implementation Work, or otherwise serve as the basis for relief from the Project Company's obligations hereunder. The Engineer-of-Record shall conduct or witness any such test or inspection to the extent required by the Contract Standards. All analyses of test samples shall be conducted by persons appearing on lists of laboratories authorized to perform such tests by the State or federal agency having jurisdiction or, in the absence of such an authorized list in any particular case, shall be subject to the approval of the KRRC, which approval shall not be unreasonably withheld or delayed.

(D) Certificates and Reports. The Project Company shall secure and deliver to the KRRC promptly all required certificates of inspection, test reports, work logs, or approvals with respect to the Project Implementation Work as and when required by the Contract Standards.

(E) KRRC Tests, Observations and Inspections. The KRRC, its employees, agents, representatives and contractors (which may be selected in the KRRC's discretion), and all Governmental Bodies and Utilities (including PacifiCorp) having lawful jurisdiction, may at any reasonable time and with reasonable notice conduct such on-site observations and inspections, and such civil, structural, mechanical, electrical or other tests as the KRRC deems necessary or desirable to ascertain whether the Project Implementation Work complies with the Contract Standards. The Project Implementation Work Costs paid in connection with any such test, observation or inspection shall result in a Change Order unless such test, observation or inspection reveals a material failure of the Project Implementation Work to comply with the Contract Documents or Applicable Law, in which event the costs and expenses of such observation, inspection or test shall be Unallowable Costs borne solely by the Project Company. The Project Company shall be entitled to Uncontrollable Circumstance relief as and to the extent provided in Article 14 (Uncontrollable Circumstances) in the event that any requested test, observation or inspection causes a delay in the critical path of the Project Implementation Schedule, but only if such testing, observation or inspection does not reveal any material failure or non-compliance as set forth herein. The Project Company acknowledges and agrees that any test, observation or inspection by the KRRC or its representatives is for the sole benefit of the KRRC and shall not relieve the Project Company from its obligations to perform the Project Implementation Work in accordance with the requirements of the Contract Documents.

(F) Notice of Covering Project Implementation Work. The Project Company shall give the KRRC notice in the Monthly Progress Report of its upcoming schedule with respect to the covering and completion of any Project Implementation Work, and shall update such notice, if necessary, within a reasonable time period (at least seven days) before such covering and completion. The KRRC shall give the Project Company reasonable notice (a minimum of 48 hours) of any intended inspection or testing of such Project Implementation Work in progress prior to its covering or completion. If the KRRC provides such notice, the Project Company shall afford the KRRC a reasonable opportunity to conduct such tests or inspections, which the KRRC shall promptly complete. At the KRRC's written request, the Project Company shall take apart or uncover for inspection or testing any previously-covered or completed Project Implementation Work; provided, however, that the KRRC's right to make such requests shall be limited to circumstances where there is a reasonable basis for concern by the KRRC as to whether the disputed Project Implementation Work complies with the requirements of the Contract Documents. The cost of uncovering, taking apart, or replacing such Project Implementation Work along with the costs related to any delay in performing Project Implementation Work caused by such actions, shall:

(1) Be Unallowable Costs borne solely by the Project Company, if such Project Implementation Work was covered prior to any observation or test required by the Contract Standards or for which the KRRC was not provided reasonable advance notice hereunder, or prior to the date on which the KRRC was to conduct any observation or test as to which the KRRC has provided notice of its intention to conduct in accordance with this Section; and

(2) In all other cases, as follows:

(a) Be Unallowable Costs borne solely by the Project Company, if such observation or test reveals that the Project Implementation Work does not comply with the Contract Documents; or

(b) Be Project Implementation Work Costs, if such observation or test reveals that the Project Implementation Work complies with the Contract Documents, and shall result in a Change Order.

In the event such Project Implementation Work does comply with the Contract Documents and the associated costs are determined to be Project Implementation Work Costs pursuant to this Section, the delay caused by such observation or test shall be treated as having been caused by an Uncontrollable Circumstance and any costs incurred with respect to such observation or test shall be costs for the account of the KRRC in accordance with Article 14 (Uncontrollable Circumstances).

SECTION 6.17. CORRECTION OF WORK.

(A) Correction of Non-Conforming Project Implementation Work. Throughout the Project Implementation Period, the Project Company shall complete, repair, replace, restore, re-perform, rebuild and correct promptly any Project Implementation Work that does not conform with the Contract Standards. The Project Company shall be solely responsible for the removal of defective work. The costs incurred by Project Company in completing, repairing, replacing, restoring, re-performing, rebuilding, correcting and removing any such non-conforming or defective Project Implementation Work shall be payable solely through the Project Company Contingency subject to all limitations specified in Appendix 8 (Contract Price), including particularly Attachment 8C (Schedule of Values and Project Company Contingency). Any such costs caused by negligence or willful misconduct shall be Unallowable Costs borne solely by the Project Company. To the extent that any such costs

incurred pursuant to this Section can be recovered from any insurer or from another third party (including any Subcontractor), the Project Company shall exercise its commercially reasonable efforts to obtain recovery from the appropriate source and provide a credit to the KRRC if recovery is obtained. In the event of a failure of the Project Company to take action to correct any such non-conforming Project Implementation Work in a timely manner, the KRRC, upon 10 days' written notice, shall have the right, but not the obligation, to correct or provide for the correction of such non-conforming Project Implementation Work and the costs and expenses reasonably incurred by the KRRC in connection therewith shall be reimbursed by the Project Company to the KRRC, subject to cost substantiation. The KRRC shall provide the Project Company with seven days' advance written notice prior to exercising its right to correct or provide for the correction of any non-conforming Project Implementation Work pursuant to this Section.

(B) Election to Accept Non-Conforming Project Implementation Work. The KRRC may elect by Change Order, at the Project Company's request, to accept non-conforming Project Implementation Work and charge the Project Company (through a Base Guaranteed Maximum Price Adjustment) for the amount agreed upon by the parties as reflecting the reduction in value of the Project Implementation Work. The KRRC shall have no obligation to accept non-conforming Project Implementation Work pursuant to this Section.

(C) Relation to Other Obligations. The obligations specified in this Section establish only the Project Company's specific obligation to correct the Project Implementation Work and shall not be construed to establish any limitation with respect to any other obligations or liabilities of the Project Company under this Project Agreement. This Section is intended to supplement (and not to limit) the Project Company's obligations under the Project Technical Requirements and any other provisions of this Project Agreement or Applicable Law.

SECTION 6.18. PROPERTY DAMAGE.

(A) Damage Prevention. In performing the Project Implementation Work, the Project Company shall use care and diligence, and shall take all appropriate precautions in accordance with the Contract Standards to protect the Project Implementation Work from loss, damage or destruction. In case of a suspension of Project Implementation Work, for any reason, the Project Company shall take precautions as may be necessary in accordance with the Contract Standards to prevent damage to the Project Implementation Work, all material or equipment to be incorporated therein, whether in storage on or off the Project Site, and other property at the Project Site or adjacent thereto; provide for proper drainage; provide temporary heat, light and other required Utilities and services; and shall erect any necessary temporary structures, signs, or other facilities at its expense. In addition, the Project Company shall properly and continuously maintain in acceptable growing condition all living material in newly established plantings, seedings and sodding furnished under this Project Agreement, and shall take adequate precautions to protect new and existing growth against injury.

(B) Restoration. In case of damage to the Project Implementation Work, and regardless of the extent thereof or the estimated cost of restoration, and whether or not any insurance proceeds are sufficient or available for the purpose, the Project Company shall promptly undertake and complete restoration of the damage to the Project Implementation Work to the character and condition existing immediately prior to the damage and in accordance with the procedures set forth herein, as applicable, regarding Uncontrollable Circumstances, Change Orders and Unilateral Change Directives, and subject to subsection (E) (Payment for Restoration Work and Uninsured Costs) of this Section. The KRRC shall have the right to monitor, review and inspect the performance of any repair, replacement and restoration work by the Project Company in accordance with this Article. If the Project Company fails to undertake restoration of the damage, or having so commenced fails to

complete restoration in accordance with the Contract Documents, the KRRC may (but shall not be obligated to) undertake or complete restoration at the Project Company's expense to the extent applicable in accordance with this Section. The KRRC shall provide the Project Company with 10 days' advance written notice prior to exercising its right to undertake or complete restoration pursuant to this Section. Notwithstanding any of the foregoing, to the extent that Uncontrollable Circumstances cause damage to the Project Implementation Work and insurance proceeds or other third-party payments are not sufficiently available to pay for restoration work pursuant to this Section, the Project Company's obligation to perform such restoration work shall be subject to the receipt of reasonable assurances from the KRRC of its ability to pay the costs for which the KRRC is financially responsible under this Section.

(C) Notice and Reports. In addition to the notification requirements set forth in subsection 6.14(E) (Health and Safety Compliance Requirements), the Project Company shall notify the KRRC and the insurers under any applicable policy of Required Insurance of any incident causing property damage to the Project Implementation Work in excess of \$5,000 or of any OSHA recordable injury accident on the Project Site related to the Project Implementation Work, as promptly as reasonably possible after the Project Company learns of any such damage or accident. As soon as practicable after learning of any such incident or accident (but in no event later than 72 hours), the Project Company shall submit a written report to the KRRC. Such report shall be updated on a weekly basis and upon culmination of all tests, analysis and reviews, a final report incorporating all of the tests, analysis and reviews and the findings thereof shall be submitted to the KRRC. The Project Company shall also submit to the KRRC copies of all accident and other reports filed with (or given to the Project Company by) any insurance company, adjuster, or Governmental Body or otherwise prepared or filed in connection with the damage or accident.

(D) Insurance and Other Third-Party Payments. To the extent that any repair, replacement or restoration costs incurred pursuant to this Section can be recovered from any insurer or from another third party, each party shall assist each other in exercising such rights as it may have to effectuate such recovery. Each party shall provide the other with copies of all relevant documentation, and shall cooperate with and assist the other party upon request by participating in conferences, negotiations and litigation regarding insurance claims; provided, however, that neither party shall be obligated pursuant to this Section to provide the other party with documents subject to the attorney-client privilege under the laws of the States.

(E) Payment for Restoration Work and Uninsured Costs. All insurance proceeds and recoveries from third parties resulting from damage to or the loss or destruction of the Project Implementation Work, including proceeds from all policies of Required Insurance, shall be for the benefit of the KRRC. The KRRC shall pay the Project Company for restoration work required pursuant to this Section with such proceeds and recoveries and, to the extent the damage to or loss or destruction of the Project Implementation Work is caused by an Uncontrollable Circumstance, other funds of the KRRC obtained pursuant to the Change Order provisions of this Article and the payment provisions of Article 9 (Compensation), as applicable. In the event the damage to or loss or destruction of the Project Implementation Work is not caused by an Uncontrollable Circumstance, all costs of the restoration work that are not covered by insurance proceeds or third-party payments, and are not Unallowable Costs, shall be payable solely through the Project Company Contingency subject to all limitations specified in Attachment 8C (Schedule of Values and Project Company Contingency) of Appendix 8 (Contract Price). Nothing in this Section is intended to waive any rights of recovery under applicable policies of insurance.

(F) Repair of KRRC and Private Property. The Project Company shall promptly repair or replace all KRRC Property and all private property (including Separate

Contractor work or property) damaged by any Project Company Person in connection with the performance of, or the failure to perform, the Project Implementation Work. The repair and replacement work shall restore the damaged property, to the maximum extent reasonably practicable, to its character and condition existing immediately prior to the damage. The costs incurred by Project Company in repairing or replacing any KRRC Property and any private property damaged by any Project Company Person pursuant to this Section shall be payable solely through the Project Company Contingency subject to all limitations specified in Attachment 8C (Schedule of Values and Project Company Contingency) of Appendix 8 (Contract Price), provided that such damage to KRRC Property or private property was not caused by the negligence of any Project Company Person. Such costs shall be Unallowable Costs borne solely by the Project Company to the extent the damage was caused by the negligence of any Project Company Person or to the extent insurance proceeds are not available due to a failure of the Project Company to obtain or maintain any applicable policy of Required Insurance. To the extent that any such costs incurred pursuant to this Section can be recovered from any insurer or from another third party (including any Subcontractor), the Project Company shall exercise its commercially reasonable efforts to obtain recovery from the appropriate source and provide a credit to the KRRC if recovery is obtained. Nothing in this Section is intended to waive any rights of recovery under applicable policies of insurance.

ARTICLE 7
COMPLETION

SECTION 7.1. MILESTONE SUBSTANTIAL COMPLETION.

(A) Project Implementation Work. The Project Implementation Work shall be completed in stages by five successive Scheduled Milestone Substantial Completion Dates. Scheduled Milestone Substantial Completion Dates are established in this Article for the (1) Hatchery Work, (2) Pre-Reservoir Drawdown Work, (3) Reservoir Drawdown Work, (4) Dam Removal and Initial Habitat Restoration Work, and (5) Final Habitat Restoration Work.

(B) Commencement of Each Project Implementation Work Element. The Hatchery Work and the Pre-Reservoir Drawdown Work may commence at any time following the Project Implementation Commencement Date in accordance with the Project Implementation Schedule, and may proceed in parallel. The Reservoir Drawdown Work may not commence until Milestone Substantial Completion for the Hatchery Work and the Pre-Reservoir Drawdown Work has been achieved; the Dam Removal Work and Initial Habitat Restoration Work may not commence until Milestone Substantial Completion for the Reservoir Drawdown Work has been achieved; and the Final Habitat Restoration Work may not commence until Milestone Substantial Completion for the Dam Removal Work and Initial Habitat Restoration Work has been achieved.

SECTION 7.2. SCHEDULED MILESTONE SUBSTANTIAL COMPLETION DATES AND MILESTONE LONGSTOP DATES.

The Scheduled Milestone Substantial Completion Dates and Milestone Longstop Dates for each of the Project Implementation Work Elements are as follows:

Project Implementation Work Element	Scheduled Milestone Substantial Completion Dates ⁽¹⁾	Milestone Longstop Dates ⁽¹⁾
1. Hatchery Work		
2. Pre-Reservoir Drawdown Work		
3. Reservoir Drawdown Work		
4. Dam Removal Work and Initial Habitat Restoration Work		
5. Final Habitat Restoration Work		

⁽¹⁾ Note: The Scheduled Milestone Substantial Completion Dates and Milestone Longstop Dates are expected to be negotiated and established on a definitive basis in the GMP Contract Amendment, as confirmed or revised in the Project Implementation Contract Amendment.

SECTION 7.3. MILESTONE SUBSTANTIAL COMPLETION DATE CONDITIONS.

The following conditions shall constitute the “**Milestone Substantial Completion Date Conditions**”, each of which must be satisfied in all material respects by the Project Company in order for the applicable Milestone Substantial Completion Date to have been achieved, and each of which must remain satisfied as of the Milestone Substantial Completion Date:

(1) Certification of Completion. The Project Company has submitted, and the KRRC has approved in writing, such approval not to be unreasonably withheld or delayed, a certification by the Project Company that applicable Project Implementation Work Element is physically complete and in all respects is in compliance with the Contract Standards;

(2) Governmental Approvals. All Governmental Approvals required under Applicable Law and this Project Agreement to be obtained by the Project Company which are necessary to commence and continue the next succeeding Project Implementation Work Element shall be in full force and effect, and certified copies of all such Governmental Approvals shall have been delivered to the KRRC;

(3) Required Maintenance Bond. With respect to the Final Habitat Restoration Work, the Project Company has obtained and delivered to the KRRC the Maintenance Bond required pursuant to subsection 16.2(F) (Maintenance Bond);

(4) No Default. The Project Company shall have certified that there is no Event of Default by the Project Company existing under this Project Agreement, or event which with the giving of notice or the passage of time would constitute an Event of Default by the Project Company hereunder; and

(5) Certification of Satisfaction of Conditions. The Project Company has submitted written certification that all of the foregoing conditions have been satisfied and the KRRC has approved the Project Company’s certification, which approval shall be effective as of the date of the Project Company’s certification.

The KRRC shall have the right, in its discretion, to waive any of the foregoing conditions.

SECTION 7.4. MILESTONE SUBSTANTIAL COMPLETION DATE CONCURRENCE OR DISAGREEMENT.

(A) Milestone Substantial Completion Date Concurrence. The Milestone Substantial Completion Date, with respect to each Project Implementation Work Element, shall be the day on which the Milestone Substantial Completion Date Conditions have been achieved, as determined in accordance with this Section. If the Project Company certifies that all of the Milestone Substantial Completion Date Conditions have been achieved, the KRRC shall determine, within 30 days following its receipt of such report, whether it concurs in such certification. If the KRRC states in writing that it concurs with the Project Company’s certification, the Project shall be deemed to have satisfied the Milestone Substantial Completion Date Conditions, and the Milestone Substantial Completion Date with respect to the applicable Project Implementation Work Element shall be deemed to have been established on the date of the Project Company’s original certification.

(B) Milestone Substantial Completion Date Disagreement. If the KRRC determines, at any time within 30 days following its receipt of the Project Company’s certification that all of the Milestone Substantial Completion Date Conditions have been

achieved, that it does not concur with the Project Company's certification of Milestone Substantial Completion with respect to the applicable Project Implementation Work Element, the KRRC shall promptly send written notice to the Project Company of the basis for its disagreement. In the event of any such non-concurrence by the KRRC, the Project Company may elect to initiate dispute resolution procedures in accordance with Article 11 (Dispute Resolution).

SECTION 7.5. EFFECT OF UNEXCUSED DELAY IN ACHIEVEMENT OF MILESTONE SUBSTANTIAL COMPLETION.

(A) Schedule for Completing Each Project Implementation Work Element. The Project Company shall achieve Milestone Substantial Completion with respect to the applicable Project Implementation Work Element by the applicable Milestone Scheduled Substantial Completion Date as set forth in Section 7.2 (Scheduled Milestone Substantial Completion Dates and Milestone Longstop Dates), and as such date may be extended pursuant to Article 14 (Uncontrollable Circumstances) and subsection (E) (Adjustment of Dates Applicable to Liquidated Damages) of this Section. The Project Company shall pay delay liquidated damages for delays in the achievement of Milestone Substantial Completion beyond the applicable Scheduled Milestone Substantial Completion Date as and to the extent provided in subsection (B) (Daily Delay Liquidated Damages) and subsection (C) (Lump Sum Delay Liquidated Damages) of this Section.

(B) Daily Delay Liquidated Damages. Subject to relief in accordance with the terms and conditions of this Project Agreement as and to the extent provided in Article 14 (Uncontrollable Circumstances), subsection (E) (Adjustment of Dates Applicable to Liquidated Damages) of this Section, and subsection 12.3(B) (Liquidated Damages Sublimit), if the Milestone Substantial Completion Date with respect to any Project Implementation Work Element occurs subsequent to the applicable Scheduled Milestone Substantial Completion Date, the Project Company shall pay to the KRRC daily delay liquidated damages in the amount of \$15,000 for each day that the applicable Milestone Substantial Completion Date falls after the applicable Scheduled Milestone Substantial Completion Date and prior to the applicable Milestone Longstop Date. No daily delay liquidated damages shall be payable with respect to any delays past the applicable Milestone Longstop Date.

(C) Lump Sum Delay Liquidated Damages. The parties acknowledge and agree that in the event the Project Company fails to achieve Milestone Substantial Completion of the Hatchery Work or the Pre-Reservoir Drawdown Work by the applicable Milestone Longstop Dates set forth in Section 7.2 (Scheduled Milestone Completion Dates and Milestone Longstop Dates), the applicable Project Implementation Work cannot be completed in calendar year 2021 and instead will need to be completed in calendar year 2022, thereby causing a one year delay in the overall completion of the Project Implementation Work. Similarly, the parties acknowledge and agree that in the event the Project Company fails to achieve Milestone Substantial Completion of the Reservoir Drawdown Work or the Dam Removal Work and Initial Habitat Restoration Work by the applicable Milestone Longstop Dates set forth in Section 7.2 (Scheduled Milestone Completion Dates and Milestone Longstop Dates), the applicable Project Implementation Work cannot be completed in calendar year 2022 and instead will need to be completed in calendar year 2023, thereby causing a one year delay in the overall completion of the Project Implementation Work. Finally, the parties also acknowledge and agree that a failure to complete both calendar year 2021 Project Implementation Work and calendar year 2022 Project Implementation Work in their respective years will cause an aggregate two year delay in the overall completion of the Project Implementation Work. Accordingly, subject to relief in accordance with the terms and conditions of this Project Agreement in the event of Uncontrollable Circumstances as and to the extent provided in Article 14 (Uncontrollable Circumstances, subsection (E) (Adjustment of Dates Applicable to Liquidated Damages) of this

Section and subsection 12.3(B) (Liquidated Damages Sublimit), in the event that there is a delay in achieving Milestone Substantial Completion by either of the applicable Milestone Longstop Dates for calendar year 2021, the Project Company shall make a liquidated damage payment to the KRRC of \$4,950,000 on account of such delay. In addition, in the event that there is a delay in achieving Milestone Substantial Completion by either of the applicable Milestone Longstop Dates for calendar year 2022, the Project Company shall also make a liquidated damage payment of \$4,950,000 to the KRRC on account of such delay.

(D) Maximum Liquidated Damages. Subject to subsection 12.3(B) (Liquidated Damages Sublimit):

(1) the aggregate maximum amount of daily delay liquidated damages payable is \$465,000, calculated as the sum of the maximum daily delay liquidated damages under subsection (B) (Daily Delay Liquidated Damages) of this Section; and

(2) the aggregate maximum amount of lump sum delay liquidated damages payable under subsection (C) (Lump Sum Delay Liquidated Damages) of this Section, calculated as the sum of the lump sum delay liquidated damages payable on account of a failure to achieve both a Milestone Substantial Completion Date by the applicable calendar year 2021 Milestone Longstop Date and a Milestone Substantial Completion Date by the applicable calendar year 2022 Milestone Longstop Date, is \$9,900,000.

Any daily or lump sum delay liquidated damages payable by the Project Company pursuant to this Section shall be due on the first day of each month following the month during which such daily or lump sum delay liquidated damages were incurred by the Project Company pursuant to this Section.

(E) Adjustment of Dates Applicable to Liquidated Damages. The payment of any lump sum delay liquidated damages payable on account of a failure to achieve a Milestone Longstop Date shall cause all subsequent Scheduled Milestone Substantial Completion Dates and Milestone Longstop Dates to be adjusted to a date that is one year later than the applicable date set forth in Section 7.2 (Scheduled Milestone Substantial Completion Dates and Milestone Longstop Dates), as such date may be adjusted by Article 14 (Uncontrollable Circumstances). The parties acknowledge and agree this adjustment is established for the purposes of avoiding a double recovery of liquidated damages for the same delay.

(F) Extension of Milestone Longstop Date. If the Project Company fails to achieve Milestone Substantial Completion with respect to any Project Implementation Work Element by the applicable Milestone Longstop Date for any reason, the Milestone Longstop Date for such Project Implementation Element shall be extended by 365 days to account for seasonal considerations in carrying out the Project Implementation Work, and the Project Company shall resume performance of such Project Implementation Work Element as soon as practicable. Failure of the Project Company to achieve Milestone Substantial Completion with respect to such Project Implementation Work Element in such circumstances by the extended Milestone Substantial Completion Date, without excuse for Uncontrollable Circumstances, shall constitute an Event of Default hereunder without further cure opportunity, as provided in Section 12.2 (Events of Default by the Project Company).

(G) Milestone Substantial Completion Requires Completion of Work on All Facilities. In order to achieve Milestone Substantial Completion with respect to a particular Project Implementation Work Element, the Project Company shall complete the Project

Implementation Work with respect to all of the Facilities; work completion with respect to some but not all of the Facilities shall not be deemed to constitute Milestone Substantial Completion.

(H) KRRC's Right to Complete a Project Implementation Work Element. In the event the Project Company fails to achieve Milestone Substantial Completion with respect to any Project Implementation Work Element by the last day of the applicable Milestone Longstop Date, without limiting any other right of the KRRC hereunder, the KRRC shall have the right, but not the obligation, to engage others to complete performance of the applicable Project Implementation Work Element, at the risk and cost of the Project Company, and the KRRC may deduct such cost from any amount remaining to be paid against the Contract Price or deduct and retain an amount equal to such cost from the retainage held pursuant to subsection 9.3(E) (Retainage). If the cost of such completion of the applicable Project Implementation Work Element by the KRRC exceeds the cost of such applicable Project Implementation Work Element, as specified in the Schedule of Values prepared in accordance with Appendix 8 (Contract Price), then the Project Company shall reimburse the KRRC for all such excess cost and expenses reasonably incurred by the KRRC in connection therewith. The KRRC shall provide the Project Company with seven days' advance written notice prior to exercising its right to complete the applicable Project Implementation Work Element pursuant to this Section. The Project Company acknowledges that if the KRRC exercises its right to complete the applicable Project Implementation Work Element pursuant to this Section, the KRRC shall have the right to take possession of and utilize such materials, appliances and equipment on the Project Site that the KRRC deems necessary or useful in completing the applicable Project Implementation Work Element. The right of the KRRC to complete the applicable Project Implementation Work Element specified in this Section shall not be construed to establish any limitation with respect to any obligations or liabilities of the Project Company under this Project Agreement. This Section is intended to supplement (and not to limit) the Contract Obligations otherwise applicable to the Project Implementation Work.

SECTION 7.6. MILESTONE PUNCH LIST ITEMS.

(A) Milestone Punch List Requirements. The Project Company shall submit a proposed Milestone Punch List to the KRRC and the Program Manager when the Project Company believes that a Project Implementation Work Element has been substantially completed in compliance with the Contract Documents. The "**Milestone Punch List**" shall be a statement of repairs, corrections and adjustments to the Project Implementation Work Element, and incomplete aspects of the Project Implementation Work, which in the Project Company's opinion:

(1) The Project Company can complete before the date specified in subsection (B) (Completion of Milestone Punch List Items) of this Section, and with minimal interference to the occupancy, use and lawful operation of the Project; and

(2) Would represent, to perform or complete, a total cost of not more than 0.5% of the portion of the Guaranteed Maximum Price applicable to such Project Implementation Work Element (unless the KRRC determines, in its discretion, that a higher percentage is acceptable, as evidenced by the written approval of the KRRC Contract Representative).

The KRRC shall, acting reasonably, have the right to approve the Milestone Punch List.

(B) Completion of Milestone Punch List Items. The Project Company shall complete all items on the Milestone Punch List within 90 days following the Substantial Completion Date. All work associated with the Milestone Punch List items shall constitute

Project Implementation Work hereunder and shall be performed by the Project Company in accordance with the Contract Standards.

SECTION 7.7. MILESTONE FINAL COMPLETION.

(A) Requirements. The Project Company shall achieve each Milestone Final Completion within 120 days following each applicable Milestone Substantial Completion Date. **“Milestone Final Completion”** shall be deemed to have occurred when all of the following conditions have been satisfied:

(1) Milestone Substantial Completion Achieved. The Project Company shall have achieved Milestone Substantial Completion for the applicable Project Implementation Work Element in accordance with this Article;

(2) Project Implementation Work Completed. All applicable Project Implementation Work for the applicable Project Implementation Work Element is complete and in all respects is in compliance with the Contract Documents;

(3) Deliverable Material. The Project Company shall have delivered to the KRRC all Deliverable Material required by the Contract Documents;

(4) Final Record Drawings. The Project Company shall have delivered to the KRRC a final and complete reproducible set of record Drawings, as required by Appendix 7 (Project Implementation Work Review Procedures);

(5) Milestone Final Completion Payment Requirements. The Project Company shall have satisfied all requirements associated with payment for Milestone Final Completion, as set forth in Section 9.5 (Payment Upon Milestone Final Completion); and

(6) Certification. The Project Company has submitted written certification that all of the foregoing conditions have been satisfied and the KRRC has approved the Project Company’s certification, which approval shall be effective as of the date of the Project Company’s certification.

(B) Notice and Report of Milestone Final Completion. When the Project Company believes that it has achieved any Milestone Final Completion, it shall deliver to the KRRC and the Program Manager a written notice thereof (the **“Notice of Milestone Final Completion”**). The Notice of Milestone Final Completion shall contain a report in a form acceptable to the KRRC, and with sufficient detail to enable the KRRC and the Program Manager to determine the completion by the Project Company of all Project Implementation Work to be performed under this Project Agreement, and such other information that the KRRC may require to determine whether Milestone Final Completion has been achieved.

(C) Achievement of Milestone Final Completion. The KRRC shall, in consultation with the Program Manager, within 20 days following receipt of a Notice of Milestone Final Completion, inspect the Project Implementation Work Element, review the report submitted by the Project Company and either: (1) deliver a written certificate to the Project Company stating that all conditions set forth in subsection (A) (Requirements) of this Section have been satisfied; or (2) notify the Project Company in writing that Milestone Final Completion has not been achieved, stating in detail the reasons therefor. In the event that the KRRC determines that Milestone Final Completion has not been achieved, the Project Company shall promptly take such action or perform such Project Implementation Work as will achieve Milestone Final Completion and shall issue to the KRRC and the Program Manager another

Notice of Milestone Final Completion pursuant to subsection (B) (Notice and Report of Milestone Final Completion) of this Section. Such procedure shall be repeated as necessary until Milestone Final Completion is achieved. If the KRRC, in its written certificate delivered in accordance with this Section, states that it concurs that all conditions set forth in subsection (A) (Requirements) of this Section have been satisfied, the Project shall be deemed to have achieved Milestone Final Completion and Milestone Final Completion shall be deemed to have been established on the date of the Project Company's most recent Notice of Milestone Final Completion.

(D) Failure to Achieve Milestone Final Completion. The Project Company shall achieve Milestone Final Completion by the date specified in subsection (A) (Requirements) of this Section. If Milestone Final Completion has not been achieved by such date, an Event of Default by the Project Company shall be deemed to have occurred under Section 12.2 (Events of Default by the Project Company), notwithstanding any absence of notice, further cure opportunity or other procedural rights accorded the Project Company thereunder, and the KRRC shall thereupon have the right to terminate this Project Agreement upon written notice to the Project Company. Upon any such termination, the KRRC shall have all of the rights provided in Article 12 (Breach, Default, Remedies and Termination) upon a termination of this Project Agreement for cause.

SECTION 7.8. PROJECT FINAL COMPLETION.

(A) Project Final Completion Services Requirements. The Project Company shall submit a proposed list of Project Final Completion Services to the KRRC and the Program Manager when the Project Company believes all Milestone Substantial Completion Dates have been achieved. The "**Project Final Completion Services List**" shall be a statement of all necessary ongoing habitat monitoring work which in the Project Company's opinion:

- (1) Will be completed before the date specified in subsection (B) (Completion of Project Final Completion Services List) of this Section, in order to complete the Project; and
- (2) Would represent, to perform or complete, a total cost of not more than 0.5% of the Guaranteed Maximum Price (unless the KRRC determines, in its discretion, that a higher percentage is acceptable, as evidenced by the written approval of the KRRC Contract Representative).

The KRRC shall have the right, acting reasonably, to approve the Project Final Completion Services List.

(B) Completion of Project Final Completion Services List. The Project Company shall complete all items on the Project Final Completion Services List within 60 days following the Milestone Substantial Completion Date applicable to the Final Habitat Restoration Work. All Project Final Completion Services shall constitute Project Implementation Work hereunder and shall be performed by the Project Company in accordance with the Contract Standards.

ARTICLE 8

MANAGEMENT, LABOR AND SUBCONTRACTORS

SECTION 8.1. MANAGEMENT.

(A) Project Manager. The Project Company shall designate an employee of the Project Company, any Affiliate of the Project Company, or the Project Company's Project Implementation Work manager as the "**Project Manager**". When the Project Company or any Subcontractor is performing Project Implementation Work, the Project Manager (or designee reasonably acceptable to the KRRC) shall be present at the Project Site. The Project Manager shall, among other things:

- (1) Be familiar with the Contract Obligations and all requirements of the Contract Documents;
- (2) Be able to communicate in fluent English;
- (3) Coordinate the Contract Obligations and give the Contract Obligations regular and careful attention and supervision;
- (4) Maintain a daily status log of the Project Implementation Work when being performed; and
- (5) Attend all Project meetings (including meetings concerning scope, review, pre-bid, pre-construction, construction, demolition and habitat restoration matters) with the KRRC and its representatives.

The Project Company represents and warrants that the Project Manager shall be vested with the authority to act on behalf of the Project Company in connection with the performance of the Contract Obligations and to bind the Project Company with respect to any certification required under this Project Agreement to be made by the Project Manager. If the Project Company is comprised of two or more persons functioning as a joint venture, the Project Company shall have the authority to represent and act for the joint venture. The Project Manager may be a different individual for the Preliminary Services and the Project Implementation Work. The Project Company may change the person assigned as the Project Manager solely in accordance with the provisions of subsection (C) (KRRC Rights with Respect to Key Personnel) of this Section.

(B) Replacement of Certain Key Personnel. If the Project Company formally or informally replaces the Project Manager, the Construction Design Coordinator or the Construction Manager, each as identified in Appendix 10 (Key Personnel and Approved Subcontractors), absent the KRRC's request and absent good cause shown (as defined in subsection (C) (KRRC Rights with Respect to Key Personnel) of this Section), a deduction of \$150,000 shall be applied to the Contract Compensation. Any successor Project Manager, Construction Design Coordinator, or Construction Manager shall be subject to the approval of the KRRC in its discretion. This Section's requirements shall apply to the replacement of any successor Project Manager, Construction Design Coordinator or Construction Manager.

(C) KRRC Rights with Respect to Key Personnel. The Project Company acknowledges that the identity of the Project Manager and the other key management and supervisory personnel proposed by the Project Company and its Subcontractors in its Proposal was a material factor in the selection of the Project Company to perform this Project Agreement. Such personnel, their affiliations and their anticipated roles in the performance of

the Contract Obligations are set forth in Appendix 10 (Key Personnel and Approved Subcontractors). The Project Company shall utilize such personnel to perform such services unless such personnel are unavailable for good cause shown. “Good cause shown” shall not include performing services on other projects for the Project Company or any of its Affiliates, but shall include termination for cause, employee death, disability, retirement, resignation or any job protected leave available under Applicable Law. In the event of any such permissible unavailability, the Project Company shall utilize replacement key management and supervisory personnel of equivalent skill, experience and reputation. Any on-site personnel change shall be proposed to the KRRC with reasonable advance notice for its review and approval, which shall not be unreasonably withheld or delayed. The Project Company shall remove or replace, or have removed or replaced, any personnel performing the Contract Obligations if the KRRC, acting reasonably, determines that an unworkable relationship has developed between the KRRC and the individual.

SECTION 8.2. LABOR.

(A) Personnel Performance. The Project Company shall enforce discipline and good order at all times among the Project Company’s employees and all Subcontractor employees. All persons engaged by the Project Company for performance of the Contract Obligations shall have requisite skills for the tasks assigned. The Project Company shall employ or engage and compensate engineers and other consultants to perform all engineering and other services required for the Contract Obligations. The Project Company shall ensure that all persons performing Contract Obligations, including all Subcontractors, comply with all registration, licensing and certification requirements imposed by any Governmental Body or otherwise under Applicable Law, including Project Company and Subcontractor employees.

(B) Training of Project Company and Subcontractor Employees. The Project Company shall provide training for all individuals employed by the Project Company or Subcontractors as a prerequisite to their entry to the Project Site. The Project Company’s training program for such employees shall include orientation training, safety and awareness training, and any other training deemed necessary.

(C) Labor Relations. The Project Company shall furnish labor that can work in harmony with all other elements of labor employed for the performance of the Project Implementation Work. The Project Company shall have exclusive responsibility for disputes or jurisdictional issues among unions or trade organizations representing employees of the Project Company or its Subcontractors, whether pertaining to organization of the Project Implementation Work, arrangement or subdivision of the Project Technical Requirements, employee hiring, or any other matters. The KRRC shall have no responsibility whatsoever for any such disputes or issues and the Project Company shall indemnify, defend and hold harmless the KRRC and the Project Company Indemnitees in accordance with and to the extent provided in Section 15.1 (Project Company’s Obligation to Indemnify) from and against all Loss-and-Expense resulting from any such labor dispute.

(D) Notice of Labor Disputes. If the Project Company has knowledge of an actual or potential labor dispute that may affect any of the Contract Obligations, the Project Company shall promptly:

- (1) Give notice thereof to the KRRC, including all relevant information related to the dispute of which the Project Company has knowledge; and

(2) Take all reasonable steps to ensure that such labor dispute does not affect the performance of any of the Contract Obligations including by applying for relief to appropriate forums or courts.

(E) Prevailing Wage Rates in California and Oregon. The Project Company shall, and shall cause all Subcontractors to, pay not less than the prevailing wage rate for all types and classifications of any of the Project Implementation Work (1) specified in Chapter 1 (commencing with Section 1720) of Part 7 of Division 2 of California Labor Code, and (2) specified in applicable Oregon law (each as applicable for Project Implementation Work in each State) or workers at the Project Site in job classifications covered thereby, including all applicable shift, weekend, holiday, foreman, health and welfare, pension, vacation, travel, training, subsistence and other pay established for each classification of work. The Project Company shall cause a copy of the prevailing rates of wages to be posted at the Project Site, shall keep and maintain payroll and other relevant information in order to permit the KRRC to monitor compliance with this requirement, and shall furnish certified copies of such payrolls and other information to the KRRC or its designee upon request. The prevailing wage rates must be posted at the Project Site. Failure to pay the prevailing wage rate is a material breach of this Project Agreement.

(F) Non-Discrimination Policy. Discrimination in any manner against any employee or applicant for employment by the Project Company or a Subcontractor on the basis of sex, race, creed, color, age, mental or physical disability, sexual orientation, religion, marital status, gender identity or national origin is prohibited. The Project Company shall include a similar nondiscrimination clause in all Subcontracts. If the Project Company fails to include a nondiscrimination clause in a Subcontract, the KRRC shall provide a reasonable opportunity to cure the defect. If the Project Company fails to cure the defect within the time period granted, the KRRC may declare this Project Agreement void and the Project Company shall be entitled to the reasonable value of the Contract Obligations that have been performed and materials that have been provided to date. If the Project Company cures the defect, this Project Agreement shall remain in force. If the Project Company willfully fails to comply with the requirements of the nondiscrimination clause, the KRRC may compel the Project Company to continue to perform under this Project Agreement as provided in California Public Utilities Code Section 20-106(b).

(G) Sexual Harassment. Sexual harassment by the Project Company, a Subcontractor, or any of their employees while on the Project Site or while actively representing or performing Contract Obligations for the KRRC is prohibited. It shall be the responsibility of the Project Company to prevent any such acts and to remove any employee who conducts such acts. Unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature constitute sexual harassment. Basic criteria for determining unlawful behavior includes conduct that has the purpose or effect of unreasonably interfering with an individual's work performance or creating an intimidating, hostile or offensive working environment.

(H) Abuse, Use, Sale or Possession of Drugs or Intoxicants. The use, possession, sale or distribution of drugs or intoxicants by the Project Company, a Subcontractor, or any of their employees while on the Project Site or while actively representing or performing Contract Obligations for the KRRC is prohibited. It shall be the responsibility of the Project Company to prevent such activities and to remove any employee or Subcontractor employee whose ability to perform appears to be affected by the use of drugs or intoxicants. Failure of the Project Company to comply with this Section shall be a material breach of this Project Agreement.

SECTION 8.3. SUBCONTRACTING GENERALLY.

(A) Right to Subcontract. The Project Company may carry out the Project Implementation Work and other Contract Obligations by contracting such obligations to one or more Subcontractors in accordance with the requirements of this Article. The Project Company shall retain full responsibility to the KRRC under this Project Agreement for all matters related to the Contract Obligations, notwithstanding the execution of, or the terms and conditions contained in, any Subcontract. Subcontracts entered into by the Project Company for the performance of the Contract Obligations shall neither supersede nor abrogate any of the terms or provisions of this Project Agreement.

(B) Approval Required. The Subcontractors identified in Appendix 10 (Key Personnel and Approved Subcontractors) are approved by the KRRC for the performance of the specific Contract Obligations identified therein, subject to the rights of the KRRC under this Section. The Project Company shall retain such Subcontractors to perform such services, unless otherwise agreed to in writing by the KRRC. All other Subcontractors shall be subject to the approval of the KRRC, which approval shall not be unreasonably withheld or delayed. The Project Company shall replace any Subcontractor at the request of the KRRC, after notice and a reasonable opportunity for corrective action, in the event that the KRRC determines, in its reasonable discretion, that an unworkable relationship has developed between the KRRC or the Project Company and the Subcontractor. The KRRC's approval of any Subcontractor performing Contract Obligations shall be subject to the terms and conditions of Section 8.4 (Self-Performance and Subcontractor Selection).

(C) Performance Failure. The Project Company shall retain full responsibility to the KRRC under this Project Agreement for all matters related to the Contract Obligations. No failure of any Subcontractor used by the Project Company in connection with the provision of the Contract Obligations shall constitute an Uncontrollable Circumstance or otherwise relieve the Project Company from its obligations hereunder to perform the Contract Obligations, except as provided in items (10), (11) and (13) in the definition of Uncontrollable Circumstances. The Project Company shall be responsible for settling and resolving with all Subcontractors all claims including those:

- (1) Arising out of delay, disruption, interference, hindrance, schedule extension caused by the Project Company;
- (2) Arising from the actions or inactions of the Project Company or a Subcontractor; or
- (3) Inflicted on the Project Company or a Subcontractor by the actions of another Subcontractor.

The Project Company shall provide to the KRRC, promptly following the receipt thereof, copies of any notice of default, breach or non-compliance received under or in connection with any Subcontract that may have a material and adverse effect on performance by the Project Company of its obligations under the Contract Documents.

(D) Restricted Persons. In providing the Contract Obligations, the Project Company shall not contract with, or allow any of its Subcontractors to contract with, any person that, in the reasonable opinion of the KRRC, is a Restricted Person.

(E) Subcontractor Licensing. All trade Subcontractors shall possess a valid contractor license as required by Applicable Law for the classification required for the work to

be performed by the Subcontractor at the time of the Subcontract and throughout the duration of the Subcontract. Subsection 8.2(A) (Personnel Performance) shall be applicable to all Subcontractors performing Design Professional Services. The Project Company and any Subcontractor that performs any construction portion of the Project Implementation Work in California shall possess and maintain a State contractor's license, classification A (General Engineering Contractor)

(F) Availability of Material Subcontractors and Key Personnel. At the request of the KRRC, the Project Company shall make the key representatives of Material Subcontractors available for meetings between the KRRC and the Project Company concerning design review, Project Implementation Work progress or any other matter relating to the performance of the Project Implementation Work. The Project Company shall provide the KRRC with periodic human resource allocation summary reports concerning the personnel of the Material Subcontractors, which reports shall include anticipated personnel allocations for all ongoing and planned projects and shall demonstrate human resource sufficiency.

(G) Assignability. All Subcontracts entered into by the Project Company with respect to the Project shall be assignable to the KRRC, solely at the KRRC's election and without cost or penalty, upon any early termination of this Project Agreement, including convenience termination under Section 12.6 (KRRC Convenience Termination Rights).

(H) SLTBE Goals. The Project Company acknowledges the KRRC has established (1) a non-mandatory goal for 5% of the Preliminary Services Fee and 5% of the Contract Price to be subcontracted to SLBE Firms, and (2) a non-mandatory goal for 5% of the Preliminary Services Fee and 5% of the Contract Price to be subcontracted to TBE Firms (the **"SLTBE Goals"**). The Project Company further acknowledges that a subcontractor that qualifies as both an SLBE Firm and an TBE Firm shall only be counted under one such category for the purposes of the SLTBE Goals. The Project Company shall use commercially reasonable efforts to comply with the SLTBE Goals by utilizing practices consistent with industry standards, including the use of outreach programs, creation of small work packages, and engagement the KRRC in a KRRC-supervised subcontracting process. The Project Company shall report its progress in meeting the SLTBE Goals in each Monthly Progress Report.

(I) Subcontractor Claims. The Project Company shall pay or cause to be paid to all Subcontractors all amounts due in accordance with their respective Subcontracts and the requirements of this Article. No Subcontractor shall have any right or claim against the KRRC for labor, services, materials or equipment furnished for the Contract Obligations. The Project Company acknowledges that its indemnity obligations under Article 15 (Indemnification) shall extend to all claims for payment or damages by any Subcontractor who furnishes or claims to have furnished any labor, services, materials or equipment in connection with the Project Implementation Work. The Project Company shall, at the KRRC Contract Representative's request, furnish satisfactory evidence that all obligations of the nature designated above in this Section have been paid, discharged or waived. If the Project Company fails to do so the KRRC may, after having notified the Project Company, either pay unpaid bills or withhold from the Project Company's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the Project Company will be resumed in accordance with the terms of this Project Agreement, but in no event shall the provisions of this sentence be construed to impose any obligations upon the KRRC to either the Project Company, the Surety or any third party. In paying any unpaid bills of the Project Company, any payment so made by the KRRC will be considered as a payment

made under this Project Agreement by the KRRC to the Project Company and the KRRC will not be liable to the Project Company for any such payments made in good faith.

(J) Removal of Subcontractors and Personnel. If at any time during the Term, the KRRC reasonably determines that the performance of any Subcontractor or any member of Subcontractor's staff performing Contract Obligations is unsatisfactory, the KRRC may require the Project Company to remove such Subcontractor or staff member immediately and replace the Subcontractor or staff member at no cost or penalty to the KRRC.

(K) Statement Required by California Business and Professions Code Section 7030. Construction contractors are required by California law to be licensed and regulated by the Contractors' State License Board, which has jurisdiction to investigate complaints against contractors if a complaint regarding a patent act or omission is filed within four years of the date of the alleged violation. A complaint regarding a latent act or omission pertaining to structural defects must be filed within 10 years of the date of the alleged violation. Any question concerning a contractor may be referred to the Registrar, Contractors' State License Board, P.O. Box 2600, Sacramento, California 95826.

SECTION 8.4. SELF-PERFORMANCE AND SUBCONTRACTOR SELECTION.

(A) Self-Performed Project Implementation Work Generally. Project Implementation Work on the Project shall not be performed by the Project Company or its Affiliates, except with the approval of the KRRC given in its discretion pursuant to subsection (F) (Alternative Procedures for Project Implementation Work) of this Section. The parties acknowledge that, during the performance of the Preliminary Services and in the development of the GMP Project Submittal, the Project Company is expected to propose that specific aspects of the Project Implementation Work be proposed for self-performance by the Project Company, any Affiliate of the Project Company or by an Approved Subcontractor. The KRRC agrees to consider approving such self-performance if the Project Company demonstrates to the KRRC's satisfaction that providing for such self-performance is in the best interest of the Project and that the pricing therefor will be fair, reasonable and consistent with industry standards for similar services. The KRRC, in its discretion, may require that any such demonstration be subject to an "open book" process in accordance with subsection (F) (Alternative Procedures for Project Implementation Work) of this Section. In the event that the KRRC approves self-performance of Project Implementation Work by the Project Company or any Affiliate of the Project Company hereunder, the KRRC expects that the value of any such self-performed Project Implementation Work will not exceed 40% of the Guaranteed Maximum Price.

(B) Division of Work. The Project Company shall coordinate and develop with the KRRC Contract Representative and the Program Manager bid packages and work scope descriptions for each separate bid category that represents the entirety of the scope of the Project Implementation Work for each phase and stage of the Project. The Project Company shall be responsible for determining the Project Technical Requirements that are applicable to each Subcontractor performing Project Implementation Work, including all trade Subcontractors and Suppliers. The Project Company shall be responsible for the assembly, reproduction and distribution of all documents defining the scope of work for each Subcontractor.

(C) Competitive Procedures for Project Implementation Work. Except as may otherwise be approved in writing by the KRRC Contract Representative in accordance with subsection (F) (Alternative Procedures for Project Implementation Work) of this Section, the Project Company shall enter into fixed-price Subcontracts for the performance of all Project

Implementation Work and, in connection therewith, shall utilize a competitive bidding or competitive proposal process in accordance with the Subcontracting Plan prepared during performance of the Preliminary Services and negotiated and agreed upon by the parties as part of the GMP Contract Amendment. All Subcontractors shall be subject to the approval of the KRRC pursuant to subsection 8.3(B) (Approval Required).

(D) KRRC and Program Manager Review and Participation Rights. Without limiting anything set forth herein, the Project Company acknowledges and agrees that the KRRC and the Program Manager shall have the right to: (a) review and comment on all procurement documents; (b) attend any bid or proposal openings; (c) attend any meetings with prospective Subcontractors or Suppliers, including scope review meetings; (d) review all bids, proposals, and other information developed or otherwise resulting from any competitive procurement, including the Project Company's tabulation, scoring or evaluation materials; and (e) otherwise participate in the negotiation and contract award process. Upon contract award, the Project Company shall provide the KRRC Contract Representative and the Program Manager with a description of the competitive process undertaken in connection with such contract award, together with copies of all material documents used in connection therewith and agreements resulting therefrom.

(E) KRRC Right to Require Re-Solicitations. The KRRC, in its discretion, shall have the right to direct the Project Company to reject any or all bids and proposals and re-solicit any Project Implementation Work in accordance with subsection (C) (Competitive Procedures for Project Implementation Work) of this Section in the event the KRRC is not satisfied that the pricing received is fair, reasonable and consistent with industry standards for similar services. In making such determination, the KRRC, in its discretion, shall have the right to request a review of any bids and proposals received by the Project Company under an "open book" process.

(F) Alternative Procedures for Project Implementation Work. The Project Company may propose to the KRRC Contract Representative alternative procedures for the procurement of Project Implementation Work, including performance of Project Implementation Work by labor forces of the Project Company, any Affiliate of the Project Company or by an Approved Subcontractor as indicated in subsection (A) (Self-Performed Project Implementation Work Generally) of this Section. The KRRC Contract Representative's approval of any such alternative procedure, shall be in the KRRC's discretion. The Project Company recognizes that, if the Project Company wishes to perform Project Implementation Work with its own labor forces or the labor forces of an Affiliate or an Approved Subcontractor, the KRRC may, but is not obligated to, require that the Project Company, Affiliate or Approved Subcontractor submit a bid or proposal for the work on a competitive basis, as contemplated by subsection (C) (Competitive Procedures for Project Implementation Work) of this Section. If the Project Company or any Affiliate of the Project Company intends to submit a competitive bid or proposal for Project Implementation Work, the Project Company shall notify the KRRC Contract Representative in writing prior to the issuance of procurement documents for the work, and the KRRC Contract Representative shall have the right to require the submittal of all bids or proposals directly to the KRRC (and not to the Project Company) for review, evaluation and selection. Any decision by the KRRC to approve the performance of Project Implementation Work without obtaining competitive bids or proposals shall, in the KRRC's discretion, be subject to an "open book" process to provide the KRRC with sufficient information to determine whether the proposed pricing of the work is fair, reasonable and consistent with industry standards for similar services.

(G) Procurement of Subcontractors Prior to the GMP Contract Amendment Date. The Project Company, during the Preliminary Services, in the development of the

proposed Base Guaranteed Maximum Price to be submitted to the KRRC in the GMP Project Submittal (1) may conduct discussions with and obtain indicative pricing information from potential Project Implementation Work Subcontractors, and (2) may initiate, subject to the approval of the KRRC given in its discretion, the formal procurement process for selecting Project Implementation Work Subcontractors. Any such formal procurement process shall be conducted in accordance with the requirements of this Section. No Subcontract resulting from such procurement process shall be executed prior to the GMP Contract Amendment Date without the KRRC's consent given in its discretion.

(H) Security for Project Implementation Work Subcontractor Performance. The Project Company, acting reasonably, may provide security for the performance of Subcontractors under Project Implementation Work Subcontracts, and the reasonable costs therefor shall constitute Project Implementation Work Costs. Such security may include Subcontractor Default Insurance.

SECTION 8.5. TERMINATION, AMENDMENT, ASSIGNMENT AND REPLACEMENT OF MATERIAL SUBCONTRACTS.

(A) Termination, Amendment and Assignment. Unless the Project Company has, at its earliest practicable opportunity, submitted to the KRRC notice of the proposed course of action (and any relevant documentation), the Project Company shall not:

- (1) Terminate, or agree to, or permit the termination of, any Material Subcontract;
- (2) Make, or agree to, or permit the making of (a) any material amendment of any Material Subcontract; or (b) any departure by any party from any material provision of any Material Subcontract; or
- (3) Permit any Material Subcontract party to assign or transfer to any person any of such Material Subcontract party's rights or obligations under a Material Subcontract.

(B) Replacement. If any Material Subcontract at any time lapses, terminates, or otherwise ceases to be in full force and effect (whether by reason of expiration or otherwise), unless the goods, services or rights which were the subject matter of such Material Subcontract are no longer reasonably required for the Project, the Project Company will forthwith enter into, or cause to be entered into, a replacement contract or contracts upon the same or substantially similar terms as the contract so replaced (to the extent reasonably practicable). If at any time any amendment is made to any Material Subcontract, or a replacement Material Subcontract (or any agreement which materially affects the interpretation or application of any Material Subcontract) is entered into, the Project Company shall deliver to the KRRC a copy of each such amendment or agreement within 14 days of the date of its execution or creation, certified as a true copy by the Project Manager.

ARTICLE 9

COMPENSATION

SECTION 9.1. COMPENSATION FOR PRELIMINARY SERVICES.

(A) Compensation for Base Preliminary Services. During the Preliminary Services, the KRRC shall pay the Project Company the Preliminary Services Fee in the manner and subject to the terms and conditions set forth in this Project Agreement and in Appendix 2 (Preliminary Services). The Project Company agrees that the Preliminary Services Fee, when earned, shall be the Project Company's entire compensation and reimbursement for the performance of the Preliminary Services, inclusive of all costs, expenses and disbursements paid or incurred by the Project Company, as well as all overhead, administration, risk and profit. The Preliminary Services Fee shall be subject to adjustment solely in accordance with Section 5.2 (Changes to the Scope of the Preliminary Services).

(B) Compensation for Additional Preliminary Services. The Project Company shall be compensated for any Additional Preliminary Services on a time and materials or lump sum basis, agreed to in writing through a Change Order or a Contract Amendment executed by the KRRC and the Project Company. Compensation for Additional Preliminary Services may consist of compensation on the basis of Project Company's and Subcontractors' billing rates approved by the KRRC. The Change Order or Contract Amendment, as applicable, may set forth additional compensation and Payment Request requirements.

(C) Payment Requests and Payment. The Project Company shall provide the KRRC with a Payment Request for the performance of the Preliminary Services on a monthly basis in accordance with the specific requirements set forth in Appendix 2 (Preliminary Services). The Payment Request shall state the amount payable for the month and the total amount paid against the Preliminary Services Fee through the date of the Payment Request, along with the Monthly Progress Report regarding the performance of the Preliminary Services and such other information or documentation as the KRRC may reasonably require. The KRRC shall make payment to the Project Company of all properly supported invoiced amounts within 30 days of receipt of the Payment Request, subject to the terms and conditions of this Project Agreement. Payments of the Preliminary Services Fee shall not be subject to retainage holdback or, except as provided in subsections (D) (Non-Compliant Preliminary Services) and (E) (Billing Statement Disputes) of this Section, offset.

(D) Non-Compliant Preliminary Services. Nothing contained in this Project Agreement shall require the KRRC to pay for any Preliminary Services which are not performed in accordance with the terms and conditions of this Project Agreement. The KRRC shall not be required to pay the Preliminary Services Fee to the Project Company at any time the Project Company is in material breach or default under this Project Agreement.

(E) Billing Statement Disputes. If the KRRC disputes in good faith any Payment Request for Preliminary Services, the KRRC shall pay all undisputed amounts when due but may withhold payment of the disputed amount, and shall provide the Project Company with a written objection indicating the amount being disputed and the reasons then known to the KRRC for the dispute. In the event that the Project Company disputes any amounts offset by the KRRC, it shall provide the KRRC with a written objection indicating the amount being disputed and the reasons then known to the Project Company. If the Project Company is unable to reach agreement with the KRRC as to the payment dispute, the Project Company may elect to initiate dispute resolution procedures in accordance with Section 11.1 (Dispute Resolution Procedures). When any billing dispute is finally resolved, if payment by the KRRC to the Project Company of amounts withheld is required, such payment shall be made within

30 days of the date of resolution of the dispute, together with interest thereon, from the date originally due, determined as provided in Section 9.9 (Interest on Overdue Obligations) of this Project Agreement.

SECTION 9.2. COMPENSATION FOR PROJECT IMPLEMENTATION WORK.

The KRRC shall pay the Project Company the Contract Price for properly performed and completed Project Implementation Work during the Project Implementation Period. The Contract Price and the components thereof are defined in Appendix 8 (Contract Price). The KRRC's obligation to pay the Contract Price is subject to the Guaranteed Maximum Price and the terms and conditions of this Article and Appendix 8 (Contract Price). Except with respect to (1) payments of the Preliminary Services Fee in accordance with Section 9.1 (Compensation for Preliminary Services), and (2) Project Implementation Work performed pursuant to an Early Work Package Amendment, the Project Company shall not be entitled to any compensation for costs or expenses incurred, or Project Implementation Work performed, prior to the issuance of the Notice to Proceed with Project Implementation Work pursuant to subsection 6.3(B) (Establishment of the Project Implementation Commencement Date). Any amount payable for Project Implementation Work performed pursuant to an Early Work Package shall, on the GMP Contract Amendment Date, be part of the Contract Price and subject to the Guaranteed Maximum Price and all other terms and conditions of this Article and Appendix 8 (Contract Price).

SECTION 9.3. CONTRACT PRICE PAYMENT PROCEDURE.

(A) Progress Payments. The Project Company shall be paid the Contract Price for the performance of Project Implementation Work on a progress-payment basis in accordance with the Schedule of Values and the terms and conditions of this Section. The Project Company shall prepare and submit to the KRRC for its approval preliminary and final drafts of the Schedule of Values in accordance with the Contract Standards. After the final Schedule of Values is accepted by the KRRC, it shall be used to assist in the estimating of the value of the Project Implementation Work performed for payment purposes. The Project Company shall not submit requests for progress payments of the Contract Price unless a final Schedule of Values has been approved, except as otherwise agreed to by the KRRC, in its discretion.

(B) Payment Request. The Project Company shall be entitled to submit Payment Requests to the KRRC on a monthly basis and to receive from the KRRC the payments, which (1) shall be made on a percent complete basis in accordance with the Schedule of Values; (2) shall be subject to the Guaranteed Maximum Price limitations; and (3) shall be subject to the conditions to payment set forth in this Article. Each Payment Request shall be in a form provided by or otherwise reasonably acceptable to the KRRC and must be accompanied by a monthly requisition report, which shall include:

- (1) A reasonably detailed description of all Project Implementation Work actually completed to date;
- (2) Revisions to the Project Implementation Schedule, which shall reflect changes in the Project Company's cost loaded, critical path schedule since the date of the last Payment Request and any changes to the Schedule of Values;
- (3) A signed certificate of the Engineer-of-Record and the Project Manager certifying: (a) the portion of the Contract Price payable to the Project Company for completed Project Implementation Work; (b) that the Project Company is neither in default under this Project Agreement nor in breach of any material provision of this

Project Agreement such that the breach would, with the giving of notice or passage of time, constitute an Event of Default; and (c) that all items applicable to the Project Implementation Work entitling the Project Company to the requested payment under the Schedule of Values have been completed in accordance therewith and with the Contract Documents;

(4) A verified statement setting forth the information required under any Contract Standard pertaining to prevailing wages;

(5) Notice of any Encumbrances which have been filed together with evidence that the Project Company has discharged any such Encumbrances or made timely notification to the Payment Bond Surety regarding such Encumbrances; and

(6) Any other documents or information relating to the Project Implementation Work or this Project Agreement reasonably requested by the KRRC or the Program Manager or as may be required by Applicable Law, this Project Agreement or generally accepted accounting practices or principles, including payrolls, receipts, fully detailed invoices with check vouchers or other evidence of Project Implementation Work Costs incurred which the KRRC or the Program Manager deems necessary to support the amount requested in the Payment Request.

The General Conditions Costs shall be shown as a separate line item on each Payment Request in accordance with Appendix 8 (Contract Price). In determining the percentage of completion of the Project Implementation Work, the parties shall use the lesser of the percentage of the Project Implementation Work actually completed for each classification on the Schedule of Values or the percentage of the Guaranteed Maximum Price allocable to that item which has been actually incurred and demonstrated as a Project Implementation Work Cost by the Project Company. The Project Company Fee shall be shown as a separate line item on each Payment Request and shall be paid on a monthly, pro-rata basis, for Project Implementation Work performed from the date of the Notice to Proceed with the Project Implementation Work until the Scheduled Milestone Substantial Completion Date.

(C) Review and Payment. Prior to submitting a Payment Request for the Contract Price to the KRRC, the Project Company shall submit a draft Payment Request to the KRRC Contract Representative and the Program Manager, including all information required pursuant to this Section. The Program Manager shall have no fewer than 10 days to review each draft Payment Request. Within such 10-day period, the Program Manager shall verify or dispute in writing (or by telecommunication promptly confirmed in writing) the Project Company's certification that the Project Company has achieved the level of progress indicated and is entitled to payment. If the Program Manager does not approve the draft Payment Request, the Project Company may make the necessary corrections and resubmit the draft Payment Request. If the Program Manager determines that the Project Implementation Work has progressed as indicated in the draft Payment Request, the Program Manager shall notify the KRRC and the Project Company, and the Project Company shall submit a final, certified Payment Request to the KRRC, which may not contain any material change from the draft Payment Request reviewed by the Program Manager. The KRRC shall pay the Project Company the requisitioned amount included in the final, certified Payment Request within 30 days following receipt, subject to subsection (E) (Retainage) of this Section and the KRRC's rights to withhold payments under Section 9.4 (Permissible Withholdings). Disputes regarding payments of the Contract Price shall be resolved in accordance with subsection (D) (Payment Dispute Procedures) of this Section. Any undisputed amounts of the Contract Price shall be paid within 30 days after receipt of the Project Company's final, certified Payment Request. The Project Company, when signing each draft and final Payment Request submitted in accordance with this Section, shall certify that it has made payment from proceeds of prior

payments and that it will make timely payments from the proceeds of the progress and final payment then due to the Project Company to its Subcontractors and Suppliers in accordance with the applicable Subcontract. Failure to meet the conditions in the preceding two sentences may result in a pause in the processing of subsequent draft Payment Requests and progress payments until such conditions are met.

(D) Payment Dispute Procedures. If the KRRC determines, pursuant to subsection (C) (Review and Payment) of this Section, that the Project Implementation Work required for any payment has not progressed as indicated by the Project Company in the draft Payment Request, or otherwise disputes any draft Payment Request, the KRRC shall provide prompt written notice to the Project Company as to the KRRC's reasons, in reasonable detail, for such determination or the basis for such dispute. After receiving such determination notice, the Project Company may make the necessary corrections and resubmit the Payment Request, or the KRRC may agree on a revised amount, in which case the Project Company shall promptly submit a final, certified Payment Request to the KRRC as to any undisputed amount. If the Project Company is unable to reach agreement with the KRRC as to the progress of the Project Implementation Work and the payment dispute, the Project Company may exercise its right to contest the KRRC's determination in accordance with the dispute resolution procedures set forth in Article 11 (Dispute Resolution). Any proceedings undertaken to resolve a dispute arising under this Section shall immediately terminate if (1) the Project Company demonstrates to the KRRC that the Project Implementation Work has progressed as indicated in the Payment Request giving rise to the dispute and that the disputed Payment Request is correct, and (2) the KRRC concurs with such demonstration. The Project Company shall not be entitled to payment of the amount so requisitioned and disputed except upon resolution of the dispute in accordance with this Section; provided, however, that the KRRC shall pay all requisitioned amounts which are not in dispute in accordance with subsection (C) (Review and Payment) of this Section. In the event that upon resolution of any such dispute, it is determined that the Project Company was properly entitled to the disputed amount as of a date earlier than the date on which payment is actually made, the Project Company shall be entitled to receive, promptly following such resolution, such disputed amount plus interest on such disputed amount as and to the extent provided under Applicable Law.

(E) Retainage. Each Contract Price payment will be subject to a 5% retainage holdback. Pursuant to Section 22300 of the California Public Contract Code, the Project Company shall have the option to request in writing that the KRRC make payments of all retained funds directly to an escrow agent, or to deposit securities valued in an amount equal to 5% of each Contract price payment with an escrow agent or the KRRC as a substitute for retained funds. The Parties acknowledge that a "retainage bond" shall not constitute "securities" for purposes of the preceding sentence. The KRRC shall release to the Project Company or the escrow agent, as applicable, all of the accumulated funds retained from all prior drawdown payments or the escrow agent shall release all of the securities deposited with the escrow agent upon each Milestone Final Completion in accordance with Section 9.5 (Payment upon Milestone Final Completion). The Project Company acknowledges and agrees that the performance of the Project Implementation Work and the Warranty Work under this Project Agreement is not complete until the expiration of the applicable Warranty Period. In the event the Project Company deposits securities in lieu of retained funds or requests that the KRRC make payments of all retained funds to an escrow agent, the Project Company shall be responsible for paying all fees incurred by the escrow agent. Any interest earned on the retainage held by the KRRC shall be for the KRRC's benefit only. Any interest earned on securities or retained funds held in escrow pursuant to Section 22300 of the California Public Contract Code shall be for the Project Company's benefit only.

(F) Cost Control and Reporting. The Project Company shall develop and monitor an effective system of Project Implementation Work cost control, which system shall be

disclosed to and reviewed and approved by the KRRC and the Program Manager. The Project Company shall develop cash flow reports and forecasts as reasonably requested or required by the KRRC and the Program Manager, including a good faith calendar quarterly estimate of payments of the Contract Price throughout the Project Implementation Period, specifying the range of minimum and maximum monthly payments, which shall not exceed the Guaranteed Maximum Price or any line item on the Schedule of Values. The Project Company shall promptly (within seven days) after acquiring such information, identify and report to the KRRC and the Program Manager all variances between estimated costs and actual costs of the Project Implementation Work, including any proposed corrective action to be taken by the Project Company.

(G) Certification of Amounts Due. Whenever requested by the KRRC or the Program Manager, the Project Company shall submit a sworn statement certifying all amounts then due (or yet to become due) the Project Company for the Project Implementation Work (or any portion thereof) and describing any payment or other dispute which may exist between the Project Company and any Subcontractor.

SECTION 9.4. PERMISSIBLE WITHHOLDINGS.

In addition to the amounts required to be retained pursuant to subsection 9.3(E) (Retainage), the KRRC may disapprove and withhold and retain all or any portion of any payment requested in any Payment Request for Project Implementation Work in an amount equal to the sum of:

- (1) Any liquidated damages or reimbursement payments which are due and owing to the KRRC hereunder;
- (2) Any indemnification amounts which are due and owing to the KRRC hereunder and with respect to which a claim has been filed against a Project Company Indemnatee by a third party in accordance with Applicable Law;
- (3) Any amount determined pursuant to subsection 13.1(D) (Maintenance of Insurance Coverage) of Appendix 9 (Insurance Requirements);
- (4) Any other deductions which are required by Applicable Law;
- (5) Any payments with respect to which documents to be delivered in connection therewith are not correct and complete;
- (6) Any payments to the extent that the Project Implementation Work covered by such Payment Request (or any previous Payment Request) does not comply with this Project Agreement;
- (7) The cost of repairing damage to the work of a Separate Contractor, to the extent the Project Company is responsible for such costs and fails to promptly repair or replace the damaged work as required by this Project Agreement;
- (8) Any payments with respect to which any person has filed a Lien resulting from the acts or omissions of the Project Company in performing the Project Implementation Work and such Lien remains unreleased or unbonded;
- (9) All requisitioned payments if an Event of Default of the Project Company has occurred under Section 12.2 (Events of Default by the Project Company); and

(10) In the event the Project Company fails to pay any Taxes, assessments, penalties or fees imposed by any Governmental Body, then the Project Company authorizes the KRRC to deduct and withhold or pay over to the appropriate Governmental Body those unpaid amounts upon demand by the Governmental Body.

In addition, the KRRC may withhold payment for persistent and uncured Project Company noncompliance with the administrative provisions of this Project Agreement, including failure to electronically submit monthly Subcontractor payment information. In the event of any permissible withholding under this Section, the KRRC shall notify the Project Company in writing at least seven days prior to the date payment is otherwise due. The notice shall indicate the specific amounts the KRRC intends to withhold, the reasons and contractual basis for the withholding, and the specific measures the Project Company must take to rectify the KRRC's concerns. Any dispute associated with any such withholding shall be handled in accordance with subsection 9.3(D) (Payment Dispute Procedures).

SECTION 9.5. PAYMENT UPON MILESTONE FINAL COMPLETION.

(A) Milestone Final Completion Payment Request. In connection with the achievement of each Milestone Final Completion in accordance with Section 7.7 (Milestone Final Completion), the Project Company shall prepare and submit to the KRRC and the Program Manager a Milestone Final Completion Payment Request. Each Milestone Final Completion Payment Request shall enclose:

(1) A notarized affidavit in duplicate stating under oath that all Subcontractors, vendors, and other persons or firms who have furnished or performed labor or furnished materials for the Project Implementation Work Element have been fully paid or satisfactorily secured, and, if requested by the KRRC, further proof, including waiver or release of lien or claims from any Subcontractors or Suppliers;

(2) A certificate of the Surety for both the Performance Bond and the Payment Bond certifying that the Surety consents to payment for Milestone Final Completion and agrees that such payment shall not relieve the Surety of any of its obligations under the Performance Bond or the Payment Bond;

(3) A general release executed by the Project Company waiving, upon receipt of payment for Milestone Final Completion, all claims arising out of or resulting from the Project Implementation Work Element, except those claims made in writing to the KRRC and remaining unsettled at the time of such payment, which claims shall be specifically listed in an attachment to the general release, identifying the claimant and the nature of the claim; and

(4) Certificates of insurance confirming that required coverages will remain in effect consistent with the requirements of this Project Agreement.

(B) Milestone Final Completion Payment. If based on the Program Manager's (1) observation of the Project Implementation Work Element, (2) final inspection, and (3) review of the Milestone Final Completion Payment Request and other documents required by subsections (A) (Milestone Final Completion Payment Request) and (C) (Final Determination and Approval of Contract Price) of this Section and Section 7.7 (Milestone Final Completion), the Program Manager is satisfied that the conditions for Milestone Final Completion have been achieved, the Program Manager shall, within 15 days after receipt of the Milestone Final Completion Payment Request, furnish to the KRRC and the Project Company the Program Manager's recommendation of payment for Milestone Final Completion. If the Program Manager is not satisfied, the Program Manager shall return the Milestone Final Completion

Payment Request to the Project Company, indicating in writing the reasons for not recommending payment, in which case the Project Company shall either (1) exercise its right to contest the Program Manager's determination in accordance with subsection 9.3(D) (Payment Dispute Procedures), or (2) make the necessary corrections and resubmit the Milestone Final Completion Payment Request.

(1) KRRC Concurrence. If the KRRC concurs with the Program Manager's recommendation of payment for Milestone Final Completion, the KRRC shall, within 15 days, file a written notice of Milestone Final Completion and notify the Project Company of such concurrence. As soon as reasonably practicable (but in no event later than 45 days after the KRRC's original receipt of the Project Company's Milestone Final Completion Payment Request, subject to the KRRC's right to dispute payment in accordance with this Project Agreement and Applicable Law) after filing such notice, the KRRC shall pay to the Project Company the balance of the Contract Price associated with such Project Implementation Work Element, subject to any withholdings and any other provisions governing final payment specified herein.

(2) KRRC Non-Concurrence. If the KRRC does not concur with the Program Manager's determination, the KRRC shall return the Payment Request to the Project Company, indicating in writing its reasons for refusing payment for Milestone Final Completion. The Project Company shall promptly make the necessary corrections and resubmit the Payment Request to the KRRC and the Program Manager. The KRRC's written determination shall bind the Project Company, unless the Project Company delivers to the KRRC written notice of a claim within 30 days after receipt of the KRRC's determination.

Payment for Milestone Final Completion does not constitute a waiver by the KRRC of any rights relating to the Project Company's obligations under this Project Agreement. Except as specifically provided in subsection (A) (Milestone Final Completion Payment Request) of this Section with respect to exceptions taken in the Project Company's general release, payment for Milestone Final Completion constitutes a waiver of all claims by the Project Company against the KRRC, including all claims associated with Uncontrollable Circumstances, relating to the Project Implementation Work, the payment of the Project Implementation Work Costs or otherwise in connection with the Project Implementation Period.

(C) Final Determination and Approval of Contract Price. Notwithstanding any of the foregoing, the KRRC shall have no obligation to make payment for Milestone Final Completion hereunder until a final accounting of the Project Implementation Work Costs for the Project Implementation Work Element has been submitted by the Project Company and has been verified by the KRRC and the Program Manager. Such accounting shall be provided by the Project Company in connection with the Milestone Final Completion Payment Request. The aggregate total of payments to the Project Company with respect to the Contract Price (including amounts retained pursuant to subsection 9.3(E) (Retainage)) shall not exceed the total of the actual Project Implementation Work Costs relating to the Project Implementation Work Element, as verified by the KRRC and the Program Manager from the Project Company's final accounting, plus the Project Company Fee which shall not exceed the Guaranteed Maximum Price. If payments to the Project Company exceed that which is due and owing the Project Company pursuant to this Article, the Project Company shall promptly refund the excess to the KRRC. The Project Company acknowledges and agrees that the KRRC shall have the right to withhold and retain amounts from payment for Milestone Final Completion in accordance with Section 9.4 (Permissible Withholdings).

(D) Completion of Project Implementation Work. Notwithstanding payment for Milestone Final Completion pursuant to this Section, the Project Company acknowledges

and agrees that the performance of the Project Implementation Work is not complete until the expiration of the applicable Warranty Period, and that the Project Company shall have the continuing obligation to perform Warranty Work pursuant to the terms and conditions of Article 10 (Project Warranties) until the expiration of the applicable Warranty Period. To the extent the Project Company is entitled to payment of any amount retained by the KRRC pursuant to Section 9.4 (Permissible Withholdings) upon each Milestone Final Completion, the Project Company shall provide the KRRC with a final Payment Request in a form reasonably acceptable to the KRRC, and the KRRC shall pay the amount due within 30 days following receipt of the final Payment Request.

(E) Project Final Completion. The procedure described in this Section shall be followed for the final payment by the KRRC to the Project Company related to Project Final Completion.

SECTION 9.6. NO ACCEPTANCE, WAIVER OR RELEASE.

Unless other provisions of this Project Agreement specifically provide to the contrary, none of the following, without limitation, shall be construed as (i) the KRRC's acceptance of any Project Implementation Work which is defective, incomplete, or otherwise not in compliance with this Project Agreement, (ii) the KRRC's release of the Project Company from any obligation under this Project Agreement, (iii) the KRRC's extension of the Project Company's time for performance, (iv) an estoppel against the KRRC, or (v) the KRRC's acceptance of any claim by the Project Company:

- (1) The KRRC's payment to the Project Company or any other person with respect to performance of the Project Implementation Work;
- (2) The review, consent, approval or acceptance, as applicable, of any submissions, permit applications, punch lists, other documents, certifications, or Project Implementation Work Company or any Subcontractor by the KRRC, the Program Manager or any other person;
- (3) The review of (or failure to prohibit) any construction, demolition and habitat restoration applications, means, methods, techniques, sequences, or procedures for the Project Implementation Work by the KRRC, the Program Manager or any other person;
- (4) The entry at any time on the Project Site (including any area in which the Project Implementation Work is being performed) by the KRRC, the Program Manager or any other person;
- (5) Any observation, inspection or testing of (or failure to observe, inspect or test) any Project Implementation Work (whether finished or in progress) by the KRRC, the Program Manager or any other person;
- (6) The failure of the KRRC, the Program Manager or any other person to respond in writing to any notice or other communication of the Project Company; or
- (7) Any other exercise of rights or failure to exercise rights by the KRRC hereunder.

SECTION 9.7. CHANGES IN CONTRACT PRICE.

(A) Determination of Base Guaranteed Maximum Price Adjustment. Without limiting any requirement of Article 14 (Uncontrollable Circumstances), any Base Guaranteed Maximum Price Adjustment included in a Change Order or Unilateral Change Directive shall be determined as follows:

(1) Where unit prices set forth in the Contract Documents are applicable to the Project Implementation Work that is the subject of the Change Order or Unilateral Change Directive, or unit prices are otherwise mutually agreed upon by the parties, by application of such unit prices to the quantities of the items involved;

(2) To the extent unit prices are not applicable, by a mutually agreed lump sum supported by written Cost Substantiation documentation acceptable to the KRRC;

(3) To the extent unit prices are not applicable and the parties are unable to reach agreement on a lump sum value, on the basis of the actual cost of performing the applicable Project Implementation Work (subject to Cost Substantiation, any limitations contained in Appendix 8 (Contract Price) and excluding any cost attributable to Project Company Fault), plus (a) a reasonable lump sum fee attributable to profit, mark-up and general and indirect overhead with respect to such Project Implementation Work based upon the percentages set forth in Section 8.5 (Project Company Fee) of Appendix 8 (Contract Price), and (b) a Subcontractor mark-up determined in accordance with this Section; or

(4) A combination of the foregoing.

(B) Design Professional Services. Without limiting anything in subsection (C) (Subcontractor's Maximum Mark-Up on Subcontracted Project Implementation Work) of this Section, for purposes of determining the amount payable for Design Professional Services included in any Change Order or Unilateral Change Directive, the rates payable for Project Company personnel and personnel of Subcontractors providing Design Professional Services shall not exceed their then currently applicable rates for similar services on projects of similar size and scope to the Project Implementation Work. The Project Company shall use commercially reasonable efforts to use available Project Company personnel for additional work hereunder before using Subcontractors.

(C) Subcontractor's Maximum Mark-Up on Subcontracted Project Implementation Work. The price payable to all Subcontractors for work performed under Project Implementation Work Subcontracts, including Project Implementation Work Subcontractor overhead and mark-ups for risk and profit, shall be commercially reasonable. A Change Order or Unilateral Change Directive may provide for a mark-up payable to Project Implementation Work Subcontractors for their risk, profit, administration, and all other overhead where Project Implementation Work that is the subject of the Change Order or Unilateral Change Directive is performed through such Project Implementation Work Subcontractors. Any such Project Implementation Work Subcontractor mark-up shall not exceed: (1) 15% of the costs incurred by such Project Implementation Work Subcontractor in respect of labor, materials, equipment, supplies; and (2) for any higher tier Project Implementation Work Subcontractor, 5% of the amount paid to the next lower-tier Project Implementation Work Subcontractor.

SECTION 9.8. COST SUBSTANTIATION.

(A) Required Substantiation and Competitive Practices. Without limiting anything in Appendix 8 (Contract Price), the Project Company shall substantiate the Project Implementation Work Costs and any other costs for which it claims compensation hereunder, other than (1) the Project Company Fee, which was proposed and negotiated on a fixed basis, (2) any other costs that are part of a negotiated fixed price, or (3) any fixed-price Subcontracts for the performance of all Project Implementation Work procured in accordance with Section 8.4 (Self-Performance and Subcontractor Selection). In incurring any other costs which are subject to Cost Substantiation, the Project Company shall utilize competitive practices to the maximum reasonable extent (including, where practicable, obtaining three competing bids, quotes, proposals or estimates for costs expected to be in excess of \$50,000), and shall enter into Subcontracts on commercially reasonable terms and prices in light of the work to be performed and the KRRC's potential obligation to pay for it.

(B) Cost Substantiation Certificate. Any Payment Request for compensation relating to costs requiring Cost Substantiation under subsection (A) (Required Substantiation and Competitive Practices) of this Section shall be accompanied by a certificate stating that the Project Implementation Work Costs or other costs being invoiced (1) are properly payable under this Project Agreement, and specifying the provisions of this Project Agreement under which compensation is due, and (2) are equal to amounts paid by the Project Company for Project Implementation Work that has been properly performed. The Cost Substantiation certificate shall describe the competitive or other process utilized by the Project Company to obtain the commercially reasonable price in accordance with subsection (A) (Required Substantiation and Competitive Practices) of this Section, and shall state that such services and materials are reasonably required pursuant to this Project Agreement. Each Cost Substantiation certificate shall be accompanied by copies of all documentation reasonably necessary to demonstrate that the Project Implementation Work Costs have been paid and are reasonable. Such documentation shall be in a format and level of detail reasonably acceptable to the KRRC. To the extent reasonably necessary to confirm the payment of costs that are subject to Cost Substantiation under subsection (A) (Required Substantiation and Competitive Practices) of this Section, copies of timesheets, invoices, canceled checks, expense reports, receipts and other documents, as appropriate, shall be provided.

SECTION 9.9. INTEREST ON OVERDUE OBLIGATIONS.

Except as otherwise provided for herein, all amounts due hereunder, whether as damages, credits, revenue, charges or reimbursements, that are not paid when due shall bear interest at the rate of interest set forth in California Code of Civil Procedure Section 685.010(a).

SECTION 9.10. RETENTION AND AUDIT OF BOOKS AND RECORDS.

(A) Books and Records. The Project Company shall, and shall cause its Subcontractors to, prepare and maintain proper, accurate and complete books and records regarding the Contract Obligations and all transactions related thereto, including all books of account, bills, vouchers, invoices, personnel rate sheets, cost estimates and bid computations and analyses, Subcontracts, time books, daily job diaries and reports, correspondence, and any other documents showing all acts and transactions in connection with or relating to or arising by reason of the Contract Obligations, any Subcontract or any operations or transactions in which the KRRC has or may have a financial or other material interest hereunder (collectively, "**Books and Records**"). The Project Company and its Subcontractors shall produce such Books and Records for inspection, audit and reproduction for all such purposes within 15 days of request by the KRRC, any Governmental Body having an interest in the performance of this Project Agreement, and any of their authorized representatives. All

financial records of the Project Company and its Subcontractors shall be maintained in accordance with generally accepted accounting principles and generally accepted auditing standards. The Project Company and its Subcontractors shall maintain such Books and Records in accordance with subsection (E) (Preservation of Books and Records) of this Section.

(B) KRRC Rights to Audit and Examine Payments Other than Lump Sum Payments. All payments whatsoever by the KRRC to the Project Company (other than lump sum payments, including any lump sum payments of the Preliminary Services Fee or any lump sum payments of Project Implementation Work Costs) and all Contract Obligations shall be subject to audit at any time by the KRRC, the States, any Governmental Body having an interest in the performance of this Project Agreement, and any of their authorized representatives. The Project Company shall provide all evidence necessary to support Cost Substantiation as required under this Project Agreement, and allow the KRRC access to the Project Company's Books and Records that are directly related to the Project. The Project Company shall require all Subcontractors to comply with the provisions of this Section and include the requirements hereof in the written contract between the Project Company and the Subcontractor. The Project Company shall also require all Subcontractors to include the requirements of this Section in any lower tier Subcontracts relating to the Project. In the event that the Project Company is a joint venture, such right to examine, copy and audit shall apply collaterally and to the same extent to the Books and Records that are directly related to the Project of the joint venture sponsor, and those of each individual joint venture member.

(C) Notice and Process. Upon no less than 30 days' prior written notice by the KRRC, the States, any Governmental Body having an interest in the performance of this Project Agreement, or any of their authorized representatives, the Project Company shall, and shall cause its Subcontractors to, make available at its office at all reasonable times the Books and Records for examination, audit, or reproduction. The KRRC may take possession of such Books and Records by reproducing such Books and Records, excluding confidential financial or payroll details, for off-site review or audit. When requested in the KRRC's written notice of examination or audit, the Project Company shall provide the KRRC with copies of electronic and electronically stored Books and Records in a reasonable usable format consistent with the Project Company's standard record keeping practices that allows the KRRC to access and analyze all such Books and Records. For Books and Records that require proprietary software to access and analyze, the Project Company shall provide the KRRC with two licenses with maintenance agreements authorizing the KRRC to access and analyze all such Books and Records. If the Project Company is unable to provide the licenses, the Project Company shall provide the KRRC with reports and records from the Project Company's accounting system whereby the KRRC can obtain applicable Books and Records, including job cost reports, material distribution reports, labor cost reports, labor productivity reports, standard time/overtime analysis reports, man-hour reports, and the like as available.

(D) Selection of Auditor or Examiner and Determination of Scope. The KRRC has discretion as to the selection of an examiner or auditor and the scope of the examination or audit.

(E) Preservation of Books and Records. The Project Company shall preserve all of its Books and Records, and the KRRC, the States, any Governmental Body having an interest in performance of this Project Agreement, and any of their authorized representatives, may examine, audit, or reproduce Books and Records, from the Contract Date until the later of three years after: (1) final payment under this Project Agreement; or (2) final settlement of a termination for convenience under Section 12.6 (KRRC Convenience Termination Rights); or (3) the final resolution of any dispute. After the expiration of a 30 day period to cure a breach of this subsection (E) (Preservation of Books and Records), the failure by the Project Company to make available the Books and Records in accordance with this Section or the Project

Company's refusal to cooperate with a notice of audit or examination shall be deemed a material breach of this Project Agreement and grounds for termination.

(F) Overpayment. In the event an audit by the KRRC determines that the Project Company cannot document a cost or expense for which payment has been made, or that the KRRC has overpaid the Project Company and the Project Company has not cured such deficiency within 30 days of the audit, the Project Company shall, within 10 days following a demand by the KRRC, refund the amounts overpaid or undocumented to the KRRC. If the overpayment exceeds 1% of the total amount that should have been properly paid by the KRRC during the period audited, then the Project Company shall, in addition, reimburse the KRRC for any reasonable fees and costs incurred in connection with the inspection or audit. Payments to the Project Company, or approval by the KRRC of any requisition for payment submitted by the Project Company, shall in no way affect the Project Company's obligation hereunder or the right of the KRRC to obtain a refund of any payment to the Project Company which is in excess of that to which it was lawfully entitled.

ARTICLE 10

PROJECT WARRANTIES

SECTION 10.1. PROJECT WARRANTIES.

(A) Project Warranties Defined. The Project Company warrants to the KRRC that the Project Implementation Work, including all completed materials, equipment, systems and structures comprising the Project, shall: (i) be new, of recent manufacture and of good quality; (ii) conform to the requirements of the Contract Documents; and (iii) be free of material faults or defects, including defects caused by or resulting from design errors or omissions and defects in title (the “**Project Warranties**”). The Project Warranties are further subject to the following:

(1) Inclusions. The Project Warranties include remedy for damage or defect caused by Project Implementation Work performed by the Project Company.

(2) Exclusions. The Project Warranties exclude remedies for damage or defect caused by capital modifications not undertaken or executed by the Project Company under this Project Agreement. In addition, except as provided in item (1), above, the Project Warranties exclude remedy for damage or defect caused by improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage.

(B) Term of the Project Warranties. The Project Warranties set forth in this Article shall be in full force and effect for the period of time beginning on each applicable Milestone Substantial Completion Date and, subject to subsection (C) (Optional Extension of Warranty Periods) of this Section and subsection 10.2(D) (Extension of Warranties), continuing for one year following such applicable Milestone Substantial Completion Date (each, a “**Warranty Period**”).

(C) Optional Extension of Warranty Periods. The KRRC shall have the right at any time prior to the expiration of the applicable one-year Warranty Period specified in subsection (B) (Term of the Project Warranties) of this Section, upon written notice to the Project Company, to elect to extend such Warranty Period so that it continues for two years following the final Milestone Substantial Completion Date. In the event the KRRC elects to extend the Warranty Period pursuant to this Section, the Project Company shall be entitled to receive the fixed sum of [\$_____] [**Note: To be finalized on the GMP Contract Amendment Date**] (the “**Extended Warranty Fee**”). The Extended Warranty Fee shall be payable on a monthly, pro-rata basis during the one-year extension of the Warranty Period. The Project Company shall provide the KRRC with a Payment Request in a form reasonably acceptable to the KRRC by the 15th day of each month, which shall state the amount payable for the month and the total amount paid against the Extended Warranty Fee through the date of the Payment Request, along with such other information or documentation as the KRRC may reasonably require. The KRRC shall pay the amount due in accordance with this Section within 30 days following receipt of the Payment Request. The Extended Warranty Fee is not included in the Contract Price and is not subject to retainage holdback; provided, however, that the KRRC shall have the right to withhold payment for Warranty Work that is not performed in accordance with the Contract Standards and otherwise as provided in Section 9.4 (Permissible Withholdings). The KRRC shall not be required to make any payment to the Project Company at any time the Project Company is in breach or default under this Project Agreement. The Maintenance Bond required pursuant to subsection 16.2(F) (Maintenance Bond) shall automatically renew for an additional one-year term if the KRRC elects to extend the Warranty Period pursuant to this Section.

SECTION 10.2. WARRANTY WORK.

(A) “Call-Back” Obligations. If, at any time during the applicable Warranty Period, the Project or any of the Project Implementation Work is found to be malfunctioning, defective or otherwise not in accordance with the requirements of the Project Warranties, the Project Company shall correct the condition promptly after receipt of written notice from the KRRC to do so. The KRRC shall provide such notice promptly after discovery of the condition. The Project Company shall respond to critical or emergency service calls from the KRRC and be onsite within four hours and to non-critical or non-emergency calls within eight hours; provided however such response times will not be required for the Final Habitat Restoration Work, which require reasonable response times. Such response shall require that a competent representative or representatives of the Project Company familiar with the Project, including its specific equipment, design and operational requirements, inspect the Project and, while on-site, either correct the problem or initiate a course of action that will fully correct the problem within a reasonable period of time in accordance with Good Dam Removal Practice and the specific requirements of this Section. In critical or emergency situations and for non-emergencies, the correction shall be made in the minimum amount of time required in accordance with Good Dam Removal Practice.

(B) Right of the KRRC to Proceed with Corrective Action; Project Company Liability. If the Project Company fails to commence and complete the steps set forth in subsection (A) (“Call-Back” Obligations) of this Section within the required time frames, in addition to any other remedies provided under this Project Agreement, the Security Instruments or Applicable Law, the KRRC may commence and complete the correction of such non-conforming Project Implementation Work with its own forces or with third-party contractors. If the KRRC does perform such corrective work, the Project Company shall be responsible for all costs reasonably incurred in performing such correction, subject to Cost Substantiation in accordance with this Project Agreement.

(C) No Period of Limitation on Other Obligations. Nothing contained in this Section shall be construed to establish a period of limitation with respect to other obligations that the Project Company has under this Project Agreement or under Applicable Law with respect to the Project Implementation Work, including warranties and obligations with respect to latent defects. The Warranty Periods relate only to the specific obligations of the Project Company to respond to notices from the KRRC under the Project Warranties, and have no relationship to the time within which the obligation of the Project Company to comply with this Project Agreement may be enforced, nor the time within which proceedings may be commenced to establish the Project Company’s liability with respect to its obligations under this Project Agreement.

(D) Extension of Warranties. The “call-back” obligations set forth in this Section shall apply to all Project Implementation Work re-done or corrected pursuant to this Project Agreement. The “call-back” obligations for re-done or corrected elements of the Project Implementation Work shall extend beyond the applicable Warranty Period, if necessary, to provide a minimum one-year period following acceptance by the KRRC of such re-done or corrected Project Implementation Work; provided, however, that in no event shall such “call-back” obligations extend beyond one year following the expiration of the applicable Warranty Period.

(E) Manufacturers’ Warranties. During each Warranty Period, the Project Company (or the KRRC) shall be permitted to enforce all warranties provided by manufacturers, suppliers and other third parties with respect to the Project Implementation Work. However, as provided in subsection 10.4(A) (Manufacturers’ Warranties Generally), no such warranty shall relieve the Project Company of any obligation with respect to the Project Warranties.

(F) Performance of Warranty Work. The Project Company acknowledges that time is of the essence in the performance of all Warranty Work required under this Section in light of the Project's essential public purpose. Accordingly, all Warranty Work shall be performed in accordance with the Contract Standards and within the minimum amount of time required in accordance with Good Dam Removal Practice. The Project Company shall provide a written plan for all proposed Warranty Work (unless expressly waived by the KRRC).

(G) Responsibility for Costs. The costs incurred by the Project Company in performing Warranty Work shall be Project Implementation Work Costs, subject to the Guaranteed Maximum Price, except to the extent that such Warranty Work was the result of Project Company Fault, in which case such costs shall be Unallowable Costs. The Project Company shall reimburse the KRRC for its costs resulting from a breach of the Project Warranties, subject to the terms and conditions of this Project Agreement.

SECTION 10.3. PROJECT WARRANTIES NOT EXCLUSIVE.

The Project Company acknowledges and agrees that the Project Warranties are in addition to, and not in limitation of, any other warranties, rights and remedies available under this Project Agreement or Applicable Law, and shall not limit the Project Company's liability or responsibility imposed by this Project Agreement or Applicable Law with respect to the Project Implementation Work, including liability for defects caused by or resulting from design errors or omissions, latent construction, demolition and habitat restoration defects, strict liability, negligence or fraud. The provisions of this Section shall survive the termination of this Project Agreement.

SECTION 10.4. MANUFACTURERS' WARRANTIES.

(A) Manufacturers' Warranties Generally. Without limiting any of the Project Warranties, the Project Company shall, for the protection of the KRRC, obtain from all Subcontractors (including vendors, suppliers and other persons from which the Project Company procures structures, improvements, fixtures, machinery, equipment and materials) such warranties and guarantees as are normally provided with respect thereto and as may be specifically required by the Contract Standards, each of which is hereby assigned to the KRRC to the full extent of the terms thereof. No such warranty or guarantee shall relieve the Project Company of any obligation hereunder, and no failure of any warranted or guaranteed structures, improvements, fixtures, machinery, equipment or material shall be the cause for any increase in the Guaranteed Maximum Price or otherwise excuse the Project Company from the performance of any Project Implementation Work or Warranty Work obligations, unless such failure is itself attributable to an Uncontrollable Circumstance.

(B) No Limitation on Third-Party Warranties. Nothing in this Project Agreement is intended to limit any third-party warranty that provides the KRRC with greater warranty rights than those provided under the Project Warranties, as set forth in this Project Agreement.

ARTICLE 11

DISPUTE RESOLUTION

SECTION 11.1. DISPUTE RESOLUTION PROCEDURES.

(A) Generally. Except as provided in Section 11.2(D) (Relation to Judicial Legal Proceedings) of this Section, each party shall follow the dispute resolution procedures set forth in this Section to attempt to resolve and settle disputes between themselves concerning the rights, obligations and liabilities of the parties. The dispute resolution procedures set forth in this Section are intended to encourage a negotiated resolution of disputes in a prompt and efficient manner without resort to litigation, which should be a last resort.

(B) Informal Negotiations. Representatives of the KRRC and the Project Company with day-to-day involvement in the administration of this Project Agreement and the performance of the Contract Obligations shall initially and promptly enter into negotiations to attempt to address and resolve any disputes that may arise concerning this Project Agreement. In connection with such negotiations, the party asserting the dispute shall provide the other with a written description of the nature of the dispute, along with reasonable supporting documentation. The parties shall consider involving senior representatives and other upper management personnel of each party in the informal negotiation process, as well as other representatives of the parties not actively involved in the day-to-day activities associated with the dispute who might be able to take a broader look at the dispute in the context of the overall objectives of the Project and this Project Agreement. At the KRRC's request, the Project Company shall involve senior representatives of any of its Subcontractors in such negotiations. Following the exercise of reasonable efforts towards resolution of a dispute through such informal negotiations without reaching agreement, a party may declare that the informal negotiations have been exhausted, and such party may request Non-Binding Mediation or request a KRRC Contract Representative's Final Decision in accordance with this Section.

(C) KRRC Contract Representative's Final Decision. If a dispute has not been resolved through direct, informal negotiations as provided in subsection (B) (Informal Negotiations) of this Section, then upon the written request of the Project Company, the KRRC Contract Representative or his or her designee (other than any personnel assigned to the Project) shall review the dispute and issue his or her determination of the dispute (the "**KRRC Contract Representative's Final Decision**"). The KRRC Contract Representative's Final Decision shall be issued in writing within 60 days following the date of the request for review. If the Project Company disagrees with the KRRC Contract Representative's Final Decision, or if the KRRC Contract Representative fails to issue a KRRC Contract Representative's Final Decision within such 60-day period, then the Project Company shall have the right to file a notice of claim with the KRRC Contract Representative. If the Project Company fails to file any such notice of claim with the KRRC Contract Representative on or prior to the final Milestone Substantial Completion Date, or such earlier date as required pursuant to Applicable Law, then the Project Company shall: (1) be deemed to have accepted the KRRC Contract Representative's Final Decision; (2) shall have waived its rights to any further relief for the matters covered by such KRRC Contract Representative's Final Decision; and (3) shall have waived its rights to initiate Legal Proceedings in accordance with Section 11.3 (Forum for Dispute Resolution) and in accordance with this Project Agreement for the matters in dispute between the parties. A KRRC Contract Representative's Final Decision, or the failure of the KRRC Contract Representative to issue a KRRC Contract Representative's Final Decision in accordance with this subsection, shall be a condition precedent to the Project Company's right to file a notice of claim, and subsequently initiate Legal Proceedings, in accordance with this Project Agreement.

SECTION 11.2. NON-BINDING MEDIATION

(A) Rights to Request and Decline Non-Binding Mediation. Subject to the requirements of Section 11.1(B) (Informal Negotiations), either party may request Non-Binding Mediation of any dispute arising under this Project Agreement, whether technical or otherwise. Non-Binding Mediation is voluntary and will not be a condition precedent to initiating the institution of Legal Proceedings by either party. The non-requesting party may decline the request in its discretion. If there is concurrence that any particular matter shall be mediated, the provisions of this Section shall apply. The costs of such Non-Binding Mediation shall be divided equally between the KRRC and the Project Company.

(B) Procedure. The mediator shall be a professional engineer, attorney or other professional mutually acceptable to the parties who has no current or on-going relationship to either party. The mediator shall have full discretion as to the conduct of the mediation. Each party shall participate in the mediator's program to resolve the dispute until and unless the parties reach agreement with respect to the disputed matter or one party determines in its discretion that its interests are not being served by the mediation.

(C) Non-Binding Effect. Mediation is intended to assist the parties in resolving disputes over the correct interpretation of this Project Agreement. No mediator shall be empowered to render a binding decision.

(D) Relation to Judicial Legal Proceedings. Except as provided in Section 11.1(C) (KRRC Contract Representative's Final Decision) with respect to the KRRC Contract Representative's Final Decision, nothing in this Section shall operate to limit, interfere with or delay the right of either party under this Article to commence judicial Legal Proceedings upon a breach of this Project Agreement by the other party, whether in lieu of, concurrently with, or at the conclusion of any Non-Binding Mediation.

SECTION 11.3. FORUM FOR DISPUTE RESOLUTION.

It is the express intention of the parties that all Legal Proceedings related to this Project Agreement or to the Project or to any rights or any relationship between the parties arising therefrom shall be solely and exclusively initiated and maintained in state or federal courts located in the City and County of San Francisco, California. The Project Company and the KRRC each irrevocably consents to the jurisdiction of such courts in any such Legal Proceeding and waives any objection it may have to the laying of the jurisdiction of any such Legal Proceeding.

SECTION 11.4. CONTINUANCE OF PERFORMANCE DURING DISPUTE.

Unless otherwise directed in writing by the KRRC, at all times during the course of any dispute resolution procedure or Legal Proceeding, the Project Company shall continue with the performance of the Contract Obligations in a diligent manner and in accordance with the applicable provisions of this Project Agreement. The KRRC shall continue to satisfy its uncontested payment obligations to the Project Company during the pendency of any such dispute, subject to the terms and conditions of this Project Agreement. Records of the Contract Obligations performed during such time shall be kept in accordance with the applicable provisions of this Project Agreement.

ARTICLE 12

BREACH, DEFAULT, REMEDIES AND TERMINATION

SECTION 12.1. REMEDIES FOR BREACH.

(A) Generally. The parties agree that, except as otherwise provided in this Section, in the event that either party breaches this Project Agreement, the other party may exercise any legal rights it may have under this Project Agreement and under Applicable Law, subject to Section 11.1 (Dispute Resolution Procedures). Neither party shall have the right to terminate this Project Agreement except as expressly provided in this Article.

(B) No Effect On Contract Obligations. The exercise by the KRRC of any of its rights under this Article shall not reduce or affect in any way the Project Company's responsibility hereunder to perform the Contract Obligations.

(C) No Duplicative Recovery. Every right to claim compensation, indemnification or reimbursement under this Project Agreement shall be construed so that the recovery is without duplication to any other amount recoverable under this Project Agreement.

(D) Liquidated Damages. This Project Agreement provides for the payment by the Project Company of liquidated damages in certain circumstances associated with unexcused delays in achieving the Milestone Substantial Completion Dates, as and to the extent provided in Section 7.5 (Effect of Unexcused Delay in Achievement of the Milestone Substantial Completion). Each party agrees that the KRRC's actual damages in each such circumstance of replacement or unexcused delay would be difficult or impossible to ascertain, and that the liquidated damages provided for herein with respect to each such circumstance of unexcused delay are intended to place the KRRC in the same economic position as it would have been in had the unexcused delay not occurred. Such liquidated damages shall constitute the only damages payable by the Project Company to the KRRC to compensate the KRRC for such replacement or for unexcused delays in achieving Milestone Substantial Completion by the applicable Scheduled Milestone Substantial Completion Date, as applicable, regardless of legal theory. This limitation, however, is not intended to limit any of the other remedies for breach specifically provided for in this Project Agreement, including the KRRC's remedies associated with an Event of Default by the Project Company under Section 12.2 (Events of Default by the Project Company). The parties acknowledge and agree that the additional remedies specifically provided for in this Project Agreement are intended to address harms and damages which are separate and distinct from those which the liquidated damages are meant to remedy. In addition, the parties agree that:

(1) The liquidated damages payable under this Project Agreement are fair and reasonable and are not a penalty, and such amounts represent a reasonable estimate of fair compensation for the losses that may reasonably be anticipated from the circumstances of unexcused delay; and

(2) In recognition of the acknowledgments above, the Project Company is expressly estopped from arguing, and waives any rights it may have to argue, that the liquidated damages provided for herein are a penalty and that they are not enforceable.

SECTION 12.2. EVENTS OF DEFAULT BY THE PROJECT COMPANY.

(A) Events of Default Not Requiring Previous Notice or Cure Opportunity for Termination. Each of the following shall constitute an Event of Default by the Project Company upon which the KRRC, by notice to the Project Company, may terminate this Project Agreement

without any requirement of having given notice previously or of providing any further cure opportunity:

(1) Failure to Achieve Milestone Substantial Completion. The failure of the Project Company, without excuse for Uncontrollable Circumstances, to achieve Milestone Substantial Completion with respect to any Project Implementation Work Element prior to the end of the applicable extended Milestone Longstop Date, as provided in subsection 7.5(F) (Extension of Milestone Longstop Date);

(2) Failure to Achieve Milestone Final Completion. Except to the extent excused due to the occurrence of Uncontrollable Circumstances, the failure of the Project Company to achieve any Milestone Final Completion by the date set forth in Section 7.7 (Milestone Final Completion);

(3) Security for Performance. The failure of the Project Company to obtain and maintain in full force and effect in accordance with the requirements of this Project Agreement any Security Instrument required by Article 16 (Security for Performance) as security for the performance of this Project Agreement;

(4) Assignment or Transfer Without Consent. The assignment or transfer by the Project Company of this Project Agreement or any right or interest therein without the KRRC's prior written consent;

(5) Insolvency. The insolvency of the Project Company as determined under the Bankruptcy Law;

(6) Voluntary Bankruptcy. The filing by the Project Company or the Guarantor of a petition of voluntary bankruptcy under the Bankruptcy Law; the consenting of the Project Company or the Guarantor to the filing of any bankruptcy or reorganization petition against the Project Company or the Guarantor under the Bankruptcy Law; or the filing by the Project Company or the Guarantor of a petition to reorganize the Project Company or the Guarantor pursuant to the Bankruptcy Law; or

(7) Involuntary Bankruptcy. The issuance of an order of a court of competent jurisdiction appointing a receiver, liquidator, custodian or trustee of the Project Company or the Guarantor or of a major part of the property of the Project Company or the Guarantor, or the filing against the Project Company or the Guarantor of a petition to reorganize the Project Company or the Guarantor pursuant to the Bankruptcy Law, which order shall not have been discharged or which filing shall not have been dismissed within 90 days after such issuance or filing.

(B) Events of Default Requiring Previous Notice and Cure Opportunity for Termination. It shall be an Event of Default by the Project Company upon which the KRRC may terminate this Project Agreement by notice to the Project Company and subject to the Project Company's cure rights set forth in subsection (C) (Notice and Cure Opportunity) of this Section, if:

(1) Any representation or warranty of the Project Company hereunder was false or inaccurate in any material respect when made, and the legality of this Project Agreement or the ability of the Project Company to carry out its obligations hereunder is thereby materially and adversely affected;

(2) The Project Company fails, refuses or otherwise defaults in its duty to pay any undisputed or uncontested amount required to be paid to the KRRC under this Project Agreement within 60 days following the due date for such payment;

(3) The Project Company suspends, ceases, stops or abandons the Project Implementation Work or fails to continuously and diligently prosecute the Project Implementation Work, exclusive of work stoppages due to an Uncontrollable Circumstance;

(4) The Project Company fails to resume performance of the Project Implementation Work which has been suspended or stopped within a reasonable time after receipt of notice from the KRRC to do so or (if applicable) after cessation of the event preventing performance;

(5) The Project Company fails materially to comply with any Applicable Law or fails unreasonably to comply with the instructions of the KRRC consistent with this Project Agreement; or

(6) The Project Company fails to perform any other material obligation under this Project Agreement (unless such failure is excused by an Uncontrollable Circumstance as and to the extent provided herein).

(C) Notice and Cure Opportunity. The Project Company acknowledges that the KRRC has an immediate termination right upon the occurrence of any of the defaults listed in subsection (A) (Events of Default Not Requiring Previous Notice or Cure Opportunity for Termination) of this Section and that the Project Company has no further right of notice or cure in such circumstances of default. Conversely, no default listed in subsection (B) (Events of Default Requiring Previous Notice and Cure Opportunity for Termination) of this Section shall constitute an Event of Default giving the KRRC the right to terminate this Project Agreement for cause under this Section unless:

(1) The KRRC has given prior written notice to the Project Company stating that a specified default has occurred which gives the KRRC a right to terminate this Project Agreement for cause under this Section, and describing the default in reasonable detail; and

(2) The Project Company has not initiated within a reasonable time (in any event not more than 15 days from the initial default notice) and continued with due diligence to carry out to completion all actions reasonably necessary to correct the default and prevent its recurrence.

If the Project Company shall have initiated and continued with due diligence to carry out to completion all actions required under item (2) above, the default shall not constitute an Event of Default during such period of time (in any event not more than 60 days from the initial default notice) as the Project Company shall continue with due diligence to carry out to completion all such actions.

(D) Other Remedies upon Project Company Event of Default. The right of termination provided under this Section upon an Event of Default by the Project Company is not exclusive. If this Project Agreement is terminated by the KRRC for an Event of Default by the Project Company, the KRRC shall have the right to pursue a cause of action for actual damages and to exercise all other remedies which are available to it under this Project Agreement, under the Security Instruments and under Applicable Law. The Project Company

shall not be entitled to any compensation for services provided subsequent to receiving any notice of termination for an Event of Default under this Section.

(E) Relationship to Liquidated Damages. Termination by the KRRC pursuant to this Section shall not relieve the Project Company or its Surety from liability for the liquidated damages provided for under this Project Agreement. The parties acknowledge and agree that such liquidated damages are intended solely to compensate the KRRC for costs and expenses associated with unexcused delay and are not intended to liquidate all other damages that the KRRC is likely to suffer in the event of a Project Company Event of Default under this Article. Accordingly, except with respect to damages relating solely to unexcused delay for which liquidated damages are provided under this Project Agreement, the payment of any such liquidated damages by the Project Company shall not serve to limit or otherwise affect the KRRC's right to pursue and recover damages under subsection (D) (Other Remedies upon Project Company Event of Default) of this Section.

SECTION 12.3. LIMITATION ON PROJECT COMPANY LIABILITY.

(A) Project Company Liability Limit. Subject to subsection (B) (Liquidated Damages Sublimit) of this Section, the Project Company's aggregate liability under this Project Agreement with respect to damages of any kind payable to the KRRC arising out of the performance or unexcused non-performance of the Preliminary Services or the Project Implementation Work as a consequence of a claim or suit initiated by the KRRC shall not exceed an amount equal to: (1) the aggregate value of Early Work Package Prices for all Early Work Packages and the Preliminary Services Fee, during the period commencing on the Contract Date and ending on the Project Implementation Contract Amendment Date; and (2) the Guaranteed Maximum Price commencing on the Project Implementation Contract Amendment Date and at all times thereafter.

(B) Liquidated Damages Sublimit. The aggregate liability of the Project Company, with respect to any liquidated damages payable pursuant subsection 7.5(B) (Delay Liquidated Damages), shall not exceed an amount equal to 15% of the Guaranteed Maximum Price. The payment by the Project Company of any such liquidated damages shall reduce commensurately the liability limit set forth in subsection (A) (Project Company Liability Limit) of this Section.

SECTION 12.4. APPLICABILITY AND INTERPRETATION OF THE LIMITATION ON LIABILITY.

The limitation on Project Company liability provided for in Section 12.3 (Limitation on Project Company Liability) applies solely to the liability of the Project Company for damages to the KRRC arising out of the performance or unexcused non-performance of this Project Agreement as a consequence of a claim or suit initiated by the KRRC. The limitation on liability provided for in Section 12.3 (Limitation on Project Company Liability) shall not apply in the event the Project Company abandons the Project, and does not apply to any other liability, loss, damage, cost or expense that may be incurred by the Project Company in connection with this Project Agreement, including any of the following liabilities, losses, damages, costs or expenses:

(1) Any financial, economic or other loss, cost or expense sustained by the Project Company in the performance of the Project Implementation Work or any other loss sustained by the Project Company, the Guarantor, or any other party in connection with this Project Agreement, the Guaranty Agreement or other agreement relating to the Project;

(2) Any loss, cost or expense incurred by the Project Company in order to perform or complete the Project Implementation Work, including those incurred in seeking to cure or prevent any breach of this Project Agreement;

(3) Any fines or penalties levied or imposed by any Governmental Body due to the acts or omissions of the Project Company;

(4) Any claims, losses or penalties incurred by the Project Company to third parties in any Legal Proceedings which arise from or are based on negligent, reckless, or intentional actions or omissions of the Project Company contrary to the requirements of this Project Agreement, from any breach of contract action in connection with third party contracts, or from any other dispute relating to this Project Agreement that results in a Legal Proceeding;

(5) Any indemnity payment made by the Project Company hereunder;

(6) Payment of any defense costs, including attorney's fees, to, for, or on behalf of the KRRC with respect to any third-party claim;

(7) Any payments made in connection with any Required Insurance under this Project Agreement, including the proceeds of Required Insurance and the payment of any deductible or self-insured retention; and

(8) Any claims, losses, penalties or settlement payments paid to the KRRC in connection with any tort claim by the KRRC against the Project Company based on gross negligence, willful misconduct, fraud, misrepresentation or false claims.

SECTION 12.5. EVENTS OF DEFAULT BY THE KRRC.

(A) Events of Default Permitting Termination. The failure, refusal or other default by the KRRC in its duty to pay any undisputed amount required to be paid to the Project Company under this Project Agreement within 30 days following the due date for such payment shall constitute an Event of Default by the KRRC upon which the Project Company, by notice to the KRRC, may terminate this Project Agreement, subject to the terms and conditions of this Section.

(B) Notice and Cure Opportunity. No such default described in subsection (A) (Events of Default Permitting Termination) of this Section shall constitute an Event of Default giving the Project Company the right to terminate this Project Agreement for cause under this Section unless:

(1) The Project Company has given prior written notice to the KRRC stating that a specified default has occurred which gives the Project Company a right to terminate this Project Agreement for cause under this Section, and describing the default in reasonable detail; and

(2) The KRRC has neither challenged in an appropriate forum the Project Company's conclusion that such default has occurred or constitutes a material breach of this Project Agreement nor initiated within a reasonable time (in any event not more than 30 days from the initial default notice) and continued with due diligence to carry out to completion all actions reasonably necessary to correct the default and prevent its recurrence.

If the KRRC shall have initiated and continued with due diligence to carry out to completion all actions required under item (2) above, the default shall not constitute an Event of Default during such period of time (in any event not more than 60 days from the initial default notice) as the KRRC shall continue with due diligence to carry out to completion all such actions.

(C) Other KRRC Breaches Constituting Uncontrollable Circumstances. Except for the KRRC Events of Default described in subsection (A) (Events of Default Permitting Termination) of this Section, the failure of the KRRC to perform any other material obligation under this Project Agreement (unless such default is due to Project Company Fault or excused by an Uncontrollable Circumstance as and to the extent provided herein), shall constitute an Uncontrollable Circumstance as and to the extent provided in Article 14 (Uncontrollable Circumstances), and the Project Company shall have no right to terminate this Project Agreement.

(D) Effect of Termination. If this Project Agreement is terminated by the Project Company for cause as a result of an Event of Default by the KRRC, the KRRC shall pay the Project Company the same amount which would be payable under Section 12.6 (KRRC Convenience Termination Rights) if this Project Agreement were terminated at the election of the KRRC for convenience and without cause based on the date of termination. The KRRC shall have no further liability to the Project Company for any Event of Default or termination under this Section.

(E) Payment of Amounts Owed Through the Termination Date. Without duplicating any amount required to be paid pursuant to subsection (D) (Effect of Termination) of this Section, upon any termination pursuant to this Section, the Project Company shall be paid all amounts due for the Project Implementation Work performed prior to the Termination Date to be paid as part of the Contract Price but not yet paid as of the Termination Date.

SECTION 12.6. KRRC CONVENIENCE TERMINATION RIGHTS.

(A) Convenience Termination Right and Payment. Notwithstanding any other provision of the Project Agreement, the KRRC shall have the right at any time following the Contract Date, exercisable in its discretion for any reason upon 30 days' written notice to the Project Company, to terminate this Project Agreement. The Project Company acknowledges that the circumstances which may lead to a convenience termination include: (1) if any of the preconditions listed in Section 7.1.4 of the KHSA are not satisfied; (2) if the FERC License Transfer Order is inconsistent with the KHSA; (3) if the KRRC does not accept the FERC License Transfer Order; (4) if any of the KRRC's funding is withdrawn; (5) if CPUC or OPUC do not approve any property disposition; and (6) if any Governmental Approval is not issued.

(B) Convenience Termination Payment for Preliminary Services. In the event of a convenience termination of the Preliminary Services pursuant to this Section, the Project Company shall not be entitled to a convenience termination payment, but shall be entitled to payment of that portion of the Preliminary Services Fee that has been earned by the terms hereof as of the Termination Date but not yet paid by the KRRC (which amount may include reasonable wind down expenses). No other compensation shall be payable by the KRRC on account of the KRRC's convenience termination of the Preliminary Services.

(C) Convenience Termination Payment for Project Implementation Work. In the event of a convenience termination of the Project Implementation Work pursuant to this subsection (including Project Implementation Work performed pursuant to an Early Work Package Amendment), the Project Company shall be entitled to a convenience termination payment in an amount equal to the sum of:

(1) The difference between (a) the value of all Project Implementation Work performed up to the Termination Date, and (b) all payments already made to the Project Company pursuant to this Project Agreement; and

(2) Subject to subsection (E) (Settlement of Subcontracts Generally) of this Section, the reasonable costs incurred by the Project Company in connection with the termination, including all actual and reasonable demobilization costs and amounts due in settlement of terminated Subcontracts.

In the event of a termination for convenience under this subsection, the Project Company acknowledges and agrees that it shall not be entitled to any compensation in excess of the value of the Project Implementation Work performed plus its settlement and closeout costs. Under no circumstances shall the Project Company or any Subcontractor be entitled to anticipatory or unearned profits, unabsorbed overhead, opportunity costs, or consequential or other damages as a result of a termination for convenience under this subsection.

(D) Early Work Packages. If the parties have entered into any Early Work Package Amendment prior to any convenience termination pursuant to this Section, the KRRC shall have the right to:

(1) Terminate the Project Company's right to perform any Project Implementation Work authorized by any such Early Work Package Amendment; or

(2) Require the Project Company to complete performance of such Project Implementation Work in accordance with the applicable Early Work Package Amendment.

If the KRRC elects to terminate such Project Implementation Work pursuant to item (1) of this subsection, the Project Company shall be entitled to a termination settlement payment associated solely with the terminated Early Work Package Project Implementation Work, as and to the extent provided in subsection (C) (Convenience Termination Payment for Project Implementation Work) of this Section. Nothing in this Section shall provide grounds for adjustment of any applicable Early Work Package Price or limit the KRRC's rights to convenience termination of Project Implementation Work authorized by an Early Work Package Amendment without terminating the Preliminary Services or the Project Implementation Work.

(E) Settlement of Subcontracts Generally. The obligation of the KRRC to pay amounts due in settlement of Subcontracts under subsection (C) (Convenience Termination Payment for Project Implementation Work) of this Section shall be limited to the reasonable costs incurred by the Project Company in settling and closing out Subcontracts that the KRRC does not elect to have assigned to it pursuant to Section 12.7 (Obligations of the Project Company upon Termination) and shall be subject to Cost Substantiation. Any convenience termination settlement payment under any Subcontract shall be calculated in the same manner as provided in subsection (C) (Convenience Termination Payment for Project Implementation Work) of this Section with respect to the convenience termination settlement payment to the Project Company. In no event shall the KRRC be responsible for anticipatory or unearned profits, unabsorbed overhead, opportunity costs, or consequential or other damages payable to any Subcontractor as a result of the termination of any Subcontract.

(F) Payment of Amounts Due as a Result of Convenience Termination. The Project Company shall submit a termination for convenience claim, in the form and with the certification prescribed by the KRRC, promptly following the Termination Date but in any event not later than 60 days following the Termination Date. In the event of a failure of the Project Company to submit a termination for convenience claim within the time allowed pursuant to

this Section, the KRRC may determine, on the basis of information available to the KRRC, the amount, if any, due to the Project Company by reason of the convenience termination and shall thereupon pay to the Project Company the amount so determined, if any. In no event shall the amount payable to the Project Company pursuant to this Section exceed the Guaranteed Maximum Price as reduced by the amount of payments otherwise made. In addition, any amount payable to the Project Company pursuant to this Section shall be reduced in the amount of (1) any claim the KRRC may have against the Project Company under this Project Agreement, and (2) the fair value, as determined by the KRRC, of property which is destroyed, lost, stolen or damaged so as to become undeliverable to the KRRC, excluding normal spoilage and except to the extent that the KRRC shall have otherwise expressly assumed the risk of loss with respect to such property hereunder. Any payment required to be made to the Project Company pursuant to this Section shall be made within 120 days following the Termination Date, subject to compliance by the Project Company with its obligations under Section 12.7 (Obligations of the Project Company upon Termination). Any payment required to be made by the Project Company to the KRRC pursuant to this Section shall be made within 120 days following the later of the Termination Date or the KRRC's resolution of the Project Company's termination for convenience claim. In the event of a dispute between the parties as to the amount of any payment required to be made pursuant to this Section, either party may elect to initiate dispute resolution procedures in accordance with Section 11.1 (Dispute Resolution Procedures).

(G) Completion or Continuance by the KRRC. Without limiting any other KRRC right or remedy provided for under this Project Agreement, after the date of any termination under this Section, the KRRC may at any time (but without any obligation to do so) take any and all actions necessary or desirable to continue and complete the Contract Obligations so terminated, including entering into contracts with other contractors.

(H) Convenience Termination Rights as Consideration. The right of the KRRC to terminate this Project Agreement for its convenience and in its discretion in accordance with this Section constitutes an essential part of the overall consideration for this Project Agreement, and, except with respect to the determination as to the amount due the Project Company pursuant to this Section, the Project Company hereby waives any right it may have under Applicable Law to assert that the KRRC owes the Project Company a duty of good faith dealing in the exercise of such right. The only compensation payable by the KRRC upon the exercise of its convenience termination option shall be any amounts specified herein in connection therewith.

SECTION 12.7. OBLIGATIONS OF THE PROJECT COMPANY UPON TERMINATION.

Upon any termination of this Project Agreement by the KRRC, the Project Company shall, as applicable and subject to any written directions provided by the KRRC:

- (1) Stop any further Contract Obligations at the Project Site or otherwise in connection with the Project;
- (2) Cease incurring any further obligations or liabilities pertaining to the Contract Obligations;
- (3) Promptly take all action as necessary to protect and preserve all materials, equipment, tools, facilities, and other property pertaining to the Project;
- (4) Vacate possession of the Project Site and turn possession of the PacifiCorp Property over to PacifiCorp, if prior to the PacifiCorp Property Transfer Date,

or to the KRRC, if after the PacifiCorp Property Transfer Date, and turn the Adjacent and Related Lands over to the KRRC;

(5) Clean up and remove all debris and trash from the Project Site;

(6) Promptly remove from the Project Site all equipment, tools, or material owned by the Project Company, or its Subcontractors, agents or representatives;

(7) Promptly deliver a list of all Suppliers, materials, machinery, equipment, property or other pending items being fabricated or on order for delivery to the Project but not yet delivered to the Project Site or incorporated into the Project Implementation Work, and comply with the written instructions of the KRRC with respect to such matters;

(8) Deliver a complete copy of all books, notes, and records of the Project Company pertaining to the Project Agreement performance or planned Project Implementation Work activities;

(9) Promptly provide a list of all files (and make available to the KRRC for review or copying) all files pertaining to the Project Implementation Work, including any and all access and security codes, and including instructions and demonstrations that show how to open and modify such codes;

(10) Promptly deliver complete copies of all Subcontracts to the KRRC, together with a detailed report on the status of such Subcontracts (status of orders and work performed and not performed or delivered under each Subcontract); a record of proposals made and balances due under each Subcontract; any cancellation penalties pertaining thereto; and any further information required by the KRRC, and furthermore assist the KRRC in contacting such Subcontractors to verify such information or answer any questions of the KRRC;

(11) Assign to the KRRC any Subcontract that the KRRC elects in writing, in its discretion, to have assigned to it, with the KRRC assuming, and the Project Company being relieved of, all obligations under the Subcontract from the date of the assignment;

(12) Cancel or terminate all Subcontracts that the KRRC does not elect to have assigned to the KRRC, in accordance with the written instructions of the KRRC;

(13) Promptly assign and transfer to the KRRC all right, title, and interest of Project Company to any items ordered for the Contract Obligations (but not yet delivered to the Project Site or incorporated into the Project) as requested by the KRRC in its discretion; provided the KRRC (or Surety) assumes responsibility for payment thereof;

(14) Promptly deliver and assign to the KRRC all warranties or guarantees by any vendor, supplier, manufacturer, or subcontractor pertaining to the Project;

(15) Promptly notify the KRRC, in writing, of any pending or threatened Legal Proceedings against the Project Company relating to this Project Agreement or the Contract Obligations; and

(16) Promptly take such other action and execute such documents as requested by the KRRC, and assist in the transition of the Contract Obligations to the

Surety or the KRRC, or as reasonably deemed necessary or appropriate by the KRRC, and avoid any action or conduct that would increase any expense or cost that would become an obligation or liability to the KRRC unless requested or directed by the KRRC Contract Representative in writing.

With respect to any of the foregoing obligations that cannot reasonably be completed by the Termination Date, the Project Company shall complete such obligations as promptly as is practicable, but in no event later than 30 days following the Termination Date. Compliance with these obligations, to the extent applicable on the Termination Date, shall be conditions precedent to the payment of any sums otherwise due to the Project Company by reason of the termination. If any Subcontracts are assigned to the KRRC under this Section, the KRRC shall not be directly liable to any Subcontractors for amounts owed to such parties for Project Implementation Work performed prior to termination, and the Project Company shall remain liable to any such parties for such amounts.

SECTION 12.8. NO WAIVERS.

No action of the KRRC or the Project Company pursuant to this Project Agreement (including any investigation or payment), and no failure to act, shall constitute a waiver by either party of the other party's compliance with any term or provision of this Project Agreement. No course of dealing, failure or delay by the KRRC or the Project Company in exercising any right, power or remedy under this Project Agreement shall operate as a waiver thereof or otherwise prejudice such party's rights, powers and remedies. No single or partial exercise of (or failure to exercise) any right, power or remedy of the KRRC or the Project Company under this Project Agreement shall preclude any other or further exercise thereof or the exercise of any other right, power or remedy. No waiver of any breach of any provision of this Project Agreement will be deemed to be a waiver of any subsequent breach of that provision or of any similar provision.

SECTION 12.9. WAIVER OF CONSEQUENTIAL AND PUNITIVE DAMAGES.

In no event shall either party hereto be liable to the other or obligated in any manner to pay to the other any special, incidental, consequential, punitive or similar losses or damages (including loss of profits, loss of production, loss of business opportunity or other consequential or indirect loss) based upon claims arising out of or in connection with the performance or non-performance of its obligations or otherwise under this Project Agreement, or the material inaccuracy of any representation made in this Project Agreement, whether such claims are based upon contract, tort, negligence, warranty or other legal theory. The parties further acknowledge and agree that nothing in this Section shall serve as a limitation or defense with respect to any obligation of a party to pay any liquidated damages specifically provided for under this Project Agreement.

ARTICLE 13

INSURANCE

SECTION 13.1. INSURANCE.

(A) Required Insurance. At all times during the Term, the Project Company shall obtain, maintain and comply with the insurance requirements set forth in this Article 13 (Insurance) and Appendix 9 (Insurance Requirements) hereto and shall pay all premiums with respect thereto as the same become due and payable. The Required Insurance shall be provided concurrently with the execution and delivery of this Project Agreement (or as otherwise specified in Appendix 9 (Insurance Requirements)) and remain in effect for the periods specified in Appendix 9 (Insurance Requirements). Proof of Required Insurance shall be furnished as provided in Appendix 9 (Insurance Requirements).

(B) Subcontractors. The Project Company shall ensure that all eligible Subcontractors secure and maintain all insurance coverage and other financial sureties pursuant to and as required by Appendix 9 (Insurance Requirements) and by Applicable Law in connection with their presence and the performance of their duties at or concerning the Project; provided, however, that the KRRC may, at its discretion, waive or modify any insurance requirement, taking into account the nature and extent of the work required under the applicable Subcontract for such Subcontractor.

(C) Compliance with Insurer Requirements. The Project Company shall comply promptly with the requirements of all insurers providing the Required Insurance pertaining to the Project. The Project Company shall not knowingly do or permit anything to be done that results in the cancellation or the reduction of coverage under any policy of Required Insurance.

(D) Maintenance of Insurance Coverage. If the Project Company fails to pay or cause to be paid any premium for Required Insurance, or if any insurer cancels any Required Insurance policy and the Project Company fails to obtain replacement coverage so that the Required Insurance is maintained on a continuous basis, then the KRRC at its election (but without any obligation to do so), following notice to the Project Company, may pay such premium or procure similar insurance coverage from another insurer, and upon such payment by the KRRC, the amount thereof shall be immediately reimbursed to the KRRC by the Project Company. The Project Company shall not perform Project Work during any period when any policy of Required Insurance is not in effect. The Project Company shall comply with all Insurance Requirements and take all steps necessary to ensure that the Project remains continuously insured in accordance with the requirements of this Project Agreement. The failure of the Project Company to obtain and maintain any Required Insurance shall not relieve the Project Company of its liability for any losses intended to be insured thereby. Should any failure to provide continuous insurance coverage occur, the Project Company shall indemnify, defend and hold harmless the Project Company Indemnitees in accordance with and to the extent provided in Article 15 (Indemnification) from and against all Loss-and-Expense arising out of such failure. The purchase of the Required Insurance to satisfy the Project Company's obligations under this Section shall not be a satisfaction of any Project Company liability under this Project Agreement or in any way limit, modify or satisfy the Project Company Indemnity.

(E) Reductions for Insurance Proceeds. Whenever this Project Agreement obligates one party to pay any amount to the other party in respect of an event or circumstance for which, or with respect to the consequences of which, an insurance claim may be made under the Required Insurance, the amount which any party is obligated to pay will be reduced by the amount of insurance proceeds which the other party actually recovers or would have

been entitled to recover if it had complied with the requirements of this Project Agreement or any policy of Required Insurance.

ARTICLE 14

UNCONTROLLABLE CIRCUMSTANCES

SECTION 14.1. UNCONTROLLABLE CIRCUMSTANCES GENERALLY.

(A) Extent of Relief Available to the Project Company. If an Uncontrollable Circumstance occurs, the Project Company may be entitled to relief from its obligations, extensions of time and compensation, as and to the extent provided in this Article. Such relief shall be available irrespective of whether an obligation of this Project Agreement expressly states that it is excused by Uncontrollable Circumstances.

(B) Mitigation Given Effect. Any relief to which the Project Company is entitled under this Article on account of Uncontrollable Circumstances shall be adjusted to account for the effect of the mitigation measures which were or should have been taken by the Project Company in compliance with its duty to mitigate under Section 17.8 (General Duty to Mitigate).

(C) Applicable Law Compliance. Nothing in this Article shall be interpreted as relieving the Project Company of its obligation, following any and all Uncontrollable Circumstances, to perform its obligations under this Project Agreement in compliance with Applicable Law.

(D) Contract Obligations Not Affected; Resumption of Performance. The occurrence of an Uncontrollable Circumstance shall not excuse the Project Company from performing any obligation hereunder not directly affected by the occurrence of the Uncontrollable Circumstance. Upon the occurrence of an Uncontrollable Circumstance, the Project Company shall promptly use all reasonable efforts to eliminate the cause thereof and resume performance of the affected Contract Obligations.

SECTION 14.2. UNCONTROLLABLE CIRCUMSTANCE CLAIM PROCEDURES.

(A) Notice and Written Report. In order to assert an entitlement based on the occurrence of an Uncontrollable Circumstance, the Project Company shall give notice of the occurrence of the Uncontrollable Circumstance to the KRRRC Contract Representative as soon as practicable, and in any event within 10 Business Days of the date the Project Company has knowledge that the Uncontrollable Circumstance has caused or is likely to cause an entitlement under this Project Agreement. The Project Company's notice shall include a written report:

- (1) Describing the Uncontrollable Circumstance and the cause thereof, to the extent known;
- (2) Stating the date on which the Uncontrollable Circumstance began and its estimated duration, to the extent known;
- (3) Summarizing the consequences of the Uncontrollable Circumstance and the expected impact on the performance of the Project Company's obligations under this Project Agreement; and
- (4) Indicating the nature and scope of the Project Company's potential entitlement to relief.

(B) Updates. The Project Company shall provide the KRRC Contract Representative with periodic updates, together with further details and supporting documentation, as it receives or develops additional information pertaining to the Uncontrollable Circumstance and the matters described in subsection (A) (Notice and Written Report) of this Section. In particular, the Project Company shall notify the KRRC Contract Representative as soon as the Uncontrollable Circumstance has ceased and of the time when performance of its affected obligations can be resumed.

(C) Submittal of Relief Request. The Project Company shall submit to the KRRC Contract Representative a further notice making its request for specific relief, the basis therefor and the event giving rise to the requested relief (the “**Relief Request Notice**”), promptly after becoming aware of such occurrence, but not more than 30 days after the KRRC’s receipt of the notice required under subsection (A) (Notice and Written Report) of this Section. Each Relief Request Notice shall include all information required in this Article with respect to the specific relief being requested.

(D) Delay in Notification. If any Uncontrollable Circumstance notice or any required information is submitted by the Project Company to the KRRC after the dates required under this Section, then the Project Company’s entitlement to relief hereunder due to the occurrence of the Uncontrollable Circumstance shall have been waived, and the Project Company shall have no rights to any further relief hereunder based upon the occurrence of an Uncontrollable Circumstance, but only to the extent the KRRC is prejudiced by the delay of such notice or required information.

(E) Multiple and Overlapping Claims. The Project Company may make multiple but not duplicative claims with respect to an Uncontrollable Circumstance.

(F) Burden of Proof and Mitigation. The Project Company shall bear the burden of proof in establishing the occurrence of an Uncontrollable Circumstance and the entitlement to relief based thereon, and shall demonstrate that the Project Company complied with its mitigation obligations under Section 17.8 (General Duty to Mitigate).

(G) KRRC Response. The KRRC may, but shall have no obligation to, respond to the Project Company’s initial notice concerning the occurrence of an Uncontrollable Circumstance under subsection (A) (Notice and Written Report) of this Section. Within 30 days after receipt of a Relief Request Notice pursuant to subsection (C) (Submittal of Relief Request) of this Section, the KRRC shall issue a written determination as to the extent, if any, to which it concurs with the Project Company’s request, and the reasons therefor.

(H) Agreement or Dispute. The agreement of the parties as to the specific relief to be given the Project Company on account of an Uncontrollable Circumstance shall be evidenced by a Contract Administration Memorandum, Change Order or a Contract Amendment. Either party may refer any dispute for resolution in accordance with Section 11.1 (Dispute Resolution Procedures).

(I) Certifications. Each submittal made under this Section by the Project Company shall be accompanied by a certification of the Project Company Contract Representative that the submittal is made in good faith; that the supporting data are complete and accurate at the time of the submittal to the best knowledge of the Project Company; and that the requested relief accurately reflects the relief to which the Project Company reasonably believes it is entitled hereunder. The Project Company shall have no entitlement to relief for uncertified claims.

SECTION 14.3. UNCONTROLLABLE CIRCUMSTANCES RELIEF.

If and to the extent that an Uncontrollable Circumstance materially and directly interferes with, delays or increases the cost to the Project Company performing the Project Implementation Work in accordance herewith, the Project Company shall, subject to Section 14.4 (Schedule Relief and Related Price Relief), be entitled to:

- (1) Relief from its performance obligations;
- (2) An adjustment to the Project Implementation Schedule and any applicable Milestone Substantial Completion Date;
- (3) An adjustment to the Contract Compensation for such costs (including the costs reasonably incurred in connection with mitigation measures undertaken by the Project Company pursuant to Section 17.8 (General Duty to Mitigate)); or
- (4) A Base Guaranteed Maximum Price Adjustment (except as and to the extent provided in this Section, Section 14.2 (Uncontrollable Circumstance Claim Procedures) and Article 15 (Indemnification));

or any combination thereof, each of which properly reflects the interference with performance, the time lost as a result thereof, or the amount of the increased cost, in each case only to the minimum extent necessary to compensate the Project Company or provide performance or schedule relief and only to the extent directly attributable to the Uncontrollable Circumstance. Any cost reduction achieved, or which should have been achieved, through the mitigation measures undertaken by the Project Company pursuant to Section 17.8 (General Duty to Mitigate) shall be reflected in a reduction of the amount of the additional Contract Compensation or Base Guaranteed Maximum Price Adjustment as appropriate to reflect such mitigation measures. The Project Company shall not be entitled to any price relief on account of any costs incurred as the result of Project Company Fault or an act, event or circumstance that the Project Company is obligated to insure against under Article 13 (Insurance), irrespective of any limits of coverage and of any deductible applicable under any policy of insurance maintained or required to be maintained thereunder. Except as expressly provided in subsection 14.4(B) (Compensable Uncontrollable Circumstance Delay), the Project Company shall not be entitled to any price relief on account of delays attributable to Uncontrollable Circumstances.

SECTION 14.4. SCHEDULE RELIEF AND RELATED PRICE RELIEF.

(A) Conditions to Schedule Relief. The Project Company shall not be entitled to an adjustment to any Milestone Substantial Completion Date, the number of days allowed for the achievement of any Milestone Final Completion, the number of days allowed for the achievement of Project Final Completion or any other schedule adjustment under this Project Agreement, unless the Project Company demonstrates:

- (1) That an Uncontrollable Circumstance has occurred and, subject to the time impact analysis requirements of Appendix 5 (General Project Implementation Work Requirements) during the Project Implementation Period, the impact of the Uncontrollable Circumstance is to one or more critical path activities in the Project Schedule, as updated, maintained and revised by the Project Company in accordance with the Contract Standards;
- (2) The Project Company, in view of all circumstances, exercised reasonable efforts to avoid and mitigate the delay; and

(3) The delay was not caused by a Project Company Fault.

(B) Compensable Uncontrollable Circumstance Delay. The Project Company shall be entitled to a Base Guaranteed Maximum Price Adjustment in an amount equal to the additional costs incurred by the Project Company to account for the impact of schedule delays caused by Uncontrollable Circumstances, determined in accordance with subsection (A) (Conditions to Schedule Relief) of this Section, as and to the extent provided in this Section. The amount of such Base Guaranteed Maximum Price Adjustment shall reflect, and the compensation to which the Project Company is entitled shall include, only reasonable and necessary additional time-related General Conditions Costs actually incurred by the Project Company, as provided in Appendix 8 (Contract Price), that are directly attributable to the period of Uncontrollable Circumstance delay, subject to subsection 14.1(B) (Mitigation Given Effect).

(C) Concurrent Delay. The Project Company's entitlement to price relief for Uncontrollable Circumstance delays under subsection (B) (Compensable Uncontrollable Circumstance Delay) of this Section shall be limited to the extent of any concurrent delay by the Project Company or to the extent performance was, or would have been, suspended, delayed, or interrupted by another cause for which the Project Company is responsible.

SECTION 14.5. UNUSUALLY SEVERE AND ABNORMAL CLIMATIC EVENTS. If the Project Company intends to seek Uncontrollable Circumstance relief on the basis of unusually severe and abnormal climatic events, the Project Company shall, in addition to fulfilling all other requirements of this Article, demonstrate that the actual weather encountered was unusually severe and abnormal compared with the five-year average weather statistics compiled by the United States National Oceanic and Atmospheric Administration for the time of year and localities of the Project Site.

SECTION 14.6. RELEASE.

The Project Company's acceptance of any performance, price or schedule adjustment under this Article shall be construed as a release of the KRRC by the Project Company (and all persons claiming by, through or under the Project Company) from any and all losses or expenses resulting from, or otherwise attributable to, the event giving rise to the adjustment claimed.

ARTICLE 15

INDEMNIFICATION

SECTION 15.1. PROJECT COMPANY'S OBLIGATION TO INDEMNIFY.

(A) Indemnity. The Project Company shall indemnify, defend and hold harmless the Project Company Indemnitees from and against (and pay the full amount of) any and all Loss-and-Expense that any Project Company Indemnatee may sustain in connection with any claim made by any third party arising by reason of (or alleged to result from or in connection with) any Project Company Indemnification Act, Event or Circumstance.

(B) Indemnification-Related Defined Terms. As used in this Article and in this Project Agreement,

(1) **“Loss-and-Expense”** means any and all (1) loss, liability, forfeiture, obligation, damage, fine, penalty, judgment, deposit, charge, assessment, tax, cost or expense relating to any Project Company Indemnification Act, Event or Circumstance, and (2) fees, costs and expenses of expert witnesses, contractors, and other persons incurred in connection with investigating, preparing for, defending or responding to any action, suit, litigation, arbitration, administrative proceeding or other legal or equitable proceeding having a bearing on this Project Agreement or relating to the Project Company Indemnity, and all appeals therefrom.

(2) **“Project Company Indemnification Act, Event or Circumstance”** means any:

(a) Project Company Fault; or

(b) Any other specific act, event or circumstance as to which the Project Company is expressly obligated to provide an indemnity hereunder, including:

(i) Activities on the Project Site, as and to the extent provided in subsection 4.4(D) (Access to the Project Site Prior to the PacifiCorp Property Transfer Date);

(ii) Non-compliance by the Project Company with Applicable Law, as provided in subsection 4.6(C) (Fines, Penalties, Indemnification and Remediation);

(iii) Release of Regulated Substances, including any de minimis quantities, by any Project Company Person, as provided in subsection 6.5(A) (Project Company Responsibilities and Indemnity);

(iv) Labor disputes, as provided in subsection 8.2(C) (Labor Relations);

(v) Subcontractor claims, as provided in subsection 8.3(I) (Subcontractor Claims);

(vi) Intellectual Property claims, as provided in subsection Section 17.7(B) (Protection from Infringement); and

(vii) Failure by the Project Company to advise the KRRC of any potential infringement or unauthorized use resulting from a KRRC-directed Change Order, as provided in subsection 17.7(D) (Exceptions to Infringement Protection).

(3) **“Project Company Indemnitee”** means the KRRC, PacifiCorp, the States, the CPUC, the OPUC and their respective elected officials, trustees, board members, officers, employees, representatives and agents.

(4) **“Project Company Indemnity”** means the obligations of the Project Company under this Article.

(C) Exceptions to and Limitations on the Project Company Indemnity. The Project Company Indemnity shall not operate to indemnify any Project Company Indemnitee:

(1) To the extent the Project Company Indemnification Act, Event or Circumstance was caused by KRRC Fault; or

(2) To the extent the Project Company’s obligation to indemnify is limited by Applicable Law, including anti-indemnity statutes; or

(3) For any Loss-and-Expense that is an economic loss, including a claim for a decline in the value of real or personal property, business interruptions or loss of profit or revenue.

(D) No Insurance Limitation. The Project Company Indemnity shall not be limited by the Required Insurance or by any coverage exclusions or other provisions in any policy of Required Insurance or other insurance maintained by the Project Company which is intended to respond to such events.

(E) Reductions. The Project Company Indemnitees’ right to indemnification pursuant to this Article shall be reduced by all proceeds actually received by the Project Company Indemnitees from any:

(1) insurance policy;

(2) settlement agreement; or

(3) other third-party indemnification agreement.

The Project Company shall indemnify the Project Company Indemnitees in a timely manner. The Project Company Indemnitees, however, shall reimburse the Project Company for any proceeds subsequently received from the sources described in this subsection (E) (Reductions), to the extent that the Project Company would not have otherwise owed the Project Company Indemnitees if such proceeds were available when the Project Company originally indemnified the Project Company Indemnitees.

(F) Reliance by Project Company Indemnitees. This Section may be relied upon by the Project Company Indemnitees and may be enforced directly by any of them against the Project Company in the same manner and for the same purpose as if pursuant to a contractual indemnity directly between them and the Project Company.

SECTION 15.2. INDEMNIFICATION PROCEDURES.

[Note: Prior to the Project Implementation Contract Amendment Date, the KRRC and Project Company shall coordinate with each Project Company Indemnatee to finalize the expected procedures that each Project Company Indemnatee will be obligated to follow pursuant to this Section 15.2.]

(A) Notice. If a Project Company Indemnatee receives any notice, demand, letter or other document concerning any claim for which it appears that the Project Company Indemnatee is, or may become entitled to, indemnification for a Loss-and-Expense under this Project Agreement in respect of the entire claim, the Project Company Indemnatee shall give notice in writing to the Project Company as soon as reasonably practicable. A delay by the Project Company Indemnatee in providing such notice beyond such period shall not waive any right to indemnification except to the extent that the Project Company demonstrates, bearing the burden of proof, that it is prejudiced, suffers loss, or incurs expense because of the delay.

(B) Consolidation of Claims. If a notice of claim is given pursuant to subsection (A) (Notice) of this Section by more than one Project Company Indemnatee relating to the same facts or circumstances, the Project Company may, acting reasonably and in consultation with the Project Company Indemnatees named in the claims, require the consolidated administration and coordination of all such noticed claims by common counsel.

(C) Project Company Right to Dispute Claim. If notice is given as provided in subsection (A) (Notice) of this Section, the Project Company shall be entitled, acting reasonably and in consultation with the Project Company Indemnatees named in the claim, to dispute the claim in the name of the Project Company Indemnatee at the Project Company's own expense and take conduct of any defense, dispute, compromise, or appeal of the claim and of any incidental negotiations. The Project Company Indemnatee will give the Project Company all reasonable cooperation, access and assistance for the purposes of considering and resisting such claim.

(D) Rights and Duties of the Parties. With respect to any claim conducted by the Project Company pursuant to subsection (C) (Project Company Right to Dispute Claim) of this Section:

(1) The Project Company shall keep the Project Company Indemnatee fully informed and consult with it about material elements of the conduct of such defense, including any settlement discussions;

(2) The Project Company shall demonstrate to the Project Company Indemnatee, at the reasonable request of the Project Company Indemnatee, that the Project Company has sufficient means to pay all costs and expenses that it may incur by reason of conducting such defense; and

(3) The Project Company shall have full control, acting reasonably and in consultation with the Project Company Indemnatees named in the claim, of such defense and proceedings, including any compromise or settlement thereof; provided, however, that any such compromise or settlement involving non-monetary obligations of Project Company Indemnatees, or otherwise having a direct effect upon such Project Company Indemnatee's continuing operations, shall (1) contain a full release of the applicable Project Company Indemnatee from all liability to the plaintiffs or claimants who are parties to or otherwise bound by the settlement, and (2) be subject to the consent of such Project Company Indemnatee, which consent will be obtained by the KRRC and shall not be unreasonably withheld, conditioned or delayed. If requested by the Project Company, acting reasonably, the Project Company Indemnatee shall at the

sole cost and expense of the Project Company, cooperate with the Project Company and its counsel in contesting any claim which the Project Company elects to contest, including the making of any related counterclaim against the person asserting the claim or any cross-complaint against any person.

(E) Project Company Indemnatee Rights to Conduct Defense. The Project Company Indemnatee may take conduct of any defense, dispute, compromise or appeal of the claim and of any incidental negotiations, if:

(1) The Project Company fails to notify the Project Company Indemnatee of its intention to take conduct of the relevant claim within 10 Business Days of the notice from the Project Company Indemnatee under subsection (A) (Notice) of this Section or notifies the Project Company Indemnatee that it does not intend to take conduct of the claim;

(2) The Project Company Indemnatee reasonably determines that a conflict exists between it and the Project Company or another Project Company Indemnatee which prevents or potentially prevents the Project Company from presenting a full and effective defense; or

(3) The Project Company fails to comply in any material respect with subsection (D) (Rights and Duties of the Parties) of this Section.

(F) Transfer of Conduct of Claim to Project Company Indemnatee. A Project Company Indemnatee may at any time, without limiting the Project Company's obligation to defend and indemnify the Project Company Indemnatees under this Article (including the obligation to pay Fees and Costs in connection with such indemnity), give notice to the Project Company that it is retaining or taking over, as the case may be, the conduct of any defense, dispute, compromise, settlement or appeal of any claim, or of any incidental negotiations, to which subsection (E) (Project Company Indemnatee Rights to Conduct Defense) of this Section applies. On receipt of such notice the Project Company will promptly take all steps necessary to transfer the conduct of such claim to the Project Company Indemnatee, and will provide to the Project Company Indemnatee all reasonable cooperation, access and assistance for the purposes of considering and resisting such claim.

(G) Project Company Responsibility for Costs. If a Project Company Indemnatee is entitled and elects to conduct its own defense pursuant to subsection (E) (Project Company Indemnatee Rights to Conduct Defense) of this Section, all Fees and Costs incurred by the Project Company Indemnatee in investigating, defending and conducting the claim for which it is entitled to indemnification hereunder shall constitute a Loss-and-Expense subject to the Project Company Indemnity.

(H) Infringement of Intellectual Property Rights. In response to any claim of infringement or alleged infringement of the Intellectual Property rights of any person, the Project Company may replace such infringing or allegedly infringing item, provided that:

(1) The replacement is performed without additional cost to the KRRC; and

(2) The replacement has at least equal quality performance capabilities when used in conjunction with the Project.

SECTION 15.3. COORDINATION WITH THE KRRC IN SATISFACTION OF THE KHSa LIABILITY PROTECTION REQUIREMENTS.

The parties acknowledge and agree that: (a) KHSA section 7.1.3 and Appendix L require the KRRC to provide comprehensive liability protection for PacifiCorp and the States; (b) the Project Company Indemnity, and the Project Company's obligations under Article 13 (Insurance) and Article 16 (Security for Performance), are provided in part in order to satisfy this requirement; and (c) the KRRC will implement other means, including contracting with a third-party "liability transfer company" indemnitor for indemnification pursuant to KHSA Appendix L Part IV. The parties further acknowledge and agree that the Project Company, in discharging its Contract Obligations and without assuming any indemnification liability or responsibility beyond its indemnity obligations and responsibilities provided in this Article, shall reasonably assist, coordinate with and cooperate with the KRRC, and any other entity designated by the KRRC such as a third-party indemnitor, with respect to the KRRC's satisfaction of the KHSA's liability protection requirements.

ARTICLE 16

SECURITY FOR PERFORMANCE

SECTION 16.1. GUARANTOR.

(A) Guaranty Agreement. The Project Company shall cause the Guaranty Agreement to be provided by the Guarantor to be executed and delivered, following negotiations between the KRRC and the Guarantor, by no later than June 30, 2019, in substantially the form attached hereto as Transaction Form A (Form of Guaranty Agreement).

(B) Reports and Notifications Concerning the Financial Condition of the Guarantor. The Project Company shall provide to the KRRC, within 180 days after the end of each fiscal year of the Guarantor, the consolidated balance sheet and income statement for the Guarantor attached to the audited year-end financial statements for that fiscal year reported upon by the independent public accountant of the Guarantor. If applicable, the Project Company shall also furnish the KRRC with copies of the quarterly and annual reports and other filings of the Guarantor filed with the Securities and Exchange Commission. If the Guarantor is not required to file quarterly reports with the Securities and Exchange Commission, the Project Company, at the request of the KRRC, shall provide the KRRC with unaudited quarterly financial statements of the Guarantor within 60 days following the end of each quarter based on the fiscal year of the Guarantor. In addition, the Project Company shall provide reasonable notice to the KRRC of any change to the financial condition of the Guarantor that would reasonably be anticipated to impair the ability of the Guarantor to meet its obligations under the Guaranty Agreement.

SECTION 16.2. BONDS.

(A) Early Work Package Bonds. If the KRRC authorizes an Early Work Package, then the Project Company shall provide to the KRRC, on or before the Early Work Package Amendment Date, a Performance Bond and a Payment Bond covering the Project Company's faithful performance of such Early Work Package Amendment and the payment of its obligations arising thereunder (the "**Early Work Package Bonds**"). The penal sum of each of the Early Work Package Bonds shall be an amount equal to the Early Work Package Price applicable to the Early Work Package. If the KRRC authorizes additional Early Work Packages, then the Project Company shall, on or before each subsequent Early Work Package Amendment Date, provide to the KRRC, for each subsequent Early Work Package, an amendment to the above-referenced Early Work Package Bonds, executed by both the Project Company and the Surety, that: (a) increases the penal sum of each of the Early Work Package Bonds by an amount equal to the Early Work Package Price of such Early Work Package; and (b) affirmatively states that the obligations under such Early Work Package Bonds encompass the Project Company's performance and payment obligations under each Early Work Package Amendment.

(B) Amendment of Early Work Package Bonds on the Project Implementation Contract Amendment Date. If Early Work Package Bonds have been provided pursuant to subsection (A) (Early Work Package Bonds) of this Section, then the Project Company shall, on or before the Project Implementation Contract Amendment Date, provide to the KRRC an amendment to both Early Work Package Bonds, executed by both the Project Company and the Surety, that: (a) increases the penal sum of each Performance Bond and a Payment Bond to an amount equal to the Base Guaranteed Maximum Price; and (b) affirmatively states that such Performance Bond and a Payment Bond cover faithful performance of this Project Agreement and payment of obligations arising thereunder.

(C) New Project Implementation Work Performance and Payment Bonds on the Project Implementation Contract Amendment Date. If Early Work Package Bonds have not been provided pursuant to subsection (A) (Early Work Package Bonds) of this Section, then the Project Company shall, on or before the Project Implementation Contract Amendment Date, provide to the KRRC a Performance Bond and a Payment Bond that are in the penal sum of an amount equal to the Base Guaranteed Maximum Price and cover faithful performance of this Project Agreement and payment of obligations arising hereunder.

(D) Base Guaranteed Maximum Price Adjustments. The amount of the Performance Bond and the Payment Bond shall be increased by the Project Company to reflect any Base Guaranteed Maximum Price Adjustments at the time such adjustment is implemented by the parties and as a condition to its entitlement to the adjustment.

(E) Term of Bonds. The Payment Bond shall be security for the payment of all persons supplying labor and material in the performance of the Project Implementation Work and shall remain open until Milestone Final Completion for the Final Habitat Restoration Work. The Performance Bond shall secure the performance of the Project Implementation Work and shall remain open until Milestone Final Completion for the Final Habitat Restoration Work.

(F) Maintenance Bond. On or before the applicable Milestone Substantial Completion Date, the Project Company shall provide the Maintenance Bond as financial security for the faithful performance of the Warranty Work, including specifically the Project Company's correction, replacement, or restoration of any portion of the Project Implementation Work which is found to be not in compliance with requirements of this Project Agreement during the applicable Warranty Period. The Maintenance Bond shall be effective for the one-year period commencing on the applicable Milestone Substantial Completion Date and shall automatically renew for an additional one-year term if the KRRC elects to extend the Warranty Period in accordance with subsection 10.1(C) (Optional Extension of Warranty Periods). The penal sum of the Maintenance Bond shall be an amount equal to [___%] **[Note: To be finalized and incorporated on the GMP Contract Amendment Date based on the GMP Project Submittal, and confirmed or revised in the Project Implementation Contract Amendment]** of the applicable Guaranteed Maximum Price (as determined on the applicable Milestone Substantial Completion Date). To the extent required by Applicable Law, the Project Company shall provide such further performance and payment bonds as may be necessary under Applicable Law to secure the performance of any Warranty Work; and such performance and payment bonds shall comply with the requirements of Applicable Law and this Section.

(G) Surety Requirements. The bonds required to be provided pursuant to this Section shall be issued by a Surety: (1) approved by the KRRC having a rating of "A" in the latest revision of the A.M. Best Company's Insurance Report; (2) listed in the United States Treasury Department's Circular 570, "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsurance Companies"; and (3) holding a certificate of authority to transact surety business in the State. The Performance Bond and the Payment Bond shall comply with and shall be subject to the California Bond and Undertaking Law (California Code of Civil Procedure Section 994.0101 et seq.).

(H) Monitoring of Sureties. The Project Company shall be responsible throughout the Term for monitoring the financial condition of any Surety issuing bonds under this Project Agreement and for making inquiries no less often than annually to confirm that each such Surety complies with the qualification requirements and maintains at least the minimum rating level specified in this Section. In the event the rating of any issuing Surety falls below such minimum level, or if any Surety is declared bankrupt or becomes insolvent or has the rights to do business in the State terminated, the Project Company shall promptly notify the KRRC of such event and shall promptly take steps to ensure continued compliance

with this Section by furnishing or arranging for the furnishing of a substitute or additional bond of a Surety whose rating and other qualifications satisfy all above requirements, unless the KRRC agrees to accept the Surety that no longer satisfies the minimum rating level specified above, or agrees to an alternative method of assurance. Upon such notice by the Project Company of such an event, the KRRC shall not unreasonably withhold its approval of such assurance.

(I) Completion of Work. Without limiting any other right or remedy provided for under the Performance Bond, if this Project Agreement is terminated by the KRRC for an Event of Default and the Surety fails to pursue completion of the Contract Obligations with reasonable speed, the KRRC may arrange for completion of the Contract Obligations and deduct the cost thereof from any amount otherwise due to the Project Company under this Project Agreement, including the cost of additional KRRC administration and consultant services made necessary by such default or neglect. In such event, no further payment shall then be made by the KRRC until all costs of completing the Contract Obligations shall have been paid.

SECTION 16.3. COSTS OF PROVIDING SECURITY INSTRUMENTS.

The cost and expense of obtaining and maintaining the Security Instruments required under this Article as security for the performance of the Project Company's obligations hereunder shall be borne by the Project Company and included in the Guaranteed Maximum Price without additional reimbursement from the KRRC.

ARTICLE 17

MISCELLANEOUS PROVISIONS

SECTION 17.1. NO PROJECT COMPANY OWNERSHIP IN THE PROJECT.

The Project Company shall perform the Contract Obligations provided for herein as an independent contractor and shall not have any legal, equitable, tax beneficial or other ownership or leasehold interest in the Project. The Project Company shall not use the Project for any purpose other than the purposes contemplated by this Project Agreement or to serve or benefit any person other than the KRRC.

SECTION 17.2. RELATIONSHIP OF THE PARTIES.

The Project Company is an independent contractor of the KRRC and the relationship between the parties shall be limited to performance of this Project Agreement in accordance with its terms. Neither party shall have any responsibility with respect to the services to be provided or contractual benefits assumed by the other party. Nothing in this Project Agreement shall be deemed to constitute either party a partner, agent or legal representative of the other party. No liability or benefits, such as workers' compensation, pension rights or liabilities, or other provisions or liabilities arising out of or related to a contract for hire or employer/employee relationship shall arise or accrue to any party's agent or employee as a result of this Project Agreement or the performance thereof.

SECTION 17.3. AFFILIATE TRANSACTIONS.

If any costs to be reimbursed by the KRRC to the Project Company under this Project Agreement arise from a transaction between the Project Company and any Affiliate of the Project Company, the Project Company shall notify the KRRC of the specific nature of the contemplated transaction, including the identity of the Affiliate, the nature of the work to be performed by the Affiliate and the anticipated cost to be incurred, before any such transaction is consummated or cost incurred. The Project Company shall not enter into any such transaction, nor incur any such cost, absent the written approval of the KRRC in its discretion.

SECTION 17.4. CONTRACT ADMINISTRATION.

(A) Administrative Communications. The parties recognize that a variety of contract administrative matters will routinely arise throughout the performance of this Project Agreement. These matters will by their nature involve requests, notices, questions, assertions, responses, objections, reports, claims, and other communications made personally, in meetings, by phone, by mail and by electronic and computer communications. The purpose of this Section is to set forth a process by which the resolution of the matters at issue in such communications, once resolution is reached, can be formally reflected in the common records of the parties so as to permit the orderly and effective administration of this Project Agreement.

(B) Contract Administration Memoranda. The principal formal tool for the administration of routine matters arising under this Project Agreement between the parties that do not require a Contract Amendment shall be a "**Contract Administration Memorandum**". A Contract Administration Memorandum shall be prepared, once all preliminary communications have been concluded, to evidence the resolution reached by the KRRC and the Project Company as to matters of interpretation and application arising during the course of the performance of their obligations hereunder. Such matters may include, for example: (1) issues as to the meaning, interpretation or application of this Project Agreement in particular circumstances or conditions; (2) calculations required to be made; (3) notices,

waivers, releases, satisfactions, confirmations, further assurances, consents and approvals given hereunder; and (4) other similar routine contract administration matters.

(C) Procedure. Either party may request the execution of a Contract Administration Memorandum. When resolution of the matter is reached, a Contract Administration Memorandum shall be prepared by or at the direction of the KRRC reflecting the resolution. Contract Administration Memoranda shall be serially numbered, dated, signed by the Contract Representative of each party, and, at the request of the KRRC, co-signed by a Senior Supervisor for the Project Company. The KRRC and the Project Company each shall maintain a parallel, identical file of all Contract Administration Memoranda, separate and distinct from the Contract Amendments and all other documents relating to the administration and performance of this Project Agreement.

(D) Effect. Executed Contract Administration Memoranda shall serve to guide the ongoing interpretation and application of the terms and conditions of this Project Agreement. Any material change, alteration, revision or modification of this Project Agreement, however, shall be effectuated only through a formal Contract Amendment in accordance with Section 17.5 (Contract Amendments).

SECTION 17.5. CONTRACT AMENDMENTS.

(A) Amendments Generally. Notwithstanding the provisions of Section 17.4 (Contract Administration), no material change, alteration, revision or modification of the terms and conditions of this Project Agreement shall be made except through a written amendment to this Project Agreement, duly authorized, approved or ratified by the Board of Directors and duly authorized by the Project Company (a “**Contract Amendment**”).

(B) Procedure. Contract Amendments (including Change Orders) shall be serially numbered, dated and signed by a Senior Supervisor for the Project Company and by the KRRC Contract Representative, as determined in accordance with subsection 17.6(B) (KRRC Contract Representative). The KRRC and the Project Company each shall maintain a parallel, identical file of all Contract Amendments, separate and distinct from the Contract Administration Memoranda and all other documents relating to the administration and performance of this Project Agreement.

SECTION 17.6. CONTRACT REPRESENTATIVES.

(A) Project Company Contract Representative and Senior Supervisors. The Project Company shall appoint and inform the KRRC in writing from time to time of the identity of (1) the individual with the responsibility and power from time to time to administer this Project Agreement and to bind the Project Company with respect to any Contract Administration Memorandum, Change Order or Contract Amendment (which may be the same or a different individual with respect to the Preliminary Services and the Project Implementation Work) (the “**Project Company Contract Representative**”), and (2) the corporate officials of the Project Company with senior supervisory responsibility for the Project and the performance of this Project Agreement (the “**Senior Supervisors**”). The Project Company shall promptly notify the KRRC in writing of the appointment of any successor Senior Supervisors. The Senior Supervisors shall cooperate with the KRRC in any reviews of the performance of the Project Manager and the Project Company Contract Representative which the KRRC may undertake from time to time, and shall give full consideration to any issues raised by the KRRC in conducting such performance reviews.

(B) KRRC Contract Representative. The KRRC shall appoint an individual or individuals to act as the “**KRRC Contract Representative**” for this Project Agreement. The KRRC Contract Representative shall have the authority to administer this Project Agreement,

subject to the Board of Directors' delegation of authority. The Project Company understands and agrees that any delegation of authority to the KRRC Contract Representative may provide only limited authority with respect to the implementation of this Project Agreement, which may include the authority to bind the KRRC with respect to any Change Order or Contract Amendment. Within such limitations, the Project Company shall be entitled to rely on the written directions of the KRRC Contract Representative. The KRRC Contract Representative shall have the right at any time to issue the Project Company a written request for information relating to this Project Agreement. Any written request designated as a "priority request" shall be responded to by the Project Company within three Business Days.

(C) KRRC Approvals and Consents. When this Project Agreement requires any approval or consent by the KRRC to a Project Company submission, request or report, the approval or consent shall, within the limits of the authority of subsection (B) (KRRC Contract Representative) of this Section, be given by the KRRC Contract Representative in writing and such writing shall be conclusive evidence of such approval or consent, subject only to compliance by the KRRC with the Applicable Law that generally governs its affairs. Unless expressly stated otherwise in this Project Agreement and the Document Submittal Procedures, and except for requests, reports and submittals made by the Project Company that do not, by their terms or the terms of this Project Agreement, require a response or action, if the KRRC does not find a request, report or submittal acceptable, it shall provide written response to the Project Company describing its objections and the reasons therefor within 30 days of the KRRC's receipt thereof. If no response is received, the request, report or submittal shall be deemed rejected unless the KRRC's approval or consent may not be unreasonably delayed by the express terms hereof, and the Project Company may resubmit the same, with or without modification. Requests, reports and submittals that do not require a response or other action by the KRRC pursuant to some specific term of this Project Agreement shall be deemed acceptable to the KRRC if the KRRC shall not have objected thereto within 30 days of the receipt thereof.

SECTION 17.7. PROPERTY RIGHTS.

(A) Identification of all Intellectual Property. The Project Company shall identify to the KRRC all Deliverable Material that constitutes Intellectual Property developed by the Project Company or any third party as or through the use of the Project or otherwise in connection with the performance of the Contract Obligations.

(B) Protection from Infringement. The Project Company shall pay all royalties and license fees in connection with the Contract Obligations during the Term. Except as provided in subsection (D) (Exceptions to Infringement Protection) of this Section, the Project Company shall indemnify, defend and hold harmless the Project Company Indemnitees in accordance with and to the extent provided in Section 15.1 (Project Company's Obligation to Indemnify) from and against all Loss-and-Expense arising out of or related to the infringement or unauthorized use of any patent, trademark, copyright or trade secret relating to, or for the Contract Obligations. The Project Company's indemnity pursuant to this Section shall apply only when infringement occurs or is alleged to occur from the intended use for which the Deliverable Material, process or equipment was provided by the Project Company pursuant to this Project Agreement.

(C) Substitutes for Deliverable Material, Process or Equipment. Except as provided in subsection (D) (Exceptions to Infringement Protection) of this Section, in the event the Project Company or the KRRC is enjoined from using any Deliverable Material, process or equipment, the Project Company, at its sole cost and expense, shall:

(1) Acquire the right to legally use such infringing Deliverable Material, process or equipment (or any affected Project Implementation Work) under infringed patents or copyrights; or

(2) Modify or replace such Deliverable Material, process or equipment (or any affected Project Implementation Work) with noninfringing Deliverable Material, process or equipment (or any affected Project Implementation Work) equivalent in quality, performance, useful life and technical characteristics and development; provided, however, that any such modification or replacement shall be subject to the KRRC's approval, which shall not be unreasonably withheld or delayed.

(D) Exceptions to Infringement Protection. Unless otherwise agreed to by the parties, the Project Company's obligations under this Section shall not apply to:

(1) Infringement resulting from KRRC-directed Change Orders or Unilateral Change Directive;

(2) Infringement resulting from unauthorized additions, changes or modifications to the Deliverable Material, process or equipment made or caused to be made by the KRRC subsequent to delivery by the Project Company; or

(3) Any claimed infringement which is settled without the consent of the Project Company.

The Project Company shall promptly advise the KRRC as to whether any KRRC-directed Change Order or Unilateral Change Directive may result in any infringement or unauthorized use and, in the event of any failure by the Project Company to so advise the KRRC, the Project Company will indemnify the KRRC for any Loss-and-Expense resulting from any such infringement or unauthorized use.

(E) Intellectual Property Developed by the Project Company. All Intellectual Property developed by the Project Company at or through the use of the Project or otherwise in connection with the performance of the Contract Obligations shall be owned by the Project Company subject to the terms and conditions of this Section, and is hereby licensed to the KRRC on a non-exclusive, cost-free, perpetual basis for use by the KRRC and any successor operator of the Project (but, with respect to any successor operator, only in connection with the operation of the Project). Such Intellectual Property shall include technology, inventions, innovations, processes, know-how, proprietary algorithms, formulas, software, hardware and databases, whether protected as proprietary information, trade secrets, or patents that the Project Company developed or licensed from third parties. The KRRC shall have an irrevocable, perpetual and unrestricted right to use such Intellectual Property for any KRRC purpose, whether before or following the Termination Date or the Expiration Date, as applicable. The KRRC shall not license, transfer or otherwise make available such Intellectual Property to any third party without the written consent of the Project Company, which consent is hereby granted for purposes of operating the Project following the Termination Date or the Expiration Date, as applicable. The KRRC's use of any such Intellectual Property for purposes other than in connection with the Project shall be at its own risk and the Project Company shall have no liability therefor.

(F) Protection of Proprietary Rights of the KRRC. The Project Company agrees and covenants to protect any and all proprietary rights of the KRRC in any material provided to the Project Company. Such protection of proprietary rights by the Project Company shall include the insertion in any copy intended for publication of a copyright mark reserving all rights to the KRRC in any such material provided by the KRRC to the Project Company. Additionally, any materials provided to the Project Company by the KRRC shall not be released

to any third party without the written consent of the KRRC and shall be returned intact to the KRRC upon completion or termination of this Project Agreement. The provisions of this Section shall not apply to material in the public domain on the Contract Date or material that subsequently comes into the public domain by other than an unauthorized disclosure.

SECTION 17.8. GENERAL DUTY TO MITIGATE.

(A) Mitigation by the Project Company. In all cases where the Project Company is entitled to receive any relief from the KRRC or exercise any rights, including the right to receive any payments, costs, damages or extensions of time, whether on account of Uncontrollable Circumstance or otherwise, the Project Company shall use all reasonable efforts to mitigate such amount required to be paid by the KRRC to the Project Company under this Project Agreement, or the length of the extension of time. Upon request from the KRRC, the Project Company shall promptly submit a detailed description, supported by all such documentation as the KRRC may reasonably require, of the measures and steps taken by the Project Company to mitigate and meet its obligations under this Section.

(B) Mitigation by the KRRC. In all cases where the KRRC is entitled to receive from the Project Company any compensation, costs or damages, but not in any other cases, the KRRC shall use all reasonable efforts to mitigate such amount required to be paid by the Project Company to the KRRC under this Project Agreement, provided that such obligation shall not require the KRRC to:

- (1) Take any action which is contrary to the public interest of the States, as determined by the KRRC in its discretion; or
- (2) Alter the amount of liquidated damages it is entitled to receive hereunder.

The KRRC shall have no obligation to mitigate, implied or otherwise, except as set forth in this Section or as expressly provided in this Project Agreement. Upon request by the Project Company, the KRRC shall promptly submit a detailed description, supported by all such documentation as the Project Company may reasonably require, of the measures and steps taken by the KRRC to mitigate and meet its obligations under this Section.

SECTION 17.9. ASSIGNMENT.

(A) By the Project Company. The Project Company shall not assign, transfer, convey, lease, encumber or otherwise dispose of this Project Agreement, its right to execute the same, or its right, title or interest in all or any part of this Project Agreement or any monies due hereunder whatsoever prior to their payment to the Project Company, whether legally or equitably, by power of attorney or otherwise, without the prior written consent of the KRRC. Any such approval given in one instance shall not relieve the Project Company of its obligation to obtain the prior written approval of the KRRC to any further assignment. Any such assignment of this Project Agreement which is approved by the KRRC, shall require the assignee of the Project Company to assume the performance of and observe all obligations, representations and warranties of the Project Company under this Project Agreement which shall remain in full force and effect during this Project Agreement. The approval of any assignment, transfer or conveyance shall not operate to release the Project Company in any way from any of its obligations under this Project Agreement unless such approval specifically provides otherwise. In the event the Project Company violates this Section, the KRRC may, in addition to any other remedy provided herein, withhold any further payment of Contract Compensation.

(B) By the KRRC. The KRRC may not assign its rights or obligations under this Project Agreement without the prior written consent of the Project Company, which may be given or withheld by the Project Company acting reasonably. The KRRC may, however, assign its rights and obligations under this Project Agreement, without the consent of the Project Company, to either of the States if such assignee assumes, and is legally capable of discharging the duties and obligations of the KRRC hereunder.

SECTION 17.10. COMPLIANCE WITH MATERIAL AGREEMENTS.

The Project Company shall comply with its obligations under agreements of the Project Company, which are material to the performance of its obligations under this Project Agreement. The KRRC shall comply with its obligations under agreements of the KRRC, which are material to the performance of its obligations hereunder.

SECTION 17.11. BINDING EFFECT.

This Project Agreement shall inure to the benefit of and shall be binding upon the KRRC and the Project Company and any assignee acquiring an interest hereunder consistent with Section 17.9 (Assignment).

SECTION 17.12. AMENDMENT AND WAIVER.

(A) Contract Amendments. This Project Agreement may not be amended except by a written agreement signed by the parties in accordance with Section 17.5 (Contract Amendments).

(B) Waiver. Any of the terms, covenants, and conditions of this Project Agreement may be waived at any time by the party entitled to the benefit of such term, covenant or condition if such waiver is in writing and executed by the party against whom such waiver is asserted.

SECTION 17.13. NOTICES.

(A) Procedure. All notices, consents or approvals or written communications (unless otherwise provided in the communication plan required to be developed pursuant to Appendix 2 (Preliminary Services)) given pursuant to the terms of this Project Agreement shall be:

- (1) In writing and delivered in person;
- (2) Transmitted by certified mail, return, receipt requested, postage prepaid or by overnight courier utilizing the services of a nationally-recognized overnight courier service with signed verification of delivery; or
- (3) Given by email transmission, if a signed original of the emailed notice or other communication is deposited in the United States Mail within two days after transmission.

Notices shall be deemed given only when actually received at the address first given below with respect to each party; provided, however, that email transmissions shall be deemed given only when the signed original of the emailed notice or other communication is received at such address. Either party may, by like notice, designate further or different addresses to which subsequent notices shall be sent.

(B) KRRC Notice Address. Notices required to be given to the KRRC shall be addressed as follows:

The Klamath River Renewal Corporation
2001 Addison St., #317
Berkeley, CA 94704
Attn: Laura Hazlett
Telephone No.: (415) 820-4441
Email Address: lhazlett@klamathrenewal.org

with a copy to:

The Klamath River Renewal Corporation
2140 Shattuck Avenue, Suite 801
Berkeley, CA 94704
Attn: Richard Roos-Collins
Telephone No.: (510) 296-5589
Email Address: rrcollins@waterpowerlaw.com

(C) Program Manager Notice Address. Notices required to be given to the Program Manager shall be addressed as follows:

AECOM Technical Services, Inc.
300 Lakeside Drive, Suite 400
Oakland, CA 94612
Attn: Seth Gentzler
Telephone No.: (510) 874-3018
Email Address: seth.gentzler@aecom.com

With copies to the KRRC at the addresses provided in subsection (B) (KRRC Notice Address) of this Section.

(D) Project Company Notice Address. Notices required to be given to the Project Company shall be addressed as follows:

Kiewit Infrastructure West Co.
2200 Columbia House Blvd.
Vancouver, WA 98661
Attn: Jamie Wisenbaker
Telephone No.: (360) 693-5582
Email Address: jamie.wisenbaker@kiewit.com

with a copy to:

Kiewit Infrastructure West Co.
2200 Columbia House Blvd.
Vancouver, WA 98661
Attn: Nick Drury
Telephone No.: (360) 693-1478
Email Address: nick.drury@kiewit.com

SECTION 17.14. NOTICE OF LITIGATION.

In the event the Project Company or the KRRC receives notice of or undertakes the defense or the prosecution of any Legal Proceedings in connection with the Project, the party receiving such notice or undertaking such defense or prosecution shall give the other party timely notice of such proceedings. For purposes of this Section only, “timely notice” shall be deemed given if the receiving party has a reasonable opportunity to provide objections or comments or to proffer to assume the defense or prosecution of the matter in question, given the deadlines for response established by the relevant rules of procedure.

SECTION 17.15. FURTHER ASSURANCES.

The KRRC and Project Company each agree to execute and deliver such further instruments and to perform any acts that may be necessary or reasonably requested in order to give full effect to this Project Agreement. The KRRC and the Project Company, in order to carry out this Project Agreement, each shall use all commercially reasonable efforts to provide such information, execute such further instruments and documents and take such actions as may be reasonably requested by the other and not inconsistent with the provisions of this Project Agreement and not involving the assumption of obligations or liabilities different from, in excess of or in addition to those expressly provided for herein.

[Signature Page Follows]

IN WITNESS WHEREOF, the parties have caused this Project Agreement to be executed by their duly authorized representatives as of the day and year first above written.

KLAMATH RIVER RENEWAL CORPORATION

KIEWIT INFRASTRUCTURE WEST CO.

By: _____

Printed Name: Laura Hazlett

Title: Chief Financial Officer

By:  _____

Printed Name: Jamie D. Wisenbaker

Title: Senior Vice President

IN WITNESS WHEREOF, the parties have caused this Project Agreement to be executed by their duly authorized representatives as of the day and year first above written.

KLAMATH RIVER RENEWAL CORPORATION

KIEWIT INFRASTRUCTURE WEST CO.

By: 

Printed Name: Laura Hazlett

Title: Chief Financial Officer

By: _____

Printed Name: Jamie D. Wisenbaker

Title: Senior Vice President

TRANSACTION FORMS

TO THE

PROJECT AGREEMENT

FOR

DESIGN, CONSTRUCTION, DEMOLITION AND HABITAT RESTORATION SERVICES

IN CONNECTION WITH

THE REMOVAL OF THE LOWER KLAMATH RIVER DAMS

between

THE KLAMATH RIVER RENEWAL CORPORATION

and

KIEWIT INFRASTRUCTURE WEST CO.

Dated

April 24, 2019

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TRANSACTION FORM A
FORM OF GUARANTY AGREEMENT

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GUARANTY AGREEMENT

from

KIEWIT INFRASTRUCTURE GROUP, INC.

to

THE KLAMATH RIVER RENEWAL CORPORATION

Dated as of

[_____], 2019

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GUARANTY AGREEMENT

THIS GUARANTY AGREEMENT is made and dated as of [_____], 2019, between the Klamath River Renewal Corporation (the “KRRC”) and Kiewit Infrastructure Group, Inc., a corporation organized and existing under the laws of the State of Delaware (together with any permitted successors and assigns hereunder, the “Guarantor”).

RECITALS

The KRRC and Kiewit Infrastructure West Co., a corporation organized and existing under the laws of the State of Delaware and authorized to do business in the State of California (the “Project Company”), have entered into a Project Agreement for Design, Construction, Demolition and Restoration Services in connection with the Removal of the Lower Klamath River Dams, dated as of April 24, 2019, as amended from time to time (the “Project Agreement”), whereby the Project Company has agreed to perform the design, construction, demolition and habitat restoration services work necessary to carry out and complete the Project, all as more particularly described therein.

The Project Company is a subsidiary of the Guarantor.

Performance by the KRRC and the Project Company of their obligations under the Project Agreement will result in a direct and substantial benefit to the Guarantor.

The KRRC will enter into the Project Agreement only if, concurrently with its execution and delivery by the Project Company, the Guarantor guarantees the performance by the Project Company of all of the Project Company’s Obligations under the Project Agreement as set forth in this Guaranty Agreement.

In order to induce the execution and delivery of the Project Agreement by the KRRC and in consideration thereof, the Guarantor agrees as follows:

ARTICLE I

DEFINITIONS AND INTERPRETATION

SECTION 1.1. DEFINITIONS. For the purposes of this Guaranty, the following words and terms shall have the respective meanings set forth as follows. Any other capitalized word or term used but not defined herein is used as defined in the Project Agreement.

“Obligations” means the amounts payable by, and the covenants and agreements of, the Project Company pursuant to the terms of the Project Agreement.

“Transaction Agreement” means any agreement entered into by the Project Company or the KRRC in connection with the transactions contemplated by the Project Agreement, including the Project Agreement, and any supplements thereto.

SECTION 1.2. INTERPRETATION. In this Guaranty, unless the context otherwise requires:

(A) References Hereto. The terms “hereby”, “hereof”, “herein”, “hereunder” and any similar terms refer to this Guaranty, and the term “hereafter” means after, and the term “heretofore” means before, the date of execution and delivery of this Guaranty.

(B) Plurality. Words importing the singular number mean and include the plural number and vice versa.

(C) Persons. Words importing persons include firms, companies, associations, general partnerships, limited partnerships, trusts, business trusts, corporations and other legal entities, including public bodies, as well as individuals.

(D) Headings. The Table of Contents and any headings preceding the text of the Articles, Sections and subsections of this Guaranty shall be solely for convenience of reference and shall not constitute a part of this Guaranty, nor shall they affect its meaning, construction or effect.

(E) Entire Agreement. This Guaranty constitutes the entire agreement between the parties hereto with respect to the transactions contemplated by this Guaranty. Nothing in this Guaranty is intended to confer on any person other than the Guarantor, the KRRC and their permitted successors and assigns hereunder any rights or remedies under or by reason of this Guaranty.

(F) Counterparts. This Guaranty may be executed in any number of original counterparts. All such counterparts shall constitute but one and the same Guaranty.

(G) Applicable Law. This Guaranty shall be governed by and construed in accordance with the applicable laws of the State of California.

(H) Severability. If any clause, provision, subsection, Section or Article of this Guaranty shall be ruled invalid by any court of competent jurisdiction, the invalidity of any such clause, provision, subsection, Section or Article shall not affect any of the remaining provisions hereof, and this Guaranty shall be construed and enforced as if such invalid portion did not exist provided that such construction and enforcement shall not increase the Guarantor’s liability beyond that expressly set forth herein.

The Klamath River Renewal Corporation

Form of Guaranty Agreement
Article I – Definitions and Interpretation

(I) Approvals. All approvals, consents and acceptances required to be given or made by any party hereto shall be at the sole discretion of the party whose approval, consent or acceptance is required.

(J) Payments. All payments required to be made by the Guarantor hereunder shall be made in lawful money of the United States of America.

ARTICLE II

REPRESENTATIONS AND WARRANTIES OF THE GUARANTOR

SECTION 2.1. REPRESENTATIONS AND WARRANTIES OF THE GUARANTOR.

The Guarantor hereby represents and warrants that:

(1) Existence and Powers. The Guarantor is a corporation duly organized, validly existing and in good standing under the laws of the State of Delaware, with the full legal right, power and authority to enter into and perform its obligations under this Guaranty.

(2) Due Authorization and Binding Obligation. This Guaranty has been duly authorized, executed and delivered by all necessary corporate action of the Guarantor and constitutes the legal, valid and binding obligation of the Guarantor, enforceable against the Guarantor in accordance with its terms, except to the extent that its enforceability may be limited by bankruptcy, insolvency or other similar laws affecting creditors' rights from time to time in effect and equitable principles of general application.

(3) No Conflict. To the best of its knowledge, neither the execution nor delivery by the Guarantor of this Guaranty nor the performance by the Guarantor of its obligations in connection with the transaction contemplated hereby or the fulfillment by the Guarantor of the terms and conditions hereof: (a) conflicts with, violates or results in a breach of any law or governmental regulation applicable to the Guarantor; (b) conflicts with, violates or results in a breach of any term or condition of the Guarantor's corporate charter or by-laws or any order, judgment or decree, or any contract, agreement or instrument to which the Guarantor is a party or by which the Guarantor or any of its properties or assets are bound, or constitutes a default under any of the foregoing; or (c) will result in the creation or imposition of any material encumbrance of any nature whatsoever upon any of the properties or assets of the Guarantor except as permitted hereby.

(4) No Approvals Required. No approval, authorization, order or consent of, or declaration, registration or filing with, any Governmental Body is required for the valid execution and delivery of this Guaranty by the Guarantor or the performance of its payment or other obligations hereunder, except as such shall have been duly obtained or made.

(5) No Litigation. Except as disclosed in writing to the KRRC, there is no Legal Proceeding, at law or in equity, before or by any Governmental Body pending or, to the best of the Guarantor's knowledge, overtly threatened or publicly announced against the Guarantor, in which an unfavorable decision, ruling or finding could reasonably be expected to have a material and adverse effect on the validity, legality or enforceability of this Guaranty against the Guarantor, or on the ability of the Guarantor to perform its obligations hereunder.

(6) No Legal Prohibition. The Guarantor has no knowledge of any Applicable Law in effect on the date as of which this representation is being made which would prohibit the performance by the Guarantor of this Guaranty and the transactions contemplated by this Guaranty.

(7) Consent to Agreements. The Guarantor is fully aware of and consents to the terms and conditions of the Project Agreement.

(8) Consideration. This Guaranty is made in furtherance of the purposes for which the Guarantor has been organized, and the assumption by the Guarantor of its obligations hereunder will result in a material benefit to the Guarantor.

The Klamath River Renewal Corporation

Form of Guaranty Agreement
Article II – Representations and Warranties
of the Guarantor

(9) Applicable Law Compliance. Except as disclosed in writing to the KRRC, the Guarantor does not have knowledge of any material violation of any law, order, rule or regulation with respect to any facilities designed or constructed by the Guarantor, Project Company or any of their Affiliates.

ARTICLE III

GUARANTY COVENANTS

SECTION 3.1. GUARANTY TO THE KRRC. The Guarantor hereby absolutely, presently, irrevocably and unconditionally guarantees to the KRRC for the benefit of the KRRC (1) the full and prompt payment when due of each and all of the payments required to be credited or made by the Project Company under the Project Agreement (including all amendments and supplements thereto) to, or for the account of, the KRRC, when the same shall become due and payable pursuant to this Guaranty, and (2) the full and prompt performance and observance of each and all of the Obligations. Notwithstanding the unconditional nature of the Guarantor's obligations as set forth herein, the Guarantor shall have the right to assert the defenses provided in Section 3.4 (Defenses, Set-Offs and Counterclaims) hereof against claims made under this Guaranty.

SECTION 3.2. RIGHT OF THE KRRC TO PROCEED AGAINST GUARANTOR. This Guaranty shall constitute a guaranty of payment and of performance and not of collection, and the Guarantor specifically agrees that in the event of a failure by the Project Company to pay or perform any Obligation guaranteed hereunder, the KRRC shall have the right to proceed first and directly against the Guarantor under this Guaranty and without proceeding against the Project Company or exhausting any other remedies against the Project Company which the KRRC may have. Without limiting the foregoing, the Guarantor agrees that it shall not be necessary, and that the Guarantor shall not be entitled to require, as a condition of enforcing the liability of the Guarantor hereunder, that the KRRC: (1) file suit or proceed to obtain a personal judgment against the Project Company or any other person that may be liable for the Obligations or any part of the Obligations; (2) make any other effort to obtain payment or performance of the Obligations from the Project Company other than providing the Project Company with any notice of such payment or performance as may be required by the terms of the Project Agreement or required to be given to the Project Company under Applicable Law; (3) foreclose against or seek to realize upon any security for the Obligations; or (4) exercise any other right or remedy to which the KRRC is or may be entitled in connection with the Obligations or any security therefor or any other guarantee thereof, except to the extent that any such exercise of such other right or remedy may be a condition to the Obligations of the Project Company or to the enforcement of remedies under the Project Agreement. Upon any unexcused failure by the Project Company in the payment or performance of any Obligation and the giving of such notice or demand, if any, to the Project Company and the Guarantor as may be required in connection with such Obligation and this Guaranty, the liability of the Guarantor shall be effective and shall immediately be paid or performed. Notwithstanding the KRRC's right to proceed directly against the Guarantor, the KRRC (or any successor) shall not be entitled to more than a single full performance of the Obligations in regard to any breach or non-performance thereof.

SECTION 3.3. GUARANTY ABSOLUTE AND UNCONDITIONAL. The obligations of the Guarantor hereunder are absolute, present, irrevocable and unconditional and shall remain in full force and effect until the Project Company shall have fully discharged the Obligations in accordance with their respective terms and conditions, and, except as provided in Section 3.4 (Defenses, Set-Offs and Counterclaims), shall not be subject to any counterclaim, set-off, deduction or defense (other than full and strict compliance with, or release, discharge or satisfaction of, such Obligations) based on any claim that the Guarantor may have against the Project Company, the KRRC or any other person. Without limiting the foregoing, the obligations of the Guarantor hereunder shall not be released, discharged or in any way modified by reason of any of the following (whether with or without notice to, knowledge by, or further consent, of the Guarantor), except as provided in Section 3.4 (Defenses, Set-Offs and Counterclaims):

-
- (1) the extension or renewal of this Guaranty or the Project Agreement up to the specified Terms of each agreement;
 - (2) any exercise or failure, omission or delay by the KRRC in the exercise of any right, power or remedy conferred on the KRRC with respect to this Guaranty or the Project Agreement except to the extent such failure, omission or delay gives rise to an applicable statute of limitations defense with respect to a specific claim;
 - (3) any permitted transfer or assignment of rights or obligations under the Project Agreement or under any other Transaction Agreement by any party thereto, or any permitted assignment, conveyance or other transfer of any of their respective interests in the Project or in, to or under any of the Transaction Agreements;
 - (4) any permitted assignment for the purpose of creating a security interest or mortgage of all or any part of the respective interests of the KRRC or any other person in any Transaction Agreement or in the Project;
 - (5) any renewal, amendment, change or modification in respect of any of the Obligations or terms or conditions of any Transaction Agreement;
 - (6) any failure of title with respect to all or any part of the respective interests of any person in the Project Site or the Project;
 - (7) the voluntary or involuntary liquidation, dissolution, sale or other disposition of all or substantially all the assets, marshalling of assets and liabilities, receivership, insolvency, bankruptcy, assignment for the benefit of creditors, reorganization, moratorium, arrangement, composition with creditors or readjustment of, or other similar proceedings against the Project Company or the Guarantor, or any of the property of either of them, or any allegation or contest of the validity of this Guaranty or any other Transaction Agreement in any such proceeding (it is specifically understood, consented and agreed to that, to the extent permitted by law, this Guaranty shall remain and continue in full force and effect and shall be enforceable against the Guarantor to the same extent and with the same force and effect as if any such proceeding had not been instituted and as if no rejection, stay, termination, assumption or modification has occurred as a result thereof, it being the intent and purpose of this Guaranty that the Guarantor shall and does hereby waive all rights and benefits which might accrue to it by reason of any such proceeding);
 - (8) except as permitted by Section 4.1 (Maintenance of Corporate Existence) or 4.2 (Assignment) hereof, any sale or other transfer by the Guarantor or any Affiliate of any of the capital stock or other interest of the Guarantor or any Affiliate in the Project Company now or hereafter owned, directly or indirectly, by the Guarantor or any Affiliate, or any change in composition of the interests in the Project Company;
 - (9) any failure on the part of the Project Company for any reason to perform or comply with any agreement with the Guarantor;
 - (10) the failure on the part of the KRRC to provide any notice to the Guarantor which is not required to be given to the Guarantor pursuant to this Guaranty and to the Project Company as a condition to the enforcement of Obligations pursuant to the Project Agreement;

(11) any failure of any party to the Transaction Agreements to mitigate damages resulting from any default by the Project Company or the Guarantor under any Transaction Agreement;

(12) the merger or consolidation of any party to the Transaction Agreements into or with any other person, or any sale, lease, transfer, abandonment or other disposition of any or all of the property of any of the foregoing to any person;

(13) any legal disability or incapacity of any party to the Transaction Agreements; or

(14) the fact that entering into any Transaction Agreement by the Project Company or the Guarantor was invalid or in excess of the powers of such party.

Should any money due or owing under this Guaranty not be recoverable from the Guarantor due to any of the matters specified in subparagraphs (1) through (14) above, then, in any such case, such money, together with all additional sums due hereunder, shall nevertheless be recoverable from the Guarantor as though the Guarantor were principal obligor in place of the Project Company pursuant to the terms of the Project Agreement and not merely a guarantor and shall be paid by the Guarantor forthwith subject to the terms of this Guaranty. Notwithstanding anything to the contrary expressed in this Guaranty, nothing in this Guaranty shall be deemed to amend, modify, clarify, expand or reduce the Project Company's rights, benefits, duties or obligations under the Project Agreement. To the extent that any of the matters specified in subparagraphs (1) through (6) and (8) through (14) would provide a defense to, release, discharge or otherwise affect the Project Company's Obligations, the Guarantor's obligations under this Guaranty shall be treated the same.

SECTION 3.4. DEFENSES, SET-OFFS AND COUNTERCLAIMS. Notwithstanding any provision contained herein to the contrary, the Guarantor shall be entitled to exercise or assert any and all legal or equitable rights or defenses which the Project Company may have under the Project Agreement or under Applicable Law (other than bankruptcy or insolvency of the Project Company and other than any defense which the Project Company has expressly waived in the Project Agreement or the Guarantor has expressly waived in Section 3.5 (Waivers by the Guarantor) hereof or elsewhere hereunder), and the obligations of the Guarantor hereunder are subject to such counterclaims, set-offs or deductions which the Project Company is permitted to assert pursuant to the Project Agreement, if any.

SECTION 3.5. WAIVERS BY THE GUARANTOR. The Guarantor hereby unconditionally and irrevocably waives:

(1) notice from the KRRC of its acceptance of this Guaranty;

(2) notice of any of the events referred to in Section 3.3 (Guaranty Absolute and Unconditional) hereof, except to the extent that notice is required to be given as a condition to the enforcement of the Obligations;

(3) to the fullest extent lawfully possible, all notices which may be required by statute, rule of law or otherwise to preserve intact any rights against the Guarantor, except any notice to the Project Company required pursuant to the Project Agreement or Applicable Law as a condition to the performance of any Obligation;

(4) to the fullest extent lawfully possible, any statute of limitations defense based on a statute of limitations period which may be applicable to guarantors (or parties in

similar relationships) which would be shorter than the applicable statute of limitations period for the underlying claim;

(5) any right to require a proceeding first against the Project Company;

(6) any right to require a proceeding first against any person or the security provided by or under any Transaction Agreement except to the extent such Transaction Agreement specifically requires a proceeding first against any person (except the Project Company) or security;

(7) any requirement that the Project Company be joined as a party to any proceeding for the enforcement of any term of any Transaction Agreement;

(8) the requirement of, or the notice of, the filing of claims by the KRRC in the event of the receivership or bankruptcy of the Project Company; and

(9) all demands upon the Project Company or any other person and all other formalities the omission of any of which, or delay in performance of which, might, but for the provisions of this Section, by rule of law or otherwise, constitute grounds for relieving or discharging the Guarantor in whole or in part from its absolute, present, irrevocable, unconditional and continuing obligations hereunder.

SECTION 3.6. PAYMENT OF COSTS AND EXPENSES. The Guarantor agrees to pay the KRRC on demand all Fees and Costs, incurred by or on behalf of the KRRC in successfully enforcing by Legal Proceeding observance of the covenants, agreements and obligations contained in this Guaranty against the Guarantor, other than the Fees and Costs that the KRRC incurs in performing any of its obligations under the Project Agreement, or other applicable Transaction Agreement where such obligations are a condition to performance by the Project Company of its Obligations.

SECTION 3.7. SUBORDINATION OF RIGHTS. The Guarantor agrees that any right of subrogation or contribution which it may have against the Project Company as a result of any payment or performance hereunder is hereby fully subordinated to the rights of the KRRC hereunder and under the Transaction Agreements and that the Guarantor shall not recover or seek to recover any payment made by it hereunder from the Project Company until the Project Company and the Guarantor shall have fully and satisfactorily paid or performed and discharged the Obligations giving rise to a claim under this Guaranty.

SECTION 3.8. SEPARATE OBLIGATIONS; REINSTATEMENT. The obligations of the Guarantor to make any payment or to perform and discharge any other duties, agreements, covenants, undertakings or obligations hereunder shall: (1) to the extent permitted by applicable law, constitute separate and independent obligations of the Guarantor from its other obligations under this Guaranty; (2) give rise to separate and independent causes of action against the Guarantor; and (3) apply irrespective of any indulgence granted from time to time by the KRRC. The Guarantor agrees that this Guaranty shall be automatically reinstated if and to the extent that for any reason any payment or performance by or on behalf of the Project Company is rescinded or must be otherwise restored by the KRRC, whether as a result of any proceedings in bankruptcy, reorganization or similar proceeding, unless such rescission or restoration is pursuant to the terms of the Project Agreement, or any applicable Transaction Agreement or the Project Company's enforcement of such terms under Applicable Law.

SECTION 3.9. TERM. This Guaranty shall remain in full force and effect from the date of execution and delivery hereof until all of the Obligations of the Project Company have been fully paid and performed.

ARTICLE IV

GENERAL COVENANTS

SECTION 4.1. MAINTENANCE OF CORPORATE EXISTENCE.

(A) Consolidation, Merger, Sale or Transfer. The Guarantor covenants that during the term of this Guaranty it will maintain its corporate existence, will not dissolve or otherwise dispose of all or substantially all of its assets and will not consolidate with or merge into another entity or permit one or more other entities to consolidate with or merge into it unless the successor is the Guarantor; provided, however, that the Guarantor may consolidate with or merge into another entity, or permit one or more other entities to consolidate with or merge into it, or sell or otherwise transfer to another entity all or substantially all of its assets as an entirety and thereafter dissolve if the successor entity (if other than the Guarantor): (a) assumes in writing all the obligations of the Guarantor hereunder and, if required by law, is duly qualified to do business in the State of California; (b) delivers to the KRRC an opinion of counsel to the effect that its obligations under this Guaranty are legal, valid, binding and enforceable subject to applicable bankruptcy and similar insolvency or moratorium laws; and (c) has a net worth at the time of any such transaction at least equal to the net worth of the Guarantor immediately prior to such time.

(B) Continuance of Obligations. If a consolidation, merger or sale or other transfer is made as permitted by this Section, the provisions of this Section shall continue in full force and effect and no further consolidation, merger or sale or other transfer shall be made except in compliance with the provisions of this Section. No such consolidation, merger or sale or other transfer shall have the effect of releasing the initial Guarantor from its liability hereunder unless a successor entity has assumed responsibility for this Guaranty as provided in this Section.

SECTION 4.2. ASSIGNMENT. Except as provided in Section 4.1 (Maintenance of Corporate Existence), this Guaranty may not be assigned by the Guarantor without the prior written consent of the KRRC.

SECTION 4.3. QUALIFICATION IN CALIFORNIA. The Guarantor agrees that, so long as this Guaranty is in effect, if required by law, the Guarantor will be duly qualified to do business in the State of California.

SECTION 4.4. CONSENT TO JURISDICTION. The Guarantor irrevocably: (1) agrees that any Legal Proceeding related to this Guaranty or to any rights or relationship between the parties arising therefrom shall be solely and exclusively initiated and maintained in State or federal courts located in San Francisco County, California, having appropriate jurisdiction therefor; (2) consents to the jurisdiction of such courts in any such Legal Proceeding; and (3) waives any objection which it may have to the laying of the jurisdiction of any such Legal Proceeding in any such court.

SECTION 4.5. BINDING EFFECT. This Guaranty shall inure to the benefit of the KRRC and its permitted successors and assigns and shall be binding upon the Guarantor and its successors and assigns.

SECTION 4.6. AMENDMENTS, CHANGES AND MODIFICATIONS. This Guaranty may not be amended, changed or modified or terminated and none of its provisions may be waived, except with the prior written consent of the KRRC and the Guarantor.

SECTION 4.7. LIABILITY. It is understood and agreed to by the KRRC that nothing contained herein shall create any obligation of, or right to look, to any director, officer, employee or stockholder of the Guarantor (or any Affiliate of the Guarantor) for the satisfaction of any obligations hereunder, and no judgment, order or execution with respect to or in connection with this Guaranty shall be taken against any such director, officer, employee or stockholder.

SECTION 4.8. NOTICES.

(A) Procedure. All notices, demands or written communications given pursuant to the terms of this Guaranty shall be: (1) in writing and delivered in person; (2) transmitted by certified mail, return, receipt requested, postage prepaid or by overnight courier utilizing the services of a nationally-recognized overnight courier service with signed verification of delivery; or (3) given by email transmission, if a signed original of the emailed letter or other communication is deposited in the United States mail within two days after transmission. Notices shall be deemed given only when actually received at the address first given below with respect to each party. Either party may, by like notice, designate further or different addresses to which subsequent notices shall be sent.

(B) KRRC Notice Address. Notices required to be given to the KRRC shall be addressed as follows:

The Klamath River Renewal Corporation
2001 Addison St., #317
Berkeley, CA 94704
Attn: Laura Hazlett
Telephone No.: (415) 820-4441
Email Address: lhazlett@klamathrenewal.org

with a copy to:

The Klamath River Renewal Corporation
2140 Shattuck Avenue, Suite 801
Berkeley, CA 94704
Attn: Richard Roos-Collins
Telephone No.: (510) 296-5589
Email Address: rrcollins@waterpowerlaw.com

(C) Guarantor Notice Address. Notices required to be given to the Guarantor shall be addressed as follows:

Kiewit Infrastructure Group, Inc.
[ADDRESS]
Attn: [____]
Telephone No.: [____]
Email Address: [____]

with a copy to:

Kiewit Infrastructure Group, Inc.
[ADDRESS]
Attn: [____]
Telephone No.: [____]
Email Address: [____]

[Signature Page Follows]

IN WITNESS WHEREOF, the Guarantor has caused this Guaranty to be executed in its name and on its behalf by its duly authorized officer as of the date first above written.

KIEWIT INFRASTRUCTURE GROUP, INC, as
Guarantor

By: _____

Name: _____
Printed

Title: _____

ACCEPTED AND AGREED TO BY: [Company Seal]

KLAMATH RIVER RENEWAL
CORPORATION

By: _____

Name: _____
Printed

Title: _____

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TRANSACTION FORM B
FORM OF PERFORMANCE BOND

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[Surety's Header]

Bond No.: _____

FORM OF PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS:

That we, Kiewit Infrastructure West Co. as principal (the "Project Company"), and [_____] as surety (the "Surety"), are held and firmly bound unto the Klamath River Renewal Corporation (the "KRRC"), in the sum of _____ dollars (\$_____) lawful money of the United States of America, for the payment of which sum, well and truly to be made, we bind ourselves, heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents.

The condition of the foregoing obligation is such that,

WHEREAS, the Project Company was awarded and entered into the annexed Project Agreement with the KRRC for Design, Construction, Demolition and Restoration Services in connection with the Removal of the Lower Klamath River Dams, dated as of April 24, 2019, as amended from time to time (the "Project Agreement"), whereby the Project Company has agreed to perform the design, construction, demolition and habitat restoration services work necessary to carry out and complete the project, all as more particularly described therein, and is required by the KRRC to give this bond on the GMP Amendment Date (as defined in the Project Agreement) pursuant to the Project Agreement;

NOW, THEREFORE, if the Project Company, its heirs, executors, administrators, successors, and assigns shall well and truly do and perform all of the covenants and obligations of the Project Agreement and any alteration thereof made as therein provided, on its part to be done and performed at the times and in the manner specified therein, then this obligation shall be null and void, otherwise it shall be and remain in full force and effect inclusive of any period of any guarantees or warranties required under the Project Agreement.

Any alterations in the work to be done, or the materials to be furnished, which may be made pursuant to the terms of the Project Agreement, shall not in any way release either the Project Company or the Surety, nor shall any extensions of time granted under the provisions of the Project Agreement release either the Project Company or the Surety, and notice of such alterations or extensions of the Project Agreement is hereby waived by the Surety.

The Surety hereby waives the provisions of California Civil Code Sections 2819 (regarding exoneration of sureties in certain circumstances), 2845 (regarding certain limitations on remedies against sureties) and 2849 (regarding a surety's rights as to other security held by the creditor).

In the event suit is brought upon this bond by the KRRC and judgment is recovered, the Surety shall pay all costs incurred by the KRRC in such suit, including, but not limited to, reasonable attorneys' fees and administrative and consultant costs to be fixed by the court. Any proceeding, legal or equitable under this bond shall be instituted in State or federal courts located in San Francisco County, California.

The address or addresses at which the Project Company and Surety may be served with notices, papers and other documents under the California Bond and Undertaking Law (Cal. Civ. Proc. Code § 995.010 *et seq.*) is the following:

WITNESS our hands this _____ day of _____, 2019.

(Seal)

Project Company

By _____

Title

(Surety's Corporate Seal)

Surety

By _____

Title

Address of Surety

Approved:

[Title]
Klamath River Renewal Corporation

Notice: No substitution or revision to this bond form will be accepted.

ACKNOWLEDGMENT BY NOTARY PUBLIC

[Cal. Civ. Code § 1189]

State of California)
County of)

On _____ before me, _____, a notary public, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

[Any acknowledgment taken in another state shall be sufficient if it is taken in accordance with the laws of the state where the acknowledgment is made.]

(Attach proof of authority of attorney-in-fact of surety.)

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TRANSACTION FORM C
FORM OF PAYMENT BOND

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[Surety's Header]

Bond No. _____

FORM OF PAYMENT BOND FOR LABOR AND MATERIALS

KNOW ALL PERSONS BY THESE PRESENTS:

That we, Kiewit Infrastructure West Co. as principal (the "Project Company"), and [_____] as surety (the "Surety"), are held and firmly bound unto the Klamath River Renewal Corporation (the "KRRC"), in the sum of _____ dollars (\$_____) lawful money of the United States of America, for the payment of which sum, well and truly to be made, we bind ourselves, heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents.

The condition of the foregoing obligation is such that,

WHEREAS, the Project Company was awarded and entered into the annexed Project Agreement with the KRRC for Design, Construction, Demolition and Restoration Services in connection with the Removal of the Lower Klamath River Dams, dated as of April 24, 2019, as amended from time to time (the "Project Agreement"), whereby the Project Company has agreed to perform the design, construction, demolition and habitat restoration services work necessary to carry out and complete the project, all as more particularly described therein, and is required by the KRRC to give this bond on the GMP Amendment Date (as defined in the Project Agreement) pursuant to the Project Agreement;

NOW, THEREFORE, if the Project Company, or its subcontractors, fails to pay any of the persons referred to in Section 9100 of the California Civil Code for any materials, provisions, provender, equipment, or other supplies, used in, upon, for or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or for amounts due under the Unemployment Insurance Code or for any amounts required to be deducted, withheld and paid over to the Employment Development Department from the wages of employees of the Project Company and its subcontractors pursuant to Section 13020 of the Unemployment Insurance Code with respect to such work and labor, the Surety will pay for the same, in an amount not exceeding the sum specified above, and also, in case suit is brought upon this bond, reasonable attorneys' fees, to be fixed by the court. This bond shall inure to the benefit of any and all persons entitled to file claims under Section 9100 of the California Civil Code so as to give a right of action to them or their assigns in any suit brought upon this bond.

Any alterations in the work to be done, or the material to be furnished, which may be made pursuant to the terms of the Project Agreement, shall not in any way release either the Project Company or the Surety, nor shall any extensions of time granted under the provisions of the Project Agreement release either the Project Company or the Surety, and notice of such alterations or extensions of the Project Agreement is hereby waived by the Surety.

The Surety hereby waives the provisions of California Civil Code Sections 2819 (regarding exoneration of sureties in certain circumstances), 2845 (regarding certain limitations on remedies against sureties) and 2849 (regarding a surety's rights as to other security held by the creditor).

The address or addresses at which the Project Company and Surety may be served with notices, papers and other documents under the California Bond and Undertaking Law (Cal. Civ. Proc. Code § 995.010 *et seq.*) is the following:

WITNESS our hands this _____ day of _____, 2019.

(Seal)

Project Company

By _____

Title

(Surety's Corporate Seal)

Surety

By _____

Title

Address of Surety

Approved:

[Title]
Klamath River Renewal Corporation

Notice: No substitution or revision to this bond form will be accepted.

ACKNOWLEDGMENT BY NOTARY PUBLIC

[Cal. Civ. Code § 1189]

State of California)
County of)

On _____ before me, _____, a notary public,
personally appeared _____, who proved to me on
the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the
within instrument and acknowledged to me that he/she/they executed the same in
his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the
instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the
instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the
foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

*[Any acknowledgment taken in another state shall be sufficient if it is taken in accordance with
the laws of the state where the acknowledgment is made.]*

(Attach proof of authority of attorney-in-fact of surety.)

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TRANSACTION FORM D
FORM OF MAINTENANCE BOND

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[Surety's Header]

Bond No.: _____

FORM OF MAINTENANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS:

That we, Kiewit Infrastructure West Co. as principal (the "Project Company"), and [_____] as surety (the "Surety"), are held and firmly bound unto the Klamath River Renewal Corporation (the "KRRC"), in the just and penal sum of _____ dollars (\$_____), being [__]% of the Guaranteed Maximum Price (as defined in the Project Agreement) for the herein-mentioned project, lawful money of the United States of America, for the payment of which sum, well and truly to be made, we bind ourselves, heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents. **[Note: The penal sum of Maintenance Bond will be incorporated as part of the GMP Contract Amendment, and confirmed or revised on the Project Implementation Contract Amendment Date.]**

The condition of the foregoing obligation is such that,

WHEREAS, the Project Company was awarded and entered into the annexed Project Agreement with the KRRC for Design, Construction, Demolition and Restoration Services in connection with the Removal of the Lower Klamath River Dams, dated as of April 24, 2019, as amended from time to time (the "Project Agreement"), whereby the Project Company has agreed to perform the design, construction, demolition and habitat restoration services work necessary to carry out and complete the project, all as more particularly described therein, and is required by the KRRC to give this bond on the GMP Amendment Date (as defined in the Project Agreement) pursuant to the Project Agreement;

WHEREAS, the Project Company has completed the said project in accordance with the Project Agreement; and

WHEREAS, the KRRC has requested the Project Company to guarantee said work against defective workmanship, equipment and materials for the guarantee periods set forth in the Project Agreement;

NOW, THEREFORE, if the Project Company, its heirs, executors, administrators, successors, and assigns shall well and truly make good any defects in materials, equipment and workmanship which may arise in said work within the guarantee periods set forth in the Project Agreement, then this obligation shall be null and void, otherwise it shall be and remain in full force and effect.

The Surety's obligations under this bond will be maintained, and shall remain in full force and effect, until one year from the date of Milestone Final Completion for the Final Habitat Restoration Work (as defined in the Project Agreement) and shall automatically renew for an additional one-year term if the applicable Warranty Period (as defined in the Project Agreement) is extended by the KRRC for an additional one-year period in accordance with the Project Agreement.

The Surety hereby waives the provisions of California Civil Code Sections 2819 (regarding exoneration of sureties in certain circumstances), 2845 (regarding certain limitations on remedies against sureties) and 2849 (regarding a surety's rights as to other security held by the creditor).

In the event suit is brought upon this bond by the KRRC and judgment is recovered, the Surety shall pay all costs incurred by the KRRC in such suit, including, but not limited to, reasonable attorneys' fees and administrative and consultant costs to be fixed by the court. Any proceeding, legal or equitable under this bond shall be instituted in State or federal courts located in San Francisco County, California.

The address or addresses at which the Project Company and Surety may be served with notices, papers and other documents under the California Bond and Undertaking Law (Cal. Civ. Proc. Code § 995.010 *et seq.*) is the following:

WITNESS our hands this _____ day of _____, 20[___].

(Seal)

Project Company

By _____

Title

(Surety's Corporate Seal)

Surety

By _____

Title

Address of Surety

Approved:

[Title]
Klamath River Renewal Corporation

Notice: No substitution or revision to this bond form will be accepted.

ACKNOWLEDGMENT BY NOTARY PUBLIC

[Cal. Civ. Code § 1189]

State of California)
County of)

On _____ before me, _____, a notary public, personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

[Any acknowledgment taken in another state shall be sufficient if it is taken in accordance with the laws of the state where the acknowledgment is made.]

(Attach proof of authority of attorney-in-fact of surety.)

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TRANSACTION FORM E
FORM OF PACIFICORP PROPERTY ACCESS AGREEMENT

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[Note: This form of PacifiCorp Property Access Agreement is provided for illustrative purposes only. The form is based on an existing site access agreement entered into between PacifiCorp and the KRRC. The definitive form and terms of the PacifiCorp Property Access Agreement are under development by PacifiCorp and the KRRC.]

**FORM OF
PACIFICORP PROPERTY ACCESS AGREEMENT**

PacifiCorp Property Access Agreement for [_____]

This PacifiCorp Property Access Agreement is between PacifiCorp, an Oregon corporation, and _____, a _____ Corporation.

Background

- A. PacifiCorp is Federal Energy Regulatory Commission (FERC) licensee of the Klamath Hydroelectric Project (Klamath Project), FERC No. 2082, located on the Klamath River in southern Oregon and northern California. PacifiCorp owns real property in the vicinity of the Klamath Project (PacifiCorp Lands).
- B. PacifiCorp and the Klamath River Renewal Corporation (KRRC) are parties to the Amended Klamath Hydroelectric Settlement Agreement (Amended KHSA). Under the Amended KHSA, PacifiCorp and KRRC filed a joint application asking FERC to transfer the license for certain Project facilities from PacifiCorp to the KRRC. The KRRC also filed an application asking FERC to surrender the license for the transferred Project facilities for purposes of dam removal.
- C. KRRC has retained _____ to assist KRRC with the facilities removal process and other technical work required under the Amended KHSA (Surrender Work).
- D. _____ proposes to conduct the Scope of Work described in Exhibit A.
- E. PacifiCorp is willing to grant _____ permission to access the Klamath Project to conduct the activities described in the Scope of Work.

Terms and Conditions

- 1. **Access.** Subject to the terms and conditions of this Agreement, PacifiCorp grants _____ and its employees permission to access the real property designated in Exhibit B as the Study Area (hereinafter the Site) for the limited purpose of conducting the activities described in Exhibit A (the Scope of Work). Exhibits A and B are incorporated by this reference. This Agreement does not authorize _____ to perform work beyond the work described in Exhibit A. This right of access is not exclusive and may be revoked by PacifiCorp as provided in Section 2.
- 2. **Term.** The access granted under this Agreement will become effective on the first day the Agreement has been executed by both parties, and will continue until _____, unless PacifiCorp terminates the right of access early, which PacifiCorp may do in its sole discretion by providing _____ seven business days written notice of termination.
- 3. **Site Restoration.** Upon completion of the Scope of Work described in Exhibit A or upon termination of the right of access, _____ will restore the Site as near as practicable to its condition immediately before commencement of access and the Scope of Work under this Agreement. This obligation will survive the termination or expiration of this Agreement.

4. **Insurance.** Before access occurs, _____ must provide PacifiCorp with a copy of its proof of insurance demonstrating the following requirements and including PacifiCorp as an additional insured:

Without limiting any liabilities or any other obligations of _____, _____ must, in advance of access to the Site or commencing the Scope of Work, secure and continuously carry with insurers having an A.M. Best Insurance Reports rating of A-VII or better such insurance as will protect _____ from liability and claims for injuries and damages which may arise out of or result from access to the Site or from engaging in the Scope of Work and for which _____ may be legally liable, whether such operations are by _____ or a subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. _____ must insure the risks associated with access to the Site or the Scope of Work with minimum coverages and limits as set forth below:

Workers' Compensation. _____ must comply with all applicable workers' compensation laws and must furnish proof thereof satisfactory to PacifiCorp before accessing the Site or commencing the Scope of Work.

Employers' Liability. _____ must maintain employers' liability insurance with a minimum single limit of \$_____ each accident, \$_____ disease each employee, and \$_____ disease policy limit.

Commercial General Liability. _____ must maintain commercial general liability insurance on the most recently approved ISO policy form, or its equivalent, written on an occurrence basis, with limits not less than \$_____ per occurrence/\$_____ general aggregate for bodily injury and property damage (on a per location and/or per job basis) and must include the following coverages:

- a. Premises and operations coverage
- b. Independent contractor's coverage
- c. Contractual liability
- d. Broad form property damage liability

Business Automobile Liability. _____ must maintain business automobile liability insurance on the most recently approved ISO policy form, or its equivalent, with a minimum single limit of \$_____ each accident for bodily injury and property damage including sudden and accidental pollution liability, with respect to _____'s vehicles whether owned, hired or non-owned, assigned to or used in the performance of the Scope of Work.

Umbrella or Excess Liability. _____ must maintain umbrella or excess liability insurance with a minimum limit of \$_____ each occurrence/aggregate where applicable on a following form basis (or with coverage at least as broad as the primary policies) to be excess of the insurance coverage and limits required in employers' liability insurance, commercial general liability insurance and business automobile liability insurance above. _____ must immediately notify PacifiCorp, if at any time the full umbrella limit required under this Contract is not available, and must purchase additional limits, if requested by PacifiCorp.

Except for workers' compensation and employer's liability, the policies required herein must include provisions or endorsements including PacifiCorp, its parent, divisions, affiliates, subsidiary companies, co-lessees, co-venturers, officers, directors, designated agents, and employees, and insurers as additional insureds.

The Commercial General Liability additional insured endorsement must be ISO Form CG 20 10 or its equivalent.

To the extent of _____'s negligent acts or omissions, the commercial general liability, business automobile liability and pollution liability policies required by this Contract must include: (i) provisions or endorsements that such insurance is primary insurance with respect to the interests of PacifiCorp and that any other insurance maintained by PacifiCorp is excess and not contributory insurance with the insurance required hereunder; and (ii) provisions or endorsements that the policy contain a cross liability or severability of interest clause. Unless prohibited by applicable law, all required insurance policies must contain provisions or endorsements that the insurer will have no right of recovery or subrogation against PacifiCorp, its parent, divisions, affiliates, subsidiary companies, co-lessees, or co-venturers, designated agents, directors, officers, and employees, and insurers, it being the intention of the parties that the insurance as effected shall protect all of the above-referenced entities evidenced by waiver of subrogation wording. _____ must immediately notify PacifiCorp if at any time any one of _____'s insurers issues a notice of cancellation for any reason and must provide PacifiCorp with proof of replacement insurance before the effective date of cancellation.

Pollution Liability. _____ must maintain pollution liability insurance with a minimum limit of \$_____ each claim/aggregate

Before access occurs, PacifiCorp must acknowledge in writing that the certificate of insurance complies with the requirements of Section 4 (an email from PacifiCorp to _____ is sufficient for this purpose). However, such acknowledgement by PacifiCorp will not excuse any failure by _____ to enter into the required contract terms with its agents or contractors. This Section 4 will survive the termination or expiration of this Agreement.

Minimums. The insurance requirements specified in this Agreement are minimums, and do not cap or represent _____'s or its insurer's total financial responsibility for an incident.

5. **Agent or Contractor Access.** An agent or contractor of _____ may access the Site under the same terms and conditions as _____ *but only if*:
 - A. Before access occurs, the agent or contractor has executed a contract with _____ and agreed to *all* terms and conditions contained in Exhibit C and _____ has provided PacifiCorp with a copy of the contract; and
 - B. Before access occurs, _____ has provided PacifiCorp with a copy of its agent's or contractor's proof of insurance demonstrating compliance with the insurance requirements of Exhibit C; and
 - C. Before access occurs, _____ has indicated to PacifiCorp whether its agent or contractor is an ISNetworld subscriber, and if so, provided PacifiCorp with the agent or contractor's ISNetworld subscriber number or other appropriate identifying information; and
 - D. Before access occurs, PacifiCorp must acknowledge in writing that the contract and the certificate of insurance comply with the requirements of Section 4 (an email from PacifiCorp to _____ is sufficient for this purpose).

Such acknowledgement by PacifiCorp will not excuse any failure by _____ to enter into the required contract terms with its agents or contractors. Exhibit C is attached and incorporated by this reference. This Section 5 will survive the termination or expiration of this Agreement.

6. **Indemnification.** _____ acknowledges and agrees that the Site contains potentially dangerous equipment and other hazards, including without limitation, hazards associated with high voltage electricity, rotating shafts and equipment, water hazards, and tripping and fall hazards. _____ agrees that _____, its employees, agents, and contractors will access the Site at their own risk, and that PacifiCorp and its employees and agents will not be held responsible or liable for injury, damage, or loss incurred by _____, its employees, agents, or contractors arising out of or in connection with access to the Site, the Scope of Work, or other activities under this Agreement, *except* to the extent that any such injury, damage or loss is caused solely by the willful misconduct or gross negligence of PacifiCorp, its employees or agents. This Section 5 will survive the termination or expiration of this Agreement.
7. **No Interference.** In exercising access privileges under this Agreement, _____, its employees, agents, and contractors will take reasonable steps not to interfere with PacifiCorp's operations at the Site. _____ will appraise PacifiCorp of all activity at the Site conducted under the authority of this Agreement and promptly answer any reasonable requests for information made by PacifiCorp regarding any aspect of _____'s access to, or use of, the Site. Regarding portions of the Site that are enclosed by a security fence or otherwise closed to the public, _____ or its contractors may only access or visit such areas if escorted by a PacifiCorp representative unless the parties agree to other arrangements in writing.
8. **Stop Work.** PacifiCorp may direct _____ and its employees, agents, and contractors to immediately cease all activity at the Site and leave the Site if PacifiCorp determines that: (1) cessation of activity or departure from the site is necessary to facilitate Klamath Project operations, to comply with the requirements of PacifiCorp's FERC license, or to reasonably safeguard human safety; (2) _____ or its employees, agents, or contractors have violated any of PacifiCorp's safety requirements contained in Exhibit D; or (3) _____ or its employees, agents, or contractors act inconsistently with the terms and conditions of this Agreement. _____ will immediately stop work if so directed by PacifiCorp or its employees or agents. The Parties agree to meet and confer in a reasonable amount of time after PacifiCorp issues a stop work order if: (1) _____ disagrees with the basis of a stop work order from PacifiCorp; and (2) the stop work order results in a material cost or schedule impact for _____.
9. **Compliance.** _____ will make itself and its employees, contractors and agents aware of and comply with all Site regulations, and applicable laws, rules or regulations, before visiting or performing any work at the Site, including without limitation all of those regulations pertaining to safety and security. PacifiCorp Energy Hydro Resources Contractor Orientation, Revision 1.8.3, December 19, 2013, is attached as Exhibit D and incorporated by this reference. _____ will share a copy of Exhibit D with its employees, agents, and contractors and require such individuals to review completely, and comply with, Exhibit D.
10. **Use of Photographs.** _____ consents to any present or future use by PacifiCorp of any photograph of _____ or its employees, agents, or contractors on or about the Site except that PacifiCorp may not use any photograph covered by this section for the purpose of directly or indirectly stating that _____ supports PacifiCorp or an activity of PacifiCorp in any manner without further written permission of _____.
11. **Access Restrictions.** _____ agrees to restrict its activities on the Site, and those of its employees, agents, or contractors, to only those locations and times as directed by PacifiCorp's representative.

12. **Medical Emergencies.** _____ agrees that any certified medical emergency professional may administer any type of medical treatment in the event any _____ employee, agent, or contractor is injured at the Site and becomes unable to render such permission.
13. **Visitor Tags.** _____ agrees to require its employees, agents, and contractors to clearly display a visitor tag number on their person while on the Site. PacifiCorp will not provide _____ with visitor badges, but _____ may create its own unique laminated ID cards issued to each person accessing the Site. _____ agrees to provide PacifiCorp with a list of all persons issued such a badge and the corresponding badge number. _____ also agrees that all its employees, agents, and contractors will wear a uniquely colored shirt or hardhat. _____ agrees that all vehicles brought onto the Site will display a door placard or dashboard sign identifying the ownership and activity (e.g. _____ – Biological Field Work) and contact information.
14. **Authorized Party.** Each person signing this Agreement represents and warrants that he or she is duly authorized and has legal capacity to execute and deliver this Agreement. Each party represents and warrants to the other that the execution and delivery of the Agreement and the performance of such party's obligations hereunder have been duly authorized and that the Agreement is a valid and legal agreement binding on such party and enforceable in accordance with its terms.
15. **Information.** _____ will provide PacifiCorp with copies of all information and data (including but not limited to bathymetry, LIDAR, vegetation surveys, hazardous materials assessments, wetland delineations, monitoring well data) collected or generated by _____, its employees, agents, or contractors under the activities authorized in this Agreement. PacifiCorp will have the unrestricted right to possess and use such information and data.
16. **Discovery of Items of Cultural Significance.** If archaeological resources or human remains are found or believed to be found during field work activities, _____, and its employees, agents, and contractors will immediately stop all work within fifty (50) feet of such discovery and will immediately implement the Inadvertent Discovery Plan (IDP) attached as Exhibit E.
 - i. All _____ Parties working on PacifiCorp property will be familiar with and adhere to the IDP throughout the life of this project. Only certified archaeologists conducting cultural resource investigations are exempt from the "Discovery of Archaeological Resources" section of the IDP. Archaeology personnel must follow the IDP in the event of discovery of human remains.
 - ii. _____ will participate as requested, and at no cost to PacifiCorp, in any consultations with Tribes or others required to satisfy PacifiCorp's IDP, PacifiCorp's HPMP, or any other requirement regarding the Klamath Project.
 - iii. _____ will document any inadvertent cultural resource findings and provide such documentation to PacifiCorp within 24 hours of any Inadvertent Discovery.
 - iv. Nothing in this Agreement limits PacifiCorp's right to manage the Site or cultural resources on the Site as required by or consistent with PacifiCorp's license for the hydroelectric project.
17. **Termination of Ground Disturbing Work.** _____ Parties will immediately stop any or all ground disturbing work upon written or verbal request by PacifiCorp. Such work will resume, if at all, only upon written clearance to resume by PacifiCorp. PacifiCorp will not require the termination of ground disturbing work that is otherwise

in compliance with the requirements of this PacifiCorp Property Access Agreement without reasonable cause.

18. **Scope of Ground Disturbing Work.** No ground disturbing work of any kind is authorized on the Site except as expressly provided in the Scope of Work (Exhibit A).
19. **Notices.** Notices under this Agreement must be in writing and will be effective when actually delivered. If mailed, a notice will be deemed effective on the second day after deposited as registered or certified mail, postage pre-paid, directed to the other Party at the address shown below:

If to PacifiCorp:

If to _____:

PacifiCorp
Attn: PacifiCorp Legal
825 NE Multnomah, Suite 2000
Portland, Oregon 97232
Fax: 503.813.7262

20. **Remedies.** The Parties will be entitled to equitable relief, including injunction and specific performance, if there is a breach of the provisions of this Agreement, in addition to all other remedies available to them at law or in equity. If Receiving Party commits a breach, or threatens to commit a breach of, of any material terms or conditions of this Agreement, Disclosing Party will have the right to seek and obtain all judicial relief (including but not limited to specific monetary damages and interest) as may be ordered or awarded by a court of competent jurisdiction. Receiving Party hereby acknowledges that legal remedies may be inadequate to fully compensate Disclosing Party for a breach of this Agreement. TO THE FULLEST EXTENT PERMITTED BY LAW, EACH OF THE PARTIES HERETO WAIVES ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN RESPECT OF LITIGATION DIRECTLY OR INDIRECTLY ARISING OUT OF, UNDER OR IN CONNECTION WITH THIS AGREEMENT. EACH PARTY FURTHER WAIVES ANY RIGHT TO CONSOLIDATE, OR TO REQUEST THE CONSOLIDATION OF, ANY ACTION IN WHICH A JURY TRIAL HAS BEEN WAIVED WITH ANY OTHER ACTION IN WHICH A JURY TRIAL CANNOT BE OR HAS NOT BEEN WAIVED.
21. **Beneficiary; Assignment; Governing Law.** This Agreement is for the benefit of each Party and will be governed by and construed in accordance with the laws of the state of Oregon. Neither Party may assign or otherwise transfer its rights or delegate its duties under this Agreement without prior written consent, and any attempt to do so without consent is void.
22. **Termination.** It is understood and agreed that termination of this Agreement for any reason whatsoever will not affect any obligation under this Agreement before termination.

[Signature Page Follows]

AGREED:

PacifiCorp

Signature

Signature

Name

Name

Title

Title

Date

Date

Exhibit A
Scope of Work

Notification Process:

 Days Before Scheduled Visit: will email : (i) a copy of its fully executed contract with any agent or contractor that will be accessing the Site; (ii) a copy of the agent's or contractor's proof of insurance demonstrating compliance with the insurance requirements of Exhibit C; and (iii) a statement of whether the agent or contractor is an ISNetworld subscriber, and if so, the agent's or contractor's ISNetworld subscriber number or other appropriate identifying information.

PacifiCorp will review for compliance with Section of the PacifiCorp Property Access Agreement and compliance with the requirements of Exhibit C.

No agent or contractor may access the Site unless and until , or another authorized PacifiCorp representative has provided with an email or other written acknowledgment that 's certificate of insurance (or its agent's or contractor's contract and certificate of insurance) comply with the requirements of Section 4 (or Section 5 if applicable).

 will email a description of visit that includes at a minimum – date and general hours of visit, a list of visitor names, purpose of visit and number of vehicles. PacifiCorp will review for any conflicts with PacifiCorp work; if none, they will authorize and advise Klamath Hydroelectric Project personnel of 's visit. PacifiCorp will also advise of any special access conditions.

Day of visit: will email confirmation via email or phone call.

Exhibit B
Site Map – Study Area

Exhibit C

Required Terms for _____ Agents and Contractors

Before any _____ agent or contractor may access the Site or conduct any portion of the Scope of Work on PacifiCorp Lands, _____ must enter into a written agreement ("Contract") with the agent or contractor (Counter-Party) and that agreement must include the following terms or conditions:

1. The Counter-Party must agree that PacifiCorp is an intended third party beneficiary of the Contract and shall have standing to enforce the Contract's provisions as they relate to PacifiCorp, the Site, or the Scope of Work.
2. The Contract will require the Counter-Party to carry insurance satisfying the following requirements and naming PacifiCorp and _____ as an additional insured:

Insurance. Without limiting any liabilities or any other obligations of Counter-Party, Counter-Party shall, in advance of access to the Site or commencing the Scope of Work, secure and continuously carry with insurers having an A.M. Best Insurance Reports rating of A-VII or better such insurance as will protect Counter-Party from liability and claims for injuries and damages which may arise out of or result from access to the Site or from engaging in the Scope of Work and for which Counter-Party may be legally liable, whether such operations are by Counter-Party or a subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. SAIF Corporation (Oregon's not-for-profit, state chartered worker's compensation insurance company) does not have an A.M. Best Insurance Reports rating of A-VII or better but PacifiCorp agrees that SAIF Corporation is an acceptable insurer (for purposes of providing the required workers compensation or employer's liability insurance only) *provided* SAIF Corporation agrees to insure losses for work conducted at, or related to, the portion of the Site which is located in Oregon State. Counter-Party shall insure the risks associated with access to the Site or the Scope of Work with minimum coverages and limits as set forth below:

Workers' Compensation. Counter-Party shall comply with all applicable workers' compensation laws and shall furnish proof thereof satisfactory to _____ and PacifiCorp before accessing the Site or commencing the Scope of Work.

Employers' Liability. Counter-Party shall maintain employers' liability insurance with a minimum single limit of \$_____ each accident, \$_____ disease each employee, and \$_____ disease policy limit.

Commercial General Liability. Counter-Party shall maintain commercial general liability insurance on the most recently approved ISO policy form, or its equivalent, written on an occurrence basis, with limits not less than \$_____ per occurrence/\$_____ general aggregate for bodily injury and property damage (on a per location and/or per job basis) and shall include the following coverages:

- a. Premises and operations coverage
- b. Independent contractor's coverage
- c. Contractual liability
- d. Broad form property damage liability

Business Automobile Liability. Counter-Party shall maintain business automobile liability insurance on the most recently approved ISO policy form, or its equivalent, with a minimum single limit of \$_____ each accident for bodily injury and property damage including sudden and accidental pollution liability, with respect to

Counter-Party's vehicles whether owned, hired or non-owned, assigned to or used in the performance of the Scope of Work.

Umbrella or Excess Liability. Counter-Party shall maintain umbrella or excess liability insurance with a minimum limit of \$_____ each claim or occurrence/aggregate where applicable on a following form basis (or with coverage at least as broad as the primary policies) to be excess of the insurance coverage and limits required in employers' liability insurance, commercial general liability insurance and business automobile liability insurance above. Counter-Party shall provide notice to _____ and PacifiCorp, if at any time the full umbrella limit required under this Contract is not available, and will purchase additional limits, if requested by _____ or PacifiCorp.

Except for workers' compensation and employer's liability, the policies required herein shall include provisions or endorsements including PacifiCorp, its parent, divisions, affiliates, subsidiary companies, co-lessees, co-venturers, officers, directors, designated agents, insurers, and employees as additional insureds. The Commercial General Liability additional insured endorsement shall be ISO Form CG 20 10 or its equivalent.

To the extent of Counter-Party's negligent acts or omissions, the commercial general liability, business automobile liability and pollution liability policies required by this Contract shall include: (i) provisions or endorsements that such insurance is primary insurance with respect to the interests of PacifiCorp and that any other insurance maintained by PacifiCorp is excess and not contributory insurance with the insurance required hereunder; and (ii) provisions or endorsements that the policy contain a cross liability or severability of interest clause. Unless prohibited by applicable law, all required insurance policies shall contain provisions or endorsements that the insurer will have no right of recovery or subrogation against PacifiCorp, its parent, divisions, affiliates, subsidiary companies, co-lessees, or co-venturers, designated agents, directors, officers, insurers, and employees, it being the intention of the parties that the insurance as effected shall protect all of the above-referenced entities evidenced by waiver of subrogation wording. Counter-Party shall notify _____ and PacifiCorp immediately if at any time any one of Counter-Party's insurers issues a notice of cancellation for any reason and shall provide proof of replacement insurance before the effective date of cancellation.

Pollution Liability. Counter-Party must maintain pollution liability insurance with a minimum limit of \$_____ each claim or occurrence/aggregate.

A certificate of insurance shall be furnished to _____ and PacifiCorp confirming the issuance of such insurance before Counter-Party's access to the Site or commencement by Counter-Party of any part of the Scope of Work.

3. The Contract will include an indemnification and waiver of liability provision providing (at minimum) that the Counter-Party agrees to:

Release, waive, discharge, indemnify, defend, and hold harmless PacifiCorp, and its affiliates, directors, officers, employees, and designated agents (collectively "Beneficiaries") from and against any and all claims, demands, liabilities, suits, losses, costs, and damages, including reasonable attorneys' fees and litigation expenses, for or on account of any and all matters whatsoever relating to, arising from, or connected with Counter-Party's transportation to and from or presence upon the Site, including without limitation injury to or death of any person, including without limitation Counter-Party (or Counter-Party's employee's, agents, contractors, or subcontractors of any tier) or damage to any property, including without limitation property of Counter-Party (or Counter-Party's employee's, agents,

contractors, or subcontractors of any tier), or in any way connected with Counter-Party's visit to the Site, excepting only such injury or harm caused solely by the willful misconduct or gross negligence of the Beneficiaries.

4. The Contract will define the terms "Site" and "Scope of Work" to have the same meanings assigned in this Agreement (including the information contained in Exhibit A and Exhibit B to this Agreement).
5. The Contract will include a provision under which the Counter-Party acknowledges and agrees that the Site contains potentially dangerous equipment and other hazards, including without limitation, hazards associated with high voltage electricity, rotating shafts and equipment, water hazards, and tripping and fall hazards. The Counter-Party will agree that the Counter-Party, its employees, agents, contractors, and subcontractors of any tier will access the Site at their own risk, and that PacifiCorp and its employees and agents will not be held responsible or liable for injury, damage, or loss incurred by Counter-Party, its employees, agents, contractors, or subcontractors of any tier arising out of or in connection with access to the Site, the Scope of Work, or other activities under the Contract, *except* to the extent that any such injury, damage or loss is caused solely by the willful misconduct or gross negligence of PacifiCorp, its employees or agents. Such provision will survive the termination or expiration of the Contract.
6. In accessing the Site and conducting the Scope of Work, Counter-Party (and its employees, agents, contractors, and subcontractors of all tiers) will take reasonable steps not to interfere with PacifiCorp's operations at the Site.
7. PacifiCorp may direct Counter-Party and its employees, agents, and contractors to immediately cease all activity at the Site and leave the Site if PacifiCorp determines that: (1) cessation of activity or departure from the site is necessary to facilitate Klamath Project operations, to comply with the requirements of PacifiCorp's FERC license, or to reasonably safeguard human safety; (2) _____ or its employees, agents, or contractors have violated any of PacifiCorp's safety requirements contained in Exhibit D; or (3) _____ or its employees, agents, or contractors act inconsistently with the terms and conditions of this Agreement. Counter-Party will immediately stop work if so directed by PacifiCorp or its employees or agents.
8. Counter-Party will make its employees, agents, contractors, and subcontractors of all tiers aware of, and will comply with, all Site regulations identified by PacifiCorp, and applicable laws, rules or regulations, before visiting or performing any work at the Site, including without limitation all of those regulations pertaining to safety and security.
9. Counter-Party consents to any present or future use by PacifiCorp of any photograph of Counter-Party or its employees, agents, contractors, or subcontractors of any tier on or about the Site.
10. Counter-Party agrees to restrict its activities on the Site, and those of its employees, agents, contractors, or subcontractors of any tier, to only those locations and times as directed by PacifiCorp's representative.
11. Counter-Party agrees that any certified medical emergency professional may administer any type of medical treatment in the event any Counter-Party employee, agent, contractor, or subcontractor of any tier is injured at the Site and becomes unable to render such permission.

12. Counter-Party agrees to require its employees, agents, contractors, and subcontractors of any tier to clearly display a visitor tag number on their person and on all vehicles brought on the Site at all times.

Exhibit D

PacifiCorp Energy Hydro Resources
Contractor Orientation, Revision 1.8.3, December 19, 2013

Exhibit E
Inadvertent Discovery Plans

Exhibit E shall be interpreted liberally to apply the principles contained therein to the context of ground disturbing work authorized by this PacifiCorp Property Access Agreement. For purposes of this PacifiCorp Property Access Agreement, the language of Exhibit E shall be construed as follows: (a) references to PacifiCorp personnel and contractors in Exhibit E will be understood to also be references to _____ employees, agents, and contractors; (b) references to working on construction or O&M undertakings will be understood to include undertakings conducted by _____ employees, agents, and contractors under this PacifiCorp Property Access Agreement; (c) references to the Project will be understood to mean the Klamath Hydroelectric Project, the PacifiCorp Lands, and/or the Site as the context requires; (d) references to the Construction Supervisor will be understood to mean any survey crew lead who has authority to issue a stop work order; (e) HCC will mean PacifiCorp's hydro control center which can be reached 24 hours a day at 360-225-4410; (f) CRC will mean Russ Howison, PacifiCorp, at 503-813-6626 or his colleague Robert Roach at 541-776-5433.

Protocol for Inadvertent Discoveries

1. If any member of a construction, maintenance, or other field crew believes that he or she has **discovered human remains or an archaeological resource**, all work in the vicinity of the discovery will **stop and notify the work supervisor immediately**.
2. The work supervisor will notify the Production Manager and/or Cultural Resource Coordinator (CRC).
3. The Production Manager and/or Cultural Resource Coordinator (CRC) will notify the appropriate authorities including the federal land management agency if the discovery is on federal lands, law enforcement, County Medical Examiner's office, SHPO, and appropriate tribes.
4. The work supervisor will take appropriate steps to protect the discovery site. At a minimum, the immediate area of the discovery site will be secured. Vehicles, equipment, and unauthorized personnel will not be permitted to traverse the discovery site. Work in the immediate area will not be re-started until evaluation and needed treatment of the discovery has been completed.
5. PacifiCorp will direct that human remains and associated funerary objects or archaeological materials be left in place until the county medical examiner or designated professional archaeologist authorizes their removal.

Execution Version with Confidential Financial Information Redacted

APPENDICES

to the

PROJECT AGREEMENT

FOR

DESIGN, CONSTRUCTION, DEMOLITION AND RESTORATION SERVICES
IN CONNECTION WITH
THE REMOVAL OF THE LOWER KLAMATH RIVER DAMS

between

THE KLAMATH RIVER RENEWAL CORPORATION

and

KIEWIT INFRASTRUCTURE WEST CO.

Dated

April 24, 2019

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APPENDIX 1

PROJECT AND PROJECT SITE DESCRIPTION

APPENDIX 1**PROJECT AND PROJECT SITE DESCRIPTION****1.1. PURPOSE**

The purpose of this Appendix is to describe the Project and the Facilities, show the location of the Project Site, and identify the Related Projects.

The Project, Project Site, Facilities and Related Projects are described in more detail in the Definite Plan, prepared by the KRRC and issued June 28, 2018.

1.2. PROJECT

The Klamath basin's hydrologic system consists of a complex of inter-connected rivers, lakes, marshes, dams, diversions, wildlife refuges, and wilderness areas. Alterations to the natural hydrologic system began in the late 1800s, accelerating in the early 1900s, including water diversions by private water users, water diversions by and to the United States Bureau of Reclamation's Klamath Irrigation Project, and by hydroelectric facilities operated by PacifiCorp.

The Project is designed to implement the Klamath Hydroelectric Settlement Agreement (the "KHSa"). The KHSa resolved disputes among numerous parties regarding the relicensing of the Klamath Hydroelectric Project (FERC No. 2082) (the "KHP"). The parties to the KHSa include, among others: the U.S. Department of Interior; the U.S. Department of Commerce; the State of California; the State of Oregon; Humboldt County, California; the Yurok Tribe; the Karuk Tribe; the Upper Klamath Water Users Association; various conservation and fishing groups and; PacifiCorp, as the licensee for the KHP.

The parties to the KHSa agreed to a process whereby PacifiCorp and a dam removal entity, now the Klamath River Renewal Corporation ("KRRC"), would apply to the Federal Energy Regulatory Commission ("FERC") to split the KHP into two projects, the KHP and the Lower Klamath Project, and proceed with the actions necessary to achieve dam removal, a free-flowing condition on the Klamath River, and volitional fish passage. As originally licensed, the KHP consisted of eight hydroelectric facilities, which were constructed between 1911 and 1962: (1) East Side Dam; (2) West Side Dam; (3) Keno Dam (non-generating); (4) J.C. Boyle Dam; (5) Copco No. 1 Dam; (6) Copco No. 2 Dam; (7) Fall Creek Dam; and (8) Iron Gate Dam. PacifiCorp operated the KHP under a 50-year license issued by FERC until 2006 when the license expired. Since 2006, PacifiCorp has continued to operate the eight facilities under an annual license.

In September 2016, PacifiCorp and KRRC submitted an application to FERC to amend the existing license for the KHP, establish a separate license for the Lower Klamath Project consisting of four of the original eight KHP facilities and their appurtenant structures (J.C. Boyle Dam, Copco No. 1 Dam, Copco No. 2 Dam, and Iron Gate Dam (collectively, the "Facilities")) and also the transfer of the newly-established license for the Lower Klamath Project from PacifiCorp to the KRRC. At that time, the KRRC also applied to surrender the license for the Lower Klamath Project, which would authorize the decommissioning and removal of the Facilities.

In March 2018, FERC (i) amended the KHP license by administratively removing the Facilities from the KHP license, and (ii) administratively placing the Facilities on a newly-created license for the Lower Klamath Project (FERC No. 14803). In June 2018, FERC stayed the effective date of the Lower Klamath Project license pending its final decision on the joint license transfer request.

The Project consists generally of the following key components:

General:

- (a) Achieving risk mitigation and liability protection consistent with the terms of the KHSA, but without any obligation to provide the KHSA Indemnity;
- (b) All associated field investigations, design (unless identified as “design by others”), permitting and construction for items (c) through (r) below. For those components being designed by others, the Project Company will be expected to provide design and constructability reviews at the 60% and 90% completion levels;
- (c) Adherence to all regulatory and Governmental Approval conditions and requirements, including monitoring, reporting and maintenance, unless otherwise stated herein;

Pre-Drawdown:

- (d) Mobilization and Site Preparation: Mobilization of contractor equipment and temporary on-site facilities; preparation of site including clearing and grubbing, stripping, and any other activity required to prepare the Project Site;
- (e) Instrumentation: Install and monitor instrumentation including survey monuments, piezometers and inclinometers to be used for surveillance of earthen embankments and the reservoir rim during drawdown, construction and post-construction. Design of these components shall be in general compliance with typical FERC and DSOD expectations surrounding slope stability in locations of concern;
- (f) Dam modification: Tunnel improvements, existing gate demolition and new gate installation will be required to facilitate drawdown at Copco No. 1 and Iron Gate reservoirs. It may be necessary to fast-track the gate design and procurement in order to receive the materials for drawdown. This would involve an Early Work Package Amendment to the Project Agreement (prior to GMP negotiation);
- (g) Construction access improvements: Includes temporary or permanent improvements to roads, bridges and culverts as necessary to accommodate construction vehicles, equipment and traffic while maintaining current levels of service. Initial assessments and improvement concepts were developed in the Definite Plan to address construction access for regulatory review, but may not be the most cost-effective or appropriate solution given the Project Company's specific plan for construction. The Project Company will develop a design for construction access improvements that is specific to its construction plan and associated vehicles, equipment and traffic. The design should strive for consistency with the current regulatory Project description, which in many cases allows for either temporary or permanent solutions. In addition, some roads may require ongoing maintenance to maintain the existing or better road surface condition due to construction traffic-related road degradation. In addition, portions of roads adjacent to the reservoirs will require monitoring during drawdown and repairs or improvements on an as-needed basis to maintain the current level of service;

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- (h) Bridge and culvert improvements: In order to accommodate pre-dam (post-drawdown) river and creek geometry, improvements to existing facilities will be required, as further defined below. Some level of monitoring and/or improvements will be required at the following:
- (i) Replacement Jenny Creek Bridge: Jenny Creek Bridge crosses the mouth of Jenny Creek at Iron Gate Reservoir. The abutments are built on material deposited after the dam construction and the dam removal may cause significant erosion that could possibly undermine the abutments. The Project Company shall demolish the existing bridge, and construct a new bridge on the upstream side of the existing structure, on a modified alignment, to preclude damage to the structure after drawdown.
 - (ii) New Camp Creek Bridge: A 10-foot diameter CMP arch culvert currently passes beneath Copco Road at Camp Creek adjacent to Iron Gate Reservoir. Accumulated sediment erosion is anticipated in this area following drawdown. The Project Company shall replace the culvert with a bridge prior to drawdown, and provide suitable erosion protection to account for the potential drop in creek bed elevation. The Project Company shall construct a temporary structure and detour road just upstream of the culvert to maintain through-traffic during the work.
 - (iii) Replacement Culvert at Scotch Creek: A 120-inch-diameter CMP culvert passes beneath Copco Road at Scotch Creek, adjacent to Iron Gate Reservoir. Erosion is anticipated in the vicinity of the culvert following drawdown. The Project Company shall replace the culvert prior to drawdown, and provide suitable erosion protection to account for the potential drop in creek bed elevation. The Project Company shall construct a temporary structure and detour road just upstream of the culvert to maintain through-traffic during the work.
 - (iv) Timber Bridge Removal: A timber bridge spans the Klamath River immediately downstream of J.C. Boyle Dam. The Project Company shall remove this structure after dam removal.
 - (v) Spencer Bridge: Project Company shall inspect bridge embankments and bents for post-drawdown erosion and/or scour. Should erosion and/or scour occur within the two years post-drawdown, the Project Company shall repair and determine if further improvements are required to maintain current bridge function.
 - (vi) Topsy Grade Road culvert: Topsy Grade Road crosses an unnamed creek, roughly 1,900 feet to the east of the J.C. Boyle Dam. The road is found on an embankment roughly 400 feet long with three 24-inch culverts draining a watershed of roughly 5 square miles. J.C. Boyle as-built drawings indicate that the culverts do not align with the original thalweg of the creek. The Project Company shall monitor this location during and following drawdown. If erosion of reservoir sediments affects this culvert, the Project Company shall install riprap armor on the downstream face of the embankment and remove sediment and debris from the culverts, if needed, to protect the road embankment.
 - (vii) Unnamed culvert off Keno Access Road: Approximately 0.9 miles north of OR66, off Keno Access Road, an unnamed road crosses an unnamed
-

creek. The road is found on an embankment, with two 36-inch-diameter corrugated metal pipe (CMP) culverts allowing drainage of the creek. The Project Company shall monitor this location during and following drawdown. If erosion of reservoir sediments affects this culvert, the Project Company will place riprap armor on the downstream face of the embankment and remove sediment and debris from the culvert, if needed, to protect the road embankment.

- (viii) Copco Road Bridge: Copco Road Bridge crosses Copco Lake immediately north of the junction of Copco Road and Ager Beswick Road. Both drawdown and post-project flows have the potential to cause erosion at the abutments or central pier. The Project Company shall further evaluate this during the detailed design phase, and shall provide erosion protection at the abutments or pier, if needed.
- (ix) Patricia Avenue culverts: Patricia Avenue passes over two unnamed creeks near Copco Lake and the Copco Lake Fire Department. Beneath each crossing is a 60-inch-diameter CMP culvert. The Project Company shall monitor this location during and following drawdown. If erosion of reservoir sediments affects this culvert, the Project Company will place riprap armor on the downstream face of the embankment and remove sediment and debris from the culvert, if needed, to protect the road embankment.
- (x) Numerous Copco Road culverts (Raymond Gulch, Beaver Creek, and near Brush Creek): The Project Company shall monitor these locations during and following drawdown. If erosion of reservoir sediments affects any culvert, the Project Company shall place riprap armor on the downstream face of the embankment.
- (xi) Additional culverts adjacent to the reservoirs may require monitoring during drawdown and repairs or improvements on an as-needed basis. Improvements and/or modifications at these crossings will require compliance with current fish passage criteria and regulations.
- (i) Downstream flood control: Flood improvement or protection actions at up to 36 habitable structures and three river crossings (two pedestrian bridge and one railroad crossing) required to protect against the 100-years flood elevation after removal of the dams. The parties acknowledge and agree that the Project Company received within two weeks of the selection of its Proposal as the winning proposal, conceptual design figures for 12 of the habitable structures identified in the Definite Plan, which have been discussed and generally agreed to with the property owner. Design concepts include either existing flood wall raises (<4') or new (<4') levee construction. All existing history, communication, and data associated with the conceptual design will be made available to the Project Company on the timeline stated above, as input for detailed design. The Project Company shall assume that they will need to complete initial outreach, data collection, development of conceptual design option(s), and subsequent discussion and negotiation with property owners for 20 of the habitable structures, as well as the pedestrian and railroad bridge(s), identified in the Definite Plan, as input for detailed design. The Project Company shall assume that they will be given contact information for property owners and that access will be coordinated through the KRRC. For the remaining four habitable structures identified in the Definite Plan, the Project Company shall assume that

they will be involved in initial outreach with property owners, but that no design solution will be required. All proposed improvements will be included in subsequent Design Completion Document submittals summarized in Appendix 2 (Preliminary Services). The construction of these facilities would need to be completed prior to reservoir drawdown;

- (j) Groundwater wells: Replacement or improved groundwater wells for parcels adjacent to the reservoirs that are anticipated to be impacted by reservoir drawdown;
- (k) City of Yreka Water System: City of Yreka waterline relocation and intake improvements (design by others). The construction of these facilities would need to be completed prior to reservoir drawdown. The Project Company shall work with owners of potentially impacted wells to determine a final engineered solution for each location;
- (l) Hatchery improvements: Improvements at both Iron Gate and Fall Creek Hatcheries improvements (design by others). The construction of these facilities would need to be completed several months prior to reservoir drawdown;
- (m) Rim stability improvements: The Project Company shall review previous reservoir rim stability analyses provided in the Definite Plan and confirm whether or not they agree with the approach and recommendations. The Project Company shall propose any additional geotechnical investigations and analyses they deem necessary to support the development of a conceptual design solution at locations of concern, which shall include, at a minimum, rim stability segments S4, S9, S11 and N16. Solutions should consider both engineering options (e.g. buttress, wall) and monitoring/temporary relocation options (that could result in long-term relocation depending on rim condition post-drawdown), and shall include figures, feasibility summaries, and rough order of magnitude costs. Once a solution is determined at any location, the Project Company will submit a scope and budget to complete the detailed design work, and the construction fee will be subsequently included in the GMP Contract Amendment;
- (n) Invasive exotic vegetation (IEV) control: The Project Company will be responsible for removal of invasive exotic vegetation before and after drawdown. The Project Company will prioritize Integrated Pest Management and will strive to implement IEV control techniques with minimal effects on humans, beneficial and non-target organisms, and natural habitats. This work will include ongoing IEV monitoring and adaptive management of IEV within the Project Site before and after restoration work begins;
- (o) Seed collection and propagation: In order to produce the large quantity of native ecotypic seed needed for the habitat restoration, the Project Company will complete required native seed collection in the Project vicinity and the Upper Klamath River Watershed within the 1,800'-4,300' elevation range. Subsequent large-scale seed propagation will be contracted by the Project Company to specialty farms with expertise in native plant seed propagation;

Drawdown:

- (p) Reservoir drawdown: The Project Company will be responsible for implementing drawdown at each reservoir to meet FERC and other regulatory approvals. In

general, the reservoirs must be drawn down between January and mid-March of the drawdown year to minimize the impact to downstream biological resources;

Post-Drawdown:

- (q) Dam and hydropower developments removal: Includes full dam and hydropower facility removal at each of the four Facilities, in addition to on-site waste disposal and offsite materials recycling and waste disposal;
- (r) Recreation facilities removal and new improvements: Includes full removal and habitat restoration of existing recreation sites and associated access at Pioneer Park, Mallard Cove, Copco Cove, Fall Creek, Jenny Creek, Wanaka Springs, Camp Creek, Juniper Point, Mirror Cove, Overlook Point, and Long Gulch. Also includes removal and habitat restoration of the boat launch, floating dock and fishing pier at Topsy Campground. New recreation facilities involve design and construction of proposed river access facilities for boat put-in/take-out and fishing at several locations along the Klamath River;
- (s) Restoration of former reservoir and other disturbed areas: Includes full restoration of previously inundated and other disturbed areas with native vegetation to meet regulatory expectations for habitat acreage, coverage and sustainability. This will also involve engineered habitat features, including excavation in select areas to optimize near channel habitat and improve floodplain and tributary connectivity, installation of large wood habitat features, riparian bank revegetation, and installation of bank stability and/or channel fringe complexity features in select locations.

The Project is to be designed and constructed in two phases using the Progressive Design-Build (PDB) delivery method:

- Preliminary Services: The design, planning, permitting and other pre-construction services to be performed by the Project Company pursuant to the Project Agreement prior to the execution and delivery of the GMP Contract Amendment. Key Preliminary Services submittals include the 60% design and GMP Submittal Package.
- Project Implementation Work: All work, besides the Preliminary Services, necessary to complete the Project, including final design, construction, demolition and removal, habitat restoration of former reservoir and other disturbed areas, monitoring, adaptive management maintenance and correction of deficiencies. The Project Implementation Work can generally be broken down into Pre-Drawdown work, Drawdown work, followed by Post-Drawdown work, as organized above.

Complete details regarding the Project Technical Requirements and the Project Implementation Work will set forth in Appendix 4 (Project Technical Requirements). Appendix 4 will be included as part of the overall amendment to this Project Agreement constituting the GMP Contract Amendment and will incorporate the Project design furnished by the Project Company through its performance of the Preliminary Services. Accordingly, Appendix 4 will augment and, to the extent of any inconsistencies, supersede this Appendix 1 in defining the Project and the Project Implementation Work the Project Company is required to perform hereunder.

1.3. PROJECT SITE

The Project Site is located along the Klamath River in the states of California and Oregon and consists of the PacifiCorp Property, which is currently owned by PacifiCorp and Adjacent and Related Lands, which are owned by various other parties.

1.3.1 PacifiCorp Property.

The PacifiCorp Property is described in Attachment 1A.

1.3.2 Adjacent and Related Lands.

The Adjacent and Related Lands are described in Attachment 1B.

1.4. FACILITIES

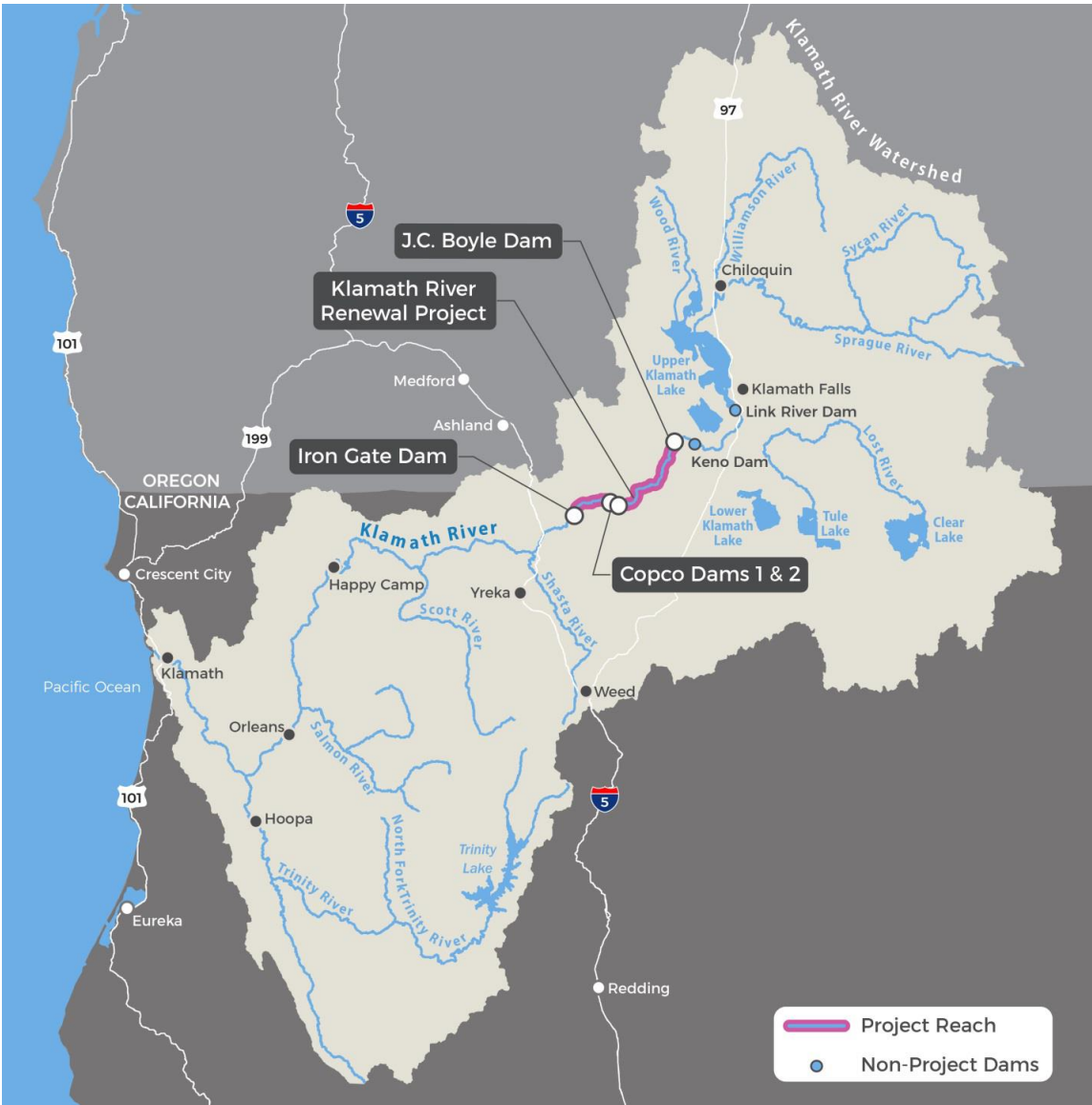
This Section describes the individual sites and features of the four Facilities (J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate dams and appurtenant structures, facilities and equipment) that the Project Company will remove as part of the Project. The April 2015 Supporting Technical Information Documents prepared by PacifiCorp for FERC provides additional detail on the four Facilities.

1.4.1 J.C. Boyle.

The J.C. Boyle Facility (originally known as Big Bend) consists of a reservoir, combination embankment and concrete gravity dam, gated spillway, diversion culvert, water conveyance system, and powerhouse located on the Klamath River between RM 234.1 and RM 226.0 in Klamath County, Oregon. Refer to Figure 2.1-1 of Appendix C (Figures – Other) to the Definite Plan for plan views of these features.

California-Oregon Power Company completed J.C. Boyle Dam in 1958 at RM 203.6, currently downstream of Keno Dam and upstream of Copco No. 1 Dam. The primary purpose of the J.C. Boyle Facility is to generate hydroelectric power. Structures at the site include an office building (known as the Red Barn), maintenance shop, fire protection building, communications building, two occupied PacifiCorp-owned residences near the dam, and a large warehouse near the powerhouse.

Figure 1.3-1 – Klamath River Watershed and Facilities Locations



Reservoir

J.C. Boyle Dam impounds a narrow reservoir (J.C. Boyle Reservoir) of 350 acres, and provides approximately 2,267 acre-feet of total storage capacity at reservoir water surface (RWS) elevation 3797.2. The maximum and minimum operating levels are between RWS elevations 3796.7 and 3791.7, a vertical operating range of 5 feet, although the reservoir is normally maintained at RWS elevation 3796.7, or 0.5 feet below the top of the spillway gates.

Dam, Spillway, and Diversion Culverts

The dam is composed of an earthen embankment section, fish ladder, spillway and diversion culverts, intake to the powerhouse, and concrete gravity section (from right abutment to left abutment, looking downstream).

The earthfill embankment portion is 68 feet tall (on the dam axis at its maximum height above the original streambed elevation 3735.7) with a 15-foot-wide crest and a crest length of 413.5 feet at elevation 3803.7. The zoned embankment has a central impervious clay core flanked by upstream and downstream shells composed of compacted sand and gravel, with a downstream filter blanket. The upstream face above elevation 3783.7 has a 2½H:1V slope with a 3-foot-thick riprap layer, and a 3H:1V slope below elevation 3783.7. The downstream face has a 2½H:1V slope, with a 2-foot-thick riprap layer below approximately elevation 3771.7. The dam includes a 3-foot-high concrete cutoff wall along the bedrock foundation about 7 feet upstream of the dam axis.

The concrete portion of the dam is 279 feet long and from right to left (looking downstream) is composed of a 117-foot-long spillway section, a 48-foot-long intake structure, and a 114-foot-long concrete gravity section with a maximum height of 23 feet.

The spillway section is a concrete gravity overflow structure with three 36-foot-wide by 12-foot-high radial gates, and upstream stoplog slots. The spillway crest is at elevation 3785.2, with the top of gates at elevation 3797.2 (0.5 feet above the normal operating level). The spillway includes a traveling gate hoist for operation of the spillway gates. The spillway bays discharge onto a 13-foot-long concrete apron stepped at three elevations generally following the profile of the bedrock surface. Below the apron is a vertical drop of 15 feet to the discharge channel, which was excavated in rock. The discharge channel is generally unlined. The estimated spillway discharge capacity at RWS elevation 3796.7 with all three gates open is 15,400 cubic feet per second (cfs).

A concrete box culvert with two 9.5- by 10-foot bays is located beneath the center and right spillway gates at invert elevation 3755.2 (30 feet below the spillway crest). This feature was used for diversion during construction of the dam, and has been sealed with concrete stoplogs at the upstream end. Approach and outlet channels for the diversion culvert were excavated in bedrock.

Intake, Fish Screens, and Fish Ladder

The intake structure is located to the left of the spillway and consists of a 40-foot-high reinforced concrete tower. It has four approximately 11-foot by 37-foot openings to the reservoir, each of which has a steel trash rack followed by a stoplog slot and a vertical traveling fish screen (with 0.25-inch-square openings) with high pressure spray cleaners. Spray water along with any screened fish are collected and diverted downstream of the dam through a 340-foot-long, 24-inch-diameter fish screen bypass pipe, which provides approximately 20 cfs to the Klamath River below the dam. A fabricated metal building was added to the intake structure in 1989. Downstream of the traveling fish screens is the entrance to a 14-foot-diameter steel

pipeline. The upstream end of the 14-foot pipeline includes a wheel-mounted slide gate and hoist, with upstream stoplog slots, for operation and maintenance purposes.

A concrete pool and weir fish ladder located along the abutment wall between the embankment and concrete sections provides upstream fish passage at the dam. The fish ladder is approximately 569 feet long with 63 pools. A 24-inch slide gate regulates reservoir releases to the fish ladder, and the fishway operates over a head range of approximately 61 to 66 feet.

Water Conveyance to Powerhouse

A water conveyance system connects the dam to the powerhouse and has a total length of 2.56 miles. The conveyance system from upstream to downstream consists of a steel pipeline, a headgate, a flume, a forebay, a tunnel, and two penstocks connecting to the powerhouse.

From the intake structure at the dam, the water flows through a 638-foot-long, 14-foot-diameter steel pipeline, supported on steel frames where it spans the Klamath River. The downstream end of the pipeline is equipped with a 14- by 14-foot automated fixed-wheel gate within a concrete headgate structure completed in 2002, which discharges into an open concrete-lined flume (the power canal).

The power canal is nearly 2.2 miles long and located along a bench cut in the slope of the river canyon. Depending on the terrain, the power canal either has walls on the down-slope side only or on both the down-slope and up-slope sides. The power canal is a concrete flume approximately 17 feet wide and 12 feet high, with shotcrete applied to the canyon walls where exposed. It has overflow structures at the upstream end (consisting of a siphon pipe) and at the downstream forebay (consisting of a gated overflow weir).

The forebay is a somewhat enlarged area at the end of the power canal that connects to the tunnel, the next downstream component in the water conveyance system. The forebay has an overflow or spillway equipped with two float-operated automatic spill gates, which release water from the power canal during a hydraulic surge following any load rejection at the powerhouse. The released water discharges through a short, concrete-lined chute and returns to the bypass reach of the Klamath River (between the dam and powerhouse) via a large eroded channel (or scour hole) in the hillside. A forebay sluiceway pipe has been abandoned in place.

A 60-foot-wide and 17.9-foot-high trash rack with 2-inch bar spacing draws water for power generation from the forebay into a 15.5-foot-diameter, concrete-lined, horseshoe-shaped tunnel, which is 1,644 feet long. The last 57-foot length of the tunnel before the downstream portal is steel-lined with the liner bifurcating into two 10.5-foot-diameter steel penstocks. A concrete anchor block encases the bifurcation and includes a 78-foot-high, 30-foot-diameter steel surge tank.

Descending to the powerhouse, the penstocks reduce in two steps to 9 feet in diameter. Ring girders seated on concrete footings support each 956-foot-long penstock. The downstream end of each penstock includes a 108-inch-diameter butterfly valve.

Powerhouse

A conventional outdoor-type reinforced concrete peaking powerhouse is located on the right bank of the river and approximately 4.6 river miles downstream of the dam, at RM 226.0, and is the largest power generating Facility in the Project. The two turbines are vertical-shaft, Francis-type units with a total rated discharge capacity of 2,850 cfs. The turbines are rated at 75,700 horsepower (hp) for Unit No. 1 (replaced in 1994) and 63,900 hp for Unit No. 2, with a net head of 440 feet. The system provides no bypass capacity. Four draft tube bulkhead gates

and slots, with two hoists, are provided downstream of the units. A single 150-ton gantry crane is currently located at the J.C. Boyle powerhouse, but can also be used at the Iron Gate powerhouse.

The generators are rated at 53 megavolt-amperes (MVA) for Unit No. 1, with a 0.95 power factor (50 megawatts (MW)), and 50 MVA for Unit No. 2, with a 0.95 power factor (48 MW). The power from the powerhouse is transmitted a very short distance to the adjoining J.C. Boyle substation. Two three-phase transformers step up the generator voltage for transmission interconnection. Line No. 58 (to Lone Pine) and Line No. 59 (to Klamath Falls) extend from the J.C. Boyle substation to a line tie. There is also a third line that pre-dates the substation. The 0.24-mile 69-kV transmission line (PacifiCorp Line No. 98) connects the J.C. Boyle powerhouse to a tap point on PacifiCorp's Line No. 18, but this line appears to have been removed.

Recreation Facilities

Recreation facilities include Topsy Campground and boat launch (managed by the Bureau of Land Management ("BLM")), Pioneer Park east and west units and boat launches (managed by PacifiCorp), Spring Island whitewater boating launch (managed by BLM), and numerous smaller dispersed shoreline recreation sites, including two picnic areas, 13 campsites, and 11 shoreline access points.

1.4.2 Copco No. 1.

The Copco No. 1 Facility consists of a reservoir, concrete dam, gated spillway, diversion tunnel, intake structure, and powerhouse located on the Klamath River between approximately RM 209.0 and RM 202.2 in Siskiyou County, California. Refer to Figure 2.2-1 to Appendix C (Figures – Other) of the Definite Plan for plan views of these features.

Siskiyou Power and Light Company (previously California-Oregon Power Company) constructed Copco No. 1 Dam between 1911 and 1922 at RM 202.2, currently downstream of J.C. Boyle Dam and upstream of Copco No. 2 Dam. The primary purpose of the Copco No. 1 Facility is to generate hydroelectric power. Structures at the site include an occupied residence with a small garage, vacant house, and a maintenance building.

Reservoir

Copco No. 1 Dam impounds a reservoir (Copco Lake) of approximately 972 acres and provides approximately 33,724 acre-feet of total storage capacity at RWS elevation 2611.0. The maximum and minimum reservoir operating levels are between RWS elevations 2611.0 and 2604.5, a vertical operating range of 6.5 feet, although the reservoir is normally maintained at RWS elevation 2609.5, or 1.5 feet below the top of the spillway gates.

Dam, Spillway, and Diversion Tunnel

The dam is composed of a concrete gravity arch which also functions as a spillway, diversion culverts and intakes to the powerhouse.

The dam is a concrete gravity arch structure approximately 133 feet tall from the pre-dam river bed elevation to the top of the spillway deck, with a 492-foot radius at the upstream face. The crest length between the rock abutments is approximately 410 feet at elevation 2616.5. The upstream face of the dam is vertical at the top, then battered at 1 horizontal to 15 vertical. The downstream face is stepped, with risers generally about 6 feet in height.

A 224-foot-long, ogee-type overflow spillway is located on the crest of the dam and is divided into 13 bays controlled by 14- by 14-foot radial (Tainter) gates, with a spillway crest at elevation 2597.0. Three traveling gate hoists are provided for operating the spillway gates, and stoplog slots are provided upstream of each opening.

As originally designed, the spillway crest was approximately 115 feet above the original river bed. After construction began, the river gravel was found to be over 100 feet deep at the dam site, and was excavated and then backfilled with concrete, making the total structural height of the dam 230 feet, measured from the lowest depth of excavation to the spillway crest, or 250 feet to the top of the spillway deck. The estimated spillway discharge capacity at RWS elevation 2611.0 with all 13 gates fully open is 35,000 cfs.

A 16- by 18-foot diversion tunnel was excavated through the left abutment for streamflow diversion during construction, but was later sealed by the construction of a concrete plug approximately 200 feet upstream from the downstream tunnel portal. A gated concrete intake structure, which regulated flows during construction, is located at the upstream end of the tunnel and has three 72-inch-diameter flap (or clack) valves, three 72-inch-diameter butterfly regulating valves, and three 12-inch-diameter filling lines with valves. All valves were manually operated using gate stems and wire ropes from hoists located on a concrete deck upstream of the left abutment of the dam. The current condition of the valves and upstream tunnel is unknown, as they are submerged by reservoir sediment. The existing hoists, stems and wire ropes were abandoned in place and are not currently operational.

Water Conveyance to Powerhouse

The intakes for the three penstocks, two 10-foot-diameter and one 14-foot-diameter, are located at the right abutment at approximately invert elevation 2,578.5. Each penstock includes two cast-iron slide gates with electric motor hoists located in two concrete gatehouses. The two 10-foot-diameter (reducing to 8-foot-diameter) steel penstocks closest to the river feed Unit No. 1 in the powerhouse, and the 14-foot-diameter (splitting and reducing to two 8-foot-diameter) steel penstock feeds Unit No. 2. Trash racks with bar spacing of 3 inches proceed each intake.

A third generating unit at the powerhouse was planned but never built. Some conveyance facilities (two slide gates and a short penstock section) were built to the right of the existing penstocks for this possible future expansion.

Powerhouse

The Copco No. 1 Powerhouse is a reinforced-concrete substructure with a concrete and steel superstructure located at the base of Copco No. 1 Dam, on the right bank of the river. It operates as peaking powerhouse. The two turbines are horizontal-shaft, double-runner Francis-type units with a total rated discharge capacity of 3,650 cfs. The turbines have a rated output of 21,759 hp and 18,600 hp for Unit No. 1 and Unit No. 2, respectively, with a net head of 125 feet. The system provides no bypass capacity.

The generators are each rated at 12,500 kilovolt-amperes (kVA) with a 0.8 power factor (10 MW). Unit No. 1 has three indoor, single-phase 5,000-kVA, 2,300/72,000-volt (V) transformers, and Unit No. 2 has three indoor, single-phase 4,165-kVA, 2,300/72,000-V transformers, to step up the generator voltage for transmission interconnection.

The Copco No. 1 Powerhouse has four associated 69-kV transmission lines. PacifiCorp Line Nos. 26-1 and 26-2 are each approximately 0.07 miles long and connect the Copco No. 1 Powerhouse to the Copco No. 1 switchyard, located on the right abutment upslope of the

powerhouse. PacifiCorp Line No. 15 is approximately 1.23 miles long and connects the Copco No. 1 switchyard to the Copco No. 2 Powerhouse, and Line No. 3 is approximately 1.66 miles long and connects the Copco No. 1 switchyard to the Fall Creek powerhouse.

Recreation Facilities

Recreation facilities include Mallard Cove and Copco Cove, each with boat launches (both managed by PacifiCorp), and smaller dispersed shoreline recreation sites.

1.4.3 Copco No. 2.

The Copco No. 2 Facility consists of a small reservoir, concrete diversion dam, embankment section, gated spillway, water conveyance system, and powerhouse located on the Klamath River between approximately RM 202.2 and RM 200.3 in Siskiyou County, California. Refer to Figure 2.2-1 of Appendix C (Figures – Other) to the Definite Plan for plan views of these features.

California-Oregon Power Company completed the dam in 1925 approximately 0.4 miles downstream of Copco No. 1 Dam at RM 201.8, while the powerhouse is located at RM 200.3, just upstream of Iron Gate Reservoir. The purpose of the Copco No. 2 Facility is to generate hydroelectric power.

Structures near the powerhouse include a control center building, maintenance building, and an oil and gas storage building. The nearby PacifiCorp-owned Copco Village includes a former cookhouse/bunkhouse, modern bunkhouse, garage/storage building, bungalow with a garage, three occupied modular houses, four older ranch-style houses, and a school house/community center, all of which are within FERC project boundary.

Reservoir

The reservoir created by Copco No. 2 Dam is approximately 0.3 miles long (unnamed), and has a total storage capacity of approximately 70 acre-feet at the normal operating RWS elevation 2486.5.

Dam and Spillway

The dam is composed of a concrete gravity section which also functions as a spillway, an earthen embankment section, a small penetration for bypass flows and a water conveyance intake for the powerhouse.

The dam is a concrete gravity structure with a gated side intake to a water conveyance tunnel at the left abutment, a central 145-foot-long spillway section with five 26- by 11-foot radial (Tainter) gates, and a 100-foot-long earthen embankment with gunite cutoff wall on the right abutment. The dam is 32 feet high, with an overall crest length of 305 feet and a crest width of 9 feet at elevation 2496.5.

A manually-operated slide gate controls a small sluiceway adjacent to the intake, but is not currently believed to be operational. A small corrugated metal half-pipe provides approximately 5 cfs of flow to the bypass reach below the dam. The concrete gravity spillway crest is at elevation 2476.5, with a downstream apron at elevation 2459.5, between two concrete retaining walls. The estimated spillway discharge capacity at RWS elevation 2486.5 is 13,500 cfs with the five spillway gates fully open.

The remnant of a cofferdam is located upstream of the dam below the normal waterline. An old rock-filled timber crib is located high above the left abutment of the dam.

Water Conveyance to Powerhouse

Water conveyance to the powerhouse is via the intake at the dam to a first tunnel, then through a wood-stave penstock, a second tunnel, and into a pair of steel penstocks to the powerhouse.

The intake structure incorporates a large trash rack and a 20- by 20-foot roller-mounted (caterpillar) gate at invert elevation 2459.5. The trash rack is 36.5 by 48 feet with 4-inch bar spacing.

The water conveyance system for the powerhouse includes 2,500 feet of concrete-lined tunnel (including an adit and an air vent shaft), 1,330 feet of wood-stave pipeline, an additional 1,110 feet of concrete-lined tunnel, an underground surge tank (including an air vent and overflow spillway), and two steel penstocks. The diameter of the tunnel and wood stave pipeline sections is 16 feet. The two penstocks, one 405 feet long and one 410 feet long, range from 16 feet in diameter at the upstream ends to 8 feet in diameter at the turbine spiral casings. A 138-inch butterfly valve is provided near the downstream end of each penstock.

Powerhouse

The Copco No. 2 Powerhouse is a reinforced-concrete structure located 1.6 miles downstream of Copco No. 2 Dam on the left bank of the river. It operates as peaking powerhouse. The two turbines are vertical-shaft, Francis-type units with a total rated discharge capacity of 2,786 cfs. Each turbine has a rated output of 26,285 hp and 20,000 for Units No. 1 and No. 2, respectively, with a net head of 145 feet and 140 feet for Units No. 1 and No. 2, respectively. No bypass capacity is provided.

The synchronous generators are each rated at 15,000 kVA with a 0.9 power factor (13.5 MW). There are three outdoor, single-phase 10/20-MVA, 6,600/72,000-V transformers for each generator to step up the voltage. There are also three outdoor, single-phase 10/20-MVA, 73,800/230,000-V step-up transformers for interconnection to the transmission system.

A 69-kV transmission line (also Line No. 15) is approximately 0.20 miles long and connects the Copco No. 2 Powerhouse to the Copco No. 2 switchyard. A distribution line approximately 0.21 miles long connects to Copco No. 2 Dam. Line No. 62 runs along the north side of Iron Gate reservoir for approximately 6.32 miles, from the Iron Gate powerhouse to the Copco No. 2 switchyard. Drawings provided by PacifiCorp also note Lines 1, 2, 4, 14, 18, 19, and 67 connecting to the Copco No. 2 switchyard.

Recreation Facilities

Two water access points exist directly upstream of the Copco No. 2 dam, but they are not publicly accessible.

1.4.4 Iron Gate.

The Iron Gate Facility consists of a reservoir, embankment dam, side-channel spillway, diversion tunnel, intake structures, and powerhouse located on the Klamath River between RM 200.3 and RM 193.1, about 17 miles northeast of Yreka, California, in Siskiyou County. Refer to Figure 2.4-1 of Appendix C (Figures – Other) to the Definite Plan for plan views of these features.

California-Oregon Power Company completed the facility in 1962 at RM 193.1. It is the farthest downstream hydroelectric facility of the Project. The primary purpose of the Iron Gate Facility is to generate hydroelectric power. Structures at the site include a communications building, a restroom building, a maintenance shop, two occupied residences, and a fish spawning building.

Reservoir

Iron Gate Dam impounds a reservoir of 942 acres (Iron Gate Reservoir) and provides approximately 50,941 acre-feet of total storage capacity at RWS elevation 2331.3. The maximum and minimum operating levels are between RWS elevations 2331.3 and 2327.3, a vertical operating range of 4 feet.

Dam, Spillway, and Diversion Tunnel

The dam is composed of a side channel spillway, earthen embankment section, diversion tunnel, intake to Iron Gate hatchery water supply, and intake to the powerhouse (from right abutment to left abutment, looking downstream). A fish ladder and trapping and holding facilities are located at the downstream base of the dam.

The dam is a zoned earthfill embankment with a current height of 189 feet from the rock foundation (elevation 2157.5) to the dam crest at elevation 2346.3. The dam crest is 20 feet wide and approximately 740 feet long. The embankment includes a central impervious clay core, with filter zones and a downstream drain, and is flanked by compacted pervious shells. The upstream face has a 2H:1V slope above elevation 2331.3, a 2½H:1V slope between elevations 2331.3 and 2303.3, and a 3H:1V slope below elevation 2303.3, with a 29-foot-wide bench at elevation 2278.3. The upstream face includes a 10-foot-thick riprap layer for slope protection.

The downstream face has a 1.75H:1V slope above and a 2H:1V slope below elevation 2326.3, with a 10-foot-wide bench at elevation 2278.3. The downstream face includes a 5-foot-thick riprap layer for slope protection. The dam is founded on a sound basalt rock foundation, with a grout curtain beneath the impervious core.

PacifiCorp completed modifications in 2003 to raise the dam crest five feet from elevation 2341.3 to elevation 2346.3 by over-steepening the upstream and downstream slopes and decreasing the crest width from 30 feet to 20 feet. A sheet pile wall was also driven upstream of the dam centerline to extend five feet above the dam crest to provide freeboard in addition to the 5-foot crest raise. The top of the sheet pile wall is at elevation 2351.3. Additional riprap materials were placed on the upstream face of the dam to protect those areas inundated by the higher reservoir elevations during large flood events.

The spillway is excavated in rock on the right abutment, and consists of an ungated side-channel spillway crest with a concrete-lined chute. The spillway crest is at elevation 2331.5, or 15 feet below the raised dam crest. The spillway crest is 727 feet long and consists of a concrete ogee crest and slab placed over the excavated rock ridge. Concrete partly lines the upper part of the channel. The downstream end of the spillway crest includes a 10- by 8-foot hinged trash/slucice gate for sluicing sediments and debris.

A flip-bucket terminal structure is located at the downstream end of the spillway chute. The spillway has an estimated discharge capacity of 22,350 cfs at RWS elevation 2336.3. The modifications completed in 2003 included shotcrete protection at the top of the spillway crest and chute.

The diversion tunnel used during construction of the dam was driven through bedrock in the right abutment and terminates in a reinforced concrete outlet structure near the downstream toe of the dam. The diversion tunnel intake is a reinforced concrete structure equipped with four 10- by 33-foot trash racks and is located approximately 520 feet upstream from the dam axis near the upstream toe. A two-piece concrete slide gate located in a gate shaft approximately 119 feet upstream of the dam axis controls flow in the tunnel. A reinforced concrete tower accessible by footbridge from the dam crest houses the slide gate hoist and controls. Operation of the upper sluice gate is limited to an opening of 23.5 inches at RWS elevation 2331.3, with a corresponding discharge capacity of 1,750 cfs; under emergency conditions, a full gate opening of 57 inches would produce a release of 2,700 cfs. The lower diversion gate is currently welded in place. Recent modifications added a 9-foot-diameter hinged blind flange and concrete ring approximately 20 feet downstream of the concrete slide gate (designed for full reservoir head) to permit underwater inspection of the gate.

Water Conveyance to Powerhouse

Water conveyance to the powerhouse consists of an intake structure and penstock.

The intake structure for the powerhouse is a 45-foot-high, free-standing, reinforced-concrete tower, located in the reservoir immediately upstream of the left abutment and accessible by footbridge from the abutment. It houses a 12- by 17-foot wheel-mounted slide gate, which controls the flow into a 12-foot-diameter, welded-steel penstock. The penstock is concrete-encased where it penetrates the dam approximately 35 feet below the normal maximum reservoir level. Concrete supports down the dam abutment support the penstock. There is a 17.5- by 45-foot trash rack at the penstock intake with 4-inch bar spacing.

Powerhouse

The Iron Gate Powerhouse is an outdoor-type facility located at the downstream toe of the dam on the left bank and consists of a single vertical-shaft, Francis-type turbine with a rated discharge capacity of 1,735 cfs. The turbine has a rated output of 25,000 hp with a net head of 154 feet. In the event of a turbine shutdown, a synchronized Howell-Bunger bypass valve located immediately upstream of the turbine diverts water around the turbine to maintain flows downstream of the dam. The synchronous generator is rated at 18,975 kVA with a 0.95 power factor (18 MW).

There is a single outdoor, three-phase 19-MVA, 6,600/69,000-V step-up transformer at the powerhouse for interconnection to the transmission system. A 69-kV transmission line is approximately 0.21 miles long and connects the Iron Gate switchyard to Tower P 2/007. A second 69-kV transmission line is approximately 0.33 miles long and connects the Iron Gate switchyard to the Iron Gate Hatchery tie-in. Two distribution lines totaling 0.21 miles provide local distribution around the dam and powerhouse area.

Fish Trapping and Holding Facilities

There are fish trapping and holding facilities located on “random fill” at the downstream toe of the dam. The top of the random fill area is at elevation 2192.3. The fish facilities at the dam include six fish holding tanks, a spawning building, a fish ladder, and an aerator for the hatchery water supply. High-level (elevation 2313.3) and low-level (elevation 2253.3) intakes for the fish facility cold water supply are incorporated in the dam on the left abutment.

Iron Gate Fish Hatchery

The Iron Gate fish hatchery was constructed in 1966 and is located on the left bank, downstream of Iron Gate Dam, adjacent to the Bogus Creek tributary. The hatchery complex includes an office, warehouse, hatchery/incubator building, four fish rearing ponds, a fish ladder with trap, visitor information center, and four employee residences. Up to 50 cfs of water is diverted from the Iron Gate reservoir to supply the 32 raceways and fish ladder. The hatchery provides the capacity to capture, hold, and spawn returning adult Chinook salmon, steelhead trout, and Coho salmon and to hatch and rear fish until their release. CDFW operates the hatchery, with a large portion of the operations and maintenance costs currently funded by PacifiCorp.

Recreation Facilities

Recreation facilities include Fall Creek day-use area and boat launch, Jenny Creek campground, Wanaka Springs day-use area and campground, Camp Creek campground and boat launch, Juniper Point campground, Mirror Cove campground, Overlook Point day-use area, and Long Gulch campground and boat launch (each managed by PacifiCorp), and smaller dispersed shoreline recreation sites. Among the referenced facilities, there exist a visitors' center at Iron Gate hatchery, two interpretive displays, five boat launches, one fishing platform, two picnics areas, six campgrounds (with sixty-six campsites), five dispersed camping areas (with 20 campsites), and four other water access points.

1.5. RELATED PROJECTS

The text below summarizes likely related projects that should be considered by the Project Company in development of their Proposal.

1.5.1 KRRC Related Projects.

KRRC activities associated with Project implementation that are not within the Project Company scope of work include the following:

1. Hatchery Design: Site investigations and final detailed design, including development of final drawings and specifications for improvements at Fall Creek and Iron Gate hatcheries. Additional details concerning these activities can be found in Section 7.8 of the Definite Plan.
2. Waterline Design: Site investigations and final detailed design, including development of final drawings and specifications for relocation of the City of Yreka's waterline across Iron Gate Reservoir and improvements at the City of Yreka's intake. Additional details concerning these activities can be found in Section 7.5 of the Definite Plan.
3. Implementation of aquatic resource measure and reporting: Additional details concerning these activities can be found in Section 7.2 and Appendix I of the Definite Plan.
4. Implementation of terrestrial resource measure and reporting: Additional details concerning these activities can be found in Section 7.3 and Appendix J of the Definite Plan.
5. Completion of water quality monitoring and reporting: Additional details concerning these activities can be found in the Oregon Department of Environmental Quality (ODEQ) final Clean Water Act section 401 water quality certification (issued

- September, 2018) for the removal of the J.C. Boyle Dam located in Klamath County, OR, and the California State Water Resource Control Board's (SWRCB) draft Clean Water Act section 401 water quality certification (issued June 7, 2018) for the removal of Copco No. 1, No. 2 and Iron Gate Dams located in Siskiyou County, CA.
6. Cultural resource support: Additional details concerning these activities can be found in Appendix L of the Definite Plan.

The Project Company will need to coordinate with contractors selected for the related work, and accommodate activities associated with all KRRC related work. At the KRRC's discretion, the Project Company may be asked to be involved in contractor selection.

1.5.2 PacifiCorp Related Projects.

Prior to license transfer, PacifiCorp will retain ownership of all their current property and existing Facilities, and will continue to operate and maintain the Facilities according to their current operating license with FERC and any Governmental Approvals issued by federal and state regulatory agencies. The Project Company shall consider ongoing PacifiCorp operations and maintenance, as well as any PacifiCorp access related requirements (see Section 1.6 (PacifiCorp Property Access)) for outside contractors in development of their Proposals, particularly with respect to Project Company field investigations and Preliminary Services design site visits.

Post-license transfer, property and Facilities ownership will transfer to the KRRC. Through an existing operations and maintenance agreement (see Reference Document 12 (PacifiCorp Operations and Maintenance Agreement)), PacifiCorp will continue to operate and maintain the Facilities according to the current operating license with FERC and any permits issued by federal and state regulatory agencies. PacifiCorp's operations and maintenance continue up to the start of drawdown. The Project Company shall consider ongoing PacifiCorp operations and maintenance, in development of their Proposals, particularly with respect to Project Company work or activities on or within the existing Facilities.

The Project Company will need to coordinate with PacifiCorp staff and contractors selected for the related work, and accommodate activities associated with all PacifiCorp related work.

1.6. PACIFICORP PROPERTY ACCESS

Primary access to the Iron Gate and Copco Facilities is from Interstate 5 to Copco Road, and primary access to the J.C. Boyle Facility is from US 97 to Oregon State Route 66.

1.6.1 J.C. Boyle Site Access.

Oregon Route 66 (OR66, Green Springs Highway) and Topsy Grade Road provide site access via a network of unpaved project access roads. A small timber bridge crosses the Klamath River downstream of the dam.

1.6.2 Copco No. 1 Site Access.

Copco Road from Interstate 5 provides site access, and access continues via a steep and narrow access road to the dam right abutment and powerhouse. Copco Road provides access to the north side of the reservoir. Ager-Beswick Road provides access to the south side of the reservoir, and is an extension of the Topsy Grade Road in Oregon.

1.6.3 Copco No. 2 Site Access.

Copco Road from Interstate 5 provides site access. Access to the dam is provided via a steep and narrow access road (the same access road as for Copco No. 1). Access to the powerhouse is provided via the Daggett Road crossing of the Klamath River on a single-lane bridge.

1.6.4 Iron Gate Site Access.

Site access is provided from Interstate 5 via Copco Road and then by Lakeview Road to the dam crest and reservoir area, or by a project access road to the powerhouse. The single-lane Lakeview Road Bridge crosses the Klamath River downstream of the dam.

1.7. ADJACENT AND RELATED LANDS ACCESS

[Site access to Adjacent and Related Lands to be provided here.]

1.8. KRRC OBJECTIVES:

The KRRC's goal for delivery of the Project is completion of the Project Preliminary Services and Project Implementation Work on-time and within budget, subject to the objectives below.

- Safety – Implement an effective safety program incorporating industry best practices.
- Public – Provide a safe and effective project that minimizes nuisance impacts to the public.
- Quality – Provide the highest quality design and construction submittals, and complete the Project in a manner that is consistent with the KHSA, and meets all tribal, federal, state and other agency expectations.
- Cost – Obtain the most cost effective design and construction approach to accomplish the defined Project for a Guaranteed Maximum Price and while meeting the other stipulated cost constraints, including constraints embodied in the KHSA.
- Schedule – Achieve the scheduled completion dates for design, construction, and post-construction monitoring of the Project, including planning to accommodate foreseen and unforeseen change.
- Local and Tribal Participation – Obtain the highest level of local and tribal involvement in the performance of the Project Work as is practicable and feasible, including direct hires of local workers by the Project Company, as well as subcontracting with local firms and tribes.
- Women, Minority, Disabled Veteran, Lesbian, Gay, Bisexual, and Transgender Participation – Obtain the highest level of women, minority, disabled veteran, lesbian, gay, bisexual, and transgender involvement in the performance of the Project Work as is practicable and feasible.
- Accountability – Obtain in the Project Company a single point of accountability for performance of all services under the Project Agreement.
- Aesthetics – Achieve full native habitat restoration that blends seamlessly with the adjacent habitat communities.

- Sustainability – Meet all other design and habitat goals in the short and long-term while requiring minimal long-term maintenance and monitoring outside of regulatory requirements.
- Collaboration – Provide for coordinated design development, with the Project Company eliciting the KRRC input in a manner that preserves Project Company's sole responsibility for the achievement of Project performance objectives while meeting the other KRRC objectives listed above.

ATTACHMENT 1A
DESCRIPTION OF PACIFICORP PROPERTY

[Metes and bounds description of PacifiCorp Property to be provided here.]

ATTACHMENT 1B

DESCRIPTION OF ADJACENT AND RELATED LANDS

[Metes and bounds description of Adjacent and Related Lands to be provided here.]

APPENDIX 2
PRELIMINARY SERVICES

APPENDIX 2**PRELIMINARY SERVICES****2.1. GENERAL REQUIREMENTS****2.1.1 Scope of Base Preliminary Services.**

The Base Preliminary Services shall consist of the following nine Preliminary Services Tasks:

- Task #1: Project Management
- Task #2: Project Site and Project Conditions Verification
- Task #3: Permitting Support and Compliance Program
- Task #4: Initial Cost Model and Schedule
- Task #5: Design Criteria Report
- Task #6: 30% Design Completion Documents
- Task #7: 60% Design Completion Documents
- Task #8: GMP Project Submittal and Supporting Cost Estimates
- Task #9: 90% Design Completion Documents

Unless specifically excluded from this Project Agreement, the Project Company shall provide to the KRRC all architectural, engineering, geotechnical, landscape, Project management, cost estimating and other professional services necessary to perform the Base Preliminary Services required by this Project Agreement.

2.1.2 Deliverable Material.

Required Deliverable Material for each Preliminary Services Task is identified in this Appendix. All Deliverable Material identified in this Appendix shall be reviewed with representatives of the KRRC. The Project Company shall promptly correct deficiencies in Deliverable Material and shall promptly make modifications to conform to Project requirements and modifications to achieve acceptability of the Deliverable Material to the KRRC. Draft deliverables shall be provided to the KRRC in Microsoft® WORD or EXCEL format. Unless specified otherwise, the Project Company shall provide electronic copies of all final deliverables in .pdf format. For draft and final design drawing, design report and specification deliverables, the Project Company shall provide six (6) hard copies to the KRRC or their designated representative. Drawing hardcopies shall be ½-size printed single sided on 11 x 17 paper and spiral bound.

2.1.3 Plans and Reports.

The Preliminary Services Tasks provide for the preparation of all plans, reports and other deliverables listed in Attachment 2C, Preliminary Services Project Company Submittals.

2.2. PRELIMINARY SERVICES TASK #1 – PROJECT MANAGEMENT**2.2.1 Project Management.**

The Project Company shall provide Project management of the Project Company team in terms of staffing, budget, schedule, scope, as well as communication and coordination with the KRRC. The Project Company management team will be co-located during the duration of Preliminary Services in Kiewit's Fairfield office.

This Preliminary Services Task includes managing the scope of work, schedule and budget, coordination with the KRRC and development of the plans and reports listed below:

- Mobilization and Site Access Plan, which shall include:
 - Site Trailers and Utilities Plan
 - Security Plan
 - Photographic Documentation Plan
 - Related Projects Coordination Protocol
 - Maintenance of Facilities Operations Plan
 - Emergency Operations and Response Plan
- Health and Safety Plan
- Project Execution Plan, which shall include:
 - Project Team Structure and Staffing Plan
 - Communications Plan
 - Scope Management Plan
 - Change Management/Integration Management Plan, which shall include a Trend Management Log and Project Decision Log
 - Schedule Management Plan
 - Budget Management Plan
 - Risk Management Plan, which shall include risk register
 - Procurement Management Plan
 - Project Implementation Quality Management Plan, which shall meet the requirements set forth in Appendix 6 (Project Implementation Work Quality Control Requirements) (including QA/QC requirements)
 - Document Control Plan
- Preliminary Services Schedule and Initial Project Implementation Schedule
- FERC-Required Plans and Submittals
- Monthly Progress Reports

Requirements associated with the various plans and submittals listed above are included in Sections 2.2.8 (Mobilization and Site Access Plan) through 2.2.12 (FERC and DSOD-Required Plans and Submittals) below.

The Project Company will prepare invoices, progress reports, and design progression and design decision log updates on a monthly basis. Other activities include keeping the KRRC informed and soliciting input from the KRRC when making key decisions, coordination with Subcontractors, scheduling of staff, and coordinating the QA effort.

The Project Company shall also conduct weekly Project management meetings with the Project Company Project managers and KRRC Project managers. An agenda will be distributed to the KRRC prior to the meetings and the Project Company will distribute meeting notes and action items within three days after each meeting. Each meeting agenda shall include:

- (a) Ongoing activities

- (b) Upcoming activities
- (c) Scope, schedule and budget
- (d) Project risks
- (e) Issues
- (f) Decisions and actions
- (g) Change management
- (h) Health and safety

A minimum of nine Technical Workshops shall be incorporated into Base Preliminary Services to address specific subjects and facilitate collaboration and development of ideas and decisions to be carried forward during design development. Each workshop will last two to four hours in length and will be facilitated by the Project Company and KRRC Project managers. An agenda (including desired outcomes) as well as technical background documents will be distributed to workshop attendees prior to the meetings. The Project Company will document the outcome of each workshop and distribute meeting notes and action items within three days after each workshop. At a minimum, Technical Workshops will be conducted on the following subjects:

- (a) Project Kickoff and Partnering
- (b) Risk Identification, Evaluation and Management
- (c) Design Submittals and Challenges
- (d) Schedule and Project Implementation Work Sequencing
- (e) Permitting and Compliance
- (f) Subcontractor Procurement

Deliverables:

All final plan or other submittals shall be submitted within 2 weeks of receipt of KRRC comments, unless otherwise noted below.

- Draft and final Mobilization and Site Access Plan; draft shall be submitted within 60 calendar days of Contract Date
- Draft and final Health and Safety Plan; draft shall be submitted within 30 calendar days of Contract Date
- Draft and final Project Execution Plan; draft shall be submitted within 30 calendar days of Contract Date
- Draft and final Preliminary Services Schedule; draft shall be submitted within 30 calendar days of Contract Date
- Monthly Updates to Preliminary Services Schedule: shall be submitted in each Monthly Progress Report
- Draft and final FERC Plans/Submittals; drafts shall be submitted based on final Preliminary Services Schedule
- Meeting Agendas and Notes
- Technical Workshop Agendas and Notes

2.2.2 Document Submittal Procedures.

Within 10 days following the Contract Date, the Project Company shall submit to the KRRC a set of document submittal procedures ("Document Submittal Procedures"). The Document Submittal Procedures shall identify the key document submittal packages to be prepared by the Project Company, the expected submittal dates to the KRRC, as well as the expected review durations for the KRRC. Proposed KRRC review durations should vary based on the type and size of submittal, and review durations should be organized by category. The Project Company should expect a two week review for draft submittals, except for Preliminary Services Tasks #7 and #8, which will require three weeks. A one week review duration shall be assumed for all final submittals to back-check. The parties acknowledge and agree that if submittals are not provided on the agreed upon submittal dates, it could extend the KRRC's review completion date a corresponding number of days. The Document Submittal Procedures shall also identify the frequency of the Project Company's design progress meetings during various phases of the design. The Document Submittal Procedures shall require the Project Company to submit a minimum of one electronic and one original hardcopy, with up to six paper copies of each document submittal and CD copies as requested by the KRRC. The Document Submittal Procedures shall also require the Project Company to distribute the document submittals as directed by the KRRC.

Unless otherwise noted herein for specific tasks/submittals, the Project Company shall anticipate a review duration of two weeks for any submittals/applications to agencies or other stakeholders.

The Project Company may propose to create a project web site, accessible to the KRRC and KRRC-designated representatives, for posting all document submittals and other reference information. This web site shall be integrated with the Records Management System described in Section 2.2.5 (Records Management System). Implementation of the project website shall be subject to the KRRC's approval. The KRRC may reduce the requirements for hard copies and electronic and CD copies of submittals in consideration of access to information on the web site.

Deliverables:

- Draft and final Document Submittal Procedures

2.2.3 Monthly Progress Report Requirements.

The Project Company shall submit Monthly Project Reports during the Preliminary Services Period which meet the requirements set forth in Section 4.9 (Monthly Progress Reports) of this Project Agreement.

Deliverables:

- Monthly Progress Reports

2.2.4 Kickoff Meeting and Partnering.

Within two weeks after each Preliminary Services Task Notice to Proceed, key staff members of the KRRC and Project Company will participate in a Project kickoff/partnering workshop. The goal of the workshops is to deepen working relationships, develop common goals and objectives for the Project, and achieve a cooperative partnership environment among Project participants. The workshop attendees, agendas, facilitation, and venue will be coordinated by the KRRC and Project Company's Project managers immediately following the Preliminary Services Task Notice to Proceed. The Project Company will develop a Draft and Final Partnering Charter for

review and execution by the KRRC. The Project Company will distribute (within one week after workshop) and track action items that come out of the partnering workshops.

Deliverables:

- Kickoff Agenda and Meeting Notes
- Draft and Final Partnering Charter
- Workshop Action Items

2.2.5 Records Management System.

The Project Company will furnish and implement a records management software system (such as EADOC or similar) to facilitate work flow and transmit and store written documents associated with the Project. The system will be utilized by the KRRC, Project Company, and their Subcontractors and vendors to transmit, review and respond, log, and store Project related documents. The records management system will incorporate the following:

- (a) Overall Project tracking and monitoring of key performance indicators;
- (b) Meeting and workshops agendas, presentations, and notes;
- (c) Action items, issues, decision logs, and tracking;
- (d) Budget and schedule tracking;
- (e) Risk tracking and mitigation;
- (f) Submitting and tracking requests for information (RFIs);
- (g) Document submittals and transmittals including drawings (pdf format);
- (h) Quality management documentation including comments, responses, and confirmations;
- (i) Value engineering submissions;
- (j) Invoices and monthly reports;
- (k) Templates and tools;
- (l) Project related communication; and
- (m) Dashboards of Project progress for the KRRC.

Deliverables:

- Records Management System documentation
- Posting of deliverables required by this Appendix
- Entry and updating of on-line logs (action, issue, decision)
- Posting of RFIs

2.2.6 Constructability Reviews.

2.2.6.1 30% and 60% Design Stage. The Project Company shall provide for constructability reviews of the design at the 30% and 60% design submittal milestones as follows:

- (a) Identify and establish a team of individuals among the Project Company team primarily responsible for Project Implementation Work who will undertake constructability reviews on behalf of the Project Company;
- (b) Submit 30% or 60% design submittal, as applicable, to Project Company's constructability review team and to the KRRC for constructability review;
- (c) Schedule and conduct constructability workshop with Project Company's constructability review team and the KRRC;
- (d) Discuss recommendations with the KRRC and conduct follow-up evaluations including cost, schedule, and risk impact analysis of any preliminary constructability comments that are tentatively agreed-to;
- (e) Prepare written constructability review report;
- (f) Meet and review constructability review report and results of constructability evaluations with KRRC; and
- (g) Proceed with agreed-to changes.

Deliverables:

- Written constructability review report
- Workshop agenda

2.2.7 Value Engineering.

Value engineering shall be conducted at the design criteria report, 30%, and 60% design submittal milestones by the value engineering team designated by the KRRC. At each such design submittal milestone, the Project Company shall submit a draft of the Design Criteria Report, 30% or 60% design submittal, as applicable, to the value engineering team and participate in a value engineering workshop to be conducted by the value engineering team. The value engineering team shall prepare a value engineering report, and the Project Company shall review such report and prepare responses to the value engineering recommendations, including a discussion of cost and Project Implementation Schedule impacts. The Project Company shall meet with the KRRC to review responses and submit final recommendations regarding value engineering input to the KRRC for review and approval. Upon approval by the KRRC, the Project Company shall proceed with the agreed-to changes.

Deliverables:

- Value engineering report associated with referenced design tasks
- Responses to value engineering recommendations associated with referenced design tasks
- Workshop agendas

2.2.8 Mobilization and Site Access Plan.

The Project Company shall develop a Mobilization and Site Access plan that clearly identifies all proposed access routes with anticipated truck or equipment use, all mobilization activities with clear descriptions and timing of each activity, as well as a description and location of any proposed on-site construction staff housing and offices. Refer to Section 6.3 (Project Implementation Commencement Date) of the Project Agreement for additional requirements associated with laydown areas, utilities, and temporary project site facilities.

The plan shall clearly identify the number and type of temporary office facilities for the Project Company and the KRRC, including at a minimum the requirements outlined in Section 5.5 (Project Implementation Work Generally) of this Appendix. A schematic will be provided showing areas to be used by the Project Company for storage of construction, demolition and restoration materials and equipment, the location of a temporary construction trailer and for construction of new facilities including required setbacks and traffic flow for the construction vehicles entering and exiting the Project Site.

The plan shall identify the approach to providing site security for all areas where the Project Implementation Work will occur. In addition, the Project Company shall propose a process to coordinate closely with PacifiCorp to allow for ongoing maintenance and operations of existing Facilities (see Reference Document 12 (PacifiCorp Operations and Maintenance Agreement)).

The Project Company shall provide one Helicopter pad in each State within the Project Site to accommodate emergency helicopter access in the event of an emergency. Helicopter pads shall be 75 feet in diameter, graded flat, and shall be stable to accommodate the weight of an emergency helicopter. The location of the helicopter pads shall be submitted to the local Fire District Contact within two weeks after the start of construction activities.

A plan for photographic documentation throughout the duration of the Project Implementation Work shall be developed. The Project Company shall consult with the Owner to determine strategic locations for sequential construction photographs and other photographs required. Other construction photographs shall document; pre-existing conditions; disputed, changed, or deficient work; progress information; and other areas as appropriate. At a minimum, aerial photography of the entire Project Site shall be taken on an annual basis.

2.2.9 Health and Safety Plan.

The Project Company shall develop and implement a written Project Site-specific Health and Safety Plan that includes management commitment, maintaining a safe workplace, employee participation, hazard evaluation and controls, employee training and periodic inspections. The objective of this plan is to eliminate injuries to all persons and damage to property, shall be developed specifically for the needs of this Project and shall be maintained at the Site (at office facilities in CA and OR) and available for review upon request. See Section 5.7 (Project Safety and Security) of this Appendix for additional Health and Safety requirements to be included in the plan.

2.2.10 Project Execution Plan.

2.2.10.1 Submission of Project Execution Plan. In accordance with the Preliminary Services Schedule, the Project Company shall develop and submit a Project Execution Plan to the KRRC for review and comment. A Project Execution Plan shall serve as a Project management tool for the KRRC and Project Company (including Subcontractors) and will include guidelines and procedures for execution of the work and issues resolution. The Project Execution Plan will be in compliance with the Contract Standards and include:

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- (a) A Project Team Structure and Staffing Plan that provides guidance on how the Project will be staffed, managed, and eventually released, including:
- (1) a description of Project Company's organization;
 - (2) roles and responsibilities defining positions, skills and competencies that the Project demands;
 - (3) Project organization charts that identifies all key discipline design leads for the Project and the engineer-of-record for each discipline; and
 - (4) a staffing management plan delineating the time periods each Project team member will be needed and other information important to engage the Project team;
- (b) A Communications Plan that provides the following:
- (1) contact information for both the Project Company and the KRRC (including phone numbers, facsimile numbers, e-mail addresses, and points of contact);
 - (2) communication requirements for the Project Company and the KRRC (including frequency and time frame of communications, information to be communicated, and methods or technologies used to convey information);
 - (3) resources allocated for communication activities, the method of updating and refining the plan, flow charts for information flow, and a glossary of common terminology;
 - (4) regulatory coordination and public relations procedures;
 - (5) a public notification plan to inform the KRRC, Governmental Bodies, and residents and businesses located in the vicinity of the Project of the status of Project Implementation Work. The plan shall provide a schedule for issuing public notices and conducting public meetings as well as measures that are planned to notify specific residents and businesses that may be affected by the Project Implementation Work;
 - (6) the Project Company's designated public relations person and their contact information. The public relations person shall assist the KRRC with notifications and with inquiries from the public and media; and
 - (7) the Communication Plan shall be updated and resubmitted semi-annually or sooner if needed to remain current during the Project Implementation Period.
- (c) A Scope Management Plan that describes how the scope will be defined, developed, monitored, controlled, and verified, including:
- (1) process for preparing the Project scope statement;

- (2) creation of the Records Management System from the detailed scope statement, and how the Records Management System will be maintained; and
- (3) procedures for obtaining formal acceptance of completed Project deliverables and processing of the detailed scope statement;
- (d) A Change Management/Integration Management Plan that includes:
 - (1) identification of procedures that will be used to document any changes from the accepted Drawings and Specifications;
 - (2) identification of procedures that will be used to document the communication flow to the appropriate contractor's construction personnel;
 - (3) description of the process for reviewing all change requests, approving changes and managing changes to deliverables, organization process assets, Project documents, the Project Execution Plan, and communicating their disposition;
 - (4) Trend Management Log; and
 - (5) Project Description Log;

The Project Company shall prepare and maintain a change management log for the duration of the Base Preliminary Services. The change management log shall integrate with the Project decision log and be used to document proposed and approved changes to the price, schedule, or changes to the Project Agreement. At a minimum, the change management log shall be submitted on a monthly basis and shall include the following information:

- (1) Change identification number
- (2) Brief description of change
- (3) Status of change (pending, approved, rejected)
- (4) Dates associated with change including initial proposal date and the date on which the change was accepted or rejected
- (5) Back-up information including cost, schedule, and technical information

Change management shall be a standing agenda item at Project management meetings. Following approval of the Design Criteria Report (DCR), the change management log shall be used to track changes to the approved Project and their associated cost and schedule impacts.

- (e) A Schedule Management Plan that describes the criteria and activities for developing, monitoring, and controlling the Project Implementation Schedule, including:
 - (1) Project Implementation Schedule model development;

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- (2) scheduling methodology and scheduling tools;
 - (3) level of accuracy and the acceptable range used in determining realistic activity durations;
 - (4) units of measure, such as staff hours, staff days, or weeks, as well as physical units of measurement;
 - (5) organizational procedures links with activities tied to the approved Records Management System;
 - (6) Project Implementation Schedule model maintenance and the process used to update status and record progress of the Project during execution;
 - (7) control thresholds, variance thresholds for monitoring schedule performance and agreed-upon amounts of variation to be allowed;
 - (8) rules of performance management, such as earned value management rules, rules for establishing percent complete, control accounts, earned value measurement techniques, and schedule performance measurements;
 - (9) reporting formats, including the formats and frequency of schedule reports; and
 - (10) descriptions of each of the schedule management processes;
- (f) A Budget Management Plan that describes how the Project budget will be planned, structured, and controlled, including:
- (1) units of measure, the level of precision and accuracy;
 - (2) coordination with approved Records Management System; and
 - (3) control thresholds for monitoring budget performance, including the rules of performance measurement (earned value management);
- (g) A Risk Management Plan that describes how risk management activities will be structured and performed, including:
- (1) how risk management will be incorporated into the delivery of the Project in accordance with the Contract Standards.
 - (2) the methodology, approaches, tools, and data sources that will be used to perform risk management on the Project;
 - (3) roles and responsibilities, defining the lead and support risk management team members for each type of activity and their responsibilities;
 - (4) budgeting to establish estimates of funds needed based on assigned resources for inclusion in the cost baseline and protocols for application of contingency and management reserves;
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- (5) timing of risk management processes to be performed through the Project life cycle; and
- (6) protocols for application of schedule contingency reserves and risk management activities associated with the Project Implementation Schedule;

A risk management workshop will be conducted with the KRRC within 30 days of the kickoff/partnering workshop. The workshop shall be used to identify key Project risk and opportunities for avoiding and minimizing risks.

The Risk Management Plan will include a risk register developed and maintained by the Project Company. The register shall be initially populated with risks identified in the risk management workshop. The risk register shall include the following information:

- (1) Risk identification;
- (2) Activities affected (tied to schedule activities);
- (3) Risk description including qualitative categorization of risk;
- (4) Estimated/calculated percent likelihood that risk may occur (note: this will be output from quantitative analysis performed on key risks that could exceed target cost or schedule thresholds);
- (5) Phase of Project that risk could impact;
- (6) Potential schedule impact should risk occur;
- (7) Potential cost impact should risk occur;
- (8) Potential health and safety impacts should risk occur;
- (9) Risk trigger;
- (10) Risk owner; and
- (11) Risk strategy (transfer, mitigate, accept, exploit).

Risks shall be reviewed at the weekly Project management meetings. Additionally, the following risk management workshops shall be conducted to provide for re-evaluation of overall risks, a deeper level of risk analysis for identified risks, identification of new risks, and review of risk avoidance, and mitigation measures:

- (1) During the development of the DCR
- (2) Upon submission of the 30% DCD
- (3) Upon submission of the 60% DCD

Ongoing qualitative risk analysis shall be conducted by Project Company with review and input from the KRRC.

- (h) A Procurement Management Plan that describes how the Project Company will acquire goods or services from outside its organization, including:
 - (1) management of procurement processes from developing procurement documents through contract closure;
 - (2) guidance for the types of contracts to be used and use of independent estimates and standardized documents; and
 - (3) handling of long lead items, requests to self-perform and linking them into activity resources and schedule;
- (i) A Project Implementation Quality Management Plan that meets the requirements set forth in Appendix 6 (Project Implementation Work Quality Control Requirements);
- (j) A Document Control Plan that identifies how documents will be managed throughout the Project life cycle, including:
 - (1) the process of organizing, storing, protecting, and sharing documents;
 - (2) the management of both the hard copy and electronic repositories of documents, historical information, and a consistent approach to the creation, update and format of documents.

2.2.10.2 Establishment and Compliance with Project Execution Plan. The KRRC will review the draft Project Execution Plan and return comments in accordance with the Preliminary Services Schedule. The Project Execution Plan will be accepted by the KRRC only after the Project Company has addressed all KRRC comments to the reasonable satisfaction of the Project Director. Any subsequent amendments or updates to the Project Execution Plan will be submitted to the Project Director for review and comment in the same manner as the initial Project Execution Plan. The Project Company will implement and comply with the accepted Project Execution Plan, and any accepted amendments or updates thereto, in connection with the performance of the Project Implementation Work.

2.2.11 Preliminary Services Schedule.

The Project Company shall prepare the Preliminary Services Schedule using Primavera P6 scheduling software (latest version), and shall submit the Preliminary Services Schedule as electronic files (native and pdf) and hardcopy. The Project Company shall provide licenses for up to three KRRC personnel to access the Preliminary Services Schedule at any given time.

The Preliminary Services Schedule shall reflect the schedule, by use of a Gantt or Bar Chart, for all activities comprising the Preliminary Services, and shall set forth all tasks and key subtasks in a logical and efficient work sequence that the Project Company intends to utilize in taking the Project from execution of this Project Agreement to the GMP Contract Amendment.

The Project Company shall submit the Initial Preliminary Services Schedule on the Contract Date. During the Preliminary Services Period, the Project Company shall update the Initial Preliminary Services Schedule on a monthly basis. The Initial Preliminary Services Schedule, as updated pursuant to this subsection, is referred to herein as the Preliminary Services Schedule.

The Project Company shall undertake and complete the Preliminary Services in accordance with the Preliminary Services Schedule. Updates on the Project Company's compliance with the Preliminary Services Schedule shall be submitted monthly with the Monthly Progress Report required by Section 2.2.3 (Monthly Progress Report Requirements) of this Appendix and Section 4.9 (Monthly Progress Reports) of this Project Agreement. The Initial Preliminary Services Schedule, prepared in accordance with the requirements set forth in this subsection, is included as Attachment 2A (Initial Preliminary Services Schedule) to this Appendix.

At a minimum, the Preliminary Services Schedule shall generally include:

- (a) Start date for each activity;
- (b) Finish date for each activity;
- (c) Major milestones;
- (d) Meeting and workshop dates;
- (e) Submittal dates including draft submission dates, KRRC review periods, and final submission dates;
- (f) Identification of critical path; and
- (g) Float.

The KRRC shall review and comment on the Initial Preliminary Services Schedule within 15 days of receipt. Comments on the Initial Preliminary Services Schedule shall be discussed at the weekly Project management meeting following receipt of any comments provided by the KRRC. The Project Company shall provide a revised Preliminary Services Schedule, as applicable, based on agreed-to changes at the next weekly Project management meeting.

The KRRC shall review and comment on the update to the Preliminary Services Schedule. The review process shall include evaluation of missing logic, critical path, leads and lags, and float, percent complete, and changes in schedule logic or activity durations. Comments on the updates to the Preliminary Services Schedule shall be discussed at the weekly Project management meeting following receipt of any comments provided by the KRRC. The Project Company shall provide a revised draft Preliminary Services Schedule based on agreed-to changes at the next weekly Project management meeting.

2.2.12 FERC and DSOD-Required Plans and Submittals.

In connection with the FERC license transfer and surrender application process, and DSOD's dam removal permit process, the Project Company shall coordinate with the KRRC to develop specific plans and schedules for compliance at FERC and DSOD's direction, and consistent with any recommendations provided by the FERC Board of Consultants (the "BOC"). The Project Company shall assume up to 15 separate plans will be required for separate submittal to FERC/DSOD during the Preliminary Services. For each anticipated plan, the Project Company shall develop an approach to supply an adequate level of detail to FERC or DSOD based on their previous FERC/DSOD experience. The approach should be closely coordinated with other Preliminary Services design tasks (Tasks #5 through #7) and shall identify appropriate standards and criteria that apply.

The Project Company shall build on previous preliminary plan information provided in the Definite Plan, and shall complete all additional work required to inform the final plans listed below in the detailed design Preliminary Services Tasks #5 through #7. The Project Company

should anticipate additional effort to organize the design information into separate plan submittals to FERC/DSOD on the various topics. The Project Company shall anticipate BOC review prior to any plan submittal to FERC, and shall address all BOC comments to the satisfaction of the BOC and KRRC.

The following plans and submittals may be required by FERC/DSOD during the Project Company's Preliminary Services.

- Erosion and Sediment Control Plan
- Traffic Management Plan
- Public Safety Plan
- Noise and Vibration Control Plan
- Cofferdam Plan
- Temporary Construction Emergency Action Plan
- Spill Prevention, Control and Countermeasure Plan (SPCC)
- Quality Control and Inspection Plan
- Blasting Plan
- Dust Control Plan
- Reservoir Rim Stability Plan
- Recreation Improvements Plan
- Revegetation and Wetlands Management Plan
- Woody Debris Management Plan

Deliverables:

- Draft and final approach to each plan
- Draft and final plans (up to 15 separate plans)
- Response to BOC comments matrix and revised final plan

2.3. PRELIMINARY SERVICES TASK #2 – PROJECT SITE AND PROJECT CONDITIONS VERIFICATION**2.3.1 Existing Conditions Assessment Report.**

The Project Company shall complete a comprehensive review of the Project Site, the Project conditions, and contiguous areas that may be affected by the Project, including legal and regulatory requirements that may affect the Project. All reviews performed under this Preliminary Services Task shall be performed to the maximum extent reasonably possible in the circumstances and in a manner that provides a reasonable basis for the Project Company to undertake the risks assumed under Section 6.4 (Differing Site Conditions) and subsections 6.6(B) (Project Company Governmental Approval Responsibility Generally) and 6.7(B) (Sole Design Responsibility and Liability) of this Project Agreement.

The Project Company's review shall include, but is not limited to:

Site Constraints:

- (a) Project Site ingress and egress requirements and restrictions, traffic conditions, time of work restrictions, and requirements of public and private authorities with jurisdiction over roadways to and from the Project Site, parking, and any other restrictions or considerations that may affect the Project Company's work;
- (b) The Facilities, Governmental Approvals, requirements, regulations, constraints, and the KRRC's requirements set forth in Appendix 2 (Preliminary Services) and Appendix 4 (Project Technical Requirements) and objectives set forth in Section 1.7 (KRRC Objectives) of Appendix 1 (Project and Project Site Description) for the Project;
- (c) Title report easement or other restrictions or constraints;

Existing Conditions:

- (d) Existing conditions information at the Project provided by the KRRC, including all available as-built information, geotechnical reports, engineering studies and reports, environmental studies, data, construction photographs, memos, reports, surveys, and site measurements; and
- (e) Any other investigations deemed necessary by the Project Company to fully acquaint itself with existing conditions for purposes of performing the Base Preliminary Services.

Based on the review of existing drawings and information provided by the KRRC and supplemental discussions with the KRRC, the Project Company will prepare a report describing and identifying the locations of existing surface and subsurface utilities at the Project Site and the locations of man-made objects or structures. For circumstances where existing information is either conflicting or not available, the Project Company will coordinate and engage the services of a utility location Subcontractor and or surveyor for identifying, designating, locating, and mapping existing and abandoned utility or other pertinent infrastructure. Identification techniques may include magnetic, sonic, and acoustic technologies, ground penetrating radar (GPR), and radio frequency detection. The utility descriptions will be considered current as of the date of the investigation. The Project Company shall complete investigations required to verify surface and subsurface facilities, and

shall coordinate with the KRRC and PacifiCorp prior to requesting access. At a minimum, the report should cover the following areas:

- (a) Project Site;
- (b) Downstream flood improvement limits of work, as necessary;
- (c) New recreation improvements limits of work, as necessary; and
- (d) Hatchery improvement limits of work at Fall Creek and Iron Gate.

Specific investigations identified by the Project Company for inclusion in this task are as follows:

- (a) Geotechnical investigation as summarized in Section 2.3.2
- (b) Buried structure location investigation
- (c) Detailed geotechnical inspection of the diversion tunnels
- (d) Detailed geotechnical inspection of the J.C. Boyle scour hole
- (e) Topographic surveys at downstream up to 36 flood properties, 2 pedestrian bridges and CORP railroad bridge
- (f) Reference reach surveys of the Klamath River will be performed at 9 locations between JC Boyle and Iron Gate reservoirs. The survey consists of approximately 500 linear feet of river profile and 5 cross sections

The Project Company will perform the aforementioned investigations promptly after commencement of the Project. The Project Company will report to the KRRC in writing any additional information that is needed in order to complete the assessment of existing conditions. The KRRC shall respond to the Project Company requests for additional information and indicate whether or not requested information is available and if so when the KRRC will provide it to the Project Company.

Deliverables:

- Draft and final work plan for additional investigations
- Draft and final Existing Conditions Assessment Report, summarizes existing conditions and site constraints

2.3.2 Geotechnical Investigations.

The Project Company will review various sources of geotechnical information concerning the overall Project Site. Such sources will include geologic maps, seismologic literature, and other published documents. Any available soil logs and laboratory test results associated with previous subsurface explorations performed on or near the Project Site will also be reviewed. Field exploration data, laboratory testing data, and research findings will be evaluated by the Project Company to determine what additional geotechnical investigation may be required to inform the Project Company's design and associated regulatory approvals.

Additional geotechnical investigations and laboratory testing has been included to collect geotechnical data related to the following project components. The proposed geotechnical site

investigations are based upon discussion between the Project Company and KRRC. Should the Project Company and KRRC determine that additional investigations are required to complete the design, additional budget will be negotiated and allocated via amendment:

- (a) Dam sites (drilling with SPT, as required):
 - (i) major driller mob/demob to 4 dam sites
 - (ii) minor driller mob/demob at dam sites
 - (iii) 12 boreholes (average length ~25ft) for disposal/borrow sites/diversion improvement
 - (iv) 6 boreholes (average length ~25ft) for dam embankments, if/as required
 - (v) lab testing, if/as required, for index and/or strength properties
- (b) Roads & bridges:
 - (i) driller mob/demob to 14 sites (all bridges and culverts, 50% roads)
 - (ii) 26 boreholes (average length ~25ft)
 - (iii) 14 boreholes (average length ~25ft) for roads
 - (iv) field mapping/inspection for roads
 - (v) drilling with SPT, as required for design and state DOT codes
 - (vi) lab testing for index and/or strength properties, as required for design and state DOT codes
- (c) Downstream flood properties: 14 boreholes at residences and 2 boreholes at the pedestrian bridges (along with lab testing)

Planning for geotechnical investigations include:

- (a) Review existing geologic information, prior borings, and general site conditions in the vicinity of proposed borings to develop an understanding of expected conditions.
- (b) Prepare a Geotechnical Investigation and Laboratory Testing Plan (draft and final), which will define the scope of the planned explorations (geophysics, soil borings, concrete coring) and laboratory testing (soil sample, rock cores, concrete cores). The plan will identify boring locations, planned depths, drilling methods, test methods, staffing and other field procedures.
- (c) The Geotechnical Investigation and Lab Testing Plan will be submitted for review by KRRC, and comments will be incorporated in the final version of the report for approval.
- (d) A Geotechnical Drilling Site Access Plan will be prepared for KRRC review. This plan will include the requirements for utility clearance, permitting, traffic

control, floating plant access, and subcontractor coordination details specific to the geotechnical explorations.

- (e) A Geotechnical Drilling Health and Safety Plan will be prepared for KRRC review. This plan will be specific to the field work activities for the geotechnical explorations (geophysical surveys, land borings, water borings, and concrete coring).

The Project Company will provide an experienced geologist or engineer to continuously observe all drilling completed by the Project Company or their Subcontractors, log the subsurface conditions, collect representative soil samples, and transport all samples to the Project Company's laboratory for further visual examination and testing. Soil samples will be stored for 90 days after submittal of Project Company's report and then discarded unless KRRC requests longer-term storage.

Before drilling, the Project Company shall ensure that a local utility locating service has marked any underground utilities at each exploration location. The Project Company will obtain necessary encroachment permits and drilling permits prior to site exploration. All borings will be backfilled as required by the permit. The geotechnical Subcontractor will exercise due care while working at the Project Site, but anticipates that some surface disturbances will be unavoidable and that safe and adequate restoration will be provided.

It is assumed that water for drilling/coring operations will be pumped from adjacent rivers, creeks or reservoirs. If this is not allowed, water will be cost reimbursable. It is also assumed drill cuttings will be disposed of offsite.

Any new field exploration data, laboratory testing data, and research findings will be compiled with previous geotechnical information into a Geotechnical Data Report for the Project. The report will include the following specific items:

- (a) Site plan showing approximate previous and new exploration locations;
- (b) Descriptive logs of subsurface explorations;
- (c) Description of surface, soil, groundwater, and seismic conditions;
- (d) Mapping of geologic conditions;
- (e) Explanation of report limitations; and
- (f) Recommendations for further geotechnical study, if necessary.

A rim stability analysis will be performed with the goal to identify potentially unstable areas susceptible to landslide during the reservoir drawdown including private properties and adjacent public roads at higher risk. In addition, conceptual approaches for mitigation, which may include passive (monitoring) or active (engineered) approach will be developed.

Deliverables:

- Draft and final Geotechnical Investigation & Laboratory Testing Plan
- Draft and final Geotechnical Drilling Site Access Plan
- Draft and final Geotechnical Drilling Health and Safety Plan
- Draft and final Geotechnical Data Report
- Draft and final Rim Stability Memo

2.4. PRELIMINARY SERVICES TASK #3 – PERMITTING SUPPORT AND COMPLIANCE PROGRAM

The Project Company shall identify, understand and comply with all Applicable Law and Governmental Approvals. Table 3-1 in Appendix 3 identifies which Governmental Approvals will be managed by the KRRC and Table 3-2 in Appendix 3 identifies which Governmental Approvals will be managed by the Project Company. The Project Company is responsible for all activities associated with Governmental Approvals not specifically listed as the responsibility of KRRC. The Project Company is also responsible for any Governmental Approvals not included in Tables 3-1 and 3-2.

For KRRC-Managed Governmental Approvals, the Project Company shall provide draft applicable reviews and attend up to five (5) agency coordination meetings for each Governmental Approval. In addition, as part of their design work under Preliminary Tasks #5 through #7, the Project Company shall provide the KRRC with the necessary reports, submittals, plans, information, Drawings and Specifications, and responses to agency comments, as required to submit final applications and obtain approvals.

For Project Company-Managed Governmental Approvals, draft application submittals shall be supplied to the KRRC a minimum of 1 month prior to anticipated agency submittal for review and comment. The Project Company shall provide a “response to comments” matrix along with the revised application to the KRRC prior to submitting to agencies. The KRRC shall be given notification a minimum of five (5) working days prior to direct communication with agencies pertaining to the Project. The KRRC shall be given the opportunity to be involved in all communication and coordination activities with agencies.

For some KRRC-Managed Governmental Approvals, the KRRC may meet regulatory requirements by applying a good neighbor approach that would result in a letter memorandum outlining compliance requirements, or by entering into a Memorandum of Understanding with agencies. In either case, the Project Company shall consider documented requirements coming out of the process as mandatory, and shall implement accordingly.

The Project Company shall develop an Initial Environmental Compliance Plan that outlines their understanding of required activities and submittals, in addition to a summary of their approach to ensuring acquisition of all Governmental Approvals and implementation of all associated requirements and conditions. The initial plan shall also contain a matrix identifying all required Governmental Approvals, status of those approvals, and any known or assumed conditions. They Project Company shall develop the matrix in an excel database. The Project Company will be responsible for identifying any conflicts between the various Governmental Approval requirements, and proposing an approach to resolve such conflicts.

As Governmental Approvals are issued, the Project Company will review and include all requirements in the Initial or Final Environmental Compliance Plan. This plan will organize requirements of all governmental approvals in one place, identifying requirements by permit or source document, resource category, and any associated agency submittals, frequency and timing. The matrix will also identify responsible entity and staff for each requirement, and any staff or subcontractor training or certifications required for compliance with Governmental Approvals including, but not limited to, ESA or cultural resources conditions.

The Project Company shall acknowledge and consider that regulatory requirements may constrain their proposed schedule, methods, and sequence of performing the Work. In the event that Project Company proposes to alter the Project in a way that is not in compliance with existing Governmental Approvals, Project Company shall obtain necessary Governmental Approvals at no additional expense to the KRRC, including but not limited to, preparing any analysis or studies related to the Governmental Approvals.

If the KRRC or their representative notifies the Project Company in writing of any observed noncompliance with Project Agreement requirements, Applicable Law or Governmental Approvals, the Project Company shall inform the KRRC of proposed corrective action and take such action to correct the noncompliance. If the Project Company fails to promptly comply, the KRRC may issue an order stopping all or part of the Work until satisfactory corrective action is taken. No time extensions will be granted or costs or damages allowed to the Project Company for any such suspension.

During investigations and construction, some agencies may have the authority to approve or inspect certain elements of the work. Project Company shall coordinate its construction activities with agencies as required by the Government Approvals, and shall allow agency representatives access to locations within project boundaries as required by Governmental Approvals.

Deliverables:

- Initial Environmental Compliance Plan: Plan to be developed by the Project Company, for KRRC review and acceptance
- Final Environmental Compliance Plan: Within 45 calendar days of the date of issuance of the FERC Surrender Order, the Project Company shall submit a Final Environmental Compliance Plan for review and acceptance by the KRRC. No physical work at the site shall begin prior to acceptance of the Project Company's plan or an interim plan covering the work to be performed. Acceptance of the Final Environmental Compliance Plan by the KRRC in no way releases the Project Company of any and all responsibility to adhere to all requirements associated with Governmental Approvals and other Applicable Law.
- Amended Environmental Compliance Plans: The Environmental Compliance Plan shall be updated throughout the Project Implementation Work, as necessary, to document any changes to the management of environmental compliance activities and reporting that result from any permit changes that occur during design and construction, or that are negotiated with the Governmental Agencies during the Project Implementation Work. Any revisions to the Environmental Compliance Plan shall be submitted to the KRRC for review and acceptance.
- Permits: Copies of draft permit applications and final permit documents associated with Project Company-Managed Governmental Approvals
- Plans: Project Company shall prepare and maintain any plans, as required, pursuant to Applicable Law. Plans shall be submitted to the applicable regulatory agencies by the specified dates or as required to permit related construction activities to begin, whichever is earlier. All such plans shall be submitted to the KRRC for review and acceptance a minimum of two (2) weeks prior to agency submittal. Project Company shall prepare and submit these plans as required by the Governmental Approvals. Project Company shall comply with all aspects of the plans as they pertain to the Project Implementation Work.
- Bound hardcopies of all Governmental Approval documents must be available on site at all times.
- Acceptance is conditional and is predicated upon satisfactory performance during construction. The KRRC reserves the right to require the Project Company to make changes in the Environmental Compliance Plan or operations if the KRRC determines that environmental protection requirements are not being met.

2.5. PRELIMINARY SERVICES TASK #4 - INITIAL COST MODEL AND IMPLEMENTATION SCHEDULE**2.5.1 Initial Cost Model Report.**

The Project Company shall prepare an Initial Cost Model Report and estimate using cost model and procedures they plan to use for DCD construction cost submittals and the GMP Project Submittal. Design and regulatory information and assumptions shall be based on the Project Company's latest understanding of the Project Implementation Work and regulatory requirements, as informed by the Project Agreement, the Definite Plan, in addition to any clarifications and updates identified by the Project Company or KRRC since completion of the Definite Plan.

The Initial Cost Model shall include estimated costs for all Project Company services, equipment and materials and other fees that may be incurred by the Project including appropriate contingencies due to uncertainties regarding cost estimates, site conditions and other factors. The Initial Cost Model shall be broken down into logical cost categories such as regulatory requirements and tracking, engineering services during the Project Implementation Work, construction (by component), self-performed work, procured Subcontractor work, major equipment purchases (gates, etc.), major material purchases and other categories with appropriate supporting documentation that will assist the KRRC in its evaluation of the Project cost estimate. At a minimum, the construction portion of the estimate shall be broken down by each key component, as listed in Section 1.2 (Project) of this Appendix.

An initial cost model and project implementation schedule will be developed early in the project. This task will consist of reviewing the Definite Plan cost estimate, developing the initial structure to support the development of future cost models, updating crew and unit costs per construction industry standards, and development of an initial project implementation schedule, as well as updating the model and schedule to accommodate recommendations from the Proof of Concept deliverable (Task #6). The design team will provide support related to providing information on project constraints, work sequencing and design approach elements, and engineering support during implementation support.

The Project Company shall also provide a preliminary estimate of cash flow requirements by month from commencement of Project Implementation Work through Project Final Completion.

Deliverables:

- Draft and final Initial Cost Model; draft shall be submitted within 60 calendar days of Contract Date

2.5.2 Initial Project Implementation Schedule.

The Project Company shall prepare the Initial Project Implementation Schedule using Primavera P6 scheduling software (latest version), and shall submit as electronic files (native and pdf) and hardcopy. Design and regulatory information and assumptions shall be based on the Project Company's latest understanding of the Project Implementation Work and regulatory requirements, as informed by the Project Agreement, the Definite Plan, in addition to any clarifications and updates identified by the Project Company or KRRC since completion of the Definite Plan. The Initial Project Implementation Schedule shall be coordinated with the Draft Cost Model estimate and associated production rates and other constraints. The Project Company shall provide licenses for up to three KRRC personnel to access the Project Implementation Schedule at any given time.

The Project Company shall submit the draft Initial Project Implementation Schedule within 60 calendar days of the Contract Date, and shall update the draft Initial Project Implementation Schedule during the Preliminary Services Period in accordance with this Appendix. The Project Implementation Schedule shall meet the requirements set forth in this Appendix and Appendix 5 (General Project Implementation Work Requirements).

During the Project Implementation Period, the Project Company shall update the Initial Project Implementation Schedule in accordance with the requirements set forth in Section 5.3 (Project Implementation Schedule) of Appendix 5 (General Project Implementation Work Requirements).

At a minimum, the Project Implementation Schedule shall generally include:

- (a) Start date for each activity;
- (b) Finish date for each activity;
- (c) Major milestones;
- (d) Meeting and workshop dates;
- (e) Submittal dates including draft submission dates, KRRC review periods, and final submission dates;
- (f) Identification of critical path; and
- (g) Float.

The KRRC shall review and comment on the draft Initial Project Implementation Schedule within 30 days of receipt. Comments on the draft Initial Project Implementation Schedule shall be discussed at the weekly Project management meeting following receipt of any comments provided by the KRRC. The Project Company shall provide a revised draft Initial Project Implementation Schedule, as applicable, based on agreed-to changes at the next weekly Project management meeting.

The KRRC shall review and comment on the update to the draft Initial Project Implementation Schedule. The review process shall include evaluation of missing logic, critical path, leads and lags, and float, percent complete, and changes in schedule logic or activity durations. Comments on the updates to the draft Initial Project Implementation Schedule shall be discussed at the weekly Project management meeting following receipt of any comments provided by the KRRC. The Project Company shall provide a revised draft Initial Project Implementation Schedule based on agreed-to changes at the next weekly Project management meeting.

Deliverables:

- Draft and final Initial Project Implementation Schedule

2.6. PRELIMINARY SERVICES TASK #5 – DESIGN CRITERIA REPORT

This task involves comprehensive documentation of project goals, objectives and potential component failure modes, and final selection of engineering and ecological design criteria for each primary project component, in addition to other temporary and permanent design features and construction methods. Engineering design criteria will address: (1) normal operating or ‘sustained’ conditions, which may include a range of design flows or other criteria; (2) a design flood event; and (3) a design earthquake event, as appropriate. Ecological design criteria for all components will be selected to create an optimum condition for potential success of native flora and fauna defined by the project goals and objectives. CAD standards shall also be finalized based on information provided in Reliance Document 9 (CAD Drawings Standards).

Appendix 4 provides additional information pertaining to specific design criteria for various Project components and disciplines.

The first step in this process will involve development of specific functional goals and objectives for each component based on the overall project goals as defined below:

- (a) Provide a safe and effective project that minimizes nuisance impacts to the public.
- (b) Provide the highest quality design and construction submittals, and complete the Project in a manner that is consistent with the KHSA, and meets all tribal, federal, state and other agency expectations.
- (c) Obtain the most cost-effective design and construction approach to accomplish the defined Project for a Guaranteed Maximum Price and while meeting the other stipulated cost constraints, including constraints embodied in the KHSA.
- (d) Achieve the scheduled completion dates for design, construction, and post-construction monitoring of the Project, including planning to accommodate foreseen and unforeseen change.
- (e) Achieve full native habitat restoration that blends seamlessly with the adjacent habitat communities.
- (f) Meet all other design and habitat goals in the short and long-term while requiring minimal long-term maintenance and monitoring outside of regulatory requirements.

Design criteria categories will be developed to address each component specific objective and address the associated potential failure modes. Practical performance criteria will be developed for each category such that the built Project will perform to the expectations of the KRRC, regulatory agencies and stakeholders, to the greatest extent possible.

Design standards and criteria will be selected from the appropriate governing body or industry standard as appropriate for each component under the various conditions, and final standards, manuals or guidance material shall be documented in the Report. However, where additional analyses are required to provide additional information to determine design criteria, those criteria categories will be highlighted as such. The Project Company will be responsible for completing those analysis to finalize the criteria selection.

The Project Company shall identify any regulatory design standards or conditions and incorporate into the Project design criteria, as appropriate. In addition, any agency reviews or approvals will be identified and summarized with respect to schedule and cost.

An administrative draft Design Criteria Report (DCR) will be developed by the Project Company and refined through an iterative process with the KRRC. It is anticipated that the DCR will include a matrix or table to summarize the objectives and associated design criteria, along with additional text and bulleted lists as appropriate. The memorandum format will be refined with input from the KRRC prior to the administrative draft submittal.

The Project Company shall meet with the KRRC staff to present a summary of the administrative draft DCR and discuss KRRC comments on the draft DCR and obtain KRRC approval on the recommended criteria prior to proceeding with draft DCR, which will be submitted to FERC and DSOD for review. The Project Company shall anticipate a 2-week review duration from FERC/BOC/DSOD for this submittal.

The Project Company shall prepare a final DCR incorporating FERC and DSOD comments on the draft DCR.

Deliverables:

- Administrative Draft, Draft and final Design Criteria Report
- Meeting agenda and notes

2.7. PRELIMINARY SERVICES TASK #6 - 30 PERCENT DESIGN COMPLETION DOCUMENTS (DCD)

General Design Approach:

The project will be sub-divided into design packages considering project scope, discipline and design teams. The following design packages are anticipated.

- (a) Gate Procurement Package
- (b) Intake/Outlet Works/Diversion Tunnel Modifications
- (c) Roads, Bridges & Culverts (post-drawdown transportation improvements will move directly into detailed design, while construction access improvements will be assessed by the Project Company at a feasibility level to confirm approach and solution).
- (d) Downstream Flood Improvements
- (e) Recreation
- (f) Restoration
- (g) Reservoir rim engineered solution
- (h) Dam Site Packages (JC Boyle, Copco No. 1 & 2, Iron Gate): 4 packages anticipated to address pre-drawdown modifications, drawdown sequencing, dam removal, facilities decommissioning, disposal areas and erosion protection and sediment control.

The objective of this task is to allow for the Project Company to propose modifications to, or refine, key design components prior to incorporating into the 60% DCDs. It is anticipated that the Project Company will make modifications to the construction access plan based on their proposed means and methods for the Project Implementation Work. In addition, based on Project Company outreach to property owners associated with downstream flood impacts and potential reservoir rim instability impacts, engineered solutions will need to be documented. The extent of potential temporary construction easements required to complete the Work associated with downstream flood control and/or reservoir rim stability shall also be identified.

The Project Company may choose to propose modifications to other Project components that deviate from the approach and concepts summarized in the Definite Plan. The KRRC would need to review and concur with the revised approach and concepts prior to the Project Company beginning 60% design on those components.

Task #6 also includes completion of seed collection, seed propagation and invasive and exotic vegetation species removal required to support the restoration design and implementation.

No detailed design scope or budget is provided for construction access improvements, as generally defined in Table 2.7-1. Should it be determined, based on the feasibility study being completed under this task, that additional improvements are required, additional negotiated design budgets will be allocated via amendment.

Table 2.7-1

Construction Access Feasibility Study	Post-Drawdown Improvements Detailed Design
Fall Creek Bridge	Topsy Grade Culverts
Daggett Bridge	Raymond Gulch
Lakeview Bridge	Beaver Creek
Dry Creek Bridge	North Mirror Cove
OR 66 Green Springs Intersection	Jenny Creek
Construction Access – J.C. Boyle	Camp Creek
Construction Access – Iron Gate and Copco	Scotch Creek
Construction Access – Copco Road	

2.7.1 Period of Performance.

After the Project Company receives the KRRC's written notice that the KRRC's comments, if any, have been satisfactorily addressed in the final DCR, the Project Company shall proceed with the performance of services required to achieve 30% Design Completion for any modified Project components. The KRRC may, at its discretion and where there is early agreement between the KRRC and the Project Company on the criteria, allow portions of the 30% design to move forward prior to completion of the DCR through this issuance of a separate Notice to Proceed. The Project Company shall submit the Deliverable Material required by the 30% Design Completion Documents (30% DCD) to the KRRC on the date identified in the Preliminary Services Schedule.

2.7.2 Minimum Requirements.

The 30% DCD shall include but is not limited to the following (where applicable):

- (a) Proof of Concept review to confirm the validity of the Definite Plan preliminary design and cost estimate for Project Implementation, to the extent possible at that stage of Preliminary Services, and will outline any potential significant departures identified. These departures may include significant differences in predicted quantities and/or unit costs based on updated information acquisition and design development. The Proof of Concept review will be provided in a letter or brief report format and considered in development of the Initial Cost Model (Task 4).
- (b) Construction Access Feasibility Assessment to plan temporary road, bridge and culvert improvements required for construction access. A primary focus will be on selecting the preferred approach for improving or bypassing bridges that are currently unfit to handle heavy construction equipment. The Project Company will examine various options, with the aim to minimize construction access implementation costs as well as any potential restrictions on implementation schedule and travel times. The Project Company will present the results in a brief report outlining the options examined, the planned approach, and listing the design drawings to be developed
- (c) Seed Collection & Propagation Plan and implementation for the 2019 collection season.
- (d) Invasive and exotic vegetation removal plan and implementation for 2019.
- (e) Design Report

- (i) Design criteria update;
 - (ii) Supporting technical analyses and baseline data to support the proposed design;
 - (iii) Project-specific analyses of Applicable Law and Governmental Approvals; and
 - (iv) Design considerations reasonably necessary in connection with the Project Company's obligations under Section 15.3 (Coordination with the KRRC in Satisfaction of the KHSR Liability Protection Requirements) of this Project Agreement.
- (f) Design Drawings
- (i) Index of Drawings, general legend, abbreviations;
 - (ii) Cover Sheet, Location Map and Vicinity Map; and
 - (iii) Design drawings.
- (g) Project Cost Model Update
- (h) Project Implementation Schedule
- (i) Quality management will be achieved through quality control reviews and Independent Technical Reviews (ITR) consisting of an independent internal engineering team. The ITR team will be engaged at key project milestones to provide input and review of criteria, design concepts, detailed design and construction approach. ITRs are budgeted and will be scheduled into the project.

2.7.3 Criteria.

The 30% DCD shall incorporate the Project Company's final DCR and shall include, in addition to drawings and specifications set forth in this Section, such additional information as needed to describe the Project. The 30% DCD shall indicate the basis for design choices, as well as an explanation of how the design incorporates the KRRC's DCR objectives. The 30% DCD shall indicate any alternative designs, approaches, technologies, equipment or processes that the Project Company recommends be considered by the KRRC.

The 30% DCD will take any proposed design modification concepts and advance them to preliminary engineering drawings.

2.7.4 Design Refinement.

2.7.4.1 Design Refinement. Design refinement applies here to any proposed modifications to key Project components, as described above. The Project Company shall be responsible for developing and refining the Project design in close coordination with the KRRC. The Project Company shall conduct all evaluations, calculations, cost estimating, scheduling, workshops, and other services as needed to advance the Project design for modified components to the 30% DCD. At a minimum, refinement or modification (from Definite Plan) of design for construction access, downstream flood control, and rim stability improvements should be addressed.

2.7.4.2 Workshops. The Project Company shall conduct a workshop addressing proposed modifications to the Project design with the KRRC to review the alternatives and develop a recommended approach. The workshop shall include a weighted decision process to compare alternatives on the basis of established evaluation criteria.

The following information shall be prepared by Project Company for the workshop and shall be submitted a minimum of one week prior to the workshop:

- (a) Description of alternatives associated with any proposed design modification
- (b) Design criteria
- (c) General layout drawings
- (d) Temporary construction easements, as necessary
- (e) Cost, schedule, and constructability considerations of various alternatives
- (f) Project Company's preliminary evaluation and comparison of alternatives

2.7.5 30 Percent Design Report.

The Project Company shall prepare and submit to the KRRC a 30% Design Report which will include the Project Company's evaluation findings and specific recommended modifications to the Project design. The Design Report will explain how the proposed preliminary design will meet the KRRC's requirements as set forth in Appendix 4 (Project Technical Requirements) for the Project and comply with all Applicable Law and Governmental Approvals. The Design Report will include information on alternatives considered and evaluated and information on the rationale or method by which the recommended design was selected. Information considered in the evaluation of alternatives and selection of a recommended design shall include but not be limited to: estimated capital costs; compliance with regulatory requirements; public safety; and compatibility with California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA) and KRRC environmental objectives and requirements set forth in Appendix 4 (Project Technical Requirements).

The Design Report will include a description of regulatory conditions that apply to the proposed design, including but not limited to:

- (a) Applicable Law;
- (b) Approvals and limitations or constraints;
- (c) Governmental Approvals and associated agency review durations, constraints or fees; and
- (d) Utility requirements, and the Project Company's plan for coordinating with all public agencies and utilities with jurisdiction over any of the Project Implementation Work.

A draft 30% Design Report shall be reviewed by the KRRC and the KRRC's comments shall be addressed by the Project Company.

The Project Company shall prepare a final 30% Design Report incorporating KRRC comments on the draft Design Report. The report will include updated analyses, as well as table of contents, executive summary, facilities descriptions, and recommended Project chapters.

2.7.6 30 Percent Design Drawings.

The 30% DCD will incorporate the recommended elements from design refinement into the 30% drawings. The 30% drawing set will generally include drawings described below, as applicable to proposed design modifications.

- (a) **General Drawings:** Cover sheet, abbreviations and symbols, key plan, list of drawings, Project key plan, drawing symbology, numbering and tagging conventions, symbols, and abbreviations, design criteria (90% complete), and equipment schedule.
- (b) **Civil Drawings:** Project Site layout, grading and paving plan, Project Site new access road plan and sections. Identification of any required temporary construction easements.
- (c) **Structural Drawings:** Structural improvements plan, general notes, standard concrete details and standard reinforcing details.
- (d) **Mechanical Drawings:** Mechanical improvements plan, symbols and legends.
- (e) **Electrical Drawings:** Electrical symbols and legends, one-line diagram, Project Site electrical plan, lighting and power plan, and load schedules.
- (f) **Restoration Drawings:** Project site ground preparation, planting, landscaping, irrigation and any associated details.

2.7.7 Updated Project Cost Model and Estimate.

The Project Company shall update its Initial Cost Model developed under Preliminary Services Task #4 based on any modified design elements from the 30% DCD. The updated Project 30% DCD cost model should focus only on those components that have been modified and documented in the 30% DCD, so the KRRC can fully understand any changes in Project costs associated with modifications included in the 30% DCD.

2.7.8 Updated Project Implementation Schedule.

The Project Company shall update its Initial Project Implementation Schedule based on the Project Implementation Work presented in the 30% DCD. The updated Project Implementation Schedule shall indicate key milestone dates for work completion from the final 30% DCD through Project Final Completion. The schedule shall provide for adequate periods for KRRC design and GMP Project Submittal reviews and for the Project Company to make revisions and obtain written notice to proceed from the KRRC before proceeding with the next work phase. The updated Project Implementation Schedule shall be accompanied by a memo or report that explains significant changes from the Initial Schedule submittal for key activities and Project milestones.

2.7.9 30 Percent Design Submittal Workshop.

A one-day workshop will be conducted after the KRRC reviews the 30% Design Documents. A log of review comments will be maintained to ensure all design comments are addressed and there is an approach to incorporate into the 60 percent design, as appropriate.

2.7.10 Deliverables and KRRC Review.

The KRRC shall review the 30% DCD and provide the Project Company with written review comments. The Project Company shall allow for a minimum two-week review duration for this deliverable by the KRRC, which may be modified by the KRRC at their discretion. The Project Company shall make such revisions as required in order to address the KRRC's comments. The KRRC shall notify the Project Company in writing after the KRRC has determined that revisions made by the Project Company are acceptable.

The Project Company shall anticipate a review of the final 30% DCD by FERC and DSOD. The Project Company shall anticipate a 2-week review duration from FERC/BOC/DSOD for this submittal. Comments shall be incorporated into the 60% DCD.

Deliverables:

- Draft and final 30% DCD (including design report, drawings, cost model/estimate, and implementation schedule)
- Workshop Meeting agenda, notes, action items and review comments log

2.7.11 Transmission/Distribution Design Assumptions.

The following assumptions apply to the transmission and distribution system demolition design:

- (a) Quantities of transmission/distribution removals including line length and pole counts are taken from AECOM drawings provided with the RFP.
- (b) Design of transmission/distribution relocations includes final line design, pole, foundation, and material specifications. Because PacifiCorp T&D Engineering Design Standard were not included in the RFP, Project Company's transmission line design will follow generally accepted engineering and industry standard as required by the RFP. The Project Company shall make every effort to obtain the PacifiCorp T&D Engineering Design Standards prior to development of the Design Criteria Report, and shall notify the KRRC immediately concerning any change in scope of budget.
- (c) J.C. Boyle 230kV Bypass: Assumed two (2) new DE self-supporting TSP's required; single circuit, vertical framing considered. Our assumption includes 0.5 miles of new 230kV line.
- (d) Copco No. 1 230kV Bypass: Assumed five (5) new DE self-supporting TSP's required; single circuit, both vertical and horizontal framing considered. Based on provided drawings, one span will cross the Klamath River, therefore FAA requirements will be considered. Our assumption includes one mile of new 230kV line.
- (e) Design of transmission/distribution relocations will be based on information from existing historical drawings. The demolition drawings and design will not include modification of PacifiCorp-bordered drawings/document and/or drawings owned by other entities.
- (f) Design of transmission/distribution relocations includes modification of existing switchyard/ substation arrangement, one line diagrams, control house arrangement and panel layout drawings for demolition purpose only. The detail

drawings including relaying, control schematic and wiring diagrams of existing station were not included with the RFP package and are not part of the estimate.

- (g) Design for reconfiguration of the remaining substation, switchyard, control and protection systems are not included in this phase. Additional detail drawings required to determine the extent of modifications are not included in the RFP. Estimate for this task will be added at the subsequence phase.
- (h) Modification of PacifiCorp-bordered drawings/ document and/or drawings owned by other entities.
- (i) Design and modification of transmission lines and substations at remote outside the boundary of this project.
- (j) Modification of any transmission line underbuilds not identified in the RFP drawings.

2.8. PRELIMINARY SERVICES TASK #7 - 60 PERCENT DESIGN COMPLETION DOCUMENTS (DCD)

General Design Approach:

The project will be sub-divided into design packages considering project scope, discipline and design teams. The following design packages are anticipated.

- (a) Gate Procurement Package
- (b) Intake/Outlet Works/Diversion Tunnel Modifications
- (c) Roads, Bridges & Culverts (post-drawdown transportation improvements will move directly into detailed design, while construction access improvements will be assessed by the Project Company at a feasibility level to confirm approach and solution)
- (d) Downstream Flood Improvements
- (e) Recreation
- (f) Restoration
- (g) Dam Site Packages (JC Boyle, Copco No. 1 & 2, Iron Gate): 4 packages anticipated to address pre-drawdown modifications, drawdown sequencing, dam removal, facilities decommissioning, disposal areas and erosion protection and sediment control.

No scope or budget is included for reservoir rim engineered solutions at the 60% level. Should design for this be required, additional scope and budget will be negotiated and allocated via amendment.

No detailed design scope or budget is provided for construction access improvements, as generally defined in Table 2.7-1. Should it be determined, based on the feasibility study being completed under Task #6, that additional improvements are required, additional negotiated design budgets will be allocated via amendment.

2.8.1 Period of Performance.

The KRRC intends to provide a Notice to Proceed for this Preliminary Services Task #7 to allow portions of the 60% design to move forward following contract execution. For any components covered in the 30% DCD, the KRRC shall issue written confirmation that it is acceptable for the Project Company to continue with the associated 60% following the Project Company's 30% submittal. Early Work Package Notices to Proceed may also be issued by the KRRC as it may deem appropriate. The Project Company shall submit the Deliverable Material required by the 60% DCD to the KRRC on the date identified in the Preliminary Services Schedule.

2.8.2 Minimum Requirements.

The 60% DCD shall consist of CAD generated drawings and specifications covering general civil and site work improvements (including design criteria), geotechnical, soils and drainage, structural, mechanical, and landscaping. The 60% DCD shall include layouts and schematics drawn to scale, design criteria and notes showing the proposed design of all Project Implementation Work. The 60% DCD shall include all major elements of the Project design

proposed for the Project Implementation Work and shall comply with any proposed modifications included in the final 30% DCD.

The 60% DCD shall include but is not limited to the following (where applicable):

- (a) Design Report
 - (i) Design criteria update;
 - (ii) Project-specific analyses of Applicable Law and Governmental Approvals;
 - (iii) Design considerations reasonably necessary in connection with the Project Company's obligations under Section 15.3 (Coordination with the KRRC in Satisfaction of the KHSR Liability Protection Requirements) of this Project Agreement;
 - (iv) Supporting technical analyses and baseline data to support the proposed design;
 - (v) Engineering calculations for all disciplines; and
 - (vi) Project Implementation Work phasing recommendations.
- (b) Design Drawings
 - (i) Index of Drawings, general legend, abbreviations;
 - (ii) Cover Sheet, Location Map and Vicinity Map; and
 - (iii) Design drawings.
- (c) Specifications:
 - (i) A Project specifications document including general requirements, site work and materials, describing the size, character and quality of the entire Project in its essentials as to kinds and locations of materials; equipment selections; and types of structural, mechanical and electrical systems;
- (d) Project Cost Model
- (e) Project Implementation Schedule
- (f) Quality management will be achieved through quality control reviews and Independent Technical Reviews (ITR) consisting of an independent internal engineering team. The ITR team will be engaged at key project milestones to provide input and review of criteria, design concepts, detailed design and construction approach. ITRs are budgeted and will be scheduled into the project.

2.8.3 Criteria.

The 60% DCD shall incorporate the final 30% DCD and shall include, in addition to drawings and specifications set forth in this Section such additional information as needed to describe the Project. The 60% DCD shall indicate the basis for design choices, as well as an explanation

of how the design incorporates the KRRC's design criteria objectives. The 60% DCD shall indicate any new alternative designs, approaches, technologies, equipment or processes that the Project Company recommends be considered by the KRRC, if not included in the final 30% DCD.

2.8.4 Design Refinement.

2.8.4.1 Design Refinement. The Project Company shall be responsible for developing and refining the Project design in close coordination with the KRRC. The Project Company shall conduct all evaluations, calculations, cost estimating, scheduling, workshops, and other services as needed to advance the Project design to the 60% DCD. The Project Company shall develop their approach to seed collection, propagation and invasive exotic vegetation control, and shall begin implementation of those activities as soon as possible during the Preliminary Services Period. The Project Company shall perform its own collection and propagation work during the Preliminary Services Period to augment the KRRC collection/propagation described in Reliance Document 12 (KRRC Native Seed Collection Summary), as needed to achieve the complete restoration of the Project Site.

2.8.4.2 Workshops. The Project Company shall conduct workshops addressing the following topics with the KRRC to review the design and alternatives and develop a recommended approach. Each workshop shall include a weighted decision process developed by the Project Company to compare alternatives on the basis of established evaluation criteria.

- (a) Permitting design considerations and anticipated agency reviews
- (b) Update on design, schedule and procurement associated with tunnel and gate design components – potential for Early Work Packages
- (c) Proposed modifications to Project components (post 30% DCD)
- (d) Any Governmental Approval issues or updates associated with any proposed modifications
- (e) Coordination and connection to existing site utilities
- (f) Electrical supply and distribution (including emergency power)
- (g) Interface with Related Projects
- (h) Update on Mobilization and Site Access Plan; Discussion of site security including design guidelines, physical security facilities, electronic security features, and cyber security

The following information shall be prepared by Project Company for each workshop and shall be submitted a minimum of one week prior to each workshop:

- (a) Summary of Project activities associated with Workshop topic
- (b) General layout drawings, as appropriate
- (c) Cost estimates for alternatives, as appropriate
- (d) Changes to Project Implementation Schedule, as appropriate

2.8.5 60 Percent Design Report.

The Project Company shall prepare and submit to the KRRC a 60% Design Report which will include the Project Company's evaluation findings and specific recommended design for the Project. The Design Report will explain how the proposed design will meet the KRRC's requirements set forth in Appendix 4 (Project Technical Requirements) for the Project and comply with all Applicable Law and Governmental Approvals. The Design Report will include information on alternatives considered and evaluated and information on the rationale or method by which the recommended design was selected. Information considered in the evaluation of alternatives and selection of a recommended design shall include but not be limited to: estimated capital costs; schedule; compliance with regulatory requirements; public safety; and compatibility with CEQA, NEPA, and KRRC environmental objectives and requirements.

The Design Report will include information on major equipment and vendors proposed and alternatives evaluated. Comparisons on equipment and vendors will include technical and performance characteristics, reliability, warranties, and operational experience. The Design Report will include supporting documentation such as calculations, schematics, and drawings to support the comparisons and recommendations.

In addition to design criteria, supporting documentation and technical analyses, the Design Report will also include the following:

- (a) Update of Mobilization and Site Access Plan, incorporating 60% DCD;
- (b) Plan to coordinate with all Related Projects;
- (c) A description of regulatory conditions that apply to the proposed design, including Applicable Law and Governmental Approvals, and associated agency review durations, constraints or fees; and
- (d) Utility requirements, and the Project Company's plan for coordinating with all public agencies and utilities with jurisdiction over any of the Project Implementation Work.

A draft 60% Design Report shall be reviewed by the KRRC and the KRRC's comments shall be addressed by the Project Company.

The Project Company shall prepare a final 60% Design Report incorporating KRRC comments on the draft Design Report. The report will include updated analyses, as well as table of contents, executive summary, facilities descriptions, and recommended Project chapters.

2.8.6 60 Percent Design Drawings.

The 60% DCD will incorporate the recommended elements from design refinement into the 60% design drawings. The 60% drawing set will generally include drawings described below.

- (a) **General Drawings:** Cover sheet, abbreviations and symbols, key plan, list of drawings, Project key plan, drawing symbology, numbering and tagging conventions, symbols, and abbreviations, design criteria (90% complete), equipment schedule, valve and gate schedules, and boundary survey.
- (b) **Civil Drawings:** Project Site grading and paving plan, Project Site new access road plan and sections.

- (c) **Structural Drawings:** Structural improvements plan, general notes, standard concrete details and standard reinforcing details.
- (d) **Mechanical Drawings:** Mechanical improvements plan, symbols and legends.
- (e) **Electrical Drawings:** Electrical symbols and legends, one-line diagram, Project Site electrical plan, lighting and power plan, and load schedules.
- (f) **Restoration Drawings:** Project site ground preparation, planting, landscaping, irrigation and any associated details.
- (g) **Security Drawings:** Project Site plan, equipment schedules.

2.8.7 60 Percent Design Specifications.

The Project Company shall prepare technical Specifications in the Construction Specification Institute (CSI) Spec-Text format, and the list of required shop drawings, in final electronic form for printing, copying, and binding. Specifications shall reflect only the scope of work for the current Project. Standard specifications shall be modified to exclude items not applicable to the current Project.

The Project Company shall prepare a complete and coordinated set of construction specifications for all engineering disciplines with an adequate level of detail to allow for construction. The construction specifications shall provide information customarily necessary in documents for projects of similar size, complexity, and quality. The construction specifications shall include all information required by the trades to complete construction of the Project, and shall comply with all design criteria documented in the 60% DCD and the Project Agreement.

Specifications shall be prepared using the most current version of the Microsoft Word for Windows word processor. If the Project Company standard specifications are in a format other than Microsoft Word, they must first be converted to Microsoft Word format, thoroughly checked to ensure that a complete conversion was accomplished (including all tables, charts, headers, footers, etc.), then edited for this Project as appropriate within Microsoft Word. The text shall be 11-point Arial font. An electronic file name for each specification section shall include a descriptive name preceding a 5-digit specification section number followed by the Microsoft Word file extension (e.g., PROJECT 11500.doc).

Two-sided documents are required in an effort to conserve paper. The following layout is to be used for all Specification sections:

- (a) Header:
 - (i) 1st Page: Section Number: Centered at the top, all caps, first page only.
 - (ii) Section Title: Centered at the top, all caps, first page only.
 - (iii) 2nd Page: None
- (b) Footer Information: (Reverse footer for even numbered pages)
- (c) Articles: ALL CAPS
- (d) Paragraphs: Full justification

- (e) Font: Arial 11
- (f) Margins: Top, Bottom, Left and Right = 1.0"; Gutter and Header = .5", Footer = .35"
- (g) Paragraph Spacing: 12 pts before, 0 pts after
- (h) Line Spacing: Single

The Specifications shall use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

- (a) Abbreviated Language: Language used in the Specifications is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural and plural words shall be interpreted as singular where applicable as the context of the Specifications indicates.
- (b) Imperative mood and streamlined language shall generally be used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Design/Builder. Occasionally, the indicative or subjunctive mood may be used in the section text for clarity to describe responsibilities that must be fulfilled indirectly by the Design/Builder when so noted.
- (c) The words "shall", "shall be", or "shall comply with", depending on the context, are implied where a colon (:) is used within a sentence or phrase.

2.8.8 Updated Project Cost Model and Estimate.

The Project Company shall update its Initial Cost Model (or 30% DCD Cost Model) to reflect the 60% DCD. The updated Project 60% DCD cost model shall include estimated costs for all Project Company services, equipment and materials and other fees that may be incurred by the Project including appropriate contingencies due to uncertainties regarding cost estimates, site conditions and other factors. The updated cost model shall be broken down into logical cost categories such as remaining design services, engineering services during the Project Implementation Work, self-performed work, procured Subcontractor work, major equipment purchases, major material purchases and other categories with appropriate supporting documentation that will assist the KRRC in its evaluation of the Project cost model.

2.8.9 Subcontracting Plan.

The Project Company shall prepare a draft Subcontracting Plan which identifies the type of work or trades that will be required to complete the Project by the Scheduled Milestone Substantial Completion Date, describes the methods the Project Company will utilize to engage local subconsultants and subcontractors, describes the methods the Project Company will utilize to engage with subconsultants and subcontractors classified as SLTBE Firms, and provides a line item breakdown of the estimated costs of each subcontracting package.

2.8.10 Updated Project Implementation Schedule.

The Project Company shall update its Project Implementation Schedule presented in the 30% DCD. The updated Project Implementation Schedule shall indicate key milestone dates for work completion from the final 60% DCD through Project Final Completion. The updated

Project Implementation Schedule shall provide for adequate periods for KRRC design reviews through 100% completion and for the Project Company to make revisions and obtain written notification to proceed from the KRRC before proceeding with the next work phase.

The updated Project Implementation Schedule shall be accompanied by a memo or report that explains significant changes from the 30% DCD for key activities and Project milestones. Upon the KRRC's written approval, the updated Project Implementation Schedule shall be the schedule intended to be included as the "Initial Project Implementation Schedule" to be set forth as Attachment 5A to Appendix 5 (General Project Implementation Work Requirements) of this Project Agreement. In addition, each Scheduled Milestone Substantial Completion Date specified in the Project Implementation Schedule shall be the date intended to be included in Section 1.1 (Definitions) of this Project Agreement.

2.8.11 60 Percent Design Submittal Workshop.

A 60% design workshop will be conducted after the KRRC reviews the 60% DCD. This workshop will be used to finalize the design comments. A log of review comments will be maintained to assure all design comments are addressed and incorporated, if appropriate.

2.8.12 Deliverables and KRRC Review.

The KRRC shall review the 60% DCD and provide the Project Company with written review comments. The Project Company shall allow for a minimum three-week review duration for this deliverable by the KRRC, which may be modified by the KRRC at their discretion. The Project Company shall make such revisions as required in order to address the KRRC's comments. The KRRC shall indicate to the Project Company in writing after the KRRC has determined that revisions made by the Project Company are acceptable.

The Project Company shall anticipate a review of the final 60% DCD by FERC and DSOD. The Project Company shall anticipate a 4-week review duration from FERC/BOC/DSOD for this submittal. Comments shall be incorporated into the GMP Project Submittal.

Deliverables:

- Draft and final 60% DCD (including design report, drawings, specifications, cost model/estimate, and implementation schedule)
- Draft and final Subcontracting Plan
- Workshop Meeting agenda, notes, action items and review comments log

2.8.13 Inclusion as the Project Design Requirements.

Upon the KRRC's written notification that all of the KRRC's comments, if any, have been satisfactorily addressed by the Project Company, the completed 60% DCD shall be included as the Project Design Requirements in Appendix 4 (Project Technical Requirements).

2.9. PRELIMINARY SERVICES TASK #8 - GMP PROJECT SUBMITTAL AND SUPPORTING COST ESTIMATES**2.9.1 GMP Project Submittal.**

After the Project Company has received the KRRC's written notification to proceed on Task #8, the Project Company shall provide the KRRC, on the date identified in the Preliminary Services Schedule, a GMP Project Submittal, which shall be prepared in accordance with the Contract Standards and meet the requirements set forth in Section 5.8 (GMP Project Submittal) of this Project Agreement.

The GMP Project Submittal shall incorporate all of the work performed as part of Preliminary Services Task #8, set forth the proposed Base Guaranteed Maximum Price for the Project Implementation Work (including all services required for implementation of the Project through Project Final Completion), and provide information on all engineering, procurement, materials, field labor and equipment and other services necessary to perform the Project Implementation Work as required under the Project Agreement. As part of its GMP Project Submittal, the Project Company shall submit a final Subcontracting Plan and a final Project Implementation Schedule that meets the requirements set forth in Section 5.3 (Project Implementation Schedule) of Appendix 5 (General Project Implementation Work Requirements).

Quality management will be achieved through quality control reviews and Independent Technical Reviews (ITR) consisting of an independent internal engineering team. The ITR team will be engaged at key project milestones to provide input and review of criteria, design concepts, detailed design and construction approach. ITRs are budgeted and will be scheduled into the project.

2.9.2 Basis of the Proposed Base Guaranteed Maximum Price.

The Project Company will prepare and include in the GMP Project Submittal documentation supporting the proposed Base Guaranteed Maximum Price, including Subcontractor and equipment vendor bids and quotations, detailed cost estimating data, allowances (where appropriate), breakdown of general conditions, and definition of the Project Company's contingency included in the Base Guaranteed Maximum Price. Such documentation will include the following information:

- (a) Engineering services, including:
 - (1) Engineering design from 90% to 100%
 - (2) Engineering design – value engineering services
 - (3) Engineering construction, demolition and restoration support
 - (4) Engineering procurement of major equipment and structures
 - (5) Documentation
- (b) Project Implementation Work and costs for:
 - (1) Services during engineering design from 60% to 100%
 - (2) Project Implementation Work support for value engineering

- (3) General conditions
 - (4) Site work, transportation improvements (road, bridge, and culverts), downstream flood control improvements, recreation improvements, hatchery improvements, water system improvements and traffic control
 - (5) Construction of drawdown gates and other ancillary improvements
 - (6) Demolition debris removal and disposal
 - (7) Performance and payment bonds
 - (8) Contingency
- (c) Labor, expenses, rental, overhead and mark-up costs, including:
- (1) Billing rates for all proposed classifications of engineering and construction, demolition and restoration services labor and related expense rates such as mileage charges, per diem for meals and lodging, office charges and personnel vehicle rentals;
 - (2) Unburdened rental rates on construction, demolition and restoration equipment, trailers, storage containers or space and major tools;
 - (3) Direct overhead on labor (benefits), indirect overhead on labor (general and administration or G&A), and profit rate on fully cost burdened labor rates;
 - (4) Proposed overhead mark-up rates and profit rates on expenses, materials, equipment rentals, Subcontractors, equipment supplied by vendors and consumables (supplies);
 - (5) The same cost and pricing information as requested in paragraphs 3 (a), (b) and (c) above for major Subcontractors; and
 - (6) Demonstration that there are no significant tiered pricing mark-ups so that major Subcontractors' overhead and profit mark-ups are not duplicated to similar Project Company mark-ups.
- (d) Project Company shall also provide the following information:
- (1) For engineering field services during Project Implementation Work, labor costs and expenses for a Project Implementation Work manager or resident engineer for overseeing Project Implementation Work and related services;
 - (2) For engineering support during Project Implementation Work for review of Project Implementation Work Requests for Information ("RFIs"), submittals and proposed design or Project Implementation Work changes and costs, labor costs and expenses;
 - (3) All Base Guaranteed Maximum Price pricing assumptions and clarifications on terms and conditions used;

- (4) All self-performed Project Implementation Work services;
- (5) A breakdown of the Project Company Contingency, how it was determined and expected adequacy to cover costs not able to be determined accurately at the time of preparation of the GMP Project Submittal;
- (6) A list of work activities, expenses and fees not included in the GMP which the KRRC may be expected to pay for;
- (7) Key assumptions in the 60% DCD Work Schedule upon which the Base Guaranteed Maximum Price is based including dates for each Milestone Substantial Completion and Project Final Completion; and
- (8) Any other key assumptions, qualifications or conditions upon which the Base Guaranteed Maximum Price is based not covered in the preceding items in this Section.

2.9.3 Preparation of the GMP Project Submittal.

The Project Company will start the development of the GMP Project Submittal at the commencement of the Project during the kickoff partnering workshop to establish dialogue from early concept development through the 60 percent design. During the design phase, the Project Company will maintain ongoing communication with the KRRC to assess and analyze concept and design changes as they relate to the overall Project cost and schedule.

The Project Company shall utilize an “open book” approach to develop the GMP Project Submittal, providing the KRRC with full access to all the details that make up the final GMP Project Submittal.

Meetings will be held throughout the design and development of the GMP Project Submittal with the KRRC to assure the Preliminary Services work is completed in a transparent manner.

The Project will not have 100% complete plans and specifications at the time the final Base Guaranteed Maximum Price is agreed upon. Therefore, in order to get a more complete estimate of the scope, the Project Company will prepare “design gap analysis narratives” for all Project Implementation Work items to provide the Project Company’s estimators and the KRRC a clearer picture of what is included in the final GMP Project Submittal package.

During development of the GMP Project Submittal, the Project Company will perform value analysis and constructability reviews with design and Project Implementation Work team members as the plans are being prepared. The Project Company will also conduct “bid-ability” reviews with the Project Company’s estimators.

All of these efforts are designed to prepare the documents and estimates as accurately as possible and to keep the KRRC fully informed and involved with the design and cost throughout the development of the GMP Project Submittal.

The KRRC shall review the GMP Project Submittal and provide the Project Company with written review comments. The Project Company shall allow for a minimum three-week review duration for this deliverable by the KRRC, which may be modified by the KRRC at their discretion. The Project Company shall make such revisions as required in order to address the KRRC’s comments. The KRRC shall indicate to the Project Company in writing after the KRRC has determined that revisions made by the Project Company are acceptable.

Deliverables:

- Draft and final GMP Project Submittal

2.10. PRELIMINARY SERVICES TASK #9 - 90 PERCENT DESIGN COMPLETION DOCUMENTS (DCD)

General Design Approach:

The project will be sub-divided into design packages considering project scope, discipline and design teams. The following design packages are anticipated.

- (a) Gate Procurement Package
- (b) Intake/Outlet Works/Diversion Tunnel Modifications
- (c) Roads, Bridges & Culverts (post-drawdown transportation improvements will move directly into detailed design, while construction access improvements will be assessed by the Project Company at a feasibility level to confirm approach and solution)
- (d) Downstream Flood Improvements
- (e) Recreation
- (f) Restoration
- (g) Dam Site Packages (JC Boyle, Copco No. 1 & 2, Iron Gate): 4 packages anticipated to address pre-drawdown modifications, drawdown sequencing, dam removal, facilities decommissioning, disposal areas and erosion protection and sediment control.

No scope or budget is included for reservoir rim engineered solutions at the 90% level. Should design for this be required, additional scope and budget will be negotiated and allocated via amendment.

No detailed design scope or budget is provided for construction access improvements, as generally defined in Table 2.7-1. Should it be determined, based on the feasibility study being completed under Task #6, that additional improvements are required, additional negotiated design budgets will be allocated via amendment.

2.10.1 Period of Performance.

After the Project Company receives the KRRC's written notice to proceed on Task #9, the Project Company shall proceed with the performance of services required to achieve 90% Design Completion. The Project Company shall submit the Deliverable Material required by the 90% DCD to the KRRC on the date identified in the Preliminary Services Schedule.

2.10.2 Minimum Requirements.

The 90% DCD shall consist of CAD generated drawings and specifications covering general civil and site work improvements (including design criteria), geotechnical, soils and drainage, structural, mechanical, and landscaping. The 90% DCD shall include layouts and schematics drawn to scale, design criteria and notes showing the proposed design of all Project Implementation Work. The 90% DCD shall include all major elements of the Project design proposed for the Project Implementation Work and shall comply with any proposed modifications included in the final GMP Submittal Package.

The 90% DCD shall include but is not limited to the following (where applicable):

- (a) Design Report
 - (i) Design criteria update;
 - (ii) Project-specific analyses of Applicable Law and Governmental Approvals;
 - (iii) Design considerations reasonably necessary in connection with the Project Company's obligations under Section 15.3 (Coordination with the KRRC in Satisfaction of the KHSA Liability Protection Requirements) of this Project Agreement;
 - (iv) Supporting technical analyses and baseline data to support the proposed design;
 - (v) Engineering calculations for all disciplines; and
 - (vi) Project Implementation Work phasing recommendations.
- (b) Design Drawings
 - (i) Index of Drawings, general legend, abbreviations;
 - (ii) Cover Sheet, Location Map and Vicinity Map; and
 - (iii) Design drawings.
- (c) Specifications:
 - (i) A Project specifications document including general requirements, site work and materials, describing the size, character and quality of the entire Project in its essentials as to kinds and locations of materials; equipment selections; and types of structural, mechanical and electrical systems.
- (d) Project Cost Model
- (e) Project Implementation Schedule
- (f) Quality management will be achieved through quality control reviews and Independent Technical Reviews (ITR) consisting of an independent internal engineering team. The ITR team will be engaged at key project milestones to provide input and review of criteria, design concepts, detailed design and construction approach. ITRs are budgeted and will be scheduled into the project.

2.10.3 Criteria.

The 90% DCD shall incorporate the final 60% DCD and shall include, in addition to drawings and specifications set forth in this Section such additional information as needed to describe the Project. The 90% DCD shall indicate the basis for design choices, as well as an explanation of how the design incorporates the KRRC's BDR objectives. The 90% DCD shall indicate any new alternative designs, approaches, technologies, equipment or processes that the Project

Company recommends be considered by the KRRC, if not included in the final GMP Submittal Package.

2.10.4 Design Refinement.

2.10.4.1 Design Refinement. The Project Company shall be responsible for developing and refining the Project design in close coordination with the KRRC. The Project Company shall conduct all evaluations, calculations, cost estimating, scheduling, workshops, and other services as needed to advance the Project design to the 90% DCD.

2.10.4.2 Workshops. The Project Company shall conduct workshops addressing the following topics with the KRRC to review the design and alternatives and develop a recommended approach. Each workshop shall include a weighted decision process to compare alternatives on the basis of established evaluation criteria.

- (a) Permitting design considerations and anticipated agency reviews
- (b) Update on design, schedule and procurement associated with tunnel and gate design components - potential for Early Work Packages
- (c) Proposed modifications to Project components (post GMP Submittal Package)
- (d) Any permitting issues or updates associated with any proposed modifications
- (e) Coordination and connection to existing site utilities
- (f) Electrical supply and distribution (including emergency power)
- (g) Interface with Related Projects
- (h) Update on Mobilization and Site Access Plan; Discussion of site security including design guidelines, physical security facilities, electronic security features, and cyber security

The following information shall be prepared by Project Company for each workshop and shall be submitted a minimum of one week prior to each workshop:

- (a) Summary of Project activities associated with Workshop topic
- (b) General layout drawings, as appropriate
- (c) Cost estimates for alternatives, as appropriate
- (d) Proposed changes to the Project Implementation Schedule, as appropriate

2.10.5 90 Percent Design Report.

The Project Company shall prepare and submit to the KRRC a 90% Design Report which will include the Project Company's evaluation findings and specific recommended design for the Project. The Design Report will explain how the proposed design will meet the KRRC's requirements for the Project and comply with all legal and regulatory requirements. The Design Report will include information on alternatives considered and evaluated and information on the rationale or method by which the recommended design was selected. Information considered in the evaluation of alternatives and selection of a recommended design

shall include but not be limited to: estimated capital costs; schedule; compliance with regulatory requirements; public safety; and compatibility with CEQA and KRRC environmental objectives and requirements.

The Design Report will include information on major equipment and vendors proposed and alternatives evaluated. Comparisons on equipment and vendors will include technical and performance characteristics, reliability, warranties, and operational experience. The Design Report will include supporting documentation such as calculations, schematics, and drawings to support the comparisons and recommendations.

In addition to design criteria, supporting documentation and technical analyses, the Design Report will also include the following:

- (a) Update of Mobilization and Site Access Plan, incorporating 90% DCD;
- (b) Plan to coordinate with all Related Projects;
- (c) A description of regulatory conditions that apply to the proposed design, including Applicable Law and Governmental Approvals, and associated agency review durations, constraints or fees including any modifications to previously issued Governmental Approvals; and
- (d) Utility requirements, and the Project Company's plan for coordinating with all public agencies and utilities with jurisdiction over any of the Project Implementation Work.

A draft 90% Design Report shall be reviewed by the KRRC and the KRRC's comments shall be addressed by the Project Company.

The Project Company shall prepare a final 90% Design Report incorporating KRRC comments on the draft Design Report. The report will include updated analyses, as well as table of contents, executive summary, facilities descriptions, and recommended Project chapters.

2.10.6 90 Percent Design Drawings.

The 90% DCD will incorporate the recommended elements from design refinement into the 90% design drawings. The 90% drawing set will generally include drawings described below.

- (a) **General Drawings:** Cover sheet, abbreviations and symbols, key plan, list of drawings, Project key plan, drawing symbology, numbering and tagging conventions, symbols, and abbreviations, design criteria (90% complete), equipment schedule, valve and gate schedules, and boundary survey.
- (b) **Civil Drawings:** Project Site grading and paving plan, Project Site new access road plan and sections.
- (c) **Structural Drawings:** Structural improvements plan, general notes, standard concrete details and standard reinforcing details.
- (d) **Mechanical Drawings:** Mechanical improvements plan, symbols and legends.
- (e) **Electrical Drawings:** Electrical symbols and legends, one-line diagram, Project Site electrical plan, lighting and power plan, and load schedules.

- (f) **Restoration Drawings:** Project site ground preparation, planting, landscaping, irrigation and any associated details.
- (g) **Security Drawings:** Project Site plan, equipment schedules.

2.10.7 90 Percent Design Specifications.

The Project Company shall prepare technical Specifications in the Construction Specification Institute (CSI) Spec-Text format, and the list of required shop drawings, in final electronic form for printing, copying, and binding. Specifications shall reflect only the scope of work for the current Project. Standard specifications shall be modified to exclude items not applicable to the current Project.

The Project Company shall prepare a complete and coordinated set of construction specifications for all engineering disciplines with an adequate level of detail to allow for construction. The construction specifications shall provide information customarily necessary in documents for projects of similar size, complexity, and quality. The construction specifications shall include all information required by the trades to complete construction of the Project, and shall comply with all design criteria documented in the 90% DCD and the Project Agreement.

Specifications shall be prepared using the most current version of the Microsoft Word for Windows word processor. If the Project Company standard specifications are in a format other than Microsoft Word, they must first be converted to Microsoft Word format, thoroughly checked to ensure that a complete conversion was accomplished (including all tables, charts, headers, footers, etc.), then edited for this Project as appropriate within Microsoft Word. The text shall be 11-point Arial font. An electronic file name for each specification section shall include a descriptive name preceding a 5-digit specification section number followed by the Microsoft Word file extension (e.g., PROJECT 11500.doc).

Two-sided documents are required in an effort to conserve paper. The following layout is to be used for all Specification sections:

- (a) Header:
 - (i) 1st Page: Section Number: Centered at the top, all caps, first page only.
 - (ii) Section Title: Centered at the top, all caps, first page only.
 - (iii) 2nd Page: None
- (b) Footer Information: (Reverse footer for even numbered pages)
- (c) Articles: ALL CAPS
- (d) Paragraphs: Full justification
- (e) Font: Arial 11
- (f) Margins: Top, Bottom, Left and Right = 1.0"; Gutter and Header = .5", Footer = .35"
- (g) Paragraph Spacing: 12 pts before, 0 pts after

(h) Line Spacing: Single

The Specifications shall use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

- (i) **Abbreviated Language:** Language used in the Specifications is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural and plural words shall be interpreted as singular where applicable as the context of the Specifications indicates.
- (j) **Imperative mood and streamlined language** shall generally be used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Design/Builder. Occasionally, the indicative or subjunctive mood may be used in the section text for clarity to describe responsibilities that must be fulfilled indirectly by the Design/Builder when so noted.
- (k) The words “shall”, “shall be”, or “shall comply with”, depending on the context, are implied where a colon (:) is used within a sentence or phrase.

2.10.8 Updated Project Cost Model and Estimate.

The Project Company shall update its GMP Submittal Package Cost Model to reflect the 90% DCD. The updated Project 90% DCD cost model shall include estimated costs for all Project Company services, equipment and materials and other fees that may be incurred by the Project including appropriate contingencies due to uncertainties regarding cost estimates, site conditions and other factors. The updated cost model shall be broken down into logical cost categories such as remaining design services, engineering services during the Project Implementation Work, self-performed work, procured Subcontractor work, major equipment purchases, major material purchases and other categories with appropriate supporting documentation that will assist the KRRC in its evaluation of the Project cost model.

2.10.9 Subcontracting Plan.

The Project Company shall prepare a draft Subcontracting Plan which identifies the type of work or trades that will be required to complete the Project by each Scheduled Milestone Substantial Completion Date, describes the methods the Project Company will utilize to engage local subconsultants and subcontractors, describes the methods the Project Company will utilize to engage with subconsultants and subcontractors classified as SLTBE Firms, and provides a line item breakdown of the estimated costs of each subcontracting package.

2.10.10 Updated Project Implementation Schedule.

The Project Company shall update its Project Implementation Schedule presented in the final GMP Submittal Package. The updated Project Implementation Schedule shall indicate key milestone dates for work completion from the final 90% DCD through Project Final Completion. The updated Project Implementation Schedule shall provide for adequate periods for KRRC design reviews through 100% completion and for the Project Company to make revisions and obtain written notification to proceed from the KRRC before proceeding with the next work phase.

The updated Project Implementation Schedule shall be accompanied by a memo or report that explains significant changes from the GMP Submittal Package for key activities and Project

milestones. Upon the KRRC's written approval, the updated Project Implementation Schedule shall be the schedule intended to be included as the "Initial Project Implementation Schedule" to be set forth as Attachment 5A to Appendix 5 (General Project Implementation Work Requirements) of this Project Agreement. In addition, each Scheduled Milestone Substantial Completion Date specified in the Project Implementation Schedule shall be the dates intended to be included in Section 1.1 (Definitions) of this Project Agreement.

2.10.11 90 Percent Design Submittal Workshop.

A 90% design workshop will be conducted after the KRRC reviews the 90% DCD. This workshop will be used to finalize the design comments. A log of review comments will be maintained to assure all design comments are addressed and incorporated, if appropriate.

2.10.12 Deliverables and KRRC Review.

The KRRC shall review the 90% DCD and provide the Project Company with written review comments. The Project Company shall allow for a minimum two-week review duration for this deliverable by the KRRC, which may be modified by the KRRC at their discretion. The Project Company shall make such revisions as required in order to address the KRRC's comments. The KRRC shall indicate to the Project Company in writing after the KRRC has determined that revisions made by the Project Company are acceptable.

Deliverables:

- Draft and final 90% DCD (including design report, drawings, specifications, cost model/estimate, and implementation schedule)
- Draft and final Subcontracting Plan
- Workshop Meeting agenda, notes, action items and review comments log

2.10.13 Inclusion as the Project Design Requirements.

Upon the KRRC's written notification that all of the KRRC's comments, if any, have been satisfactorily addressed by the Project Company, the completed 90% DCD shall be included as the Project Design Requirements in Appendix 4 (Project Design Requirements).

2.11. POTENTIAL ADDITIONAL PRELIMINARY SERVICES

As provided in subsection 5.2(B) (Additional Preliminary Services) of this Project Agreement, the KRRC may request that the Project Company perform potential Additional Preliminary Services. In particular, such Additional Preliminary Services may include the following:

- Design or design review of City of Yreka water system improvements
- Additional permitting or related services that may be required between the GMP Contract Amendment Date and the Project Implementation Contract Amendment Date
- Design or design review of Fall Creek and Iron Gate hatchery improvements
- Implementation of aquatic resource measures and reporting
- Implementation of terrestrial resource measures and reporting
- Completion of water quality monitoring and reporting
- Cultural resources support
- Supporting review and analysis relating to KHSA Indemnity issues, only to the extent requested by the KRRC

2.12. PRELIMINARY SERVICES FEE**2.12.1 Compensation for Base Preliminary Services.**

The KRRC shall pay the Project Company a Preliminary Services Fee on a time and materials basis, with an upset limit of \$[REDACTED]. The Preliminary Services Fee shall serve as the Project Company's entire compensation for all Base Preliminary Services performed as required under this Project Agreement, and shall include costs for any and all out-of-pocket disbursements for travel, lodging and other expenses incidental to the performance of the Base Preliminary Services and any payments to third parties such as Subcontractors.

The Project Company shall earn its Preliminary Services Fee progressively based upon the Project Company's percentage completion of the Base Preliminary Services as reasonably determined by the KRRC, based on the following upset limits for each task:

<u>Preliminary Services Task</u>	<u>Upset Limit</u>
Task #1: Project Management	\$[REDACTED]
Task #2: Project Site and Project Conditions Verification	\$[REDACTED]
Task #3: Permitting Support and Compliance Program	\$[REDACTED]
Task #4: Initial Cost Model and Implementation Schedule	\$[REDACTED]
Task #5: Design Criteria Report	\$[REDACTED]
Task #6: 30% Design Completion Documents	\$[REDACTED]
Task #7: 60% Design Completion Documents	\$[REDACTED]
Task #8: GMP Project Submittal and Supporting Cost Estimates	\$[REDACTED]
Task #9: 90% Design Completion Documents	\$[REDACTED]

2.12.2 Payment Requests.

The Project Company shall request monthly progress payments of the portion of the Preliminary Services Fee payable with respect to each Preliminary Services Task. Monthly payment requests shall be submitted within 30 days after the end of the month. All billings and requests for progress payments shall require a written invoice from the Project Company in a form acceptable to the KRRC. The Project Company shall submit all billings with any necessary invoices, time records, Preliminary Services Deliverable Material, and other appropriate evidence of performance, after which the KRRC shall make payment at the earliest practicable time, but not later than 30 days following receipt of a proper payment request.

If requested by the KRRC to facilitate the payment process and track progress of the Preliminary Services Tasks, the Project Company shall provide the KRRC with an itemization of its compensation according to a Work Breakdown Structure ("WBS") in a form the KRRC

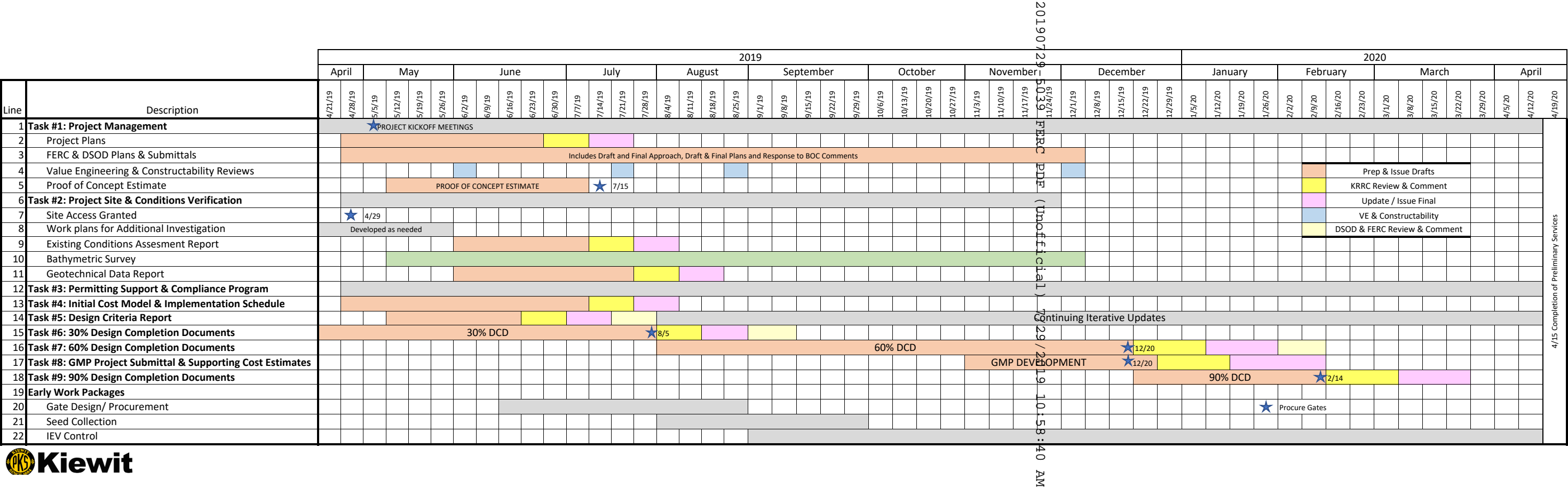
supplies or approves (at the KRRC's option), that defines all Preliminary Services Tasks (Project Company's and Subcontractors'), along with a Preliminary Services Schedule providing the timeline for each Preliminary Services Task, a Project budget defining the planned man-hours and costs for each Preliminary Services Task, and a schedule of deliverables providing the timeline for all Preliminary Services Deliverable Material to be provided to the KRRC. The WBS shall further define which tasks are to be performed by Subcontractors. The WBS shall not relieve the Project Company of its performance, schedule or other obligations under this Project Agreement.

2.12.3 Compensation for Additional Preliminary Services.

In the event the KRRC elects to request any Additional Preliminary Services, compensation for the Additional Preliminary Services shall be negotiated by the KRRC and the Project Company in accordance with subsection 9.1(B) (Compensation for Additional Preliminary Services) of this Project Agreement.

ATTACHMENT 2A

INITIAL PRELIMINARY SERVICES SCHEDULE



- 1) It is assumed that the engineering and design schedule will be continuous throughout Preliminary Services. Currently not anticipated in association with are stops, or holds for authorizations or agency approvals.
- 2) It is assumed that design reviews of earlier design submittals will be completed in parallel to the design progress on subsequent deliverables. For example: progress on 60% design will begin concurrent with 30% review and 90% design will commence concurrent with start of 60% review.

ATTACHMENT 2B**PRELIMINARY SERVICES PROJECT COMPANY SUBMITTALS**

Task No.	Task Name	Required Submittals	BOC Review	Applicable Governmental Review Entity
1	Project Management			
		Monthly Progress Reports		
		Meeting Agendas and Notes		
		Technical Workshop Agendas and Notes		
		Mobilization and Site Access Plan		
		Site Trailers and Utilities Plan		
		Security Plan		
		Photographic Documentation Plan		
		Related Projects Coordination Protocol		
		Maintenance of Facilities Operations Plan		
		Emergency Operations and Response Plan		
		Health and Safety Plan	Yes	FERC
		Project Execution Plan		
		Project Team Structure and Staffing Plan		
		Communications Plan		
		Scope Management Plan		
		Change Management/Integration Management Plan		
		Schedule Management Plan	Yes	FERC
		Budget Management Plan	Yes	FERC
		Risk Management Plan	Yes	FERC
		Procurement Management Plan		
		Project Implementation and Quality Management Plan		
		Document Control Plan		
		Preliminary Services Schedule		
		FERC Required Plans and Submittals	Yes	FERC
		Document Submittal Procedures		
		Partnering Charter		
		Records Management System Documentation		
		Constructability Review Report(s)	Yes	FERC
		Value Engineering Report(s)	Yes	FERC
2	Project Site and Project Conditions Verification			
		Existing Conditions Work Plan(s)		
		Existing Conditions Assessment Report		
		Geotechnical Investigation and Laboratory Testing Plan	Yes	FERC/DSOD
		Geotechnical Drilling Site Access Plan		
		Geotechnical Data Report	Yes	FERC/DSOD
		Rim Stability and Mitigation Memo		
3	Permitting Support and Compliance Program			
		Initial, Final and Amended Environmental Compliance Plan		Federal and State regulatory agencies
		Permit Applications		
		Plans or supporting material for KRRC-managed Governmental Approvals		
4	Initial Cost Model and Schedule			
		Initial Cost Model and Estimate	Yes	FERC
		Initial Implementation Schedule	Yes	FERC

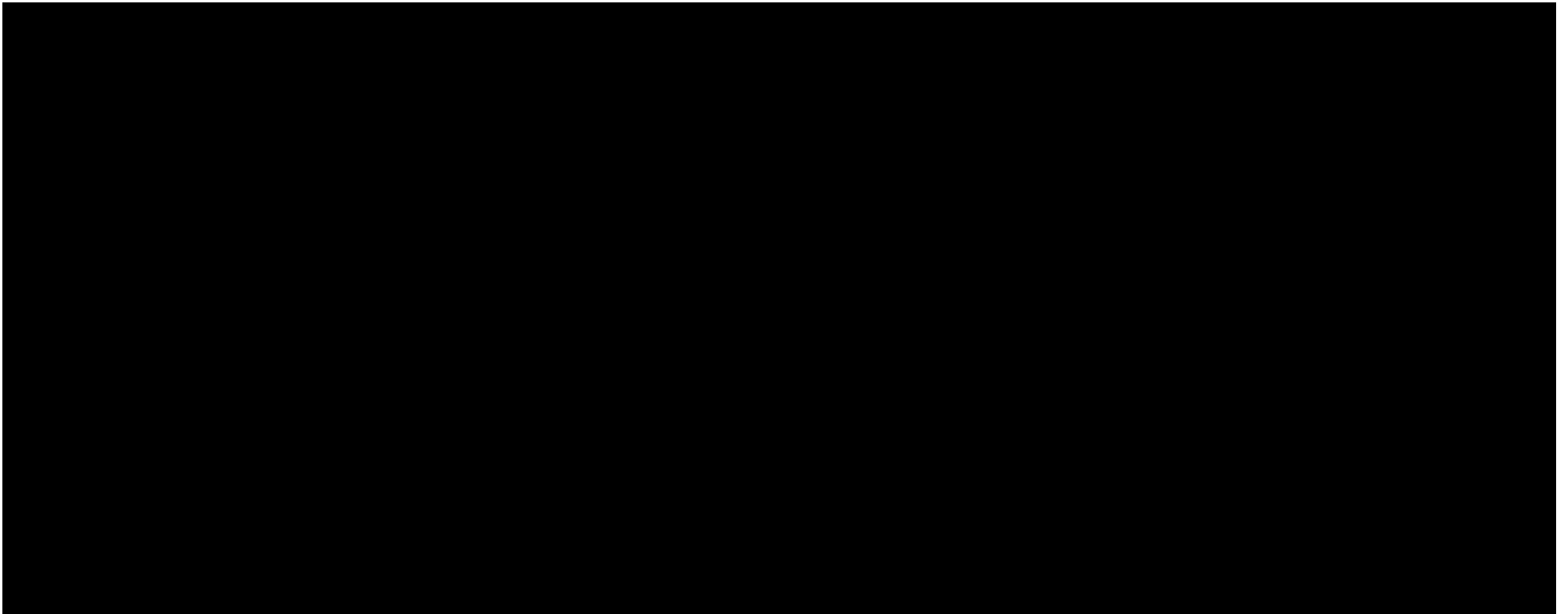
The Klamath River Renewal Corporation
Project Agreement

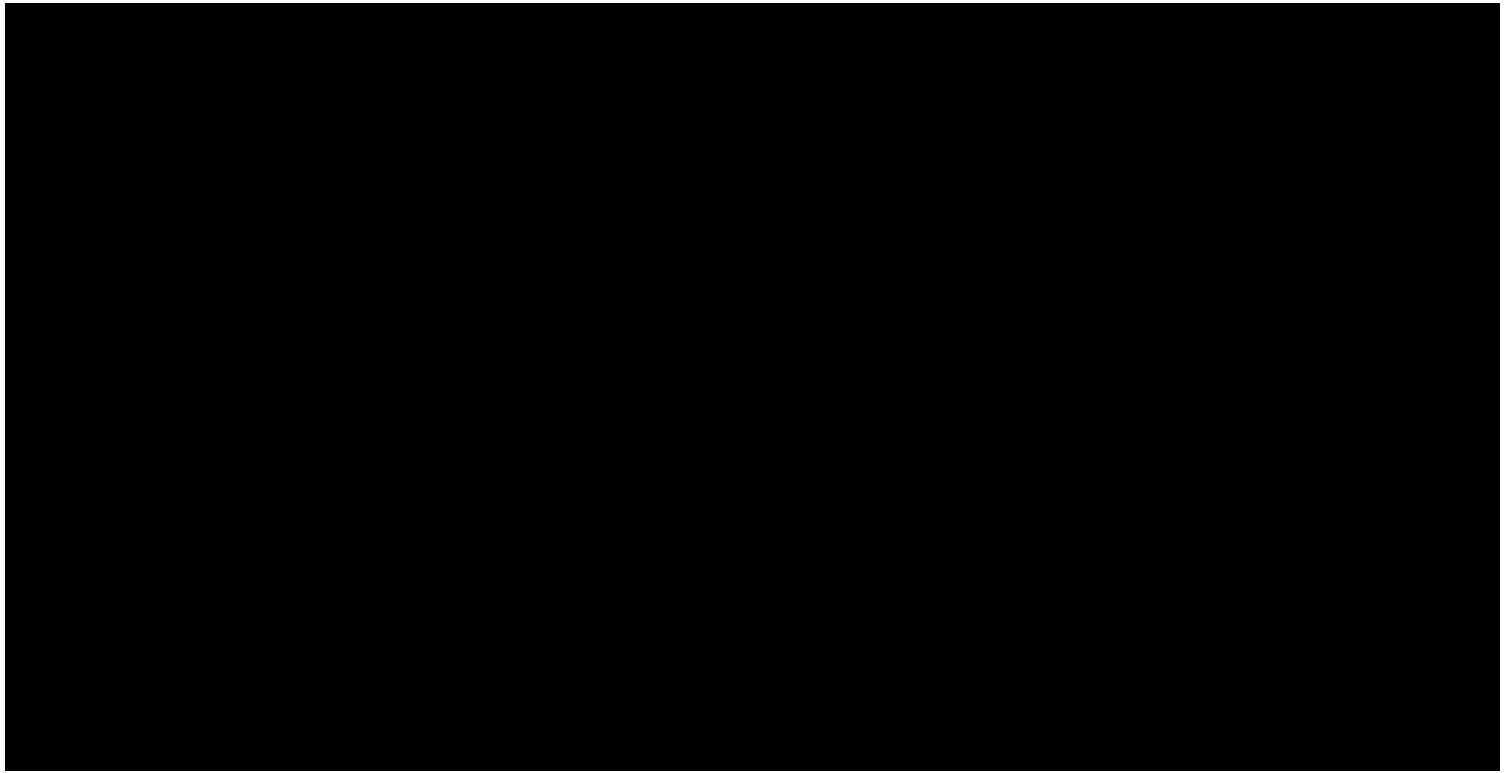
Appendix 2
Preliminary Services

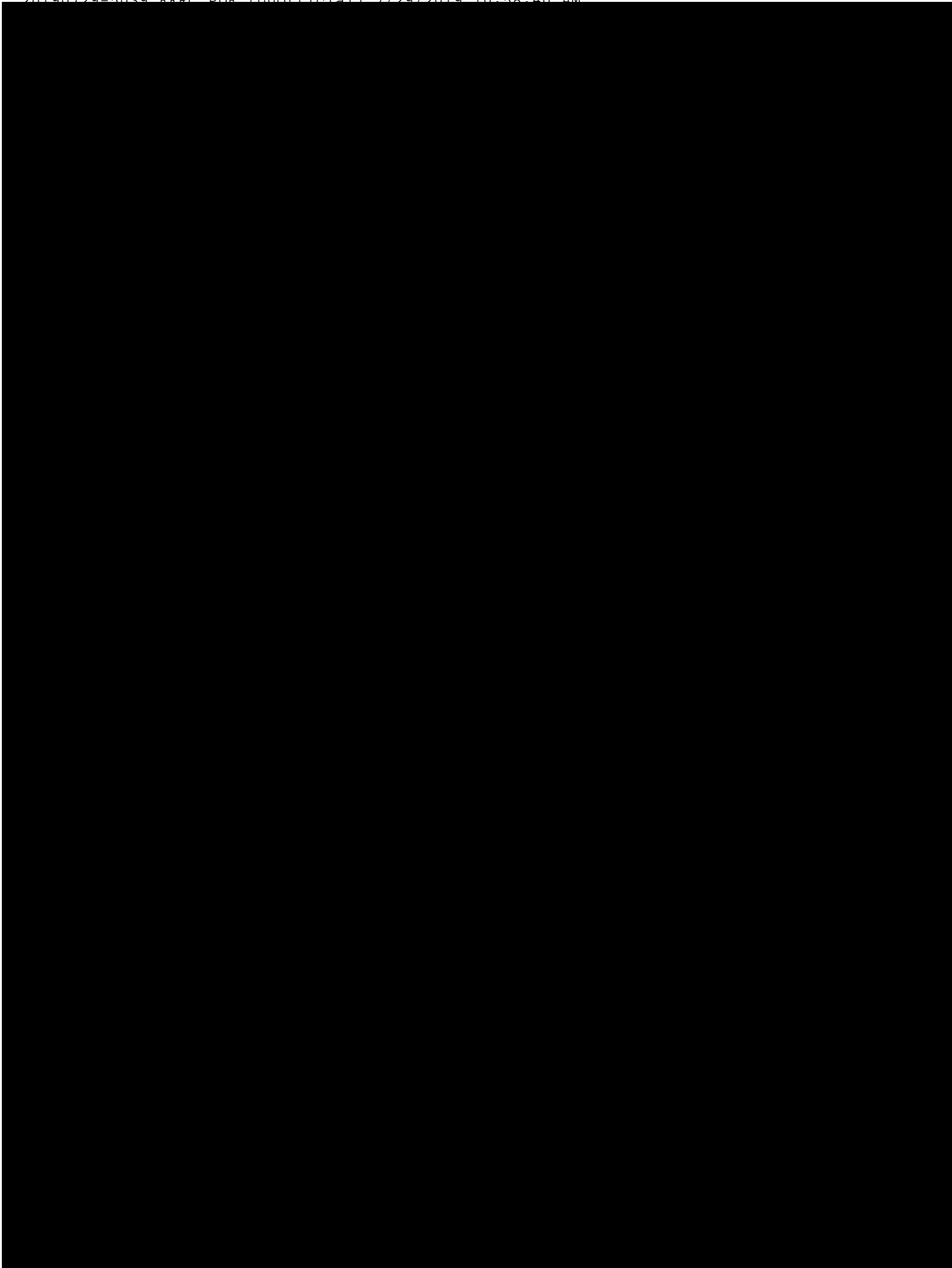
5	Design Criteria Report			
		Design Criteria Report	Yes	FERC/DSOD
		Review Meeting Agenda and Notes		
6	30% Design Completion Documents			
		Proof of Concept Assessment		
		Construction Access Feasibility Assessment		
		Seed Collection and Propagation Plan		
		Invasive and Exotic Vegetation Removal Plan		
		30% Design Drawings and Design Report		
		Cost Estimate		
		Project Implementation Schedule		
		30% Design Workshop Agenda and Meeting Notes		
7	60% Design Completion Documents			
		60% Design Drawings, Design Report and Specifications	Yes	FERC/DSOD
		Cost Estimate	Yes	FERC
		Project Implementation Schedule	Yes	FERC/DSOD
		Subcontracting Plan		
		60% Design Workshop Agenda and Meeting Notes		
8	GMP Project Submittal and Supporting Cost Estimates			
		GMP Project Submittal	Yes	FERC
		GMP Submittal Workshop Agenda and Meeting Notes		
9	90% Design Completion Documents			
		90% Design Drawings, Design Report and Specifications	Yes	FERC/DSOD
		Cost Estimate	Yes	FERC
		Project Implementation Schedule	Yes	FERC/DSOD
		90% Design Workshop Agenda and Meeting Notes		

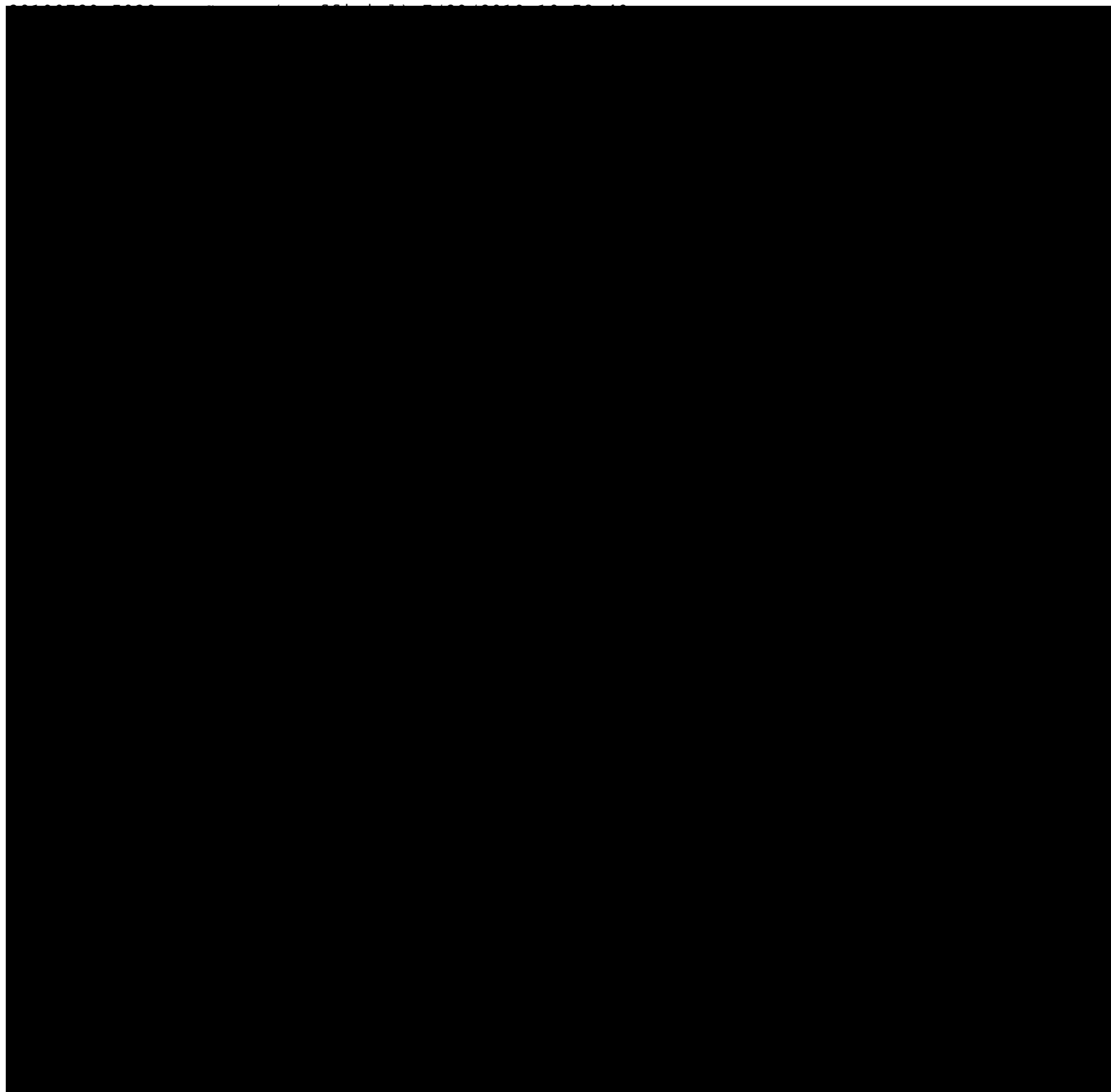
ATTACHMENT 2C

COMPENSATION FOR PRELIMINARY SERVICES



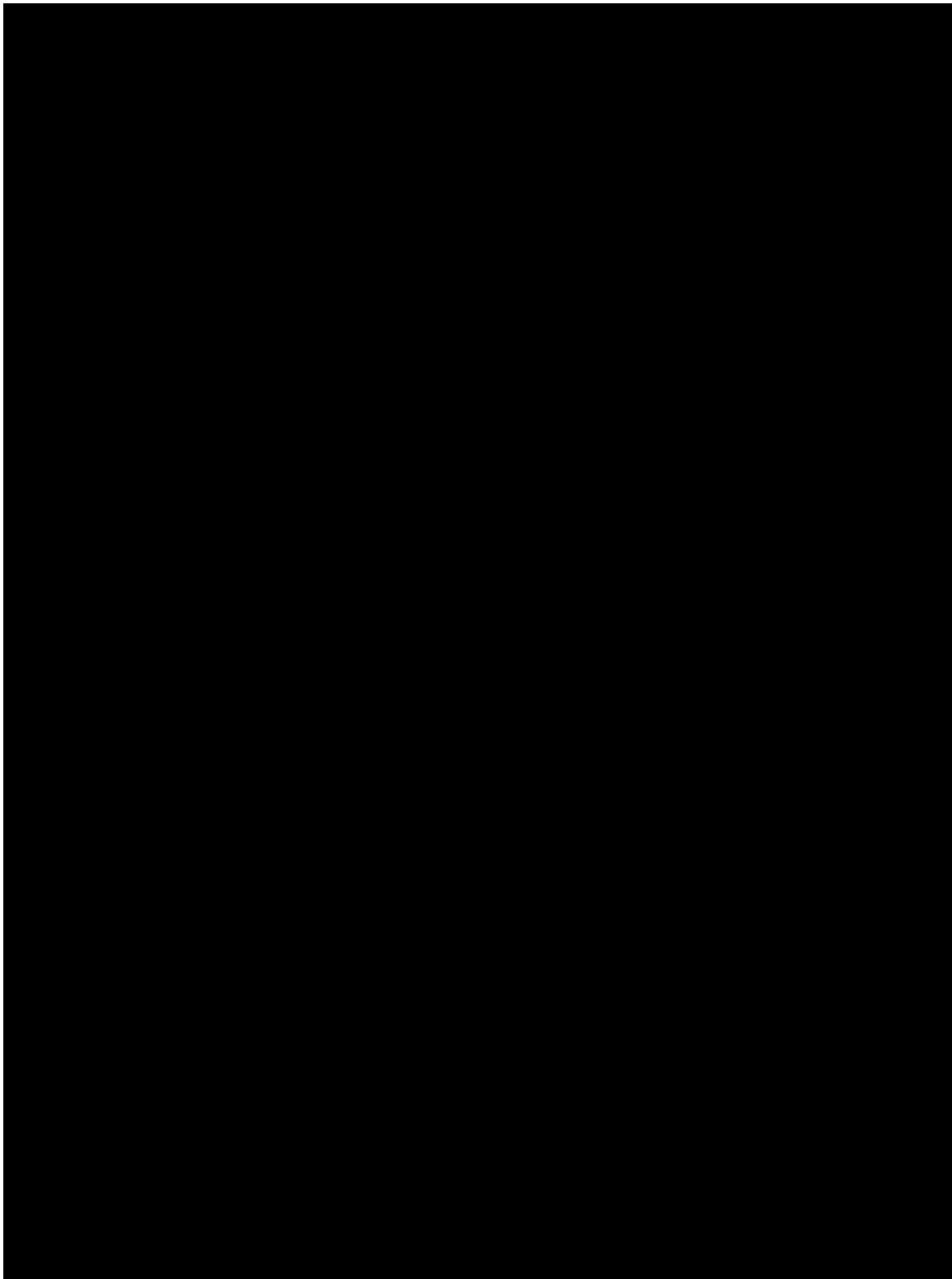


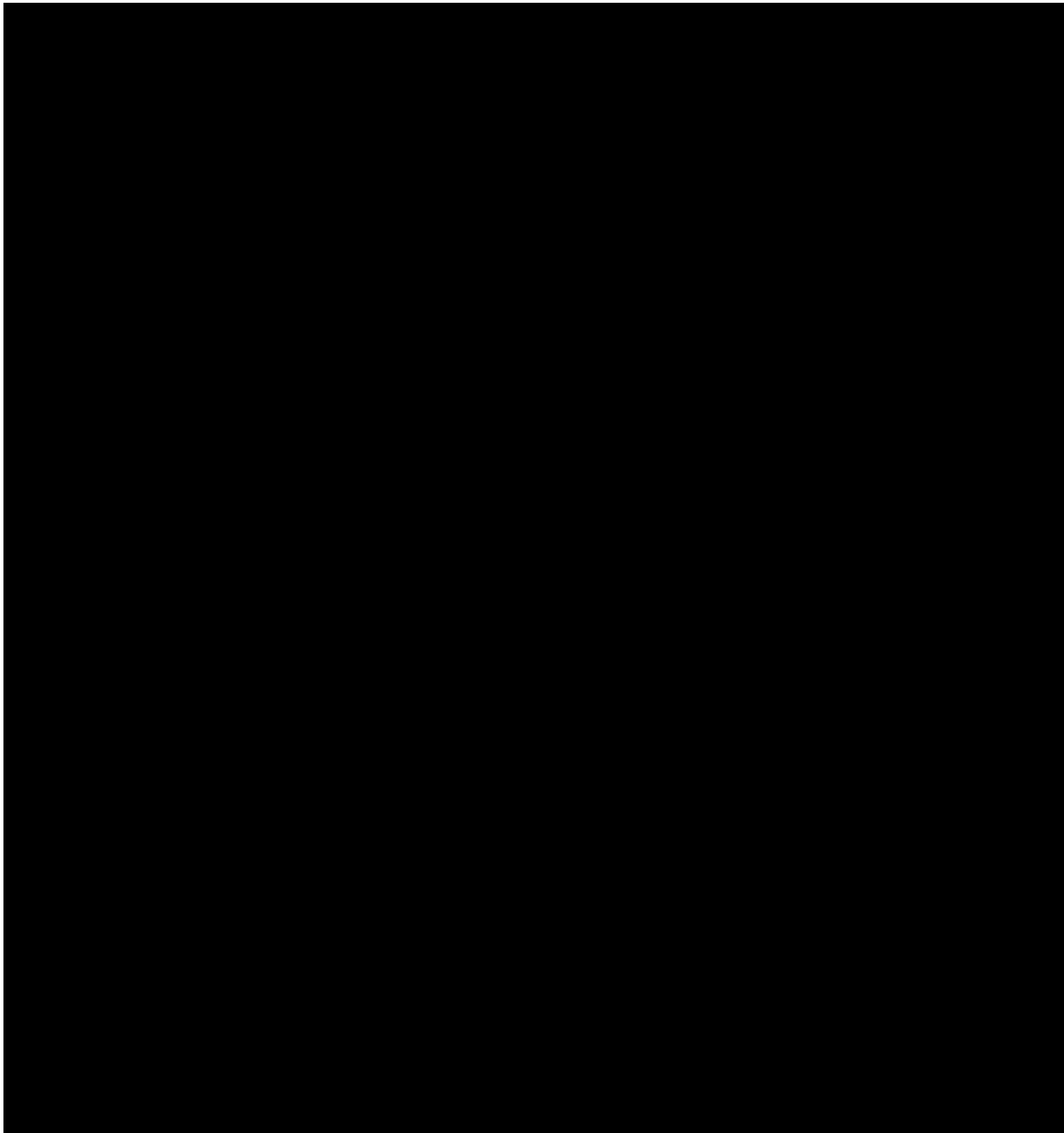




ATTACHMENT 2D

SCHEDULE OF FEES AND CHARGES





APPENDIX 3
GOVERNMENTAL APPROVALS

APPENDIX 3**GOVERNMENTAL APPROVALS****3.1. PURPOSE**

The purpose of this Appendix is to provide a list of the Governmental Approvals that are expected to be required with respect to the Contract Services. The Project Company shall obtain and maintain all Governmental Approvals required for the Project that are not identified as the responsibility of either party or are absent from the tables provided in this Section. If any additional Governmental Approvals are identified, the KRRC and the Project Company shall jointly determine which entity will be the application manager. In all cases, the Project Company will be responsible for compliance with any compliance requirements.

To the best knowledge of the parties, Table 3-1 and Table 3-2 of this Appendix represents the complete list of Governmental Approvals as of the Contract Date.

3.2. PROJECT COMPANY-MANAGED GOVERNMENTAL APPROVALS

The purpose of Table 3-1 is to indicate the Governmental Approvals for which the Project Company will be the application manager and to provide additional details on the responsibility of the Project Company and the KRRC with respect to supplying information and fee payment of such Governmental Approvals.

3.3. KRRC-MANAGED GOVERNMENTAL APPROVALS

The purpose of Table 3-2 is to indicate the Governmental Approvals for which the KRRC will be the application manager and to provide additional details on the responsibility of the Project Company and the KRRC with respect to supplying information and fee payment required to obtain such Governmental Approvals. After the KRRC-Managed Governmental Approvals are issued, the Governmental Approvals will become Compliance Documents, and the Project Company will be responsible for complying with all permit terms and conditions, unless otherwise stated herein.

[Note: Governmental Approvals listed in Tables 3-1 and 3-2 to be finalized on the GMP Contract Amendment Date based on the GMP Project Submittal. The last column of Tables 3-1 and 3-2, labeled “Expected Date of Issuance”, are to be finally determined on the Project Implementation Contract Amendment Date.]

Table 3-1
Project Company-Managed Governmental Approvals

Name of Governmental Approval	Issuing Agency	Permittee /Approval Holder	Application Manager	Information Supply Responsibility for Application	Fee Payment Responsibility	Expected Date of Issuance
Section 402 National Pollutant Discharge Elimination System (General Construction Permit)	Regional Water Quality Control Board (RWQCB) / ODEQ	Project Company	Project Company	Project Company: All materials and information required for permit application and Stormwater Pollution Prevention Plan (SWPPP) KRRC: None	Project Company	
Encroachment Permit	Oregon Department of Transportation (ODOT)	Project Company	Project Company	Project Company: Design drawings, limits of work, work activities and materials description. All materials and information required for permit application, notification, reporting, and subsequent information requests. KRRC: None	Project Company	
Over-Dimensional Permit	ODOT	Project Company	Project Company	Project Company: All materials and information required for permit application, reporting, and subsequent information requests. KRRC: None	Project Company	
Forestry Notification and Permit to Use Fire or Power-Driven Machinery (PDM)	Oregon Department of Forestry	Project Company	Project Company	Project Company: Clearing limits and acreage of forest to be cut. All materials and information required for permit application and subsequent information requests. KRRC: None	Project Company	
Asbestos/Lead/PCB/Other	ODEQ /Oregon Health	Project	Project	Project Company: All materials and information required for notification, reporting, and	Project	

Table 3-1
Project Company-Managed Governmental Approvals

Name of Governmental Approval	Issuing Agency	Permittee /Approval Holder	Application Manager	Information Supply Responsibility for Application	Fee Payment Responsibility	Expected Date of Issuance
Hazardous Wastes Removal and Abatement Notifications and related reporting and sampling	Authority / U.S. Environmental Protection Agency (EPA) / Occupational Safety and Health Administration (OSHA)	Company	Company	subsequent information requests. KRRC: Phase 1 and Phase 2 Environmental Site Assessments provided as Reliance Documents to Agreement	Company	
Underground Storage Tanks/Leaking Underground Storage Tanks decommissioning/ cleanup notification and related sampling and reporting	ODEQ	Project Company	Project Company	Project Company: All materials and information required for notification, reporting, and subsequent information requests. KRRC: None	Project Company	
Explosives Storage and Explosives Magazine Relocation notifications	Oregon Office of the State Fire Marshal	Project Company	Project Company	Project Company: All materials and information required for notification, reporting, and subsequent information requests. KRRC: None	Project Company	
Treated Wood Generation Notice	California Department of Toxic Substances Control	Project Company	Project Company	Project Company: All materials and information required for notification, reporting, and subsequent information requests. KRRC: None	Project Company	

Table 3-1
Project Company-Managed Governmental Approvals

Name of Governmental Approval	Issuing Agency	Permittee /Approval Holder	Application Manager	Information Supply Responsibility for Application	Fee Payment Responsibility	Expected Date of Issuance
Geotechnical Hole / Monitoring Well / Water Supply Well Report Forms	Oregon Department of Water Resources	Project Company	Project Company	Project Company: All materials and information required for permit, reporting, and subsequent information requests. KRRC: None	Project Company	
In-Water Blasting Permit	ODFW	Project Company	Project Company	Project Company: All materials and information required for permit, notification, reporting, and subsequent information requests. KRRC: None	Project Company	
Explosives Storage and Explosives Magazine Relocation notifications	California Office of the State Fire Marshal	Project Company	Project Company	Project Company: All materials and information required for notification, reporting, and subsequent information requests. KRRC: None	Project Company	
Business License	Klamath County	Project Company	Project Company	Project Company: All information required for license application. KRRC: None	Project Company	
Business License	Siskiyou County	Project Company	Project Company	Project Company: All information required for license application. KRRC: None	Project Company	
Asbestos/Lead/PCB/Other Hazardous Wastes Removal and	Siskiyou County	Project Company	Project Company	Project Company: All materials and information required for declaration, reporting, and subsequent information requests.	Project Company	

Table 3-1
Project Company-Managed Governmental Approvals

Name of Governmental Approval	Issuing Agency	Permittee /Approval Holder	Application Manager	Information Supply Responsibility for Application	Fee Payment Responsibility	Expected Date of Issuance
Abatement declaration and related reporting and sampling				KRRC: None		
Environmental Health Division Water Wells / Monitoring Wells / Exploratory Borings Permits	Siskiyou County	Project Company	Project Company	Project Company: All materials and information required for permit, reporting, and subsequent information requests. KRRC: None	Project Company	
Encroachment Permit	Siskiyou County	Project Company	Project Company	Project Company: All materials and information required for permit, reporting, and subsequent information requests. KRRC: None	Project Company	
Building Permit (Flood Control Improvements)	Siskiyou County	Project Company	Project Company	Project Company: All materials and information required for flood control improvements building permit, reporting, and subsequent information requests. KRRC: None	Project Company	
Transportation Permit	Siskiyou County	Project Company	Project Company	Project Company: All materials and information required for permit, reporting, and subsequent information requests. KRRC: None	Project Company	
Sign Permit	Siskiyou County	Project Company	Project Company	Project Company: All materials and information required for permit, reporting, and subsequent information requests.	Project Company	

Table 3-1
Project Company-Managed Governmental Approvals

Name of Governmental Approval	Issuing Agency	Permittee /Approval Holder	Application Manager	Information Supply Responsibility for Application	Fee Payment Responsibility	Expected Date of Issuance
				KRRC: None		
Underground Storage Tanks/Leaking Underground Storage Tanks closure/cleanup notification and related sampling and reporting	Siskiyou County	Project Company	Project Company	Project Company: All materials and information required for notification, reporting, and subsequent information requests. KRRC: None	Project Company	

Table 3-2
KRRC-Managed Governmental Approvals

Name of Governmental Approval	Issuing Agency	Permittee /Approval Holder	Application Manager	Information Supply Responsibility for Application	Fee Payment Responsibility	Expected Date of Issuance
NEPA Record of Decision or FERC Order	FERC	FERC	FERC	Project Company: Data and analyses from Preliminary Services work to support FERC, as needed. KRRC: Data and analyses to support FERC as needed.	NA	
Approval Establishing Effectiveness of LKP License Transfer	FERC	KRRC	KRRC	Project Company: Data and analyses from Preliminary Services work to support FERC, as needed. KRRC: Data and analyses to support FERC as needed.	KRRC	
Approval Establishing Effectiveness of LKP License Surrender	FERC	KRRC	KRRC	Project Company: Data and analyses from Preliminary Services work to support FERC, as needed. KRRC: Data and analyses to support FERC as needed.	KRRC	
CWA Section 404 Individual Permit	United States Army Corps of Engineers (USACE)	KRRC	KRRC	Project Company: Draft application review; Data and analyses from Preliminary Services work to support application, as needed. KRRC: All materials and information required for application.	KRRC	
WSR Determination Memo	NPS (primary), BLM, USFWS, or	KRRC	KRRC	Project Company: None KRRC: All materials and information required.	KRRC	

Table 3-2 KRRC-Managed Governmental Approvals						
Name of Governmental Approval	Issuing Agency	Permittee /Approval Holder	Application Manager	Information Supply Responsibility for Application	Fee Payment Responsibility	Expected Date of Issuance
	USFS					
ESA Section 7 Biological Opinions	United States Fish and Wildlife Service / National Marine Fisheries Service	KRRC	KRRC	Project Company: None KRRC: Draft and final Biological Assessments.	KRRC	
NHPA Section 106 Consultation and associated plans	SHPOs, THPOs, ACHP, Tribes	KRRC	KRRC	Project Company: None KRRC: All materials and information required for notification, reporting, and subsequent information requests.	KRRC	
CEQA Notice of Determination	California State Water Resources Control Board (SWRCB)	SWRCB	SWRCB	Project Company: Data and analyses to support SWRCB as needed. KRRC: Data and analyses to support SWRCB as needed.	KRRC	
Section 401 Water Quality Certification	SWRCB / ODEQ	KRRC	KRRC	Project Company: Data and analyses to support SWRCB as needed. KRRC: Data and analyses to support SWRCB as needed.	KRRC	
Lake and Streambed	CDFW	KRRC	KRRC	Project Company: Draft application review; Data and analyses from Preliminary Services work to	KRRC	

Table 3-2 KRRC-Managed Governmental Approvals						
Name of Governmental Approval	Issuing Agency	Permittee /Approval Holder	Application Manager	Information Supply Responsibility for Application	Fee Payment Responsibility	Expected Date of Issuance
Alteration Agreement				support application, as needed. KRRC: Materials and information required for application.		
Incidental Take Permit	CDFW	KRRC	KRRC	Project Company: Draft application review; Data and analyses from Preliminary Services work to support application, as needed. KRRC: Materials and information required for application.	KRRC	
Removal/Fill and In Water Work Period Variance	ODSL	KRRC	KRRC	Project Company: Draft application review; Data and analyses from Preliminary Services work to support application, as needed. KRRC: Materials and information required for application.	KRRC	
Fish Passage Approval	ODFW	KRRC	KRRC	Project Company: Draft application review; Data and analyses from Preliminary Services work to support application, as needed. KRRC: Materials and information required for application.	KRRC	
State Lands Surface and Submerged Lands Lease	State Lands Commission	KRRC	KRRC	Project Company: Draft application review. KRRC: Materials and information required for application.	KRRC	
Dam Removal Permit	California Division of Safety of	KRRC	KRRC	Project Company: Draft application review; Data and analyses from Preliminary Services work to support application, as needed. All Project	KRRC	

Table 3-2
KRRC-Managed Governmental Approvals

Name of Governmental Approval	Issuing Agency	Permittee /Approval Holder	Application Manager	Information Supply Responsibility for Application	Fee Payment Responsibility	Expected Date of Issuance
	Dams (DSOD)			Company design submittals will require review by DSOD. KRRC: Materials and information required for application.		
Dam Safety/ Decommissioning	OWRD	KRRC	KRRC	Project Company: Draft application review; Data and analyses from Preliminary Services work to support application, as needed. KRRC: Materials and information required for application.	KRRC	
California Coastal Zone Consistency Review	CCC	KRRC	KRRC	Project Company: Draft application review; Data and analyses from Preliminary Services work to support application, as needed. KRRC: Materials and information required for application.	KRRC	
Land Use Permits	Klamath County / Siskiyou County	KRRC	KRRC	Project Company: None KRRC: Materials and information required to execute a Memorandum of Agreement with each County	KRRC	
Community Development Department – Building Division and Septic On-Site Division Permits (e.g., structural, electrical,	Klamath County	KRRC	KRRC	Project Company: Data and analyses from Preliminary Services work pertaining to any septic system demolition. KRRC: Materials and information required to execute a Memorandum of Agreement with each County	KRRC	

Table 3-2
KRRC-Managed Governmental Approvals

Name of Governmental Approval	Issuing Agency	Permittee /Approval Holder	Application Manager	Information Supply Responsibility for Application	Fee Payment Responsibility	Expected Date of Issuance
mechanical, plumbing permits)						
Site Development Permit	Klamath County	KRRC	KRRC	Project Company: None KRRC: Materials and information required to execute a Memorandum of Agreement with each County	KRRC	
Development and Demolition Permit	Siskiyou County	KRRC	KRRC	Project Company: None KRRC: Materials and information required to execute a Memorandum of Agreement with each County	KRRC	
Building Permit (Hatchery Work)	Siskiyou County	KRRC	KRRC	Project Company: Draft application review KRRC: Materials and information required for hatchery related application.	KRRC	
CLOMR/LOMR	Siskiyou County / Klamath County	KRRC	KRRC	Project Company: Data and analyses from Preliminary Services work to support application, as needed. Materials and information required for LOMR application. KRRC: Materials and information required for CLOMR application.	KRRC	

APPENDIX 4
PROJECT TECHNICAL REQUIREMENTS

APPENDIX 4**PROJECT TECHNICAL REQUIREMENTS****4.1. PURPOSE**

These Project Technical Requirements set forth the minimum design, construction, demolition and restoration technical requirements for the Project. This Appendix augments and, to the extent of any inconsistencies, supersedes Appendix 1 (Project and Project Site Description) in defining the Project and the Project Implementation Work the Project Company is required to perform hereunder.

[Note: This Appendix contains the technical requirements for the Preliminary Services. This Appendix will contain the technical requirements for the Project Implementation Work as developed to the 60% level, and will be developed, augmented, and completed based on the Preliminary Services performed by the Project Company and incorporated in the Project Agreement on the GMP Contract Amendment Date.]

4.2. WORK RESTRICTIONS**4.2.1 Required Design Criteria – Cessation of Power Generation.**

- (a) Copco No. 1 – November 1 of year prior to the drawdown year;
- (b) J.C. Boyle and Iron Gate – January 1 of the drawdown year; and
- (c) Copco No. 2 – May 1 of the drawdown year.

4.2.2 Required Design Criteria – Drawdown Timing.

- (a) All drawdown and release of sediment shall comply with requirements and dates listed in Governmental Approvals;
- (b) Initial drawdown of Copco Lake from operating elevation to spillway elevation shall begin on November 1 the year prior to the drawdown year; and
- (c) Reservoir drawdown and sediment release shall start on January 1 of the drawdown year and be complete by March 15 of the drawdown year.

4.2.3 Required Design Criteria – In-Water Work.

- (a) California and Oregon in-water work shall take place within the dates listed in Governmental Approvals; and
- (b) In-water work is anticipated to be restricted to:
 - (i) California: June 15 to October 15; and
 - (ii) Oregon: July 1 to December 31

4.2.4 Required Design Criteria – On-Site Work Hours.

- (a) All construction Work shall take place during the hours listed and in compliance with Governmental Approvals; and

- (b) On-site work hours are expected to be restricted to:
 - (i) General: Shift work from 6:00 AM to 4:00 PM and 6:00 PM to 4:00 AM, with maintenance activities in between; Monday through Sunday; and
 - (ii) Blasting: 8:00 AM to 6:00 PM; Monday through Saturday.

4.2.5 Required Design Criteria - Existing Utility Interruptions.

- (a) The Project Company shall locate existing utilities and facilities or engage the services of a utilities locating service to locate existing utilities at each site prior to commencement of design and work. Existing utilities and facilities shall not be disturbed or damaged while locating them; and
- (b) Do not interrupt utilities serving other facilities unless permitted under the following conditions and then only after arranging to provide temporary utility services as required to maintain continuous operation of the Project.
 - (i) Notify KRRC and Utility Owner no less than seven (7) working days in advance of proposed utility interruptions;
 - (ii) Do not proceed with utility interruptions without KRRC's and Utility Owner's written permission; and
 - (iii) The Project Company shall make formal written request, to the KRRC and the Utility Owner which shall include a detailed, step-by-step work plan identifying all work activities to be performed during the utility interruption and the sequence and timing of each work activity. Also provide contingency plan should temporary services become unusable during Work activities.

4.3. DIVERSION TUNNEL IMPROVEMENTS AND GATES

4.3.1 Required Design Criteria.

This Section covers design of the following diversion tunnel improvements and gates:

- (a) Copco No. 1 Dam: new gate structure, erosion protection at gate structure, tunnel lining required for drawdown, modification of existing intake structure, removal of existing concrete plug, removal of intake structure after completion of new gate structure, removal of new gate structure following drawdown, and new upstream and downstream tunnel plugs following dam removal;
- (b) Iron Gate Dam: check the condition and stability of existing liner during drawdown, new tunnel lining required for drawdown, removal of downstream tunnel portal, removal of existing diversion tunnel air vent pipe, new gate structure, erosion protection at gate structure, removal of intake structure trash rack, removal of existing concrete bulkhead and blind flange, removal of existing upper sluice gate and lower concrete bulkhead from bottom of gate tower, removal of intake structure, removal of gate tower above finished grade, removal of new gate structure, new gate shaft plug, and new upstream and downstream tunnel plugs;
- (c) Design of opening of diversion culverts at J.C. Boyle;

- (d) New tunnel plugs for J.C. Boyle tunnel and Copco No. 2 tunnels;
- (e) Design of system to keep large debris that could prevent the reservoir drawdown from being completed on schedule from entering diversion tunnels during reservoir drawdown; and
- (f) Design operation of control system to implement reservoir lowering as specified in Article 4.6.

4.3.2 Applicable Standards.

The design and construction of the diversion tunnel improvements and gates shall comply with all Applicable Law, and shall be done in conformance with the latest version of applicable standards, manuals and guidelines. At a minimum, the Project Company shall comply with listed standards below, and shall propose additional standards where appropriate for KRRC review. Should proposed standards conflict with those listed below, the Project Company shall provide justification for revising the Project Agreement standards prior to proceeding with design.

- (a) ACI 318 Building Code Requirements for Reinforced Concrete, American Concrete Institute;
- (b) ACI 506 Guide to Shotcrete, American Concrete Institute;
- (c) ACI 506.4 Guide for the Evaluation of Shotcrete, American Concrete Institute;
- (d) EM 1110-2-2901 Tunnels and Shafts in Rocks, U.S. Army Corps of Engineers;
- (e) EM 1110-2-1602 Hydraulic Design of Reservoir Outlet Works, U.S. Army Corps of Engineers;
- (f) EM 1110-2-2400 Structural Design and Evaluation of Outlet Works, U.S. Army Corps of Engineers;
- (g) International Tunneling and Underground Space Association (ITA) - ITA Guidelines for the Design of Tunnels (1988);
- (h) California Code of Regulations, Title 8, Chapter 4, Division of Industrial Safety – Subchapter 20, Tunnel Safety Orders;
- (i) Occupational Safety and Health Standards for Construction Industry (USA) 29 Code of Federal Regulations Part 1926 Subpart S – Underground Construction;
- (j) PTI DC35.1-14, Recommendations for Prestressed Rock and Soil Anchors, Post Tensioning Institute;
- (k) PTI M55.1-12(13), Specification for Grouting of Post-Tensioned Structures, Post Tensioning Institute;
- (l) Occupational Safety and Health Standards for Construction Industry (USA) 29 Code of Federal Regulations Part 1926 Subpart U – Commercial Diving Operations; and

- (m) United States Department of the Interior, Bureau of Reclamation, Design Standards No.6, Chapter 12: Trashracks and Trashrack Cleaning Devices Phase 4.

4.3.3 Design Criteria.

4.3.3.1 Required Criteria

The Project Company shall meet the following Required Criteria for design and construction of the diversion tunnel improvements and gates, and any other criteria that are required by Governmental Approvals:

- (a) Diversion tunnels shall be designed for the internal pressure resulting from a reservoir elevation equivalent to a 1% flood event, flow velocities anticipated during reservoir drawdown, and external ground water pressures that could develop during reservoir lowering; and
- (b) Tunnel plug design shall include consideration of provision of bat entry into tunnels and drainage to prevent tunnels filling with water behind plugs.

4.3.3.2 Proposed Criteria

In addition to the Required Criteria above, the Project Company shall develop the following criteria, at a minimum, for design and construction of diversion tunnel improvements and gates. Additional criteria shall be proposed and developed, as appropriate, to complete the design in accordance with the requirements set forth in the Project Agreement and Appendices.

- (a) Design earthquake for temporary construction;
- (b) Loads and load combinations used for structural design;
- (c) Seepage;
- (d) Geotechnical design loads (dynamic and static);
- (e) Erosion protection;
- (f) Filter and drain criteria (if applicable); and
- (g) Size of debris for design of system to keep large debris from entering into diversion facilities.

4.3.4 Minimum Construction Submittal Requirements.

The Project Company shall take into account the constructability of the proposed design with consideration given to feasible methods of construction, constraints to construction (materials, labor, specialty construction, weather, etc.), design details, time required to complete each element of work, and possible alternatives which would reduce costs but maintain the level of quality and safety expected by the KRRC. The Project Company shall include, at a minimum, the following construction submittals in their technical specifications for diversion tunnel improvements and gates. The Project Company is responsible for defining and providing any additional construction submittals that apply to the Project.

- (a) Work plans for the execution and implementation of the required modifications as outlined in the Scope of Work: Submit a detailed work plan of the proposed

tunnel modifications and support provisions. The plan shall include details of proposed methods and procedures for temporary ventilation, lighting, and electrical system details; procedures for handling, control, and disposal of groundwater (if any); erosion control; types of equipment to be used and equipment descriptions and specifications; and other pertinent data requested by the KRRC. Include any proposed modifications to the support details on the Drawings;

- (b) Materials (fine and coarse aggregate, concrete mix design, shotcrete mix design, admixture, bond preventer, steel mill certifications, etc.);
- (c) Complete details, credentials, qualifications, and certifications of the proposed off-site source of concrete provider, if applicable;
- (d) Complete details, credentials, qualifications, and certifications of the on-site concrete batching plant, if applicable;
- (e) Concrete and shotcrete placement drawings showing locations of construction joints and control joints; lift sequence; locations of all embedded items and block-outs; and estimated volume of concrete to be placed, if applicable;
- (f) Detailed procedures for the production, transportation, placement, protection, curing, and temperature monitoring of concrete during cold weather in accordance with ACI 306R. In the submittal, include procedures to be implemented upon abrupt changes in weather conditions or equipment failures;
- (g) Shift reports and records of all concrete and shotcrete placement applications, including material quantities, mixes, locations, procedures, and test results;
- (h) Structural design calculations and Drawings for any support system modifications proposed. Indicate approximate areas where the proposed support system will be used;
- (i) Construction staging and sequence;
- (j) Work experience resumes of proposed superintendent(s) and shift supervisors;
- (k) Certificates of compliance for all materials permanently incorporated into the work;
- (l) Sump details;
- (m) Water disposal plan;
- (n) Equipment certifications from Cal/OSHA and the Mining and Tunneling Unit of Cal/OSHA indicating certification by the Mine Safety and Health Administration (MSHA) of the U.S. Department of Labor;
- (o) Working Drawings pertaining to groundwater control (if necessary) during the placement of shotcrete and cast-in-place reinforced concrete;
- (p) Quality control plan;

- (q) Catalog data, methods of construction statements, and manufacturers' installation recommendations that describe in detail the equipment and materials to be used for groundwater and surface water control systems, including pumps for information only. The information submitted on equipment shall describe performance characteristics and installation, operation, and maintenance procedures;
- (r) Submit the plans and data listed below prior to commencing the required modifications within the tunnel. All drawings and calculations submitted to satisfy requirements listed below shall be prepared and stamped by a Civil or Structural Engineer registered in the State of California;
- (s) Structural design calculations and drawings for any formwork system and all modifications indicated in the Scope of Work;
- (t) Contractor's method statement for constructing the linings and plugs, including transporting, placing and consolidating concrete, sequence of placement, and method of curing in tunnels;
- (u) Contractor's method statement for forming the concrete or shotcrete linings and the concrete plugs (or any other concrete work), including spacing and details of transverse construction joints, provisions to prevent uplift and lateral movement of forms, and coordination with reinforcement placement, and placement of embedded parts;
- (v) Daily Logs and Shift Reports: Submit for each activity taking place, regardless of whether progress is achieved. Provide a continuous accounting of all activities during the shift, including:
 - (i) Number and classification of crewmembers, equipment, and materials used; and
 - (ii) Time of, duration, and cause of any non-production, idle, or down time event, along with a summary of all operations affected and degree affected by such event;
- (w) If grout is used, the Contractor shall submit a grout mix design, including mix proportions of cement, water, and any admixtures. The submittal shall include compressive strength tests conducted at 7, 14, and 28 days on grout cubes in accordance with ASTM C 109;
- (x) The resume of the Contractor's site foreman shall be submitted to the KRCC for review. Only the individual designated as meeting the qualifications requirements shall be used for the project. The Contractor shall not substitute this individual without written approval of the KRCC;
- (y) If monitoring instrumentation is determined necessary, submit a description of the Contractor's means, methods, and procedures for QA and description of specific methods for installing and protecting all instruments;
- (z) If monitoring instrumentation is determined necessary, submit a schedule of instrument installation related to significant activities or milestones in the overall project; and

- (aa) A list, description and schedule of demolished materials to be wasted or disposed of off-site and on-site. For materials to be disposed of off-site, submit name and location of actual disposal facilities.

4.4. ROADS, BRIDGES AND CULVERTS

This Section covers permanent road, bridge and culvert improvements, as well any temporary or permanent construction access-related improvements to any roads, bridges or culverts. Specific locations for permanent improvements are listed in Section 1.2 (Project) of this Appendix, while construction access improvements will be identified by the Project Company to meet its construction plan and associated vehicles, equipment and traffic, while maintaining public safety and current levels of service. Geotechnical data reports, technical analyses, structure type selection, and design procedures shall be completed in accordance with Caltrans standards and practices and according to the Caltrans project development process.

4.4.1 Applicable Standards.

The design, modification, demolition and construction of road, bridge, culvert and associated retaining wall improvements shall comply with all Applicable Law, and shall be done in conformance with the latest version of applicable standards, manuals and guidelines. At a minimum, the Project Company shall comply with listed standards below, and shall propose additional standards where appropriate for KRRC review. Should proposed standards conflict with those listed below, the Project Company shall provide justification for revising the Project Agreement standards prior to proceeding with design.

- (a) AASHTO LRFD Bridge Design Specifications (Customary U.S. Units);
- (b) Caltrans California Amendments (to the AASHTO LRFD Bridge Design Specifications);
- (c) Caltrans Standard Plans – 2018;
- (d) Caltrans Standard Specifications – 2018;
- (e) Caltrans Office of Special Funded Projects (OSFP) Information and Procedures Guide;
- (f) Caltrans Bridge Design Aids;
- (g) Caltrans Bridge Design Details;
- (h) Caltrans Bridge Memo To Designers;
- (i) Caltrans Bridge Standard Detail Sheets (XS Sheets);
- (j) Caltrans Seismic Design Criteria;
- (k) Caltrans Bridge Design Specifications (LFD Version);
- (l) Caltrans CADD User's Manual, or approved local agency CADD standard;
- (m) Caltrans Plans Preparation Manual, or approved local agency manual;

- (n) Caltrans ARS ONLINE: Deterministic PGA Map and ARS Online Report, Fault Database, 2007 Fault Errata Report;
- (o) Caltrans Geotechnical Manual;
- (p) Caltrans Foundation Manual;
- (q) Caltrans Seismic Hazard Map and Report;
- (r) Caltrans Construction Manual;
- (s) Caltrans Design Information Bulletins;
- (t) Caltrans Project Development Procedure Manual;
- (u) Caltrans Trenching and Shoring Manual;
- (v) Central Oregon and Pacific Railroad design requirements;
- (w) AASHTO – A Policy on Geometric Design of Highways and Streets (Green Book) (Customary U.S. Units);
- (x) AASHTO – Guidelines for Geometric Design of Very Low- Volume Local Roads (ADT<400);
- (y) Caltrans Highway Design Manual;
- (z) ODOT Highway Design Manual;
- (aa) ODOT Standard Drawings;
- (bb) ODOT Standard Details;
- (cc) FHWA – Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways;
- (dd) California Manual on Uniform Traffic Control Devices;
- (ee) Oregon MUTCD; and
- (ff) Klamath County Department of Public Works Land Development Code Appendix A.

4.4.2 Design Criteria.

The Project Company shall meet the following Required Criteria for design and construction of the permanent (to remain post-construction) and public roads, bridges and culverts, and any other criteria that are required by Governmental Approvals:

4.4.2.1 Required Criteria

- (a) Roadway geometrics:
 - (i) Lane width – 11 feet minimum;

- (ii) Number of lanes during construction – Maintain one lane minimum with traffic control; temporary full lane closure as needed with prior approval;
- (iii) Number of lanes post-construction – 2 lanes + shoulders on both sides (width to match existing at a minimum);
- (iv) Vertical clearances – None, if required follow Caltrans HDM;
- (v) Shoulders – 5 feet minimum, or match existing condition; and
- (vi) Horizontal clearances – As per Caltrans HDM;
- (b) Taper lengths, deceleration lengths, land shifts, by tapers – as per Caltrans HDM;
- (c) ADA ramps – As shown on Caltrans Standard Plan sheets A88A and A88B shall be constructed on all curb returns to meet ADA requirements;
- (d) Truck turns – STAA design vehicle; and
- (e) Other design criteria:
 - (i) Cross slope – Maximum 2% for tangent section and for curve follow super-elevation standard per Caltrans HDM;
 - (ii) Minimum Profile Grade – 0.2%;
 - (iii) Maximum Profile Grade – 8.0%;
 - (iv) Minimum gutter grade – 0.3%;
 - (v) Curb return radius – As per truck turns and intersection needs;
 - (vi) Cut/Fill Slope - 1:2 or flatter; and
 - (vii) Curb and Gutter – 1.5 feet wide gutter, 0.5 wide feet curb.

4.4.2.2 Proposed Criteria

In addition to the Required Criteria above, the Project Company shall develop the following criteria, at a minimum, for design and construction of road, bridge and culvert improvements. Additional criteria shall be proposed and developed, as appropriate, to complete the design in accordance with the requirements set forth in the Project Agreement and Appendices.

- (a) Horizontal and vertical alignment;
- (b) Road surface type;
- (c) Road pavement section;
- (d) Crest vertical length, sag vertical curve length, minimum vertical curve length;
- (e) Erosion control;
- (f) Curbs and dikes;

- (g) Temporary and permanent traffic control devices;
- (h) Temporary and permanent signing and pavement delineation;
- (i) Side slopes;
- (j) Speed limit – as per local agency standard;
- (k) Bridge deck width – use Caltrans HDM;
- (l) Drainage design storm;
- (m) Bridge design storm and freeboard – use Caltrans HDM;
- (n) Bridge load – use Caltrans HDM;
- (o) Design earthquake for permanent construction;
- (p) Design earthquake for temporary construction; and
- (q) All items listed in applicable checklists shown in the Caltrans Bridge Details Manual shall be proposed design criteria.

4.4.3 Minimum Construction Submittal Requirements.

The Project Company shall take into account the constructability of the proposed design with consideration given to feasible methods of construction, constraints to construction (materials, labor, specialty construction, weather, etc.) design details, time required to complete each element of work, and possible alternatives which would reduce costs but maintain the level of quality and safety expected by the KRRC. The Project Company shall include, at a minimum, the following construction submittals in their technical specifications for roads, bridges and culverts. The Project Company is responsible for defining and providing any additional construction submittals that apply to the Project.

- (a) Photo and Video documentation of pre-construction and post-construction conditions of all access routes and road, bridge, and culvert improvements as per contract requirements;
- (b) Cofferdam or creek diversion system details necessary for bridge construction;
- (c) Slope staking for grid grades;
- (d) Shop Drawings;
- (e) Erection and dismantling procedures and plans for falsework and formwork details;
- (f) Screed elevations and build-up dimensions for bridge deck construction;
- (g) Detailed drawings for roadway contours;
- (h) Bridge demolition procedures;
- (i) Rebar cage erection and bracing procedures;

- (j) Lane Closure and Full Road Closure Plans and Schedules;
- (k) Traffic Control Plan and Detour Plans;
- (l) Product Data;
- (m) Samples;
- (n) Test samples;
- (o) Test data, test results, and evaluation reports;
- (p) Construction material approval request per contract requirements;
- (q) Proposals for substitution;
- (r) Materials Certificates of Compliance shall be submitted for:
 - (i) Hot Mix Asphalt (Type A) Job Mix Formulas;
 - (ii) Concrete Mix Design;
 - (iii) Aggregate Base;
 - (iv) Traffic Stripe, Pavement Marking and Retroreflective Markers; and
 - (v) Storm Drain Boxes and Pipes;
- (s) Engineering data and calculations as may be necessary and other engineering services required to facilitate construction; and
- (t) A list, description and schedule of demolished materials to be wasted or disposed of off-site and on-site. For materials to be disposed of off-site, submit name and location of actual disposal facilities.

4.5. FLOOD CONTROL IMPROVEMENTS

This Section covers downstream flood improvements to up to 36 habitable structures and three river crossings (two pedestrian bridges and one railroad crossing) required to protect against the 100-years flood elevation after removal of the dams. While improvements will vary from habitable structure to habitable structure, it is anticipated that improvements could include increasing the height of existing retaining walls, construction of new retaining walls, construction of levees, or raising of existing structures. Final disposition of the two pedestrian bridges are still to be worked out with existing landowners, but improvements could involve raising the bridge, replacing the bridge or demolishing the bridge. The railroad bridge will require analysis by the Project Company to identify required improvements, but at this time it is anticipated that improvements may be required to protect against scour at the bridge abutments.

4.5.1 Applicable Standards.

The design, modification, demolition and construction of downstream flood control improvements shall comply with all Applicable Law, and shall be done in conformance with the latest version of applicable standards, manuals and guidelines. At a minimum, the Project

Company shall comply with listed standards below, and shall propose additional standards where appropriate for KRRC review. Should proposed standards conflict with those listed below, the Project Company shall provide justification for revising the Project Agreement standards prior to proceeding with design.

- (a) USACE EM 1110-2-2502, Retaining and Flood Walls;
- (b) USACE EM 1110-2-1913, Design and Construction of Levees;
- (c) USDA Forest Service Timber Bridges: Design, Construction, Inspection, and Maintenance;
- (d) AASHTO LRFD Bridge Design Specifications; and
- (e) Evaluating Scour at Bridges, 5th Edition, Hydraulic Engineering Circular (HEC-18), U.S. Department of Transportation, Federal Highway Administration.

4.5.2 Design Criteria.

4.5.2.1 Required Criteria

The Project Company shall meet the following Required Criteria for design and construction of the flood control improvements, and any other criteria that are required by Governmental Approvals:

- (a) Protect against the post dam removal 100-year flood elevation.

4.5.2.2 Proposed Criteria

In addition to the Required Criteria above, the Project Company shall develop the following criteria, at a minimum, for design and construction of downstream flood control improvements. Additional criteria shall be proposed and developed, as appropriate, to complete the design in accordance with the requirements set forth in the Project Agreement and Appendices.

- (a) Freeboard;
- (b) Scour Protection; and
- (c) Static and dynamic load for bridge structures.

4.5.3 Minimum Construction Submittal Requirements.

The Project Company shall include, at a minimum, the following construction submittals in their technical specifications for flood control improvements. The Project Company is responsible for defining and providing any construction submittals that apply to the Project.

- (a) A list, description and schedule of demolished materials to be wasted or disposed of off-site and on-site. For materials to be disposed of off-site, submit name and location of actual disposal facilities.

4.6. RESERVOIR DRAWDOWN

This Section covers the drawdown design of the reservoirs impounded by J.C. Boyle, Copco No. 1, and Iron Gate dams. The design shall include developing rating curves for diversions, hydraulic reservoir drawdown analyses, stability analyses of all embankments, concrete dams,

and reservoir rims during drawdown, methods of managing drawdown under low, medium and high flow conditions, instrumentation and monitoring of embankment and reservoir rim slopes during drawdown, and remediation measures in case of slope stability issues.

4.6.1 Applicable Standards.

The design and implementation of drawdown shall comply with all Applicable Law, and shall be done in conformance with the latest version of applicable standards, manuals and guidelines. At a minimum, the Project Company shall comply with listed standards below, and shall propose additional standards where appropriate for KRRC review. Should proposed standards conflict with those listed below, the Project Company shall provide justification for revising the Project Agreement standards prior to proceeding with design.

- (a) United States Department of the Interior, Bureau of Reclamation, Design Standards No.13, Embankment Dams (CH. 1 to 21);
- (b) ICOLD (2013) – Bulletin 164, Internal erosion of existing dams, levees and dikes, and their foundations;
- (c) USBR (2008) Risk analysis for dam safety: a unified method for estimating probabilities of failure of embankment dams and piping. Guidance document version: Delta, Issue 2;
- (d) United States Department of the Interior, Bureau of Reclamation, Design Standards No.6, Chapter 12: Trashracks and Trashrack Cleaning Devices Phase 4; and
- (e) EM 1110-2-1902, U.S. Army Corps of Engineers, Engineering and Design Slope Stability.

4.6.2 Design Criteria.

4.6.2.1 Required Criteria

The Project Company shall meet the following Required Criteria, at minimum, for implementation of drawdown:

- (a) Minimum rapid drawdown factor of safety of 1.3 for J.C. Boyle and Iron Gate Dam embankments; and
- (b) Drawdown capacity:
 - (i) Maximum first time drawdown rate of 5 feet/day;
 - (ii) Unrestricted drawdown rate down to first time drawdown reservoir elevation following reservoir refilling due to storm events, except as required in (iii) and (iv);
 - (iii) Maximum release from Iron Gate diversion of 15,000 cfs; and
 - (iv) Maximum release from Copco No. 1 diversion to that allowable to maintain power generation at Copco No. 2.

4.6.2.2 Proposed Criteria

In addition to the Required Criteria above, the Project Company shall develop the following criteria, at a minimum, for implementation of drawdown. Additional criteria shall be proposed and developed, as appropriate, to complete the design in accordance with the requirements set forth in the Project Agreement and Appendices.

- (a) Trigger and action levels for instrumentation monitoring;
- (b) Define activities required to protect aquatic resources within reservoirs per Governmental Approvals; and
- (c) Types, character, quantities, and locations of remediation materials to be stockpiled in advance of drawdown.

4.6.3 Minimum Construction Submittal Requirements.

The Project Company shall take into account the constructability of the proposed design with consideration given to feasible methods of drawdown, constraints to drawdown procedure (materials, labor, specialty construction, weather, etc.) design details, time required to complete each element of work, and possible alternatives which would reduce costs but maintain the level of quality and safety expected by the KRRC. The Project Company shall include, at a minimum, the following construction submittals in their technical specifications for drawdown. The Project Company is responsible for defining and providing any additional construction submittals that apply to the Project.

- (a) Instrumentation installation reports;
- (b) Instrumentation monitoring reports;
- (c) Visual inspection reports of embankments and slopes during drawdown;
- (d) Real-time monitoring and records of drawdown flows and reservoir elevations from start of drawdown through the end of spring; and
- (e) Construction records and remediation measures implemented during drawdown.

4.7. EMBANKMENT DAM REMOVAL

The design shall include slope stability of excavation dam sections, sequencing/staging of excavations, design of cofferdam breaches and, potential failure mode analysis. This Section covers demolition by excavation for the following structures.

- (a) J.C. Boyle Dam: combination embankment and concrete gravity dam, of which the embankment portion is covered by this Section;
- (b) Copco 2 Dam: concrete diversion dam with embankment Section, of which the embankment part is covered by this Section; and
- (c) Iron Gate Dam: embankment dam.

4.7.1 Applicable Standards.

The design and implementation of any embankment removal shall comply with all Applicable Law, and shall be done in conformance with the latest version of applicable standards, manuals and guidelines. At a minimum, the Project Company shall comply with listed

standards below, and shall propose additional standards where appropriate for KRRC review. Should proposed standards conflict with those listed below, the Project Company shall provide justification for revising the Project Agreement standards prior to proceeding with design.

- (a) United States Department of the Interior, Bureau of Reclamation, Design Standards No.13, Embankment Dams (CH. 1 to 21);
- (b) EM 1110-2-1912. "Stability of Excavated and Natural Slopes in Soils and Clay Shales," U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS;
- (c) Public Law 91-190 National Environmental Policy Act of 1969;
- (d) Public Law 104-303, Section 215 National Dam Safety Program Act;
- (e) ER 1110-2-1156 Dam Safety - Organization, Responsibilities, and Activities;
- (f) Occupational Safety and Health Standards for Construction Industry (USA) 29 Code of Federal Regulations Part 1926 Subpart P – Excavations; and
- (g) Occupational Safety and Health Standards for Construction Industry (USA) 29 Code of Federal Regulations Part 1926 Subpart T – Demolition.

4.7.2 Design Criteria.

4.7.2.1 Required Criteria

The Project Company shall meet the following Required Criteria, at minimum, for embankment dam removal:

- (a) Design of the excavations of J.C. Boyle and Iron Gate dams shall provide for a dam section throughout excavation that can safely retain water, meet stability criteria, and have a crest elevation that is 2 feet greater than needed to allow for passage of a 1% probable flood for that time of year;
- (b) Temporary excavation slopes shall be designed by a qualified California/Oregon registered Professional Engineer in accordance with standard geotechnical practice;
- (c) Slope analysis of temporary slopes shall consider the short-term (during and immediately after construction), the potential for temporary raising and lowering of a reservoir during floods, taking into consideration variations and changes in groundwater levels and the effects of deterioration and loss of soil resistance due to construction conditions, if applicable;
- (d) J.C. Boyle and Iron Gate cofferdam breaches shall be designed to maximize the amount of cofferdam removal by the Klamath River;
- (e) Final channel, floodplain and canyon wall geometry throughout the removal extents shall provide a geomorphologically appropriate transition between cross sections, that is passable to fish species of concern, immediately upstream and downstream of the previous dam location; Channel bed materials shall comply with Governmental Approvals and criteria identified in Section 4.12 (Engineered Habitat Features);

- (f) Concrete cutoff walls shall be removed in accordance with Section 4.8 (Concrete Dam and Structures Removal); and
- (g) Excavated rock and earth materials shall be disposed in on-site disposal areas.

4.7.2.2 Proposed Criteria

In addition to the Required Criteria above, the Project Company shall develop the following criteria, at a minimum, for embankment dam removal. Additional criteria shall be proposed and developed, as appropriate, to complete the design in accordance with the requirements set forth in the Project Agreement and Appendices.

- (a) Minimum factors of safety for excavation design (slope stability);
- (b) Design earthquake for temporary construction;
- (c) Minimum acceptable seepage gradient; and
- (d) Cofferdam breaching rate.

4.7.3 Minimum Construction Submittal Requirements.

The Project Company shall take into account the constructability of the proposed design with consideration given to feasible methods of construction, constraints to construction (materials, labor, specialty construction, weather, etc.) design details, time required to complete each element of work, and possible alternatives which would reduce costs but maintain the level of quality and safety expected by the KRRC. The Project Company shall include, at a minimum, the following construction submittals in their technical specifications for embankment dam removal. The Project Company is responsible for defining and providing any additional construction submittals that apply to the Project.

- (a) Control of Water;
- (b) Testing, Inspection, Instrumentation and Monitoring Results (if applicable);
- (c) Dam excavation/demolition sequence, including how dam excavation/demolition interrelates to other project activities;
- (d) Construction methods to be used for excavation/demolition;
- (e) Equipment, and Materials Storage;
- (f) Methods of accessing the dam for excavation/demolition;
- (g) Methods for removing hazardous materials present in dam area and protection of workers and environment;
- (h) Methods to be used to evaluate the need for stabilization of abutments following dam removal and methods for stabilizing abutments (if applicable); and
- (i) A list, description and schedule of demolished materials to be wasted or disposed of off-site and on-site. For materials to be disposed of off-site, submit name and location of actual disposal facilities.

4.8. CONCRETE DAM AND STRUCTURES REMOVAL

Several methods exist for concrete removal such as pneumatic and hydraulic breakers, pressure bursting, dismantling ball and crane method and drilling and blasting. Dam and other concrete structure demolition would likely be performed in horizontal lifts using one or more of these methods. For J.C. Boyle, the design shall also cover the hydrology analysis for power canal bench to determine required drainage features. In addition, rock fall hazards shall be assessed following the power canal removal and forebay fill requirement, and excavations made for penstocks shall be addressed. The design shall include developing the approach and general sequence of removal of concrete dams and concrete structures and structural stability analysis to support proposed approaches. This Section covers the following concrete dams and their appurtenant structures demolition using blasting methods (if required).

- (a) J.C. Boyle Dam: combination embankment and concrete gravity dam, of which the concrete gravity portion and the mass concrete at the intakes, cutoff walls, power canal, forebay, and powerhouse are covered by this Section. Hydrology design for power canal bench to determine drainage features;
- (b) Copco No. 1 Dam: concrete dam, including the mass concrete at intakes and powerhouse;
- (c) Copco 2 No. Dam: concrete diversion dam with embankment section, of which the concrete diversion dam portion and the mass concrete at the intake and powerhouse are covered by this Section; and
- (d) Iron Gate Dam: embankment dam, of which the mass concrete at the intakes, cutoff walls, spillway, and powerhouse are covered by this Section.

4.8.1 Applicable Standards.

The design and implementation of any demolition by blasting shall comply with all Applicable Law, and shall be done in conformance with the latest version of applicable standards, manuals and guidelines. At a minimum, the Project Company shall comply with listed standards below, and shall propose additional standards where appropriate for KRRC review. Should proposed standards conflict with those listed below, the Project Company shall provide justification for revising the Project Agreement standards prior to proceeding with design.

- (a) EM 1110-2-3800: Systematic Drilling and Blasting for Surface Excavations, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS;
- (b) Occupational Safety and Health Standards for Construction Industry (USA) 29 Code of Federal Regulations Part 1926 Subpart T – Demolition;
- (c) Occupational Safety and Health Standards for Construction Industry (USA) 29 Code of Federal Regulations Part 1926 Subpart U – Blasting and the Use of Explosives;
- (d) The Federal Occupational Safety and Health Act of 1970 and the Construction Safety Act of 1969, as amended;
- (e) Safe Explosives Act, Title XI, Subtitle C of Public Law 107-296, Interim Final Rule;

- (f) OSHA of 1970, 29 U.S.C., Section 651 et seq., including safety and health regulations for construction;
- (g) CFR 27, U.S. Department of Justice, Alcohol, Tobacco, Firearms and Explosives Division (ATF). 27 CFR Part 555, Implementation of the Safe Explosives Act, Title XI, Subtitle C of Public Law 107-296; Interim Final Rule;
- (h) Organized Crime Control Act of 1970, Title XI, Public Law 91-452, approved October 15, 1970, as amended;
- (i) CFR 49, Parts 100-177 (DOT RSPA); 301-399 (DOT FHA);
- (j) California Code of Regulations (CCR):
 - (i) Title 8, Chapter 4, Subchapter 20, Tunnel Safety Orders; and
 - (ii) Title 8, General Industry Safety Orders, Subchapter 7, Group 18. Explosives and Pyrotechnics;
- (k) Non-regulating Industry Support Organizations;
 - (i) Vibration Subcommittee of the International Society of Explosive Engineers (ISEE), blast monitoring equipment operation standards (1999); and
 - (ii) IME (Institute of Makers of Explosives) Safety Library Publications (SLPs).

4.8.2 Design Criteria.

4.8.2.1 Required Criteria

The Project Company shall meet the following Required Criteria, at minimum, for the design and implementation of concrete dam and structures removal:

- (a) Temporary structural sections shall be designed by a qualified California/Oregon registered Structural Engineer in accordance with standard practice;
- (b) Structural and stability analysis of temporary structural sections shall consider the potential for temporary raising and lowering of a reservoir during floods;
- (c) Channel, floodplain and canyon wall geometry throughout the removal extents shall provide a geomorphologically appropriate transition between cross sections immediately upstream and downstream of the previous dam location; Channel bed materials shall comply with Governmental Approvals and criteria identified in Section 4.12;
- (d) All reinforcement shall be separated from concrete and removed from the site;
- (e) Concrete rubble shall be disposed in on-site disposal areas;
- (f) Copco No. 1 and Copco No. 2 shall be removed to a minimum of 20 feet below the level of the restored Klamath River bed or to bedrock, whichever is at higher elevation;

- (g) The cutoff walls that protrude above the foundation surface under the J.C. Boyle and Iron Gate embankments shall be removed down to the foundation surface; and
- (h) Final grade of penstock excavation and regrading following removal of penstocks and concrete supports shall blend into the surrounding topography.

4.8.2.2 Proposed Criteria

In addition to the Required Criteria above, the Project Company shall develop the following criteria, at a minimum, for design and implementation of concrete dam and structures removal. Additional criteria shall be proposed and developed, as appropriate, to complete the design in accordance with the requirements set forth in the Project Agreement and Appendices.

- (a) Factors of safety for temporary structural sections that will be present during demolition;
- (b) Design earthquake for temporary construction;
- (c) Noise limits;
- (d) Vibration limits;
- (e) Storm event for drainage of J.C. Boyle power canal bench; and
- (f) Elevation below river channel at which portions of powerhouse or other concrete structures can remain.

4.8.3 Minimum Construction Submittal Requirements.

The Project Company shall take into account the constructability of the proposed design with consideration given to feasible methods of construction, constraints to construction (materials, labor, specialty construction, weather, etc.) design details, time required to complete each element of work, and possible alternatives which would reduce costs but maintain the level of quality and safety expected by the KRRC. The Project Company shall include, at a minimum, the following construction submittals in their technical specifications for concrete dam and structures removal. The Project Company is responsible for defining and providing any additional construction submittals that apply to the Project.

- (a) A summary of proposed methods for transportation, handling, weekly storage, day-storage, security and use of explosives;
- (b) General concept for excavation and blasting including controlled blasting techniques and methods for control of noise, air-overpressure, ground vibration, flyrock (if applied), and dust: Mitigation measures for controlling dust during blasting of concrete or rock, if required;
- (c) Methods of accessing the dam for excavation/demolition;
- (d) Excavation sequence for all structures, blasting design measures;
- (e) Blasting plan including but not limited to:

- (i) A scaled drawing showing the location, orientation, number, diameter, and depth of blast holes relative to the specified stations, slopes, lines, and grades;
- (ii) Manufacturer's data on material and equipment including type of explosive, cartridge size, detonator, blasting monitors (both air and seismic), plus other equipment required to perform the blast;
- (iii) Total weight of explosive in the blast and maximum weight per hole and charge per-delay, powder factor, and type and length of stemming;
- (iv) The delay sequencing and the type and manufacturer of the delays used;
- (v) Blasting schedule for all structures;
- (vi) List of all locations to be monitored;
- (vii) Methods to prevent over-blasting and loosening of rock or any structure not indicated to be removed or disturbed;
- (viii) Location of seismographs and instruments that will measure ground vibration and blast noise in A-weighted decibel scale; and
- (ix) Provisions for scaling after each blast, including when scaling will begin, and who will perform the scaling;
- (f) Methods of controlling, collecting and disposing of concrete dust and fragments during demolition to protect air and water quality (if applicable);
- (g) Blast reports to be submitted along with seismograph and noise (air overpressure) monitoring records;
- (h) Testing, Inspection, Instrumentation and Monitoring Results (if applicable);
- (i) Blasting permits, approvals, and agreements required for the use of explosives or to carry out blasting operations;
- (j) Proof of calibration of the monitoring equipment prior to commencement of any monitoring operations;
- (k) Blasting Safety Plan for Use of Explosives;
- (l) Fire prevention plan;
- (m) Control of Water;
- (n) Equipment and Materials Storage;
- (o) Methods for removing hazardous materials present in dam area and protection of workers and environment;
- (p) Methods to be used to evaluate the need for stabilization of abutments following dam removal and methods for stabilizing abutments (if applicable); and

- (q) A list, description and schedule of demolished materials to be wasted or disposed of off-site and on-site. For materials to be disposed of off-site, submit name and location of actual disposal facilities.

4.9. COFFERDAMS

This Section covers the design of all cofferdams except for the cofferdams that are formed from the existing J.C. Boyle and Iron Gate dam embankments that will be breached to complete removal of those dams. Cofferdams covered under this Section include those that may be required to construct new wheel gate structures, remove powerhouses, fill tailraces, provide access, remove Copco No. 2 dam, and remove any other structures associated with the Project. Design of cofferdams could include borrow site design, stability and seepage analyses, erosion protection, filter and drain requirements, construction materials, and construction sequencing.

4.9.1 Applicable Standards.

The design and construction of the cofferdams shall comply with all Applicable Law, and shall be done in conformance with the latest version of applicable standards, manuals and guidelines. At a minimum, the Project Company shall comply with listed standards below, and shall propose additional standards where appropriate for KRRC review. Should proposed standards conflict with those listed below, the Project Company shall provide justification for revising the Project Agreement standards prior to proceeding with design.

- (a) United States Department of the Interior, Bureau of Reclamation, Design Standards No.13, Embankment Dams (CH. 1 to 21);
- (b) ER 1110-2-8152 (Regulation No. 1110-2-8152) Planning and Design of Temporary Cofferdams and Braced Excavations, U.S. Army Corps of Engineers, Washington, DC 20314-1000;
- (c) Public Law 91-190 National Environmental Policy Act of 1969;
- (d) Public Law 104-303, Section 215 National Dam Safety Program Act;
- (e) ER 1110-2-1156 Dam Safety - Organization, Responsibilities, and Activities;
- (f) Occupational Safety and Health Standards for Construction Industry (USA) 29 Code of Federal Regulations Part 1926 Subpart S – Underground Construction, Caissons, Cofferdams, and Compressed Air.

4.9.2 Design Criteria.

4.9.2.1 Required Criteria

The Project Company shall meet the following Required Criteria, at minimum, for the design and construction of cofferdams:

- (a) Facilitate work required behind cofferdams during normal flow periods as well as during flood periods;
- (b) Include provisions for continuous dewatering and maintenance required to maintain the areas enclosed by the cofferdams and the excavations in a dewatered state; and

- (c) Dewatering systems shall reduce the groundwater pore pressures sufficiently to ensure the stability of the side slopes or shoring and base of the excavations, as applicable.

4.9.2.2 Proposed Criteria

In addition to the Required Criteria above, the Project Company shall develop the following criteria, at a minimum, for design and construction of cofferdams. Additional criteria shall be proposed and developed, as appropriate, to complete the design in accordance with the requirements set forth in the Project Agreement and Appendices.

- (a) Minimum factors of safety for stability;
- (b) Design earthquake for temporary construction;
- (c) Minimum acceptable seepage gradient;
- (d) Design flood levels;
- (e) Minimum freeboard requirements;
- (f) Erosion protection; and
- (g) Filter and drain criteria (if applicable).

4.9.3 Minimum Construction Submittal Requirements.

The Project Company shall take into account the constructability of the proposed design with consideration given to feasible methods of construction, constraints to construction (materials, labor, specialty construction, weather, etc.) design details, time required to complete each element of work, and possible alternatives which would reduce costs but maintain the level of quality and safety expected by the KRRC. The Project Company shall include, at a minimum, the following construction submittals in their technical specifications for cofferdam construction. The Project Company is responsible for defining and providing any additional construction submittals that apply to the Project.

- (a) Materials;
- (b) Construction staging and sequence;
- (c) Foundation preparation;
- (d) Maintaining cofferdam crest;
- (e) Dewatering and pumping plan;
- (f) Sump details;
- (g) Soil testing;
- (h) Instrumentations;
- (i) Water disposal plan;
- (j) Turbidity and silt control plan;

- (k) Controlled flooding;
- (l) Cofferdam removal;
- (m) Quality control plan;
- (n) Operation, maintenance and surveillance (OMS) for cofferdam safety; and
- (o) A list, description and schedule of demolished materials to be wasted or disposed of off-site and on-site. For materials to be disposed of off-site, submit name and location of actual disposal facilities.

4.10. ELECTRICAL

This Section covers the following design and demolition work of electrical systems, which shall be closely coordinated with and reviewed by PacifiCorp. PacifiCorp will continue to own any electrical facilities proposed to remain on the PacifiCorp Properties during and after the completion of the Project Implementation Work:

- (a) J.C. Boyle Dam: demolition of substation, powerhouse and distribution lines to village areas. Design of new transmission lines and poles to tie the 230kV transmission lines that currently head south into J.C. Boyle substation.
- (b) Copco No. 1 Dam: demolition of substation, powerhouse, and transmission lines. Demolition of distribution lines to local village houses only. Distribution lines and structures that run to Copco No. 2 and Fall Creek are to remain. Design of new transmission lines and poles for 69kV lines over disposal area.
- (c) Copco No. 2 Dam: demolition of powerhouse and transmission lines to Iron Gate and Copco No. 1. Partial demolition of substation. Under-build and structures are to remain; and
- (d) Iron Gate Dam: demolition of substation, powerhouse and designated transmission/distribution lines. Design of a new feed for distribution from Hornbrook to hatchery. New meter to be installed at hatchery.

As part of the design, the following analyses and tasks shall be completed:

- (a) Conduct Line Survey of 69KV and 230KV lines for applicable data for PLS-CADD modelling;
- (b) Soil Analysis and resistivity measurements;
- (c) Grounding Study;
- (d) Structural Design (pole/towers and foundations) of transmission poles;
- (e) Coordination with utility for specifications and standards for line sizing, wire sizing, equipment installation, etc.;
- (f) Sequencing plan/drawings for construction and outage – temporary power and construction staging;
- (g) Detailed demolition plans of existing lines;

- (h) Plan drawings of new connections and poles;
- (i) Plan and profile; and
- (j) Grounding, shielding and physical arrangements.

4.10.1 Applicable Standards.

The design and implementation of any demolition and design work shall comply with all Applicable Law, and shall be done in conformance with the latest version of applicable standards, manuals and guidelines. At a minimum, the Project Company shall comply with listed standards below, and shall propose additional standards where appropriate for KRRC review. Should proposed standards conflict with those listed below, the Project Company shall provide justification for revising the Project Agreement standards prior to proceeding with design.

- (a) National Electric Safety Code;
- (b) California General Order 95; and
- (c) Institute of Electrical and Electronics Engineers (IEEE).

4.10.2 Design Criteria.

4.10.2.1 Required Criteria

None.

4.10.2.1 Proposed Criteria

As required by applicable standards.

4.10.3 Minimum Construction Submittal Requirements

The Project Company shall take into account the constructability of the proposed design with consideration given to feasible methods of construction, constraints to construction (materials, labor, specialty construction, weather, etc.) design details, time required to complete each element of work, and possible alternatives which would reduce costs but maintain the level of quality and safety expected by the KRRC. The Project Company shall include, at a minimum, the following construction submittals in their technical specifications for electrical modification or demolition. The Project Company is responsible for defining and providing any additional construction submittals that apply to the Project.

- (a) Construction staging plan;
- (b) Outage coordination;
- (c) Sequencing plan;
- (d) Temporary power plan;
- (e) Testing and commission procedures shall be furnished by the Project Company and approved by Utility, prior to starting testing work. All testing documents shall be documented on a utility approved test form; and

- (f) A list, description and schedule of demolished materials to be wasted or disposed of off-site and on-site. For materials to be disposed of off-site, submit name and location of actual disposal facilities.

4.11. DISPOSAL SITES

The requirements outlined herein shall be applicable to the design of all disposal sites required for the Project. The design shall include grading, slope stability, settlement (if required), seepage including filter and drain (if needed), surface drainage, erosion control/protection, materials criteria/limitations/zoning, and material placement and compaction.

4.11.1 Applicable Standards.

The design and construction of the disposal sites shall comply with all Applicable Law, and shall be done in conformance with the latest version of applicable standards, manuals and guidelines. At a minimum, the Project Company shall comply with listed standards below, and shall propose additional standards where appropriate for KRRC review. Should proposed standards conflict with those listed below, the Project Company shall provide justification for revising the Project Agreement standards prior to proceeding with design.

- (a) United States Department of the Interior, Bureau of Reclamation, Design Standards No.13, Embankment Dams (CH. 1 to 21) ; and
- (b) EM 1110-2-1912. "Stability of Excavated and Natural Slopes in Soils and Clay Shales," U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

4.11.2 Design Criteria.

4.11.2.1 Required Criteria

The Project Company shall meet the following Required Criteria, at minimum, for design and construction of disposal sites:

- (a) The disposal sites shall be covered with fill and shall be designed to meet the ecological design criteria and blend into the landscape as naturally as possible. Design of the disposal site slopes shall consider landscape requirements and potential future use of the area by the public;
- (b) J.C. Boyle:
 - (i) Concrete rubble shall be disposed in scour hole below power canal spillway;
 - (ii) Excavated embankment materials shall be disposed in disposal site, in forebay to blend with surrounding topography and provide drainage, and on power canal bench such that a pedestrian/maintenance trail is maintained along outer edge of bench;
 - (iii) Concrete rubble in scour hole shall be covered with a 3-foot minimum thickness layer of cobbles and boulders salvaged from below the scour hole with soil washed into the voids after placement; and
 - (iv) Concrete rubble from J.C. Boyle powerhouse and penstock cradles shall be disposed in the powerhouse tailrace and covered with adjacent fill

materials to blend with surrounding topography and create a floodplain bench;

- (c) Copco No. 1 and Copco No. 2:
 - (i) Concrete rubble from Copco No. 1 dam and powerhouse and Copco No. 2 dam shall be disposed in disposal site;
 - (ii) Excavated Copco No. 2 embankment materials shall be used to cover disposal site after concrete rubble placement is complete; and
 - (iii) Concrete rubble from Copco No. 2 powerhouse shall be disposed in the Copco No. 2 tailrace and covered with native materials to blend with surrounding topography;
- (d) Iron Gate:
 - (i) Concrete rubble at Iron Gate dam and powerhouse shall be disposed in the disposal site and covered with a minimum 3 feet of excavated embankment materials;
 - (ii) Excavated embankment materials shall be disposed in the spillway and in the disposal site. The spillway shall be filled to the maximum extent possible while still meeting the requirements for stability; and
 - (iii) Portions of the spillway concrete structure that would remain exposed following filling with disposed materials shall be demolished so that a minimum of 3 feet of cover will be present following filling.

4.11.2.2 Proposed Criteria

In addition to the Required Criteria above, the Project Company shall develop the following criteria, at a minimum, for design and construction of disposal sites. Additional criteria shall be proposed and developed, as appropriate, to complete the design in accordance with the requirements set forth in the Project Agreement and Appendices.

- (a) Minimum required factors of safety for long-term and earthquake slope stability loading conditions;
- (b) Design earthquake for permanent construction;
- (c) Maximum exit gradient for seepage;
- (d) Design storm for surface drainage and erosion control/protection design;
- (e) Design river storm event (level, velocity, and shear stress) for erosion control/protection design for disposal areas adjacent to the Klamath River; and
- (f) Filter and drain requirements (if applicable).

4.11.3 Minimum Construction Submittal Requirements.

The Project Company shall take into account the constructability of the proposed design with consideration given to feasible methods of construction, constraints to construction (materials, labor, specialty construction, weather, etc.) design details, time required to complete each

element of work, and possible alternatives which would reduce costs but maintain the level of quality and safety expected by the KRRC. The Project Company shall include, at a minimum, the following construction submittals in their technical specifications for disposal site construction. The Project Company is responsible for defining and providing any additional construction submittals that apply to the Project.

- (a) Construction staging and sequence;
- (b) Foundation preparation;
- (c) Material placement and compaction effort;
- (d) Drainage;
- (e) Erosion control measures; and
- (f) Materials placement and compaction.

4.12. ENGINEERED HABITAT FEATURES

This Section covers design of engineered habitat features for the following areas:

- (a) J.C. Boyle dam footprint, reservoir area, and tributary streams within the currently inundated areas;
- (b) Copco No. 1 dam footprint, reservoir area and tributary streams within the currently inundated areas;
- (c) Copco No. 2 dam footprint and reservoir area within the currently inundated areas; and
- (d) Iron Gate dam footprint, reservoir area and tributary streams within the currently inundated areas.

The design shall generally comply with Section 5 of Appendix H in the KRRC Definite Plan (2018). Key design features include excavation in select areas to optimize near channel habitat and improve floodplain and tributary connectivity, installation of large wood habitat features, riparian bank revegetation, and installation of bank stability and/or channel fringe complexity features in select locations.

4.12.1 Applicable Standards.

The design and restoration of reservoir areas shall comply with all Applicable Law, and shall be done in conformance with the latest version of applicable standards, manuals and guidelines. At a minimum, the Project Company shall comply with listed standards below, and shall propose additional standards where appropriate for KRRC review. Should proposed standards conflict with those listed below, the Project Company shall provide justification for revising the Project Agreement standards prior to proceeding with design.

- (a) Restoration goals and objectives listed in Table 2.1 of Appendix H in the KRRC Definite Plan (2018);
- (b) Large Woody Material - Risk Based Design Guidelines, Bureau of Reclamation, Pacific Northwest Region, 2014;

- (c) Oregon Revised Statutes (ORS) Chapter 509 (General Protective Regulations – Fish Passage Statutes); and
- (d) Current version of the Uniform Building Code (UBC) Appendix Chapter 33 Excavation and Grading.

4.12.2 Design Criteria.

4.12.2.1 Required Criteria

The Project Company shall meet the following Required Criteria, at minimum, for engineered habitat features:

- (a) Design shall generally comply with Section 5 of Appendix H in the KRRC Definite Plan (2018);
- (b) Volitional fish passage shall be restored in the mainstem Klamath River and tributaries in accordance with requirements in Governmental Approvals;
- (c) All human-created structures, remnant features (i.e. rock cofferdams, falsework, crib structures, etc.), and non-natural debris shall be removed to the extent feasible from the Klamath River and tributaries and remaining channel shall provide volitional fish passage in accordance with requirements in Governmental Approvals; and
- (d) Thalweg through dam removal extents shall provide a geomorphologically appropriate transition from upstream to downstream; Channel bed materials shall generally match that found in appropriate reference reaches.

4.12.2.2 Proposed Criteria

In addition to the Required Criteria above, the Project Company shall develop the following criteria, at a minimum, for design and implementation of engineered habitat features. Additional criteria shall be proposed and developed, as appropriate, to complete the design in accordance with the requirements set forth in the Project Agreement and Appendices.

- (a) Large wood type and size;
- (b) Location of large wood material to be used for restoration;
- (c) Factor of safety for large wood stability (i.e. floating, sliding, etc.);
- (d) Design storm event for large wood stability; and
- (e) Design storm event for floodplain and wetland connectivity.

4.12.3 Minimum Construction Submittal Requirements.

The Project Company shall take into account the constructability of the proposed design with consideration given to feasible methods of construction, constraints to construction (materials, labor, specialty construction, weather, etc.) design details, time required to complete each element of work, and possible alternatives which would reduce costs but maintain the level of quality and safety expected by the KRRC. The Project Company shall include, at a minimum, the following construction submittals in their technical specifications for engineered habitat

features. The Project Company is responsible for defining and providing any additional construction submittals that apply to the Project.

- (a) Construction staging areas, access roads, and site management plan (including fueling areas for equipment) within reservoir areas;
- (b) Restoration work sequence and milestone schedule;
- (c) List of equipment and facilities necessary to execute the work;
- (d) Erosion control and air quality measures including dust control;
- (e) Work area isolation and in-water measures;
- (f) Monitoring and compliance plan to ensure compliance with Governmental Approval conditions and other regulatory requirements including photo points and reporting forms; and
- (g) Grading plan for each reservoir area and dam footprint area.

4.13. PLANT MATERIALS

The design requirements described below shall be applicable to all plant materials required for the Project, including, but not limited to plant seed, pole cuttings, and salvaged vegetation. Pioneer seeding shall be completed to limit erosion of accumulated sediments to the extent feasible.

4.13.1 Applicable Standards.

Plant materials design and selection (including seed mixes) shall comply with all Applicable Law, and shall be done in conformance with the latest version of applicable standards, manuals and guidelines. At a minimum, the Project Company shall comply with listed standards below, and shall propose additional standards where appropriate for KRRC review. Should proposed standards conflict with those listed below, the Project Company shall provide justification for revising the Project Agreement standards prior to proceeding with design.

- (a) U.S. Department of Agriculture, July 2009, Technical Note No. 11, Understanding Seeding Rates, Recommended Planting Rates, and Pure Live Seed (PLS);
- (b) Federal Plant Protection Act (Pub. L. 106-224 published in 2000);
- (c) Federal Seed Act (7 USC 1551-1611);
- (d) California and Oregon Department of Agriculture seed and noxious weed control laws;
- (e) California Crop Improvement Association and Oregon Seed Certification Service standards;
- (f) Association of Official Seed Analysts (AOSA) Rules for Testing Seed;
- (g) International Seed Testing Association (ISTA) accreditation requirements; and

- (h) AOSA Pre-Variety Germplasm Certification Standards.

4.13.2 Design Criteria.

4.13.2.1 Required Criteria

The Project Company shall meet the following Required Criteria, at minimum, for plant materials:

- (a) Genetically appropriate plant materials shall be sourced from the Upper Klamath River and Lost River Watersheds with an elevational range between 1,800' and 4,300';
- (b) Seed of sterile species non-native to the Upper Klamath River and Lost River Watersheds (e.g. sterile wheat), or California or Oregon native species that will not be able to reproduce in the project area (e.g. lacy phacelia) can be sourced commercially if used in amounts up to 5% of the pioneer seed mix by seed count (to enhance the erosion control properties of the seed mix);
- (c) Propagated native seed shall not be more than four generations (G4) removed from the wild collected parent seed (G0) from the collection area;
- (d) The Project Site shall be divided into a minimum of five planting zones based on hydrology, soil type, and probability of flooding (e.g., Emergent Wetland, Bank Wetland, Bank Riparian, Floodplain Riparian, and Upland);
- (e) Proposed seed mix plant species shall be most appropriate for the planting zone they have been proposed for;
- (f) Aerially broadcast "pioneer" seed mixes shall be applied at the time of drawdown, and shall, as a minimum, consist of an upland seed mix (to be seeded in the Upland Planting Zone) and a riparian seed mix (to be seeded in Bank Wetland, Bank Riparian, and Floodplain Riparian Zones);
- (g) Aerially broadcast "pioneer seeding" shall be implemented as soon as practicable in late winter and early spring of the drawdown year while exposed sediments are still soft and moist to allow for expedited germination and sprouting of seed. (Dried sediments form a hard crust that prevents germinating seed to penetrate into the soil/sediment.) The need for soft, moist sediment to serve as a suitable germination substrate shall be carefully balanced with the need to protect seed from freezing;
- (h) Each pioneer seeding period mix shall be species-diverse;
- (i) Each over-seeding period mix shall be species diverse;
- (j) Native plant seed of species that will demonstrate that they germinate and grow well when seeded in late winter on freshly drained reservoir sediment in the test plot experiments (conducted by KRRC) shall be prioritized for collection, propagation, and pioneer seed mix design;
- (k) Plant materials collection shall be implemented in a manner that will not cause any damage to existing plant populations or parent plants;

- (l) Pole cuttings shall be taken from healthy, vigorous parent plants. Parent plants shall not be harmed; not more than 30% of any plant shall be removed for pole cuttings;
- (m) Existing wetland and riparian plants growing near the current water line within the Project Site shall be salvaged to the maximum extent feasible, and transplanted to new locations along the newly formed river banks;
- (n) Salvage of existing vegetation shall begin as early as possible while plants are dormant, during and immediately after drawdown (in late winter and early spring of the drawdown year). Plants shall be transplanted directly to new locations when equipment access to river bank areas is feasible or when roads are constructed for equipment that will be grading the riparian floodplains; and
- (o) Source areas disturbed during salvaging operations shall be re-graded and re-seeded with zone-appropriate seed mixes immediately upon completion of work with the same amount of PLS per acre as that is used for aerial pioneer seeding.

4.13.2.2 Proposed Criteria

In addition to the Required Criteria above, the Project Company shall develop the following criteria, at a minimum, for design, selection, and procurement of plant materials. Additional criteria shall be proposed and developed, as appropriate, to complete the design in accordance with the requirements set forth in the Project Agreement and Appendices.

- (a) A detailed schedule for collection and propagation of native plant materials, including but not limited to, native plant seed collection and storage, native plant seed propagation and storage, pole cutting collection and storage, existing wetland and riparian plant protection and preservation in place during drawdown for salvage, and relocation;
- (b) A method for collection and propagation of native plant material, including but not limited to, native plant seed collection and storage, native plant seed propagation and storage, pole cutting collection and storage, native riparian plant preservation in place during drawdown, salvage, and relocation;
- (c) Precautions during plant materials collection, propagation and storage that will prevent the reduction of plant materials viability and their contamination by noxious weeds, undesirable species, and diseases;
- (d) Plant species composition for the two aerially broadcast pioneer seed mixes. As a minimum, propose 12 native plant species with a minimum of five keystone, and seven associate species typical for each planting zone. Propose species from the following groups: nurse crop, grass-like (*Poaceae*, *Cyperaceae*, *Juncaceae*), legume (*Fabaceae*), one annual or biennial, and several perennial forb species. Pioneer seed mixes may contain up to 5% (by count) of seed of sterile plants (e.g., sterile wheat) and seed of California or Oregon native species from outside of the collection area that will not be able to reproduce in the project area (e.g. lacy phacelia); Utilize species previously collected or propagated for the project to the maximum extent feasible;
- (e) The minimum number of seeds per square foot to be aerially broadcasted during pioneer seeding in areas with up to 3:1 slopes (within a range of 35–60 seeds per sq. ft.), and in areas with slopes steeper than 3:1 (within a range of 60–85 seeds per sq. ft.);

- (f) Plant species composition for the over-seeding period seed mixes for each of the five planting zones (as described in the Required Criteria). As a minimum, propose 20 native plant species with a minimum of eight keystone species, and twelve associate species typical for each planting zone. Propose species for the following groups: nurse crop, grass-like (*Poaceae*, *Cyperaceae*, *Juncaceae*), legume (*Fabaceae*), annual or biennial, and perennial forb species. Over-seeding seed mixes shall not contain any non-native sterile plants or seed of California or Oregon native species that will not be able to reproduce in the project area. Utilize species previously collected or propagated for the project to the maximum extent feasible;
- (g) Plant species composition and amounts of pole cuttings and salvage transplants for each planting zone applicable;
- (h) Reference sites for each planting zone near each of the three major reservoirs; and
- (i) PLS amounts of native plant seed (by species) to be generated by Project Company for the restoration of the Project Site while utilizing to the maximum extent feasible previously collected and previously or currently propagated seed. Show what proportion (in %) of total seed amount will be used for pioneer seeding and what proportion for overseeding (by species).

4.13.3 Minimum Construction Submittal Requirements.

The Project Company shall take into account the constructability of the proposed design with consideration given to feasible methods of construction, constraints to construction (materials, labor, specialty construction, weather, etc.) design details, time required to complete each element of work, and possible alternatives which would reduce costs but maintain the level of quality and safety expected by the KRRC. The Project Company shall include, at a minimum, the following construction submittals in their technical specifications for plant materials. The Project Company is responsible for defining and providing any additional construction submittals that apply to the Project.

- (a) Restoration plant materials inventory (quarterly update) – including amount of collected seed available for propagation and for seeding, amounts of propagated seed in storage, amounts of commercially available sterile seed and seed from areas beyond the collection area, amounts of pole cuttings in storage, amounts (by species and size) of expected existing wetland and riparian plants to be salvaged and relocated to the newly formed river banks;
- (b) Collected seed field-collection forms;
- (c) Collected seed parent-plant vouchers (11"x17" sheets with pressed parent plant and correct botanical identification, collection site identification with GPS coordinates and date of collection);
- (d) Collected seed laboratory test results (quarterly update);
- (e) Propagated seed laboratory test results (quarterly update);
- (f) Qualifications for seed collectors, seed propagators, seed storage companies, and seed testing laboratories;

- (g) Weed-free certifications;
- (h) *Phytophthora*-free certifications; and
- (i) Copies of any seed packaging labels.

4.14. INVASIVE EXOTIC VEGETATION REMOVAL

The design requirements outlined herein shall be applicable to invasive exotic vegetation removal.

4.14.1 Applicable Standards.

Invasive exotic vegetation (IEV) removal shall comply with all Applicable Law, and shall be done in conformance with the latest version of applicable standards, manuals and guidelines. At a minimum, the Project Company shall comply with listed standards below, and shall propose additional standards where appropriate for KRRC review. Should proposed standards conflict with those listed below, the Project Company shall provide justification for revising the Project Agreement standards prior to proceeding with design.

- (a) EPA-applicable pesticide standards and regulations;
- (b) Federal Noxious Weed Act of 1974, as amended (7 U.S.C. 2801 et seq.);
- (c) The 2007 BLM Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States and related Record of Decision (ROD);
- (d) Oregon's prohibition of all but four herbicides (2,4 D, picloram, Tordon, dicamba, and glyphosate Rodeo and Accord and approved combinations) within the PEIS by a U.S. District Court injunction (BLM 2010);
- (e) The 2010, BLM issued ROD for the Vegetation Treatments Using Herbicides on BLM Lands in Oregon PEIS that approved the use of an additional 10 herbicide (14 approved in total) west of the Cascades and 13 herbicides (17 approved in total) east of the Cascades (BLM 2010);
- (f) Appendix C Herbicide Evaluation in the Biological Assessment for the project. This document will be in negotiation with natural resources agencies, and proposed invasive exotic vegetation techniques shall be in full compliance with the most recent version of this document;
- (g) The California Dept. of Pesticide Regulations (DPR) , A Guide to Pesticide Regulation in California (2011) regulation requirements and the County Agricultural Commissioner's recommendations;
- (h) Oregon's state Pesticide Control Law (Oregon Revised Statute Chapter 634), regulations issued by the Oregon Department of Forestry (ODF) for pesticide application in forested lands and regulations and standards from the Oregon Department of Agriculture; and
- (i) To assess the importance of control and invasiveness of invasive exotic vegetation species at the project site, the Project Company shall take into consideration information from the CDFW Noxious Weed List, the Oregon State Department of Agriculture Noxious Status, CAL-IPC Invasiveness Classifications, Klamath County

Weed List, Noxious Weed List of Siskiyou County Department of Agriculture, the Noxious Weeds of the Klamath National Forest, and the USDA's Federal Noxious Weed List.

4.14.2 Design Criteria.

4.14.2.1 Required Criteria

The Project Company shall meet the following Required Criteria, at a minimum, for all IEV removal:

- (a) All methods of IEV control shall be closely evaluated to determine their benefits and risks to the surrounding ecosystems;
- (b) The primary IEV control shall consist of physical methods such as manual IEV removal, mowing or cutting, tilling and disking after pre-germination, grazing, shading, and solarization;
- (c) Biological control of IEV shall be only utilized upon written approval by the KRRC, natural resource agencies, and key stakeholders;
- (d) Chemical control of IEV with herbicides shall only be used as a last resort and upon exhausting all other physical, biological and integrative pest management methods. Herbicides will be only utilized upon written approval by the KRRC, natural resource agencies, and key stakeholders;
- (e) By December 31 prior to drawdown, the maximum percent cover of existing high priority IEV species (as defined in Appendix H of Reservoir Area Management Plan) within the terrestrial portion of the Project Site (excluding all water surfaces up to the Ordinary High Water Mark) shall be less than 3%, and the maximum percent cover of existing medium priority IEV species shall be less than 10%;
- (f) IEV control in the former reservoir areas shall begin immediately after seeding of drawdown areas and continue until the end of maintenance and monitoring periods;
- (g) No high priority IEV plants shall be present within the Project Site at the conclusion of the maintenance and monitoring period;
- (h) The maximum relative vegetation cover of medium and low priority IEV species within each planting zone of the Project Site at the end of the maintenance and monitoring period shall be less than the average relative vegetation cover of medium and low priority IEV species in two approved reference areas for each corresponding planting zone;
- (i) Annual IEV monitoring and control shall occur for five years after installation acceptance or until the relative IEV vegetation cover performance criteria have been met;
- (j) IEV control shall be ongoing throughout all phases of the Project;
- (k) IEV control shall be performed in accordance with the best standards of practice relating to IEV control, and under continuous supervision of a qualified, and experienced foreman; and

- (l) IEV plant species capable or reproducing from underground roots, rhizomes or stolons shall be removed with the entire root system by excavation to a min. depth of 18" or as necessary to prevent the plant from reproducing.

4.14.2.2 Proposed Criteria

In addition to the Required Criteria above, the Project Company shall develop the following criteria, at a minimum, for IEV removal. Additional criteria shall be proposed and developed, as appropriate, to complete the design in accordance with the requirements set forth in the Project Agreement and Appendices.

- (a) IEV disposal location in accordance with Applicable Law and Governmental Approvals;
- (b) Priority ratings (high, medium, low) for removal of IEV species identified within the Project Site;
- (c) Specific control methods that minimize impacts to the environment and maximize eradication efficacy for each IEV species;
- (d) A quantitative GIS-based determination of relative percent cover of IEV species within the Project Site that includes on the ground field verification and data correction for complex or ambiguous GIS areas and Daubenmire frame surveys along pre-determined transects for herbaceous species not recognizable on drone generated aerial photography;
- (e) Areas of invasive species surrounding the Project Site that have large seed banks that may threaten native plant establishment; and
- (f) BMPs describing how the risk of spreading IEV shall be minimized during construction.

4.14.3 Minimum Construction Submittal Requirements.

The Project Company shall take into account the constructability of the proposed design with consideration given to feasible methods of construction, constraints to construction (materials, labor, specialty construction, weather, etc.) design details, time required to complete each element of work, and possible alternatives which would reduce costs but maintain the level of quality and safety expected by the KRRC. The Project Company shall include, at a minimum, the following construction submittals in their technical specifications for IEV removal. The Project Company is responsible for defining and providing any additional construction submittals that apply to the Project.

- (a) A list of qualifications for the team that will be implementing IEV control work in accordance with the best standards of practice relating to IEV removal;
- (b) IEV Control Plans;
- (c) IEV Plant Lists;
- (d) Annual Project Area IEV Extent Monitoring Report;
- (e) Manufacturer's information on all tools and equipment that shall be used for IEV control;

- (f) Manufacturer's information on all materials to be used for IEV control; and
- (g) Integrative Pest Management based recommendations for effective control of each IEV species present in the Project Site.

4.15. HABITAT RESTORATION

4.15.1 Applicable Standards.

Terrestrial restoration of all former reservoir and other disturbed areas shall comply with all Applicable Law, and shall be done in conformance with the latest version of applicable standards, manuals and guidelines. At a minimum, the Project Company shall comply with listed standards below, and shall propose additional standards where appropriate for KRRC review. Should proposed standards conflict with those listed below, the Project Company shall provide justification for revising the Project Agreement standards prior to proceeding with design.

- (a) The International Standards for the Practice of Ecological Restoration; and
- (b) Resource agency Governmental Approval conditions and performance criteria.

4.15.2 Design Criteria.

4.15.2.1 Required Criteria

The Project Company shall prepare design for the habitat restoration in the Project Site that at a minimum meets the following Required Criteria:

- (a) Existing native trees, shrubs, herbaceous perennials and their habitats, sensitive protected plant communities (vegetation alliances and associations as defined by CDFW), and undisturbed native soil areas shall be protected to the maximum extent feasible;
- (b) Wherever possible, lightweight (low ground pressure) equipment shall be used in areas to be planted or hydroseeded or previously undisturbed areas;
- (c) The Project Site shall be divided into a minimum of five planting zones based on hydrology, soil type, and probability of flooding – Emergent Wetland, Bank Wetland, Bank Riparian, Floodplain Riparian, and Upland;
- (d) Proposed plant species shall be most appropriate for the planting zone they have been proposed for;
- (e) Aerially broadcast "pioneer" seed mixes shall be applied at the time of drawdown, and shall as a minimum consist of an upland seed mix (to be seeded in the Upland Planting Zone) and a riparian seed mix (to be seeded in Bank Wetland, Bank Riparian, and Floodplain Riparian Zones);
- (f) Seeding of the Project Site shall occur during at least two separate periods. The first seeding period will be the 'pioneer seeding period' and shall be implemented as upland and riparian aerial pioneer seeding during drawdown (late winter). The upland and riparian 'pioneer seed mixes' shall consist of species that can reliably germinate under freezing conditions on moist clayey substrate (reservoir sediment), quickly establish, develop into a dense ground cover with an extended root system, and provide effective erosion control. The second seeding

period will be the 'over-seeding period' and shall occur in fall after drawdown. The over-seeding period seed mixes shall contain a higher diversity of plants and as a minimum shall be planting zone specific for each of the five planting zones described above. Over-seeding mixes shall be broadcast over mowed or rolled mature native vegetation (pioneer seeding);

- (g) Each pioneer seeding period mix shall be as described in Section 4.13 (Plant Materials);
- (h) Each over-seeding period mix shall be as described in Section 4.13 (Plant Materials);
- (i) All disturbed areas where soil has been compacted to more than 80% relative compaction shall be cross-ripped or otherwise de-compacted before seeding. Soil structure shall be preserved to maximum extent practicable;
- (j) Pole cuttings shall be installed as a priority in areas that have a high potential for the establishment of the invasive non-native hybrid of reed canary grass (*Phalaris arundinacea*);
- (k) The upland planting zone shall have a minimum of two seeded trees and two seeded shrubs per acre;
- (l) Existing wetland and riparian plants at the reservoirs shall be salvaged and transplanted to newly formed emergent wetland, bank wetland, bank riparian and floodplain riparian planting zones;
- (m) Transplanting of salvaged plants shall occur as early in the drawdown year as possible;
- (n) The work shall be performed by an experienced contractor familiar with native plant seeding, pole cuttings installation and ecological restoration industry methods, and standards for seeding; and
- (o) The Project Company shall review all documents indicating location and types of sensitive species at the Project Site. The Project Company shall comply with all local, state, and federal restrictions that apply to sensitive species on-site.

4.15.2.2 Proposed Criteria

In addition to the Required Criteria above, the Project Company shall develop the following criteria, at a minimum, for design and implementation of habitat restoration. Additional criteria shall be proposed and developed, as appropriate, to complete the design in accordance with the requirements set forth in the Project Agreement and Appendices.

- (a) The species composition and amounts of PLS by species for the riparian and upland pioneer seed mixes that shall be applied during drawdown;
- (b) The species composition and amounts of PLS by species for the five overseeding seed mixes that shall be applied in the fall after drawdown;
- (c) The number of salvaged transplants per 100 sq. ft. to be installed in the emergent wetland zone (within the range of 2-4 transplants per 100 sq. ft.);

- (d) The number of salvaged transplants and pole cuttings per 100 sq. ft. to be installed in the bank wetland zone (within the range of 1-2 transplants and 4-6 pole cuttings per 100 sq. ft.);
- (e) The number of salvaged transplants and pole cuttings per 100 sq. ft. to be installed in the bank riparian zone (within the range of 1-2 transplants and 4-6 pole cuttings per 100 sq. ft.);
- (f) The number of pole cuttings and seeded woody plants (shrubs or trees) per 100 sq. ft. to be installed in the floodplain riparian zone (within the range of 1-2 pole cuttings and 1-2 seeded woody plants per 100 sq. ft.);
- (g) The number of seeded woody plants (shrubs or trees) per acre to be installed in the upland planting zone (within the range of 1-3 shrubs and 1-3 trees per acre);
- (h) Mycorrhizal inoculant;
- (i) Broadcast seeding methods and seed mixes for areas that may be in need of reseeding during drawdown due to re-inundation by large storm events;
- (j) Pre-drawdown maps with existing potential salvage material locations and quantities around the edge of the reservoirs;
- (k) Plans of priority areas for installation of salvaged wetland and riparian plant materials;
- (l) Densities for plant material installation for pole cuttings, transplants, woody trees and shrubs for each vegetation zone. These densities should take into account the minimum necessary density of pole cuttings to decrease the likelihood of invasion of reed canary grass (*Phalaris arundinacea*);
- (m) Reference site locations with relative vegetation coverage, plant diversity, number of surviving trees and shrubs and percent relative cover by medium and low priority IEV;
- (n) Criteria for selection of key restoration areas to be protected from herbivory by deer fence enclosures, as appropriate;
- (o) Methods for reducing soil compaction during/and after project implementation;
- (p) Methods for reducing/preventing herbivory;
- (q) Criteria to identify areas with underperforming vegetation cover and the re-seeding methods to achieve better results;
- (r) Criteria for selection of Project Site perimeter segments to be fenced with cattle exclusion fencing; and
- (s) Height, materials, installation methods, and appropriate wildlife-friendly accommodations for cattle exclusion fencing.

4.15.3 Minimum Construction Submittal Requirements.

The Project Company shall take into account the constructability of the proposed design with consideration given to feasible methods of construction, constraints to construction (materials, labor, specialty construction, weather, etc.) design details, time required to complete each element of work, and possible alternatives which would reduce costs but maintain the level of quality and safety expected by the KRRC. The Project Company shall include, at a minimum, the following construction submittals in their technical specifications for habitat restoration. The Project Company is responsible for defining and providing any additional construction submittals that apply to the Project.

- (a) Salvage and restoration areas access route plans that minimize impacts to existing native vegetation and soils;
- (b) Seed mix composition, and laboratory test results indicating purity and germination rates for all seed species to be used in the project;
- (c) Manufacturer's information on all materials to be used for restoration (e.g. cocoons, etc.);
- (d) Information on all equipment to be used in restoration; and
- (e) A list of qualifications for the restoration teams that will be performing restoration work.

4.16. IRRIGATION

This Section covers any and all temporary irrigation systems required to meet the Project and Governmental Approval goals around habitat restoration, as further defined below.

4.16.1 Applicable Standards.

The irrigation system and its components shall comply with all Applicable Law, and shall be done in conformance with the latest version of applicable standards, manuals and guidelines. At a minimum, the Project Company shall comply with listed standards below, and shall propose additional standards where appropriate for KRRC review. Should proposed standards conflict with those listed below, the Project Company shall provide justification for revising the Project Agreement standards prior to proceeding with design.

- (a) American Society for Testing and Materials (ASTM) Standards;
- (b) American Society of Mechanical Engineers (ASME) Standards;
- (c) Manufacturers Standardization Society of the Valve and Fittings Industry (MSS) Standards;
- (d) National Sanitation Foundation (NSF) Standards;
- (e) National Electric Code (NEC);
- (f) Underwriters Laboratories (UL) Standards; and
- (g) Uniform Plumbing Code (UPC).

4.16.2 Design Criteria.

4.16.2.1 Required Criteria

The Project Company shall meet the following Required Criteria, at a minimum, for the design and construction of irrigation systems:

- (a) The Bank Riparian planting zone shall be fully, overhead spray irrigated;
- (b) The Floodplain Riparian planting zone can be partially irrigated;
- (c) The Bank Riparian planting zone irrigation system shall be designed to last for seven years or until the end of the monitoring period, whichever is longer;
- (d) Upland areas shall be intermittently irrigated with a temporary irrigation system (e.g. Rain-for-Rent) if initial restoration efforts are unsuccessful because of lack of water at the time of seed germination, an unusually dry year, or extended drought period;
- (e) The irrigation system shall be carefully designed to prevent erosion and runoff by closely matching its precipitation rate to the infiltration rate of the existing soil/sediment;
- (f) The minimum evapotranspiration coefficient for riparian vegetation shall be 0.6 or higher, and the irrigation efficiency coefficient shall be 0.8;
- (g) Pipes shall be sized to maintain flow and pressure required for proper performance of each sprinkler head, while maintaining water velocities below five feet per second, reducing the risk of pipe damage and friction losses;
- (h) Thrust blocks shall be installed in all areas where irrigation main lines change direction;
- (i) Seeded woody plants (trees and shrubs) in upland planting zones shall be provided with year-round source of water immediately after planting and throughout the installation and establishment periods;
- (j) If gas powered irrigation pumps are used to draw irrigation water from the river, they shall be set in containment basins to prevent any spills or water contamination with fuels, oils, or lubricants;
- (k) A metal wire mesh cage with openings small enough to prevent small fish entry (and approved by the natural resource agencies) shall house the irrigation intake suction basket that shall be anchored in a suitable, low-velocity area of the river;
- (l) The irrigation system shall be designed with drainage valves at low points in the system to allow for easy winterization and air purging of remnant water from the system;
- (m) The surface mounted irrigation system shall be well anchored to the ground, and designed with easily removable components (e.g., sprinkler risers) to protect the system from high flow storm events and vandalism;

- (n) Irrigation applications shall occur between the hours of 5:00 am and 10:00 am to reduce water loss due to wind and higher evapotranspiration; and
- (o) Soil infiltration rate shall be collected and reported for each irrigated location to ensure proper irrigation, minimize erosion and runoff.

4.16.2.2 Proposed Criteria

In addition to the Required Criteria above, the Project Company shall develop the following criteria, at a minimum, for design and construction of irrigations systems. Additional criteria shall be proposed and developed, as appropriate, to complete the design in accordance with the requirements set forth in the Project Agreement and Appendices.

- (a) The Bank Riparian planting zone irrigation method, system type and materials, coverage and other details;
- (b) The Floodplain Riparian planting zone partial irrigation method, system type and materials, coverage, and other details;
- (c) A description of the proposed method for measuring average water infiltration into existing soil;
- (d) Method, system type and materials, coverage and other details of year-round source of water for seeded woody plants (trees and shrubs) in upland planting zones for the installation and establishment periods;
- (e) Description of each independent irrigation systems to be provided for the Bank Riparian Zone key areas (as shown in Appendix H, Sections 5.3 – 5.5, Figures 5-23, 5-26, and 5-29);
- (f) Irrigation frequencies per table below:

Month	Minimum Install'n Estab. Periods Applications per week	Minimum Maintenance Period Y1-Y3 Applications per week	Minimum Maintenance Period Y4- Y5 Applications per week
April			
May			
June			
July			
Aug			
Sept			
Oct			

- (g) The quantities of water to be applied to each irrigated site (based on average evapotranspiration and precipitation) in addition to average natural precipitation due to rainfall/snow per table below:

Month	Gallons per Acre per Month	Inches per Month
April		

Month	Gallons per Acre per Month	Inches per Month
May		
June		
July		
Aug		
Sept		
Oct		

- (h) Criteria for initiating irrigation during the winter months;
- (i) Irrigation system design approach report describing how permanent and temporary irrigation shall be implemented;
- (j) Plant evapotranspiration coefficients; and
- (k) Irrigation efficacy coefficient.

4.16.3 Minimum Construction Submittal Requirements.

The Project Company shall take into account the constructability of the proposed design with consideration given to feasible methods of construction, constraints to construction (materials, labor, specialty construction, weather, etc.) design details, time required to complete each element of work, and possible alternatives which would reduce costs but maintain the level of quality and safety expected by the KRRC. The Project Company shall include, at a minimum, the following construction submittals in their technical specifications for irrigation. The Project Company is responsible for defining and providing any additional construction submittals that apply to the Project.

- (a) Manufacturer's information on irrigation materials proposed for use. Provide for each item, name of manufacturer, brand name and model number;
- (b) Provide irrigation performance test reports in booklet form showing the field tests performed to adjust each component and the field tests performed to prove compliance with the specified performance criteria, upon completion and testing of the installed system; and
- (c) As-built irrigation drawings, which provide current factual information showing locations of mains, heads, valves, and controllers including deviations from amendments to the drawings and changes in the work.

4.17. PLANT ESTABLISHMENT AND MAINTENANCE

4.17.1 Applicable Standards.

Plant Establishment shall comply with all Applicable Law, and shall be done in conformance with the latest version of applicable standards, manuals and guidelines. At a minimum, the Project Company shall comply with listed standards below, and shall propose additional standards where appropriate for KRRC review. Should proposed standards conflict with those listed below, the Project Company shall provide justification for revising the Project Agreement standards prior to proceeding with design.

- (a) The International Standards for the Practice of Ecological Restoration; and
- (b) American National Standards Institute (ANSI) – ANSI Z60.1 (2004), Nursery Stock.

4.17.2 Design Criteria.

4.17.2.1 Required Criteria

The Project Company shall meet the following Required Criteria, at minimum, for the Plant Establishment Period:

- (a) Plant Establishment Period shall begin as soon as any vegetation is planted, and shall extend two years after the installation is accepted by the KRRC;
- (b) Seeded areas that do not show any signs of germination within 60 days after seeding, shall be re-seeded until required vegetation coverage is achieved;
- (c) Naturally recruited native woody species shall count at 50% for the purpose of calculating the number of surviving trees and shrubs per acre;
- (d) Herbivory shall be kept to a minimum by installation of deer fencing and any other practicable means;
- (e) The irrigation system shall be in proper working condition throughout the plant establishment and long-term monitoring and maintenance periods, and shall maintain vegetation in a healthy and thriving condition;
- (f) Diseased and/or dead pole cuttings or seed shall be replaced with the same species or recommended replacements more suitable for existing conditions;
- (g) All fences and gates shall be in proper working condition at all times. Gates shall be closed after each vehicle or have solar powered closers to prevent the entry of herbivorous wildlife; and
- (h) Invasive species shall be kept at an absolute minimum and as required by the IEV Control Section.

4.17.2.2 Proposed Criteria

In addition to the Required Criteria above, the Project Company shall develop the following criteria, at a minimum, for Plant Establishment. Additional criteria shall be proposed and developed, as appropriate, to complete the design in accordance with the requirements set forth in the Project Agreement and Appendices.

- (a) Design criteria for the plant establishment and long-term monitoring and maintenance periods addressing plant maintenance, watering, irrigation system maintenance, non-native invasive species removal, plant re-setting, plant replacement, infrastructure maintenance, adaptive management, removal of storm debris and sediment, repair of eroded areas, restoration site inspections, record keeping, and reporting;
- (b) Criteria for underperforming seeded areas;

- (c) Map delineating areas where vegetation is not expected to establish due to existing physical conditions (e.g., rocky substrate, bedrock, water seepage, etc.); and
- (d) A schedule with key inspection dates throughout the plant establishment and long-term monitoring and maintenance periods.

4.17.3 Minimum Construction Submittal Requirements.

The Project Company shall take into account the constructability of the proposed design with consideration given to feasible methods, constraints to work completion (materials, labor, specialty construction, weather, etc.) design details, time required to complete each element of work, and possible alternatives which would reduce costs but maintain the level of quality and safety expected by the KRRC. The Project Company shall consider at minimum the following elements but not limited to this list, for Plant Establishment Period. The project company is responsible for defining and providing any additional construction submittals that apply to the Project.

- (a) A list of qualifications for the establishment/maintenance team that will be performing establishment/maintenance work;
- (b) Monthly establishment reports during the first year of the Plant Establishment Period and quarterly reports during subsequent years. Submit monthly establishment reports within 5 working days following the end of each month or within 10 working days following the end of each quarter. Reports shall identify, at a minimum, project name, planting zones, date, and reporting period. Identify and discuss weed control performed, irrigation activity and maintenance, plant health, vandalism, herbivory, site feature conditions, general observations, total precipitation for the month, personnel hours spent on-site, and other pertinent information describing site conditions and activities performed and shall include as-maintained drawings;
- (c) Final plant establishment inspection punch list;
- (d) Final long-term maintenance period inspection punch list;
- (e) Final plant establishment report (within 30 days following the written acceptance of the Establishment Period). Document the current vegetation and site condition as well as conditions during the past year. Survey plant survival and document in tables indicating plants installed, plants dead, plants alive, volunteer plants, survival percentage, replacement plants, and pertinent observations. Provide survival summaries for each planting zone and the Project as a whole;
- (f) Final long-term maintenance report (within 30 days following the written acceptance of the Maintenance Period). Document the current vegetation and site condition as well as conditions during the past five years. Survey plant survival and document in tables indicating plants installed, plants dead, plants alive, volunteer plants, survival percentage, replacement plants, and pertinent observations. Provide survival summaries for each planting zone and the Project as a whole;
- (g) As-maintained drawings of the work completed. As-maintained drawings shall be based upon the as-built drawings. These drawings shall be updated to

include current conditions, impacts, and results of the planting survival, and infrastructure items. Establishment reports shall be based upon the information recorded on the as-maintained drawings as well as observations in the field. As-maintained drawings shall be attached to establishment reports; and

- (h) A plan indicating the sources and methods of procurement of replacement plant materials.

4.18. PLANT MONITORING

4.18.1 Applicable Standards.

The plant monitoring shall comply with all Applicable Law, and shall be done in conformance with the latest version of applicable standards, manuals and guidelines. At a minimum, the Project Company shall comply with listed standards below, and shall propose additional standards where appropriate for KRRC review. Should proposed standards conflict with those listed below, the Project Company shall provide justification for revising the Project Agreement standards prior to proceeding with design.

- (a) The International Standards for the Practice of Ecological Restoration.

4.18.2 Design Criteria.

4.18.2.1 Required Criteria

The Project Company shall meet the following Required Criteria, at minimum, for the Plant Monitoring:

- (a) The plant diversity for each project planting zone will be the following percentages of approved reference sites for each monitoring year: Year (Y) 1-60%, Y2-65%, Y3-70%, Y4-75%, Y5-80%, or equal to/better than agency set permit requirements, whichever more stringent;
- (b) The number of surviving trees and shrubs per acre will be the following percentages of the trees originally planted from seed for each monitoring year: Y1-90%, Y2-85%, Y3-80%, Y4-75%, Y5-70%, or equal to/better than agency set permit requirements, whichever more stringent;
- (c) Naturally recruited native woody species shall count at 50%; and
- (d) The relative vegetation cover for each project planting zone will be the following percentages of the average of the relative vegetation cover of approved reference sites for each monitoring year: Y1-70%, Y2-75%, Y3-80%, Y4-85%, Y5-90%, or equal to/better than agency set permit requirements, whichever more stringent.

4.18.2.2 Proposed Criteria

In addition to the Required Criteria above, the Project Company shall develop the following criteria, at a minimum, for Plant Monitoring. Additional criteria shall be proposed and developed, as appropriate, to complete the design in accordance with the requirements set forth in the Project Agreement and Appendices.

- (a) Detailed description of plant monitoring methods with specific information on monitoring procedures for each of the performance criteria;

- (b) Plant monitoring annual timing and schedule for the duration of the monitoring period; and
- (c) Plant monitoring reporting.

4.18.3 Minimum Construction Submittal Requirements.

The Project Company shall take into account the constructability of the proposed design with consideration given to feasible methods of construction, constraints to construction (materials, labor, specialty construction, weather, etc.) design details, time required to complete each element of work, and possible alternatives which would reduce costs but maintain the level of quality and safety expected by the KRRC. The Project Company shall include, at a minimum, the following construction submittals in their technical specifications for plant monitoring. The Project Company is responsible for defining and providing any additional construction submittals that apply to the Project.

- (a) Monthly and bi-monthly monitoring reports; and
- (b) Annual monitoring reports for review and comments prior to submission to resource agencies.

APPENDIX 5

GENERAL PROJECT IMPLEMENTATION WORK REQUIREMENTS

APPENDIX 5**GENERAL PROJECT IMPLEMENTATION WORK REQUIREMENTS****5.1. PURPOSE**

The purpose of this Appendix is to set forth certain requirements for the performance of the Project Implementation Work. The Project Company shall perform the Project Implementation Work in accordance with the Contract Standards, including the requirements set forth in this Appendix.

5.2. MANAGEMENT AND COORDINATION**5.2.1 Coordination.**

The Project Company shall hold meetings that are separate from and in addition to Project progress meetings described in Section 5.4.2 (Project Progress Meetings - Scheduling and Attendance) of this Appendix, and shall prepare correspondence and make any other arrangements as necessary to coordinate the Project Implementation Work. The Project Company shall coordinate its activities with other contractors performing work at or near the Project Site. The Project Company shall identify other construction or operations work that may be in progress in close proximity to or bordering on the Project. The Project Company shall coordinate all Project Implementation Work activities that could impact existing utility services and installations (e.g., conduits, pipelines, transmission mains and other Utility equipment and appurtenances) with the utilities. Coordination meetings may include review of the Project Implementation Schedule and installation procedures of other contractors to identify potential conflicts, allocation of space on the Project Site, drawing/design interchange among contractors, establishment and modification of schedules and sequences of construction, demolition and restoration, and planning of future meetings.

5.2.2 Partnering Sessions.

The KRRC and the Project Company shall use good faith efforts to promote the formation of a successful formal partnering relationship in order to effectively perform the Project Agreement to the benefit of both parties. The purpose of this relationship is to establish and maintain cooperative communication and to mutually resolve conflicts at the lowest responsible management level. The establishment of a formal partnering relationship will not change or modify the terms and conditions of this Project Agreement and will not relieve any party of the legal requirements of this Project Agreement.

The KRRC and the Project Company shall implement the partnering relationship through at least one pre-commencement partnering workshop ("Partnering Sessions"). The purpose of the Partnering Sessions is to deepen working relationships, develop common goals and objectives for the Project, achieve a cooperative partnership environment among Project participants, and mutually develop a strategy for forming a successful partnering relationship. The KRRC and the Project Company may participate in additional facilitated workshops during the Term as they mutually agree is necessary and appropriate.

The scheduling of a Partnering Session, selection of the facilitator and workshop site, and other administrative details will be coordinated by the KRRC and the Project Company's project managers. The parties shall use good faith efforts to schedule the initial Partnering Session before commencing the Project Implementation Work and to select the facilitator for the workshop as soon as reasonably possible following the Contract Date.

Each party shall bear their respective costs of formal partnering (including costs involved in providing the pre-commencement Partnering Session, any subsequent, additional Partnering Sessions, and the facilitator for the Partnering Sessions), and the Project Company's costs relating to the Partnering Sessions shall be deemed to constitute Project Implementation Work Costs. All other costs associated with the Partnering Sessions will be borne separately by the party incurring the costs, such as wages and travel expenses, and no additional compensation will be allowed therefor.

5.3. PROJECT IMPLEMENTATION SCHEDULE

5.3.1 Initial Project Implementation Schedule.

All activities comprising the Project Implementation Work shall be scheduled and monitored by use of a Gantt or Bar Chart which sets forth all tasks and key subtasks in a logical and efficient work sequence that the Project Company intends to utilize in taking the Project from the Project Design Requirements to Project Final Completion. The "Initial Project Implementation Schedule," prepared in accordance with these requirements and included as part of the Project Company's GMP Project Submittal, is set forth as Attachment 5A to this Appendix. The Initial Project Implementation Schedule, as updated periodically pursuant to this Section, is referred to herein as the "Project Implementation Schedule." The Project Company shall undertake and complete the Project Implementation Work in accordance with the Project Implementation Schedule.

5.3.2 Project Implementation Schedule Updates.

The Project Company shall, as required from time to time during the Project Implementation Period, but no less than once per calendar month, in consultation with the KRRC update the Initial Project Implementation Schedule so that it is at all times an accurate, reasonable and realistic representation of the Project Company's plans for the completion of the Project Implementation Work in accordance with the requirements of this Project Agreement. The updates shall include:

- (a) adjustments resulting from Uncontrollable Circumstances and Project Design Requirements Changes, if any, as permitted by this Project Agreement and as provided in Section 5.3.4 (Events Affecting the Project Implementation Schedule) of this Appendix;
- (b) as the design progresses, proposed changes in the:
 - (i) start and completion dates for design work described in this Appendix; and
 - (ii) commencement of Project Implementation Work;
- (c) start and completion dates of the major activities of Project Implementation Work; and
- (d) the date on which each Milestone Substantial Completion Date is expected to occur.

The Project Company shall deliver to the KRRC and the Program Manager on a monthly basis the updated Project Implementation Schedule. The monthly updated Project Implementation Schedule shall be accompanied by a report that (1) shows current work progress and the status of work completed for each task and subtask included in the Initial Project

Implementation Schedule; (2) contains information on the resources to be employed and work to be completed in the upcoming month, including a 60-day look-ahead that reflects all agreements made by the parties as to Project Implementation Schedule revisions in sufficient detail for the KRRC to be able to verify agreed-upon work schedule and milestone date changes; and (3) describes conditions that have affected or may accelerate or decelerate the Project Implementation Schedule then in effect, together with proposed Project Implementation Schedule adjustments and mitigation measures.

5.3.3 KRRC Review.

The KRRC shall review the updated Project Implementation Schedule and advise the Project Company as to any of its concerns, along with proposed changes. Every three months, or more frequently if requested by the KRRC, in addition to the weekly progress meetings, the Project Company shall meet with the KRRC to discuss Project progress and the updated Project Implementation Schedule. The Project Company shall respond to KRRC concerns and indicate how the proposed changes or revisions thereto can be made to satisfactorily address KRRC concerns. Upon KRRC approval, the changes shall be incorporated in the updated Project Implementation Schedule and replace any previously issued Project Implementation Schedule. Project Implementation Schedule updates are for the purpose of providing the Project Company with flexibility in its work activity durations and sequences, but in no event shall such updates result in a change in the Scheduled Milestone Substantial Completion Dates. The Scheduled Milestone Substantial Completion Dates shall be adjusted solely as provided in Section 7.5 (Effect of Unexcused Delay in Achievement of Substantial Completion) of this Project Agreement.

5.3.4 Events Affecting the Project Implementation Schedule.

No later than 15 days following the occurrence of an Uncontrollable Circumstance or a KRRC-directed Change Order, the Project Company shall submit a report containing an analysis of the effects of such events on the Project Implementation Schedule, including any new dates for work task and major subtasks, each Milestone Substantial Completion and each Scheduled Milestone Substantial Completion Date. The Project Company shall present mitigation measures that were considered to offset potential work delays; those proposed for KRRC review and acceptance; and a revised Project Implementation Schedule incorporating the Project Company's proposed changes.

5.4. PROJECT IMPLEMENTATION WORK MEETINGS AND REPORTS

5.4.1 Pre-Commencement Conference.

The Project Company shall hold a pre-commencement conference prior to commencement of the Project Implementation Work. The Project Company shall prepare an agenda which shall be reviewed with the KRRC prior to the conference, and shall preside at the conference, contribute appropriate items for discussion, provide any data requested, record minutes to summarize significant proceedings and decisions, and distribute the minutes to all parties in attendance. The agenda shall include, but shall not necessarily be limited to, the status of the following items:

- (a) Designation of responsible personnel during the Project Implementation Period.
- (b) Subcontractors, and their roles on the Project Implementation Work.
- (c) Coordination with other contractors and projects.

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- (d) Project Implementation Schedule.
 - (e) Project Company submittals and KRRC review.
 - (f) Schedule of Project Company submittals.
 - (g) Requests for Information and Clarification.
 - (h) Required Insurance.
 - (i) Project Company's site-specific Health and Safety Plan.
 - (j) Security.
 - (k) Housekeeping.
 - (l) Record drawings.
 - (m) Proposed Project Implementation Work Date.
 - (n) Governmental Approvals.
 - (o) Emergency telephone numbers.
 - (p) Temporary Utilities/Utilities coordination.
 - (q) Any other Project Implementation Work-related items.

The pre-commencement conference shall be scheduled by the Project Company at a time reasonably acceptable to the KRRC and shall be attended by the Project Implementation Manager, the Project Company's Project Manager, the Project Company's Project Superintendent, and the Project Company's principal Subcontractors' project managers or superintendents and representatives of major suppliers as the Project Company deems appropriate. Other attendees may include a representative from the Project Company's executive team, the quality assurance/quality control manager ("QA/QC Manager"), the Design Manager, local police and fire departments and other Governmental Bodies with jurisdiction over the Project Implementation Work, any other contractors whose work affects or is affected by construction, demolition or restoration work and others as deemed appropriate by these parties. The Project Company shall conduct the conference at the Project Site and make all arrangements for space, facilities and food services and shall notify all participants of the arrangements.

5.4.2 Project Progress Meetings – Scheduling and Attendance.

The Project Company shall schedule, hold, and facilitate regular weekly Project progress meetings from the time mobilization for Project Implementation Work commences through Project Final Completion, and at other times if requested by the KRRC or as the Project Company deems necessary. The Project progress meetings shall be attended by the Project Company Project Manager, the Project Company Superintendent, and the Project Company's principal Subcontractors' project managers or superintendents and representatives of major suppliers, as the Project Company deems appropriate. The Project Company, Project Manager and representatives from the Project Company's executive team shall attend progress meetings periodically as requested by the KRRC. Other attendees may include the QA/QC Manager, any other contractors whose work affects or is affected by, demolition or restoration work, and

others deemed appropriate by these parties. The KRRC shall attend the weekly progress meetings. Project progress meetings shall be held at the Project Site.

5.4.3 Project Progress Meetings – Agenda.

At such meetings, discussions shall be held concerning all aspects of the Project Implementation Work including, but not limited to, the Project Implementation Schedule, coordination of work with others, Project Design Requirements Changes, Governmental Approvals and Project Implementation Work submittals, and any test results. The Project Company shall prepare an agenda, preside at meetings, record minutes to include significant proceedings and decisions, and distribute the minutes to all parties in attendance within 10 Business Days of the meeting. The agenda shall include, but shall not necessarily be limited to, the status of the following matters:

- (a) Summary of previous meeting issues, actions and assignments.
- (b) Progress since last meeting (Project Company and Subcontractors).
- (c) Schedules, including updates on planned progress for next four to six weeks, off-site fabrication and delivery schedules; corrective action measures, if required and when to be implemented.
- (d) Problems, issues and considerations.
- (e) Change Orders, Contract Administration Memoranda and Project Agreement Amendments.
- (f) Status of submittals, including to be submitted, submitted, responses requiring corrective actions and resubmittal and approved.
- (g) Requests for Information, including those to be submitted, submitted, responses and whether adequate or more information is required.
- (h) Quality standards and control.
- (i) Quality assurance/quality control “(QA/QC)” reviews, findings, issues and actions.
- (j) Coordination among parties.
- (k) Safety program update, concerns, accidents, and injuries, if any.
- (l) Visits by regulatory agencies.
- (m) Public affairs and issues or concerns of nearby residents.
- (n) Project Site visits by KRRC, KRRC’s representatives, representatives of Governmental Bodies and Project Company’s representatives.
- (o) Compliance with CEQA mitigation requirements and any environmental issues.
- (p) Status of record drawings and specifications.
- (q) Other business.

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- (r) Next meeting date.

5.4.4 Monthly Progress Reports.

Monthly progress reports required to be submitted by the Project Company shall include:

- (a) a summary of Project Implementation Work activities during the reporting month.
- (b) a schedule of upcoming Project Implementation Work activities.
- (c) a listing of submittals delivered during the reporting month and their status;
- (d) a listing of submittals scheduled for delivery the following month.
- (e) the Project Company's verification that the record documents have been updated as appropriate.
- (f) a summary of activities involved with obtaining Governmental Approvals.
- (g) a listing of any violations of Governmental Approvals or Applicable Law and actions taken or to be taken to eliminate any subsequent violations.
- (h) a listing of issues needing resolution.
- (i) a listing of all telephone calls received during the reporting month involving material inquiries or complaints.
- (j) Project Implementation Schedule updates.
- (k) the Project Company's plan for accelerating the Project Implementation Schedule to meet the Scheduled Milestone Substantial Completion Dated should the Project Company's progress-to-date indicate that the Project Company's Project Implementation Work is behind schedule and at risk of not being completed by the then applicable Scheduled Milestone Substantial Completion Date (as adjusted for extensions of time permitted under this Project Agreement).
- (l) Expenditures for the most recently completed month and for the Project to date, and a comparison to the Schedule of Values; explanations for significant deviations from the Schedule of Values for both over expenditures and under expenditures; corrective actions proposed by the Project Company to bring spending in-line with Schedule of Values or proposals to KRRC for an adjustment in the Schedule of Values or acceptance of the deviations.
- (m) Progress payment requests as described in Article 9 (Compensation) of this Project Agreement. The format of the payment request shall be matched with the description of work activities completed for the reporting month so that the KRRC can easily relate the breakdown of the payment request to work progress on specific tasks and subtasks. Supporting documentation shall be provided so that the KRRC can readily determine the basis for the requested payment amounts for Project Implementation Work performed during the month by task or subtasks in terms of labor hours, Project equipment costs, Capital Improvements equipment and materials expenditures, specialty Subcontractors including similar breakdowns for Subcontracts in excess of \$500,000 and other

Project costs incurred during the month. Current retainage and total retainage to date shall be included in the monthly report. Payment request information shall include similar information for changes made pursuant to Sections 6.8 (Changes to the Project Design Requirements at Project Company Request) and 6.9 (Other Changes to the Project Design Requirements) of this Project Agreement.

The monthly progress report shall also provide a description of (1) any concerns or issues raised by the KRRC or other parties regarding the Project Implementation Work, and the Project Company's approach to promptly addressing and resolving such concerns or issues, and (2) a section containing health and safety statistics and a description of any accidents or injuries that occurred and the follow up investigations as to cause and subsequent corrective actions to be taken or already implemented by the Project Company. The format of the monthly report shall be developed by the Project Company and approved by the KRRC prior to the commencement of any construction or demolition on the Project Site.

5.4.5 Project Records.

The Project Company, in connection with the Project Implementation Work generally, shall maintain and provide the following records:

- (a) Record Drawings and Specifications: The Project Company shall:
 - (1) throughout the Project Implementation Work, update the Design Documents (with respect to the drawings, such update shall be in hard copy and "CAD" or other electronic format reasonably acceptable to the KRRC), including approved shop drawings that are available from Subcontractors in CAD format, so as to produce accurate and complete record documents for the Project.
 - (2) as requested from time to time during the Project Implementation Work, make available such record drawings and specifications to the KRRC for review to permit the KRRC to monitor the Project Company's compliance with the requirements of this Section.
 - (3) provide seven hard copies (in architectural D size and electronically in PDF format and current version of Bentley Microstation CAD file) of the completed record drawings and specifications to the KRRC as a condition to each Milestone Final Completion. The record drawings shall not be deemed to have satisfied the condition to the applicable Milestone Final Completion unless reviewed and deemed final by the KRRC.
- (b) Design Records: The Project Company shall retain records of the design development.
- (c) Minutes of Meetings: The Project Company shall retain minutes of meetings between the KRRC and the Project Company relating to the Project Implementation Work, and shall circulate such minutes to the KRRC and the KRRC Technical Representative for review and comment.
- (d) Inspection Reports and Tests Results: The Project Company shall retain official reports and certified test records of all inspections and tests which were undertaken as part of the Project Implementation Work.

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- (e) Utility Plans: The Project Company shall retain utility plans for the Project and the Project Site.
 - (f) Landscape and Irrigation Plans: The Project Company shall retain landscape and irrigation plans for the Project and the Project Site.
 - (g) Copies of all Governmental Approvals: The Project Company shall retain copies of all Governmental Approvals for the Project Implementation Work.
 - (h) Signed Project Implementation Quality Management Plan: The Project Company shall retain a signed copy of the Project Implementation Quality Management Plan for the Project Implementation Work and all records of the QA program implemented as required by this Project Agreement.

The records referred to in this Section shall be retained for at least five years following the Milestone Substantial Completion Date for the Final Habitat Restoration Work.

5.5. PROJECT IMPLEMENTATION WORK GENERALLY

5.5.1 Deliverable Material.

The Project Company shall deliver to the KRRC all Deliverable Material required to be delivered under this Appendix, Appendix 6 (Project Implementation Work Quality Control Requirements), Appendix 7 (Project Implementation Work Review Procedures).

5.5.2 Signs.

The Project Company shall provide and maintain temporary identification and information signs during the Project Implementation Period. No signs shall be erected until their appearance, content, and location have been fully reviewed and approved by the KRRC, which approval shall not unreasonably be withheld, conditioned or delayed. The Project Company shall remove temporary signs from the Project Site when they are no longer necessary.

5.5.3 Laydown Areas and Field Office Space.

Laydown and staging areas for materials shall be located at the Project Site or at other locations arranged and paid for by the Project Company. At a minimum, field office facilities shall include the following:

- (a) Field office facilities for the Project Company;
- (b) Field office facilities for the KRRC's construction management team and inspectors;
- (c) At a minimum, separate office facilities shall be provided at J.C. Boyle and Copco/Iron Gate;
- (d) Each office facility shall provide a minimum of two private offices with doors and keyed locksets, two restrooms, one enclosed conference room, one breakroom with refrigerator, microwave oven, coffee brewer, bottled water and waste receptacle, copier/scanner/printer/fax and security system;
- (e) All office desks or offices shall have duplex power receptacles, telephone, broadband internet connection, and appropriate lighting at desktop; and

- (f) The cost of the KRRC's construction office furniture, fixtures, equipment, supplies, consumables, or telephone/internet service provider fees shall be borne by the Project Company.

5.5.4 Maintenance of the Project Site.

During performance of the Project Implementation Work, the Project Company shall be responsible for the overall maintenance of the Project Site. The Project Company shall keep the Project Site neat and orderly at all times, and shall clean up and remove all rubbish and construction, demolition and restoration debris from the Project Site as they accumulate in accordance with the Contract Standards.

5.5.5 Temporary Utilities.

The Project Company shall supply all necessary temporary Utilities, including electricity, telecommunications services, potable water (at no unit charge from KRRC), fire protection, lighting, and sanitary facilities, during the performance of the Project Implementation Work. Prior to the Milestone Substantial Completion Date for the Final Habitat Restoration Work, the Project Company shall disconnect and arrange for the disconnection and removal of all temporary Utility connections and services. The Project Company shall coordinate with the KRRC on all temporary Utilities.

5.5.6 Relocation of Existing Utilities.

The Project Company shall be responsible for all construction activities required with regard to existing utility services and installations (e.g., conduits, pipelines, transmission mains and other utility equipment and appurtenances), including after KRRC review and approval any relocation of Utilities.

5.5.7 Noise Control.

The Project Company shall comply with all noise regulations required pursuant to Applicable Law. Project Implementation Work will be allowed as defined in Section 4.2.4 (Required Design Criteria – On-Site Work Hours) of Appendix 4 (Project Technical Requirements). In the event that the work hours are restricted further than as described therein, such restrictions will be considered an Uncontrollable Circumstance, as and to the extent provided in Article 14 (Uncontrollable Circumstances) of this Project Agreement.

5.5.8 Notice of Default.

The Project Company shall provide to the KRRC, promptly following the receipt thereof, copies of any notice of default, breach or non-compliance received under or in connection with any Governmental Approval or Subcontract that may have a material and adverse effect on performance by the Project Company of its obligations under this Project Agreement.

5.6. COORDINATION OF PROJECT IMPLEMENTATION WORK AND OPERATIONS

5.6.1 Facilities Shutdowns during Project Implementation Work.

The Project Company shall plan and coordinate in advance with the KRRC in order to obtain KRRC approval and schedule its Project Implementation Work which requires partial or complete shutdowns of the Facilities. The Project Company shall make every effort to minimize the number and duration of partial or complete shutdowns.

5.6.2 Maintenance of Facilities Operations.

The Project Company shall take no actions during performance of the Project Implementation Work that adversely affect the operation of the Facilities. The Project Company shall comply with the Maintenance of Facilities Operations Plan, which is included as Attachment 5B (Maintenance of Facilities Operations Plan) to this Appendix.

5.6.3 Coordination of PacifiCorp Staff Relocations and Building Demolitions.

The Project Company shall be responsible for providing temporary conditioned work space for PacifiCorp staff as needed to accommodate the performance of the Project Implementation Work. Temporary work spaces shall be provided with hot and cold potable water and temporary shower facilities where applicable. To facilitate coordination of relocations with the KRRC, the Project Company shall prepare detailed plans as part of the Maintenance of Facilities Operations Plan describing how construction, relocations and demolition are to occur.

5.7. PROJECT SAFETY AND SECURITY**5.7.1 Safety and Security.**

The Project Company shall maintain safety and security at the Project Site at all times at a level consistent with the Contract Standards. The KRRC will neither assume administration nor direct control and responsibility for maintaining the Project Company's health and safety program.

Nothing contained in this Section shall relieve Project Company, or any subcontractor or supplier, from the obligations set forth above and obligations as required by Applicable Law. If a provision of this Section conflicts with any applicable provision of this Project Agreement or any Applicable Law, the more stringent requirements that maintain a greater level of safety shall apply.

Without limiting the foregoing, the Project Company shall:

- (a) Implement a zero incident philosophy on the Project and establish a goal of zero accidents and zero injuries with work tasks designed to minimize or eliminate hazards to personnel, process, equipment, environment and the general public.
- (b) Be committed to protecting the health and safety of individual employees, their co-workers, and the public at large from the hazards caused by the misuse of drugs and alcohol on the job. The safety of the public, as well as the safety of fellow employees, dictates that employees are not permitted to perform their duties while under the influence of drugs or alcohol. Accordingly, the Project Company agrees to develop and comply with an appropriate substance abuse policy. Project Company shall select and use a qualified, approved substance abuse third party administrator to perform all required substance abuse testing.
- (c) Include a description of the process of notification, reporting, and investigating incidents or near-miss incidents. The results of investigations of incidents shall be documented in final root cause analysis and corrective actions reports. Investigations of incidents shall be documented in investigation reports.
- (d) Take appropriate precautions for the safety and security of the Project Implementation Work and provide appropriate protection to prevent damage,

injury or loss related to the performance of the Project Implementation Work over the Project Implementation Period for:

- (1) Workers at the Project Site and all other persons who may be involved with deliveries or inspections;
 - (2) Visitors to the Project Site;
 - (3) Passersby, neighbors and adjacent properties with respect to the Project Implementation Work activities;
 - (4) Materials and equipment under the care, custody or control of the Project Company or Subcontractors on the Project Site;
 - (5) Other property constituting part of the premises or the Project; and
 - (6) KRRC Property;
- (e) Establish and enforce appropriate safeguards for safety and protection, including posting danger signs and other warnings against hazards;
 - (f) Provide temporary fencing of all open or partially open trenches and excavations, all open or partially completed structures, and all work and storage areas at all times while unattended by workmen;
 - (g) Implement a comprehensive safety program in accordance with Applicable Law;
 - (h) Give all notices and comply with all Applicable Law relating to the safety of persons or property or their protection from damage, injury or loss;
 - (i) Operate and maintain all equipment in a manner consistent with the manufacturer's safety requirements;
 - (j) Provide for safe and orderly vehicular movements;
 - (k) Develop and implement a written Project Site-specific Health and Safety Plan that includes management commitment, maintaining a safe workplace, employee participation, hazard evaluation and controls, employee training and periodic inspections ("Health and Safety Plan");
 - (l) Designate an appropriately certified and experienced safety professional to develop and sign the Project Site-specific Health and Safety Plan, including all safety rules at the Project Site;
 - (m) Designate a qualified safety professional at the Project Site during on-site Project Implementation Work activities who shall be responsible for the implementation of safety rules at the Project Site, the prevention of fires and accidents, monitoring compliance with the Project Company's Project Site-specific Health and Safety Plan, and the coordination of such activities as shall be necessary with the KRRC and all Governmental Bodies related to health and safety; and
 - (n) Require all Subcontractors to work in accordance with and implement the Health and Safety Plan, comply with the Project Company's on-site safety requirements, and designate a qualified safety professional whose duty shall be

the implementation of safety rules at the Project Site and monitoring compliance of Subcontractor employees with the Subcontractor's Project Site-specific Health and Safety Plan.

- (o) The Project Company shall maintain Project safety audits, equipment safety inspection logs, incident reports, and all reports covering the implementation of Health and Safety Plan on the Project Site for review upon request by the KRRC.
- (p) If the Project Company repeatedly fails to comply with applicable health and safety-related Applicable Law and contract safety requirements, the KRRC reserves the authority to have work performed by others and to deduct corresponding costs from Project Company's progress payment(s) and/or suspend progress payments.
- (q) The Project Company's non-compliance with health and safety-related Applicable Law and Agreement safety requirements shall be considered failure by the Project Company to perform a provision of the Project Agreement, and may be cause for the suspension of the Project Implementation Work and/or the discharge from the Project Implementation Work of an employee, Subcontractor or Supplier as set forth in the Project Agreement. The Project Company will be responsible for all costs for stoppage of Project Implementation Work and/or replacement of employee(s).

5.7.2 Perimeter Security.

The Project Company shall develop, maintain and comply with a Project Site perimeter security plan that is approved by the KRRC and constitutes part of the Health and Safety Plan. The perimeter security plan shall assure the security of the Project Site when perimeter fencing cannot be continuously maintained.

5.8. ENVIRONMENTAL REVIEW AND PROTECTION

5.8.1 Wildlife and Protected Species Protection.

In accordance with the Governmental Approvals, the Project Company shall develop and implement a plan that is consistent with required measures for wildlife and protected species that may be affected by construction, demolition and restoration activities of the Project Company. Prior to implementing the plan, the Project Company shall obtain KRRC approval.

5.8.2 Project Company Environmental Monitor.

If required by the Environmental Mitigation Measures, the Project Company shall assign a Project Company Environmental Monitor ("CEM") to ensure that its mitigations plan is properly and fully implemented. The CEM shall be the single, identified entity or person responsible for, at a minimum, the following duties:

- (a) Planning of environmentally compliant Project Implementation Work methods.
- (b) Oversight of Project Implementation Work activities to determine compliance with mitigation measures.
- (c) Ensuring that all training has been conducted, and signage, marking and barriers to protected areas have been installed.

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- (d) Ensuring compliance with the Stormwater Pollution Prevention Program (SWPPP).
 - (e) Coordination with the KRRC on implementation of environmental mitigation measures.
 - (f) Coordination with Governmental Bodies that have administrative oversight of the environmental sites to be protected, if required.
 - (g) Compliance with environmental Governmental Approvals.
 - (h) Meeting or interacting with representatives of Governmental Bodies with environmental oversight authority, if required.

All environmental monitoring duties conducted by the CEM shall be recorded in the form of a standard report and photographic log (as required). The photographic log shall be kept in both electronic and hardcopy form. All reports shall be submitted to the KRRC in summary form on a monthly basis or more frequently if required by KRRC. Copies of all daily monitoring records shall be maintained at the Project Site by the CEM.

5.8.3 Regulated Substances Management Program.

The Project Company shall develop, maintain and implement a Regulated Substances management plan that includes as a minimum, but is not limited to, the requirements specified in this Section ("Regulated Substances Management Program"). A copy of the Regulated Substances Management Plan shall be submitted to the KRRC for review and approval. The intent of the plan is to prevent accidental spills, site contamination, and injury or illness of all personnel on the site due to contact or exposure to Regulated Substances. The KRRC shall notify the Project Company of any observed conditions that may be in violation of the plan. If the Project Company fails to address KRRC-reported concerns about observed conditions that may be in violation of the plan in a timely and appropriate manner, the KRRC may notify all appropriate Governmental Bodies, and report the observed conditions to them, and request that they inspect the sites involved that are under the Project Company's control. All documents required by the Regulated Substances Management Plan shall be made available to the KRRC immediately upon request.

5.8.4 Project Company Regulated Substances.

Any Regulated Substances generated by the Project Company shall be the responsibility of the Project Company. The Project Company shall obtain an EPA identification number for all Project Company Regulated Substances, listing the Project Company's name and address as the generator of the Project Company Regulated Substances. The Project Company shall be responsible for the identification, analysis, profiling, documentation, reporting, transport and disposal of Project Company Regulated Substances. Any fines that are levied against the KRRC for violations of Applicable Law as determined by any Governmental Body relating to Project Company Regulated Substances shall be reimbursed immediately by the Project Company after payment by KRRC.

5.8.5 Emergency/Spill Response Plan.

The Project Company shall develop an Emergency/Spill Response Plan ("Emergency Response Plan"), for each Regulated Substance or class/group of Regulated Substances either known to be on the Project Site or intended to be brought to the Project Site by the Project Company. At a minimum, the Response Plan must include the following:

- (a) A description of on-site equipment available to contain and respond to an emergency/spill of the Regulated Substance.
- (b) Notification procedures, including notification to potentially impacted residents adjacent to the Project.
- (c) Response coordination procedures between the Project Company and the KRRC.
- (d) A Regulated Substance Site Map showing the location of stored Regulated Substances and location spill containment/response equipment.
- (e) A description of the Regulated Substances handling and spill response training provided to the Project Company's employees and Subcontractors.

5.8.6 Dust Control.

The Project Company shall be responsible for dust control during the performance of the Project Implementation Work and shall comply with all air pollution control Applicable Law and Governmental Approvals. The Project Company shall furnish all necessary labor, materials and equipment for dust control.

ATTACHMENT 5A**INITIAL PROJECT IMPLEMENTATION SCHEDULE**

[Note: The negotiated Initial Project Implementation Schedule will be inserted here as part of the GMP Contract Amendment, based on the initial Project Implementation Work schedule in the KRRC-accepted GMP Project Submittal. All activities of the Project Implementation Work shall be scheduled and monitored by use of a Gantt or Bar Chart which presents all tasks and key subtasks in a logical and efficient work sequence that the Project Company intends to use in advancing the Project from 60% Design Completion to Project Final Completion. The Initial Project Implementation Schedule is to be approved by the KRRC prior to the commencement of Project Implementation Work activity. The Project Company shall be responsible for completing all Project Implementation Work by each Scheduled Milestone Substantial Completion Date.]

ATTACHMENT 5B

MAINTENANCE OF FACILITIES OPERATIONS PLAN

[Note: The negotiated Maintenance of Facilities Operations Plan will be inserted here as part of the GMP Contract Amendment, based on the draft Maintenance of Facilities Operations Plan in the KRRC-accepted GMP Project Submittal].

APPENDIX 6

PROJECT IMPLEMENTATION WORK QUALITY CONTROL REQUIREMENTS

APPENDIX 6**PROJECT IMPLEMENTATION WORK QUALITY CONTROL REQUIREMENTS****6.1. PURPOSE**

The purpose of this Appendix is to describe the minimum requirements for the Project Implementation Quality Management Plan, including quality assurance ("QA") and quality control ("QC") procedures that shall be implemented during the Project Implementation Period. QA/QC shall include inspection, sampling and testing, and other requirements.

6.2. KRRC'S QUALITY OBJECTIVES

The Project Implementation Quality Management Plan, including QA/QC, shall be consistent with and support the following quality objectives for the Project Implementation Work:

- (a) Ensure that the Project Implementation Work is consistent with the Contract Standards.
- (b) Ensure that Governmental Approval requirements are effectively incorporated into Project Implementation Work.
- (c) Develop and implement procedures to ensure that problems are discovered early, resolved in a timely manner, and do not recur.
- (d) Ensure that adequate QA/QC procedures and resources are provided by the Project Company to effectively assess and ensure high quality in all work products and services, warranty requirements, safety, security and environmental compliance requirements.
- (e) Provide timely reporting and documentation of QA/QC inspections, technical reviews, testing, analysis and determinations of compliance with the Contract Standards.
- (f) Provide follow up inspections, analysis and testing if conditions are found to be non-compliant with the Contract Standards and verify through special reports and direct communications with the KRRC that all corrective actions have been effectively implemented and that the resultant product or service is of acceptable quality.

6.3. PROJECT IMPLEMENTATION QUALITY MANAGEMENT PLAN DEVELOPMENT AND IMPLEMENTATION**6.3.1 General Requirements.**

The development and implementation of the Project Implementation Quality Management Plan shall be the responsibility of the Project Company. The Project Implementation Quality Management Plan shall integrate the permitting, design, construction, demolition and restoration phases of the Project during the Project Implementation Period and shall include detailed QA and QC programs as attachments. Other Project Implementation Quality Management Plan requirements are defined in Section 6.4 (Project Implementation Work Quality Control Requirements) of this Appendix.

6.3.2 Project Implementation Quality Management Plan Requirements.

The Project Implementation Quality Management Plan shall include a description of how the Project Company will provide the following:

- (a) Adequate resources for effective plan implementation throughout all phases of the Project Implementation Work. Information on QA/QC staff to be assigned to the Project and their qualifications for performing required QA/QC functions;
- (b) Programs, procedures, methods, tests, analyses and communications procedures, reports, photographs and comments on drawings and specifications and other documents used by the Project Company to assess Project Implementation Work quality and compliance with the Contract Standards;
- (c) How the QA/QC program shall function independently of Project Company's production staff and be empowered to enforce plan objectives, define quality requirements, independently verify quality of Project Implementation Work products and services, identify potential causes of unacceptable quality of work and provide safeguards to prevent unacceptable work quality, and require prompt corrective action for identified deficiencies;
- (d) A communications plan for demonstrating that quality requirements have been established and communicated to all Subcontractors prior to their commencement of providing products or services on the Project. This shall include information on the roles, responsibilities and authorities of identified QA/QC staff; and
- (e) The Project Company shall submit its Project Implementation Quality Management Plan for KRRC review for all phases of the Project Implementation Work, including verification of compliance with the Contract Standards as part of its initial document submittal package. KRRC will provide comments on the Project Implementation Quality Management Plan and the Project Company shall make required changes and include the final KRRC-approved Project Implementation Quality Management Plan as an attachment to this Project Agreement.

6.3.3 Changes to the Project Implementation Quality Management Plan.

Revisions and updates to the Project Implementation Quality Management Plan may be proposed by the Project Company as the Project Implementation Work progresses. Changes to the initial Project Implementation Quality Management Plan require written approval of the KRRC. Proposed revisions or updates shall be provided to the KRRC at least 30 days prior to the start of the Project Implementation Work to which the revision applies. The KRRC will review and respond in a timely manner to Project Implementation Quality Management Plan proposed changes. The Project Company shall not initiate any of the Project Implementation Work that is impacted by such proposed revision or change until the KRRC has reviewed and accepted the change.

6.4. PROJECT IMPLEMENTATION WORK QUALITY CONTROL REQUIREMENTS

6.4.1 Project Implementation Work Quality Control Program.

The Project Implementation Quality Management Plan shall include the details of the Project Company's Project Implementation Work Quality Control Program ("CQCP"). Instructions for performing inspections must be clearly defined, including the work attributes to be inspected, acceptability criteria, frequency of inspections, and the requirements for documenting the

inspection results. Documentation requirements shall include contractor production reports, contractor quality control reports, field test reports, testing plan and log, inspection reports, rework items list and quality control meeting minutes. The CQCP shall require inspection during the performance of the Project Implementation Work by inspectors who are not responsible, in whole or in part, for the scheduling or performance of the Project Implementation Work being inspected. Inspection records must be kept current, have sufficient detail to enable the Engineer-of-Record to identify inspections which have been performed, and the results of these inspections. Inspections must be made throughout Project Implementation Period, including the initial work, in-process inspections, final inspections, and testing during the performance of the Project Implementation Work. The CQCP shall describe methods to be implemented, including a daily quality control report, to identify and track all unsatisfactory, deviating, and nonconforming work until the required repair, rework, or replacement is performed, and the work has been re-inspected and accepted. The CQCP shall detail the means and methods for identifying and correcting all deficiencies such that the Project Implementation Work quality meets the Contract Standards and the Project Company's Design Documents. The Project Company shall be informed of all unsatisfactory conditions that the Project Company will correct and for any nonconforming conditions for which the Project Company intends to request the KRRC's acceptance in accordance with Section 6.17 (Correction of Work) of this Project Agreement.

6.4.2 Materials and Equipment.

The CQCP shall ensure the quality of all material and equipment. Procedures shall be used to verify that the procurement documents meet all Contract Standards and the Project Company's Design Documents, and that quality has been controlled during the manufacture and testing of all equipment which is being fabricated for the Project. The CQCP shall require written documentation of inspection of all material and equipment to ensure that it meets all Contract Standards and the Project Company's Design Documents. Documentation such as material test reports, certifications, and equipment tests results must be delivered to the KRRC and KRRC-designated representatives to demonstrate compliance with all Contract Standards and the Project Company's Design Documents. The CQCP shall include monitoring procedures to ensure that material and equipment is delivered to the Project Site are undamaged, in the proper quantities and in accordance with the specification requirements, and that all materials and equipment are stored and maintained on the Project Site according to the Contract Standards, including the requirements of the designer and the manufacturer. Procedures and controls shall be provided to ensure that inspections are being performed using the latest Design Documents and approved shop drawings. Procedures shall ensure that an adequate number of inspection personnel are available at all times, and that all inspectors are qualified, trained, and proficient in performing inspections for the Project Implementation Work to which they are assigned.

6.4.3 Project Management and Testing.

The Project Company shall provide full-time Project management and full and comprehensive administration for the Project Implementation Work. Project inspectors, who shall be provided with the latest Design Documents released to construction, demolition and restoration, shall perform initial verification of procurement, construction, demolition and rehabilitation activities, so that any conflicts will be identified at an early stage. The CQCP shall clearly identify the circumstances under which the Project Company's registered soils or geotechnical engineer and the Engineer-of-Record will be involved in Project Implementation Work quality oversight. The Project Company shall perform all testing and inspections as required by the Contract Standards, approved design documents and Applicable Law (such as ACI and ASTM) which may be referenced in Appendix 4 (Project Design Requirements). Section 1.2(U)

(Applicability, Stringency and Consistency of Contract Standards) of this Project Agreement shall govern any conflicts or inconsistency in the stringency of test requirements.

6.4.4 Laboratories.

All Project Implementation Work testing shall be performed by individuals who are qualified and experienced in providing these testing services. Equipment used to perform tests shall be calibrated according to requirements in the testing procedure. The Project Company shall hire a certified independent testing laboratory to perform all laboratory testing. The laboratory selected shall be authorized to operate in the State, certified under the State's National Environmental Laboratory Accreditation Program, as applicable, and shall be subject to the approval of the KRRC. Project Company requests for laboratory approval shall be made by the Project Company in a timely manner, in writing, to the KRRC. Laboratory tests shall include the proposed concrete mix design, concrete aggregate tests, strength of concrete field test cylinders, gradation, and moisture density relationship of soils. The certified testing laboratories must also perform on-site tests that the Project Company is not experienced, qualified, or certified to perform or that require independent testing under the Contract Standards. On-site tests shall include tests for: concrete slump, concrete air entrainment, concrete temperature, casting of concrete test cylinder specimens, in-place testing of concrete strength, compaction density testing of soils, coating thickness measurements and structural bolting torque.

6.5. INSPECTION OF PROJECT IMPLEMENTATION WORK

6.5.1 Inspection and Correction.

All Project Implementation Work performed by the Project Company or its Subcontractors shall be inspected by the Project Company. All nonconforming Project Implementation Work and any safety hazards in the work area shall be noted and promptly corrected. The Project Company is responsible for the performance of the Project Implementation Work safely and in conformance with Section 5.7 (Work Safety and Security) of Appendix 5 (General Project Implementation Work Requirements).

6.5.2 KRRC Access.

The KRRC, its employees, agents, representatives and contractors shall be permitted access to all parts of the Project Implementation Work, including plants where materials or equipment are manufactured or fabricated. The presence of the KRRC, its employees, agents, representatives and contractors shall not relieve the Project Company of the responsibility for the proper execution of the Project Implementation Work in accordance with all requirements of this Project Agreement. No act or omission on the part of the KRRC, its employees, agents, representative and contractors (other than KRRC Fault) shall be construed as relieving the Project Company of this responsibility.

6.5.3 Materials Inspection.

All materials and articles furnished by the Project Company shall be subject to documented inspection, by qualified personnel, and no materials or articles shall be used in the Project Implementation Work until they have been inspected and accepted by the QA/QC Manager or other designated representative. Any Project Implementation Work covered in the absence of inspection shall be subject to uncovering as set forth in Section 6.16 (Monitoring, Observations, Testing and Uncovering of Project Work) of this Project Agreement.

6.6. TIME OF INSPECTION AND TESTS

Whenever the Project Company is ready to backfill, bury, cast in concrete or otherwise cover any Project Implementation Work, the KRRC shall be notified before such covering and completion, and the KRRC shall notify the Project Company of a requested inspection of any such Project Implementation Work as set forth in subsection 6.16(F) (Notice of Covering Project Implementation Work) of this Project Agreement. Failure of the Project Company to properly notify the KRRC, as required by subsection 6.16(F) (Notice of Covering Project Implementation Work) of this Project Agreement, in advance of any such covering or completion shall be reasonable cause for the KRRC to request the Project Company take apart or uncover for inspection or testing any previously covered or completed Project Implementation Work in accordance with subsection 6.16(F) (Notice of Covering Project Implementation Work) of this Project Agreement. The costs of any uncovering, taking apart, remedial or corrective work required and all costs of such delays, including the impact on other portions of the Project Implementation Work, shall be borne as set forth in 6.16(F) (Notice of Covering Project Implementation Work) of this Project Agreement.

6.7. MATERIALS SAMPLING AND TESTING

6.7.1 Materials Testing and Removal.

All sampling and testing of materials shall be conducted in accordance with the methods prescribed in the current standards of the ASTM or otherwise required by the Contract Standards, as applicable to the class and nature of the article or materials considered. The KRRC reserves the right to require the Project Company to use any generally accepted system of inspection that, in the opinion of the KRRC, will ensure the KRRC that the quality of the materials and workmanship is in full accord with this Project Agreement. Results of such tests and analyses shall be considered along with the tests or analyses made by the Project Company to determine compliance with the applicable specifications for the materials so tested or analyzed. Wherever any material, as a result of such independent testing or investigation by the KRRC, fails to meet the requirements of this Project Agreement, all costs of such independent inspection and investigation and all costs of removal, correction, reconstruction, or repair of any such material shall be borne by the Project Company in accordance with subsection 6.16(F) (Notice of Covering Project Implementation Work) and Section 6.17 (Correction of Work) of this Project Agreement.

6.7.2 Materials Rejection.

The KRRC shall have the right at all times and places to reject any articles or materials to be furnished hereunder which, in any respect, fail to meet the requirements of this Project Agreement, regardless of whether the defects in such articles or materials are detected at the point of manufacture or after completion of the Project Implementation Work at the Project Site. If the KRRC, through an oversight or otherwise, has accepted materials or work which are defective or in any way contrary to this Project Agreement, such materials, no matter in what stage or condition of manufacture, delivery, or erection, may be rejected. The Project Company, at its cost and expense and without any adjustment to the Scheduled Milestone Substantial Completion Dates, shall promptly remove and replace rejected articles or materials from the Project Site after notification of rejection.

6.8. MATERIALS TESTING SERVICES

6.8.1 Project Company's Laboratories.

The Project Company shall perform all tests requiring the services of a laboratory, to determine compliance with this Project Agreement, using independent commercial materials testing firms acceptable to the KRRC. The materials testing firm's laboratory shall be staffed with

experienced technicians, properly equipped, and fully qualified to perform the tests in accordance with the specified standards. The Project Company shall obtain the KRRC's acceptance of the testing firm before having testing services performed, and pay all costs for these testing services.

6.8.2 Interruptions for Testing and Sampling.

The Project Company shall furnish all sample materials and cooperate in the testing activities, including sampling, and shall interrupt the Project Implementation Work when necessary to allow testing, including sampling, to be performed. The Project Company shall have no claim for an increase in the Contract Price or extension of the Scheduled Milestone Substantial Completion Dates due to such interruption. When testing activities, including sampling, are performed in the field by the testing firm's laboratory personnel, the Project Company shall furnish personnel and facilities to assist in the activities.

6.8.3 Test Reports.

Written reports of tests and engineering data regarding materials and equipment proposed to be used in the Project Implementation Work shall be submitted by the Project Company for the KRRC's review. The testing firm's laboratory shall perform all laboratory tests within a reasonable time, consistent with the specified standards, and shall furnish a written report of each test. The KRRC shall furnish one copy of each field and laboratory QA/QC test conducted by the KRRC to the Project Company. The testing firm retained by the Project Company for material testing shall furnish five copies of a written report for each test. Three copies of each test report shall be transmitted directly to the KRRC in a sealed envelope, within three Business Days after each test is completed. Two copies of each test report shall be transmitted to the Project Company. The Project Company shall consecutively number each report for each type of test.

6.8.4 KRRC-Approved Laboratories.

The KRRC shall have the right to inspect work performed by the KRRC-approved independent testing laboratory utilized by the Project Company, both at the Project Site and at the laboratory. This may include inspection of the independent testing laboratory's internal quality assurance records (quality assurance manual, equipment calibrations, proficiency sample performance, etc.). Testing services provided by the KRRC, if any, are for the sole benefit of the KRRC; however, test results shall be available to the Project Company. Testing necessary to satisfy the Project Company's internal QA/QC procedures shall be the sole responsibility of the Project Company.

6.8.5 Materials to be Tested.

The Project Company shall provide all testing services in connection with the following materials as required under Good Dam Removal Practice, and deliver the test reports for review by the KRRC:

- (1) Concrete materials and mix designs.
- (2) Masonry units, masonry grout, mortar materials, and design mixtures.
- (3) Asphaltic concrete materials and design mixtures.
- (4) Embankment, fill, and backfill materials.

- (5) QC testing of all precast concrete.
- (6) Holiday testing of pipeline coatings.
- (7) Air testing of field-welded joints for steel pipe and fabricated specials.
- (8) Concrete strength tests.
- (9) Test of masonry prisms.
- (10) Field control test of masonry.
- (11) Asphaltic concrete.
- (12) Magnetic particle or dye penetrant testing of field welds for steel pipe and fabricated specials.
- (13) Moisture-density and relative-density tests on embankment, fill, and backfill materials.
- (14) In-place field density test on embankments, fills, and backfill.
- (15) Other materials and equipment as specified herein.
- (16) All other tests and engineering data required for the KRRC's review of materials and equipment proposed to be used in the Project Implementation Work.

6.9. INSTALLATION

6.9.1 Inspection and Measurement.

The Project Company shall inspect materials or equipment upon the arrival at the jobsite and immediately prior to installation, and remove damaged and defective items from the jobsite. The KRRC shall be provided the opportunity to observe any such Project Company inspections in accordance with Section 6.16 (Monitoring, Observations, Testing and Uncovering of Project Work) of this Project Agreement. The Project Company shall verify measurements and dimensions of the work as an integral step of starting each installation.

6.9.2 Manufacturer's Instructions.

Where installations include manufactured products, the Project Company shall comply with manufacturer's applicable instructions and recommendations for installation, to whatever extent these are more explicit or more stringent than the Contract Standards, so as not to violate manufacturers' warranty conditions.

APPENDIX 7

PROJECT IMPLEMENTATION WORK REVIEW PROCEDURES

APPENDIX 7**PROJECT IMPLEMENTATION WORK REVIEW PROCEDURES****7.1. OVERVIEW****7.1.1 Purpose.**

The purpose of this Appendix is to set forth the procedures for the KRRC's review of each aspect of the Project Implementation Work to verify that the Project Implementation Work has been performed in accordance with the Project Design Requirements and the terms and conditions of this Project Agreement.

7.2. DOCUMENTS TO BE SUBMITTED

At a minimum, the documents to be submitted during the Project Implementation Period shall include the following:

- (a) Monthly Progress Schedule Updates
- (b) Intermediate submittals for review sessions and workshops on various materials, facilities, systems, equipment, and disciplines
- (c) Final Design Documents (Issued for Dam Removal Specifications)
- (d) Applications and supporting documents required for Governmental Approvals
- (e) Record drawings and specifications

Such documents shall be submitted in accordance with the Document Submittal Procedures.

7.2.2 Project Implementation Work Package Information.

The Project Company shall have flexibility with how it organizes and performs Project Implementation Work packages so that it can proceed with ordering any necessary equipment or commence with any necessary construction, demolition and restoration activities such as civil-site work prior to the 100% design; provided, however, such construction, demolition, restoration or ordering of equipment prior to the 100% design shall not negatively affect the remaining Project Implementation Work, the Contract Price or the Project Implementation Schedule. The Project Company shall provide the following information in the appropriate Project Implementation Work package in accordance with the Document Submittal Procedures:

- (a) Specifications, Design Narratives and Lists:
 - (1) Project design criteria
 - (2) Specifications
 - (3) Process systems piping line list
 - (4) Major equipment list (process, mechanical, electrical, instrumentation and control, support systems, other)
 - (5) Proprietary technology/equipment list

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- (b) Drawings, in both three dimensional electronic and standard design formats:
- (1) Cover sheet
 - (2) Drawing index
 - (3) Layout of the Project Site
 - (4) Project Site master planning layouts
 - (5) Landscape inventory plan
 - (6) Landscape and irrigation plans
 - (7) Project Site grading and utility plans, with sections as needed for construction, demolition and restoration clarity or dimensioning
 - (8) Surface drainage system and features plans and details
 - (9) Fire protection and security system plans
 - (10) Project Site sections and details
 - (11) Major structure foundation plans and sections
 - (12) Major structure exterior elevations and sections
 - (13) Architectural renderings
 - (14) Electrical site plan

7.3. KRRC REVIEW DURING GOVERNMENTAL APPROVAL PROCESS

7.3.1 Project Company-Managed Governmental Approvals.

The Project Company's responsibilities for obtaining and maintaining the Project Company-Managed Governmental Approvals required for implementation of the Project are described in Section 6.6 (Permitting Responsibilities and Schedule) and Appendix 3 (Governmental Approvals) to this Project Agreement. The KRRC shall have the right to review and comment on Project Company submittals as provided by Section 6.6 (Permitting Responsibilities and Schedule) of this Project Agreement and this Appendix. Governmental Approval applications shall not include design specifications or drawings that the KRRC has not previously reviewed. For all Project Company-Managed Governmental Approval applications, the Project Company shall provide draft copies of the applications and supporting documents for KRRC review and comment. The KRRC's review will not diminish the Project Company's responsibility for timely submittals of complete applications for Project Company-Managed Governmental Approvals. The KRRC may attend Project Company meetings with permitting agencies and help arrange for agency reviews and meetings.

7.3.2 KRRC-Managed Governmental Approvals.

The Project Company's responsibilities for assisting the KRRC in obtaining and maintaining the KRRC-Managed Governmental Approvals required for the implementation of the Project are

described in Section 6.6 (Permitting Responsibilities and Schedule) and Appendix 3 (Governmental Approvals) to this Project Agreement.

7.4. KRRC DOCUMENT REVIEW

7.4.1 KRRC Review Responsibilities.

On or before the Project Implementation Work Commencement Date, the Project Company shall submit updated Document Submittal Procedures that address the submittal of the Final Design Documents (the "Final Design Submittal Protocol"). In accordance with the Final Design Submittal Protocol, the KRRC shall review the Project Company's Final Design Documents for compliance and consistency with the final 90% design documents for compliance and consistency with the Final Design Documents and both for overall compliance with the requirements of this Project Agreement. The KRRC's input during finalization of the design documents and preparation and finalization of Project Implementation Work packages shall be solicited by the Project Company on a timely basis so as to provide adequate periods for review by the KRRC, revisions by the Project Company and final review by the KRRC without negatively impacting the Project Implementation Schedule. The KRRC shall make reasonable efforts to bring staff or representatives with review and decision-making authority to the work sessions as requested and scheduled by the Project Company. The Project Company shall provide the KRRC with advance notice of the work sessions and agenda topics to facilitate the KRRC's scheduling of the appropriate participants for the work sessions. The Project Company shall provide the KRRC with Final Design Documents before commencing any Project Implementation Work activity, except as provided in Section 7.2.1 (Project Implementation Work Package Information) of this Appendix. Project Implementation Work activities shall not vary from the Final Design Documents submitted to the KRRC except where such variations are allowed, subject to the KRRC's and applicable Governmental Body's review and approval. Adherence to the Final Design Documents during work completion shall be a factor used by the KRRC in its review and approval of the Project Company's Payment Requests during Project Implementation Work.

7.4.2 Changes to Project Design Requirements.

Any change requested by the Project Company to the Project Design Requirements (regardless of prior oral discussion) must be clearly identified by the Project Company in its cover letter that transmits the submittal and must be fully documented with compelling justification of the Project Company's request for a change to the Project Design Requirements and the benefits to the KRRC for consenting to such a change. Any such change shall comply with the requirements set forth in Article 6 (Project Implementation Work) of this Project Agreement, as applicable. No change to the Project Design Requirements shall be made except with the KRRC's approval pursuant to Section 6.8 (Changes to the Project Design Requirements at Project Company Request) of this Project Agreement. The Project Company shall assume all risks associated with obtaining KRRC approval of any change to the Project Design Requirements.

7.4.3 Time for KRRC Review.

The KRRC shall complete its review of each submittal in a timely manner in order to determine that the Project Implementation Work conforms to the Project Design Requirements and other Contract Standards. The Project Company and the KRRC shall periodically review the Document Submittal Procedures, which define key submittals and the target submittal dates, and develop a submittal review schedule for each submittal based on the content and criticality of each submittal.

7.4.4 Time for Project Company Response.

For each submittal, the KRRC shall provide written comments in a tabular summation describing any concerns, problems, or assertions of non-compliance with the applicable Contract Standards. The tabular summation shall be on a form created mutually by the Project Company and the KRRC, with provisions on the form for the Project Company's responses. The Project Company shall provide a written response to the KRRC's comments within 15 Business Days of receipt of the KRRC's comments, primarily through use of the tabular summary form, including documentation of responses and agreed-upon action items.

7.4.5 Project Progress Meetings.

For the purpose of facilitating a timely review process, the Project Company shall schedule design-build progress meetings with the KRRC on a routine basis and at least monthly (unless both parties agree that more frequent meetings are required) throughout the design finalization and Project Implementation Work package development period. Any outstanding review comments not satisfactorily resolved shall be transferred to an issues tracking form by the Project Company for subsequent follow-up. The primary purpose of these meetings shall be to discuss overall Project Company work progress, the conformance of the design and Project Implementation Work packages to the Project Design Requirements, and to address outstanding issues arising from the review and response process. The status and issues of related permitting and early Project Implementation Work activities may also be included as agenda items for each Project progress meeting. These meetings shall be held in the KRRC's offices, or another location agreed to by the KRRC. Project Company representatives with responsibility for the Project Implementation Work shall participate in the meeting. Similarly, the KRRC shall be appropriately represented by individuals with knowledge and authority for decision making at the meeting.

7.4.6 Design Submittals During Project Implementation Work.

It is anticipated that there could be some redesign or design clarifications needed during the performance of the Project Implementation Work. Additional design work by the Project Company shall be subject to the KRRC's review for compliance and consistency with applicable Project Design Requirements. Design changes to a particular Design Document performed following the issuance of the Design Document for the Project Implementation Work shall be issued under a Design Change Notice (DCN) process that accurately tracks and documents changes to the design. No later than 30 days prior to initiation of the Project Implementation Work, the Project Company shall submit to the KRRC additions to the Document Submittal Procedures to include the DCN. The KRRC shall be provided with copies of all DCNs in a timely manner to allow review, comment, and, where appropriate, approval in the same manner as set forth with respect to the initial design. Design clarifications shall be issued in a timely manner using a similar procedure. If a DCN requires a material change from what was reflected in the applications for Governmental Approvals, the DCN must be approved by the appropriate Governmental Body if required by Applicable Law.

7.4.7 Design Change Authority.

The Project Company shall be responsible for providing design changes to the Design Documents necessary to complete the Project in accordance with this Project Agreement. All such changes shall be implemented in accordance with the DCN process described above, and in accordance with this Appendix. No DCN shall operate to change the Project Design Requirements unless approved by the KRRC in writing. Any DCN which requests a change to the Project Design Requirements shall be subject to the KRRC's rights under subsection 7.4.2 (Changes to Project Design Requirements) of this Appendix.

7.5. KRRC PROJECT IMPLEMENTATION WORK INSPECTION**7.5.1 Project Implementation Work Review Intent.**

The KRRC and its designated representatives, including the Program Manager, shall have the right, as provided in this Appendix, periodically to review and inspect Project Implementation Work activities and participate in Project progress meetings as needed to verify compliance with the Contract Standards. In addition, the KRRC shall have the right to monitor the progress of the Project Implementation Work and verify all applications for payment covering all Project Implementation Work performed during the preceding calendar month in accordance with the procedures set forth in Article 9 (Compensation) and Appendix 8 (Contract Price) of this Project Agreement. Notwithstanding the KRRC's review of Project Implementation Work activities, the Project Company shall be fully responsible for means, methods, techniques, sequences, and procedures of the Project Implementation Work, as well as safety precautions and programs in the performance of the Project Implementation Work. The KRRC's review and involvement in the Project Implementation Work activities is intended for the informational purposes of the KRRC and to monitor compliance with this Project Agreement. Such activities shall also be a part of the KRRC's independent QA process and shall not be viewed as an additional layer or integral part of the Project Implementation Quality Management Plan.

7.5.2 "Or Equals".

Whenever an item of material or equipment is specified in the Project Design Requirements by using the name of a proprietary item or the name of a particular supplier, and is followed by the words "or equal", material or equipment of other suppliers may be considered. The KRRC shall determine, acting reasonably, the acceptability of proposed "or equal" items associated with the Project Implementation Work. The Project Company shall allocate adequate time in the Document Submittal Procedures for the KRRC to review and approve all "or equal" items for the Project Implementation Work. Any delays resulting from submittal of "or equal" items later than as set forth in the Document Submittal shall be the responsibility of the Project Company. The Project Company's design personnel shall be permitted to review proposed "or equal" suppliers for the balance of the Project Implementation Work.

7.5.3 Named Suppliers.

Whenever an item of material or equipment is specified in the Project Design Requirements by using the name of a proprietary item or the name of a particular supplier, and is not followed by the words "or equal", the Project Company shall provide the named material or equipment.

7.5.4 Functionally Equal.

If, in the KRRC's reasonable discretion, an item of material or equipment proposed by the Project Company for the Project Implementation Work is functionally equal to that named, it may be considered by the KRRC as an "or equal" item. A proposed item of material or equipment shall be considered functionally equal to an item so named if:

- (a) The KRRC determines that:
 - (1) it is at least equal in quality, durability, appearance, strength, and design characteristics; and
 - (2) it shall reliably perform at least equally well the function imposed by the design concept of the completed Project as a functioning whole; and

- (b) The Project Company certifies that it shall conform substantially, even with deviations, to the detailed requirements of the item named in this Project Agreement.

7.5.5 Corrections and Changes.

The procedures to be followed for correction of non-conforming Project Implementation Work and for instituting changes and additions to such work are set forth in Article 6 (Project Implementation Work) of this Project Agreement.

7.6. RECORD DRAWINGS

At each Milestone Substantial Completion, the Project Company shall prepare and submit to the KRRC two complete sets of record drawings for the Project Implementation Work Element as implemented. The record drawings shall be submitted in accordance with the Document Submittal Procedures. The record drawings shall be prepared in accordance with the Contract Standards and shall include all electrical and control wiring schematics/diagrams. The Project Company shall obtain the KRRC's approval of the record drawings as a condition of Milestone Final Completion. The KRRC's approval of the record drawings shall not be unreasonably withheld.

APPENDIX 8
CONTRACT PRICE

APPENDIX 8**CONTRACT PRICE****8.1. PURPOSE**

The purpose of this Appendix is to set forth the procedures and requirements for determining (1) the Contract Price, and (2) the Guaranteed Maximum Price.

8.2. CONTRACT PRICE**8.2.1 Payment.**

The KRRC shall pay the Project Company the Contract Price for its performance of the Project Implementation Work, subject to the Guaranteed Maximum Price established in accordance with Section 8.6 (Guaranteed Maximum Price) of this Appendix.

8.2.2 Contract Price Defined.

The Contract Price shall be an amount equal to the sum of:

- (a) The Project Implementation Work Costs; and
- (b) The Project Company Fee,

all subject to the following:

- (a) The Contract Price shall not include Unallowable Costs, all of which shall be borne by the Project Company without payment or reimbursement by the KRRC; and
- (b) The Contract Price shall not exceed the Guaranteed Maximum Price.

8.2.3 Related Definitions.

As used in this Project Agreement, the following terms shall have the meanings set forth below:

- (a) "Contract Price" has the meaning specified in Section 8.2.2 (Contract Price Defined) of this Appendix.
- (b) "General Conditions Costs" has the meaning specified in Attachment 8A hereto (Description of General Conditions Costs).
- (c) "Guaranteed Maximum Price" has the meaning specified in Section 8.6 (Guaranteed Maximum Price) of this Appendix.
- (d) "Project Company Contingency" is [\$_____] and may be utilized as set forth in Attachment 8C (Schedule of Values and Project Company Contingency) of this Appendix. The Project Company Contingency is a subcomponent of the Base Guaranteed Maximum Price. **[Note: To be finalized on the GMP Contract Amendment Date based on the GMP Project Submittal]**
- (e) "Project Company Fee" has the meaning specified in Section 8.5 (Project Company Fee) of this Appendix.

- (f) “Project Implementation Work Costs” has the meaning specified in Section 8.3 (Project Implementation Work Costs) of this Appendix. Project Implementation Work Costs include the General Conditions Costs.
- (g) “Unallowable Costs” has the meaning specified in Section 8.4 (Unallowable Costs) of this Appendix.
- (h) “Uncontrollable Circumstance Costs” means, subject to Article 14 (Uncontrollable Circumstances), Section 17.8 (General Duty to Mitigate), and the other terms and conditions of this Project Agreement, any Project Implementation Work Costs paid by the Project Company to the extent that such Project Implementation Cost has been paid due to the occurrence of an Uncontrollable Circumstance.

8.2.4 Certification and Cost Substantiation.

In submitting each Payment Request, the Project Company shall:

- (a) Comply with and submit such Payment Request in accordance with the procedures and requirements of Article 9 (Compensation) of this Project Agreement.
- (b) Present such Payment Request by element of the Contract Price.
- (c) If Uncontrollable Circumstance Costs are being invoiced, present such Uncontrollable Circumstance Costs separately from other Project Implementation Work Costs.
- (d) If costs resulting from Subcontractor or Supplier delay or non-performance are being invoiced, present such costs separately from other Project Implementation Work Costs.
- (e) For Project Implementation Work Costs payable on a reimbursable basis, provide Cost Substantiation for the Project Implementation Cost for which reimbursement is sought, including copies of all documentation reasonably necessary to demonstrate that the reimbursable Project Implementation Cost has been paid or incurred.
- (f) For Project Implementation Work Costs payable on a lump sum basis, provide copies of all documentation reasonably necessary to demonstrate the value of the Project Implementation Work in place.

All such documentation shall be in a format and a level of detail reasonably acceptable to the KRRC. The Schedule of Values shall set forth those items that will be payable on a reimbursable basis (item (e) above) and on a lump sum basis (item (f) above).

8.2.5 Discounts, Rebates and Refunds.

All cash discounts, trade discounts, rebates, refunds and returns from the sale of surplus materials and equipment shall be reported and accrue to the benefit of the KRRC and serve to offset the Project Implementation Work Costs.

8.3. PROJECT IMPLEMENTATION WORK COSTS

“Project Implementation Work Costs” means the reasonable and necessary costs paid or incurred by the Project Company in the proper performance of the Project Implementation Work (including costs resulting from the occurrence of the risks assumed by the Project Company under the Project Agreement) that (1) are described in and meet the requirements of this Section, and (2) are not Unallowable Costs.

As used in this Section, “reasonable and necessary costs paid or incurred by the Project Company in the proper performance of the Project Implementation Work” includes: (1) costs of Project Implementation Work necessitated by ordinary mistakes or inadvertence; (2) costs incurred in repairing or correcting defective, damaged or non-conforming Project Implementation Work (including any warranty or corrective Project Implementation Work performed after Milestone Substantial Completion); (3) additional costs incurred due to Subcontractor delay or non-performance; (4) costs incurred in performing corrective action needed to address a failure to demonstrate compliance with the requirements for Milestone Substantial Completion; and (5) Uncontrollable Circumstance Costs, in all cases except to the extent any such costs constitute Unallowable Costs. The Project Company Contingency may be used to pay such costs as provided in Attachment 8C (Schedule of Values and Project Company Contingency).

8.3.1 Third-Party Professional Services Fees.

- (a) Professional fees and expenses payable by the Project Company to design engineers for design engineering services under third-party design Subcontracts.
- (b) Fees and expenses payable by the Project Company for professional services under third-party professional services Subcontracts for other professional services, including accounting, planning, surveying, consulting and other professional services.

8.3.2 Project Implementation Work Subcontractor and Major Equipment Supplier Costs.

An amount equal to the amounts properly payable by the Project Company to Subcontractors for Project Implementation Work performed under Subcontracts for construction, demolition and restoration and for major equipment entered into in accordance with the procedures and requirements set forth in Section 8.4 (Self-Performance and Subcontractor Selection) of this Project Agreement. No Subcontract shall provide for payment of Unallowable Costs.

8.3.3 Project Company’s Own Labor Costs.

Except to the extent that any of the following costs are supervisory and administrative personnel costs and, as such, constitute General Conditions Costs:

- (a) Wages or salaries of professional and non-professional direct employees of the Project Company based at the Project Site and performing Project Implementation Work at the Project Site, and wages and salaries of Key Personnel, wherever based. The costs for any such personnel of the Project Company who perform professional services shall be calculated on the basis of the rates set forth in Attachment 8B (Professional Personnel Rate Schedule) to this Appendix or, if applicable, on the basis of prevailing market rates for professionals performing similar services. Such rates are not subject to audit. The parties acknowledge and agree that the rates set forth in Attachment 8B

(Professional Personnel Rate Schedule) will be escalated in accordance with Attachment 8B. The parties further acknowledge and agree that adjustments for wages and salaries of non-professional employees, to account for inflation, will be reflected in the applicable prevailing wage rate schedules established by the States.

- (b) Wages and salaries paid to employees of the Project Company described in item (a) of this subsection may include compensation in excess of the applicable State prevailing wages, as and to the extent needed to retain safe and dependable craft workers in light of the remote location of the Project Site.
- (c) Costs reasonably paid or incurred by the Project Company for employee benefits, premiums, taxes, insurance, contributions and assessments required by law, collective bargaining agreements and, for personnel not covered by such agreements, customary benefits such as sick leave, medical and health benefits, holidays, vacations, retirement and pension contributions, paid by the Project Company, excluding bonuses, as and to the extent such costs are based on wages and salaries paid to non-professional employees and craft workers of the Project Company described in item (a) of this subsection.
- (d) The cost of travel, accommodations, subsistence and meals for (i) Project Company employees described in item (a) of this subsection; and (ii) Project Company employees whose wages or salaries constitute General Conditions Costs, in any case necessarily and directly incurred in connection with the performance of Project Implementation Work, as approved by the KRRC acting reasonably. The parties acknowledge and agree that the KRRC will not pay for any costs incurred in this item (d) in excess of the then prevailing and applicable General Services Administration (GSA) per diem rates.

8.3.4 Costs of Materials, Equipment and Supplies.

Except to the extent any of the following constitute General Conditions Costs or costs paid or incurred under Subcontracts with Suppliers for Major Equipment:

- (a) Costs, including transportation, inspection, testing, storage and handling, of materials, equipment and supplies incorporated, to be incorporated or reasonably used in completing the Project Implementation Work.
- (b) Costs of materials, equipment and supplies, described in item (c) of this subsection, in excess of those actually installed to allow for reasonable waste and spoilage. Unused excess materials, equipment and supplies, if any, shall become the KRRC's property at the completion of the Project Implementation Work or, at the KRRC's option, shall be sold by the Project Company. Any amounts realized from such sales shall be credited to the KRRC as a deduction from the Contract Price.
- (c) Costs, including transportation and storage, installation, maintenance, dismantling and removal of materials, supplies, temporary facilities, machinery, equipment and hand tools not customarily owned by the construction, demolition and reconstruction workers, that are provided by the Project Company at the Project Site and fully consumed in the performance of the Project Implementation Work; and costs (less salvage value) of such items if not fully consumed, whether sold to others or retained by the Project Company. The basis for the cost of items previously used by the Project Company shall be fair market value.

- (d) Rental charges and the costs of transportation, installation, minor repairs and replacements, dismantling and removal of temporary facilities, machinery, equipment and hand tools not customarily owned by the construction, demolition and reconstruction workers, which are provided by the Project Company at the Project Site, whether rented from the Project Company or others, and incurred in the performance of the Project Implementation Work. Rates and quantities of equipment rented shall be subject to the KRRC's prior written approval.
- (e) Costs of materials and equipment suitably stored off the Project Site at a mutually acceptable location, if approved in advance in writing by the KRRC.

8.3.5 Other Costs.

Except to the extent any of the following constitute General Conditions Costs:

- (a) Premiums for the Performance Bond and the Payment Bond required by Section 16.2 (Bonds) of this Project Agreement.
- (b) Premiums and fees for Required Insurance, except to the extent such premiums and fees constitute Unallowable Costs in Section 8.4.2 (Unallowable Costs) of this Appendix. **[DRAFTING NOTE: AWAITING FINAL REVIEW BY AON TO LIST ALL PROJECT-SPECIFIC POLICIES.]**
- (c) Costs of handing, removal and disposal of Hazardous Material and remediating Hazardous Environmental Conditions (except as provided in subsection 6.5(A) (Project Company Responsibilities and Indemnity) of this Project Agreement).
- (d) Fuel and utility costs paid or incurred in the performance of the Project Implementation Work.
- (e) Sales, use or similar taxes, tariffs or duties imposed by a Governmental Body and incurred by the Project Company in the performance of the Project Implementation Work for which the Project Company is not able to obtain an exemption under Applicable Law.
- (f) Costs for obtaining and maintaining Project Company-Managed Governmental Approvals, and assisting KRRC in obtaining and maintaining KRRC-Managed Governmental Approvals.
- (g) Fees of laboratories for tests required by this Project Agreement.
- (h) Royalties and license fees paid for the use of a particular design, process or product required by this Project Agreement.
- (i) Any other reasonable and necessary costs paid or incurred by the Project Company in the proper performance of the Project Implementation Work, as described in the second paragraph of Section 8.3 of this Appendix.

8.3.6 General Conditions Costs.

The Project Company will incur and be paid for certain General Conditions Costs in connection with the performance of the Project Implementation Work. Such General Conditions Costs shall include only the items specified in Attachment 8A (Description of General Conditions

Costs) to this Appendix. In no event shall any General Conditions Costs be duplicative with any other Project Implementation Work Costs specified in Section 8.3 of this Appendix.

8.4. UNALLOWABLE COSTS

8.4.1 No Payment Obligation.

Notwithstanding any other provision of this Project Agreement, the KRRC shall have no obligation to pay the Project Company for any Unallowable Costs.

8.4.2 Unallowable Costs Defined.

“Unallowable Costs” means:

- (a) Costs for wages, salaries and benefits for non-professional employees and craft workers, as and to the extent they exceed wage, salary and benefit rates, fees or compensation customarily paid for similar services, in a similar locale, by comparably qualified non-professional employees and craft workers.
- (b) Any costs incurred in handling disputes or litigation with Subcontractors or any other third party, except as such costs are reasonably incurred with respect to Subcontractors pursuant to Attachment 8C (Schedule of Values and Project Company Contingency).
- (c) Salaries and other compensation for the Project Company’s personnel stationed at the Project Company’s principal office or branch offices other than the Project Site, except as provided in Section 8.3.3 (Project Company’s Own Labor Costs) and Attachment 8A (Description of General Conditions Costs) of this Appendix.
- (d) Overhead, office and general and administrative expenses at any location, other than at the Project Site, except as provided in Section 8.3.3 (Project Company’s Own Labor Costs) and Attachment 8A (Description of General Conditions Costs) of this Appendix.
- (e) The cost of the capital (including interest on capital) used in the performance of the Project Implementation Work or otherwise.
- (f) Rental costs of machinery and equipment, except as specifically provided for in item (d) of Section 8.3.4 (Costs of Materials, Equipment and Supplies) of this Appendix.
- (g) Costs incurred as a result of the negligence or willful misconduct of the Project Company, any Affiliate, any Subcontractor or any other party performing any aspect of the Project Implementation Work.
- (h) Fines, penalties, sanctions or impositions assessed or imposed by any Governmental Body as a result of Project Company Fault, including violations of or non-compliance with any Governmental Approval.
- (i) Any costs relating to Regulated Substances or Regulated Site Conditions for which the Project Company is responsible under Section 6.5 (Regulated Site Conditions) of this Project Agreement.

- (j) Any cost relating to the Project Company's indemnification obligations hereunder.
- (k) Premiums or fees payable by the Project Company for the following Required Insurance: (a) **[DRAFTING NOTE: TO BE COMPLETED UPON THE RESOLUTION OF AON'S REVIEW OF APPENDIX 9 AND RELATED INSURANCE ISSUES, WITH THE GOAL OF IDENTIFIED SUCH INSURANCE WHICH WILL BE NON-COMPENSABLE BECAUSE SUCH POLICIES ARE ACQUIRED UNDER THE PROJECT COMPANY'S CORPORATE POLICY.]**
- (l) The cost of any deductibles, self-insured retentions and exceedances incurred under any Required Insurance.
- (m) Travel and subsistence expenses, in excess of those specifically provided for in subsection 8.3.3 (Project Company's Own Labor Costs) of this Appendix.
- (n) Legal costs incurred for any reason.
- (o) The fees of independent experts hired to assist in connection with dispute resolution.
- (p) Amounts required to be paid the Project Company or any Subcontractor for federal or State income, franchise or other business Taxes.
- (q) Any costs associated with establishment of a joint venture (or other legal entity), including registration and accounting costs.
- (r) Any costs that would cause the Guaranteed Maximum Price to be exceeded.
- (s) Any other costs specifically identified as "Unallowable Costs" in this Project Agreement.

8.5. PROJECT COMPANY FEE

The "Project Company Fee" is an amount equal to ■■■% of the Project Implementation Work Costs (other than the General Conditions Costs and the costs of the Performance Bond and the Payment Bond). The Project Company Fee is an amount attributable to profit and risk, and includes consideration for all costs that the Project Company may incur in connection with or related to the Project that are not specifically compensable hereunder as Project Implementation Work Costs. The Project Company acknowledges and agrees that full consideration for all Unallowable Costs has been taken account of, and priced into, the Project Company Fee.

8.6. GUARANTEED MAXIMUM PRICE

8.6.1 Guaranteed Maximum Price Generally.

The KRRC shall pay the Project Company the Contract Price for the Project Implementation Work, subject to the Guaranteed Maximum Price calculated in accordance with this Section. The "Guaranteed Maximum Price" shall be the sum of (1) the Base Guaranteed Maximum Price, and (2) the Base Guaranteed Maximum Price Adjustments. The Guaranteed Maximum Price represents the absolute limit of the total of all amounts payable to the Project Company by the KRRC for the performance of the Project Implementation Work. In the event additional amounts are required to be expended over and above the Guaranteed Maximum Price to

perform the Project Implementation Work and achieve Project Final Completion, liability for and payment of such additional amounts shall be the sole responsibility of the Project Company. The KRRC shall not be liable for any such amounts, and the Project Company shall not pursue any claim for any such additional amounts against the KRRC. Notwithstanding any reference in the Project Agreement to the terms “mark-up” or “profit”, the Project Company acknowledges that (1) the KRRC is not guaranteeing the Project Company any profit, a particular level of profit, or the avoidance of any loss in the overall performance of the Project Implementation Work, and (2) the obligation of the Project Company to complete the Project Implementation Work may result in a loss or in a mark-up and profit that is less than the mark-up and profit amounts anticipated by the Project Company in proposing its Project Company Fee, in making its GMP Project Submittal, and in entering into this Project Agreement.

8.6.2 Base Guaranteed Maximum Price.

The “Base Guaranteed Maximum Price” is [_____]. **[Note: To be negotiated based on the GMP Project Submittal and incorporated in this Section on the GMP Contract Amendment Date.]** Except as provided in Section 8.6.3 (Base Guaranteed Maximum Price Adjustments) of this Appendix, the Base Guaranteed Maximum Price shall not be increased for any reason.

8.6.3 Base Guaranteed Maximum Price Adjustments.

The adjustments to the Base Guaranteed Maximum Price provided for in this subsection constitute the “Base Guaranteed Maximum Price Adjustments”, and each adjustment shall be reflected in a Contract Administration Memorandum. The Base Guaranteed Maximum Price shall be adjusted (increased or decreased) only to reflect adjustments required on account of:

- (a) Uncontrollable Circumstances generally, as provided in Section 14.3 (Uncontrollable Circumstances Relief) of this Project Agreement);
- (b) Project Design Requirements Changes made under Section 6.9 (Other Changes to the Project Technical Requirements) of this Project Agreement; or
- (c) Unilateral Change Directives made under Section 6.10 (Unilateral Change Directives) of this Project Agreement.

8.6.4 Value of Base Guaranteed Maximum Price Adjustments.

The value of a Base Guaranteed Maximum Price Adjustment shall be determined as follows:

- (a) Where the Project Implementation Work involved is covered by unit prices contained in this Project Agreement, by application of such unit prices to the quantities of the items involved;
- (b) To the extent unit prices are not applicable, by a mutually agreed lump sum; or
- (c) To the extent unit prices are not applicable and the parties are unable to reach agreement on a lump-sum value, on the basis of the Project Implementation Work Costs of the associated Project Implementation Work, as determined in accordance with this Appendix.

A Base Guaranteed Maximum Price Adjustment may provide for mark-up payable to Subcontractors where Project Implementation Work is performed through Subcontracts. Any

such Subcontractor mark-up shall not exceed (a) for the Subcontractor who actually performs or furnishes the additional Project Implementation Work, 15% of the costs incurred by such Subcontractor in respect of labor, materials, equipment and supplies, and (b) for any higher tier Subcontractor, 5% of the amount paid to the next lower tier Subcontractor.

8.7. SHARED SAVINGS AMOUNT

8.7.1 Entitlement to Shared Savings Amount

In the event that upon Project Final Completion the Contract Price is less than an amount equal to (1) the Guaranteed Maximum Price minus (2) the Project Company Contingency, as each such amount is finally determined in accordance with this Appendix, the KRRC shall pay the Project Company an amount equal to 40% of the difference between the Guaranteed Maximum Price (minus the Project Company Contingency) and the Contract Price (the "Shared Savings Amount"). The Project Company Contingency is the dollar amount set forth in the definition thereof in Section 8.2.3 of this Appendix, and shall be applied irrespective of any amount actually expended for Project Implementation Work Costs from the Project Company Contingency. The Shared Savings Amount shall be paid as part of the final payment to the Project Company in accordance with Section 9.5 (Payment Upon Milestone Final Completion) of this Project Agreement.

8.7.2 Example Shared Savings Amount Calculation

By way of example, if the Guaranteed Maximum Price (which is inclusive of the Project Company Contingency) is \$250,000,000 and the Project Company Contingency is \$10,000,000, then (a) a Contract Price of \$220,000,000 will result in a Shared Savings Amount of \$8,000,000 (a \$250,000,000 Guaranteed Maximum Price less a \$10,000,000 Project Company Contingency equals \$240,000,000; less a \$220,000,000 Contract Price equals \$20,000,000; multiplied by a 40% shared savings factor equals \$8,000,000); and (b) a Contract Price of \$245,000,000 will result in no Shared Savings Amount because the Contract Price exceeds \$240,000,000 (the Guaranteed Maximum Price less the Project Company Contingency).

ATTACHMENT 8A**DESCRIPTION OF GENERAL CONDITIONS COSTS****GENERAL CONDITIONS COSTS**

In connection with the Project Implementation Work, the Project Company is responsible for the General Conditions Costs, as well as the performance of the related obligations, identified in this Section. The General Conditions Costs shall constitute Project Implementation Work Costs, but shall be separately stated from other Project Implementation Work Costs in each Payment Request and the Schedule of Values. The Project Company Fee shall not be applied to the General Conditions Costs. The General Conditions Costs consist solely and exclusively of costs incurred for the following items with respect to the Project Implementation Work:

(1) Project Company Home Office Employee Supervisory and Administrative Personnel Costs

Costs of base wages or salaries of supervisory and administrative personnel of the Project Company stationed at the Project Company's principal or branch offices and engaged in the performance of the Project Implementation Work (except as provided in subsection 8.3.3 (Project Company's Own Labor Costs)) of this Appendix.

(2) Field Office and Project Implementation Work Supply Costs for Project Company Staff Only

- Project Company field office mobilization and demobilization
- Office trailer rental
- Office furniture and equipment
- Office janitorial
- Document reproduction services (off-site or custom)
- Copy machines, fax machines, printers, scanners and paper shredders
- Office computers, software and maintenance.
- Office telephones, and telephone and internet service
- Accounting and data processing costs
- Jobsite radios/cellular phones
- Postage, courier, and express delivery
- Scheduling expenses
- Job travel, including fuel and vehicle
- Job meeting expenses
- Temporary parking and laydown areas
- Storage facilities, both on and off site
- Tools and tool shed
- Surveying equipment and supplies
- Office supplies
- Partnering sessions
- Project redline drawings
- Project specific signage
- Reference manuals
- Employee identification system

(3) Temporary Amenities for Project Company Project Site activities:

- Temporary toilets
- Temporary fire protection
- Project Site security
- Traffic control equipment rental
- Fencing, barricades, partitions and protected walkways
- Temporary water distribution and meters
- Temporary power generation
- Temporary and emergency lighting
- Site erosion control
- Drinking water
- Temporary construction, demolition and restoration facilities and services
- Temporary heat and ventilation

(4) Site Cleanup

- Daily site cleanup and dumpsters
- Cleanup at Milestone Substantial Completion
- Cleanup at Milestone Final Completion

(5) Project Implementation Work Trade Training Program**(6) Health and Safety Program****(7) Project Information and Documentation**

- Project photographs
- Pre-Project Implementation Work video

The Klamath River Renewal Corporation

Appendix 8
Attachment 8B
Professional Personnel Cost Schedule

ATTACHMENT 8B

PROFESSIONAL PERSONNEL COST SCHEDULE

**[To be Finalized on the GMP Contract Amendment Date
Based on the GMP Project Submittal]**

ATTACHMENT 8C**SCHEDULE OF VALUES AND PROJECT COMPANY CONTINGENCY****GENERAL**

The purpose of this Attachment is (1) to define the requirements for the Project Company's preparation of a Schedule of Values and the Project Company Contingency, which will be used as the basis for payments of the Contract Price pursuant to Article 9 (Compensation) of this Project Agreement, and (2) to describe the manner in which payment of the Contract Price will be made based on the Schedule of Values and the Project Company Contingency. **[The Schedule of Values and the Project Company Contingency will be negotiated based on the GMP Project Submittal, and incorporated in this Attachment 8C on the GMP Contract Amendment Date]**

EARLY PROJECT IMPLEMENTATION WORK PACKAGES

As provided in subsection 5.7(F) (Complete Early Work Package Pricing) of this Project Agreement, the parties intend that each Early Design-Build Work Package Amendment will contain complete pricing for the Project Implementation Work covered by the Early Project Implementation Work Package, and that a schedule of values and contingency will be established for such Early Project Implementation Work Package separate and apart from the Schedule of Values and Project Company Contingency established on the GMP Contract Amendment Date for the balance of the Project Implementation Work.

TOTAL SCHEDULE OF VALUES AMOUNT

The sum of all amounts comprising the line items in the initial Schedule of Values shall be equal to the total amount of the reasonably estimated costs of achieving each Milestone Substantial Completion, as such total amount of reasonably estimated costs is negotiated by the parties pursuant to subsection 5.9(E) (Base Guaranteed Maximum Price Negotiating Principles) of this Project Agreement. The total Schedule of Values amount, and the line items in the Schedule of Values, shall be adjusted appropriately by agreement of the parties to account for Base Guaranteed Maximum Price Adjustments.

PROJECT COMPANY CONTINGENCY AMOUNT

The Project Company Contingency amount shall be a single stated dollar amount equal to the amount negotiated by the parties pursuant to subsection 5.9(E) (Base Guaranteed Maximum Price Negotiating Principles) of this Project Agreement.

SUM OF THE SCHEDULE OF VALUES AMOUNT AND THE PROJECT COMPANY CONTINGENCY AMOUNT

The sum of the total Schedule of Values amount and the Project Company Contingency amount shall be equal to the Base Guaranteed Maximum Price.

PREPARATION OF THE SCHEDULE OF VALUES

As part of the GMP Project Submittal, the Project Company shall prepare a Schedule of Values identifying, on a line item basis, costs of major items of Project Implementation Work and other costs in accordance with this Attachment, and which shall include a Project Company Contingency separately stated as a block amount.

The Klamath River Renewal Corporation

Appendix 8
Attachment 8C
Schedule of Values and
Project Company Contingency

The Schedule of Values shall be consistent with the work scope and cost breakdown structure presented in the GMP Project Submittal, as negotiated and agreed to by the KRRC. The Schedule of Values shall assign prices to major elements of the Project Implementation Work based on costs associated with scheduled activities for each such element.

The Schedule of Values shall:

- (a) Be broken down by each structure at the Project Site and show each specification division within each structure;
- (b) Show the division of work between the Project Company and each of the Subcontractors;
- (c) Include an item for:
 - (1) The General Conditions Costs;
 - (2) The Project Company Fee;
 - (3) The Required Insurance, the Performance Bond and the Payment Bond; and
 - (4) The Project Company Contingency.

The Project Company shall provide supporting data, including certified payrolls, as requested by the KRRC for any Schedule of Values item. The final Schedule of Values must be approved by the KRRC.

USE OF THE PROJECT COMPANY CONTINGENCY

The Project Company shall be compensated by receiving payments of the Contract Price based on the Schedule of Values line items. The Project Company Contingency shall be used for payment of Project Implementation Work Costs only as provided in this Section.

In the event the cost for completing Project Implementation Work described in any particular Schedule of Values line item exceeds the Schedule of Values dollar amount listed for such line item, the Project Company shall have the right to receive compensation for such excess amounts from any remaining balance in the Project Company Contingency. If and when the Project Company Contingency has been fully used in compensating the Project Company for such excess amounts, the Project Company shall not be entitled to any compensation for costs of Project Implementation Work exceeding the Schedule of Values line item relating to such cost (except as provided below in "Use of Line Item Savings"), notwithstanding the fact that the Project Company has paid or incurred Project Implementation Work Costs in excess of such line item in the Schedule of Values; provided, however, that upon Project Final Completion the Project Company shall be entitled to receive compensation for such excess Project Implementation Work Costs to the extent that payment of such costs does not cause the Project Implementation Work Costs to exceed the Guaranteed Maximum Price.

The Project Company shall keep and provide the KRRC with an ongoing record of the original amount of the Project Company Contingency, all uses thereof under this Appendix, and the remaining balance of the Project Company Contingency at any time. The Project Company shall provide the KRRC with notice of all anticipated charges against the Project Company Contingency, and shall provide the KRRC as part of the monthly status report all reasonably

foreseeable potential uses of the Project Company Contingency in the upcoming three month period. Any use of the Project Company Contingency must be clearly identified in the associated Payment Request.

USE OF LINE ITEM SAVINGS

In administering payment of the Contract Price based on the Schedule of Values line items, the parties acknowledge that the Project Implementation Work Costs associated with any particular line item may be less than the dollar amount provided for such line item in the Schedule of Values. The Project Company may request at any time a determination by the KRRC that the Project Implementation Work Costs associated with a particular Schedule of Values line item are reasonably projected to be less than the dollar amount provided for such line item in the Schedule of Values. The KRRC shall have the right, acting reasonably, to approve or disapprove any such request. In the event the KRRC approves any such request, the dollar value associated with the line item cost underage shall be available to be requested by and paid to the Project Company in the event the Project Implementation Work Costs associated with another particular line item exceed the Schedule of Values dollar amount listed for such line item. Such line item savings amounts shall be in addition to any Project Company Contingency amounts that may be available to pay such Schedule of Values line item excess costs.

DAMAGE TO THE PROJECT AND INSURANCE RECOVERIES

The costs of repairing any damage to the Project constitute Project Implementation Work Costs, and (1) are payable to the Project Company as part of the Project Implementation Work Costs, as provided in Section 8.3 (Project Implementation Work Costs) of this Appendix, (2) shall result in an appropriate revision of the Schedule of Values, and (3) shall result in a Base Guaranteed Maximum Price Adjustment, as provided in subsection 8.6.3 (Base Guaranteed Maximum Price Adjustments) of this Appendix. All recoveries under policies of Required Insurance on account of any damage to the Project shall be applied to the payment of such repair costs, as provided in Article 13 (Insurance) of this Project Agreement.

SUBCONTRACTOR AND SURETY RECOVERIES

A substantial portion of the Project Implementation Work of the Project is expected to be performed by Project Implementation Work Subcontractors. The risks of delay and non-performance by Subcontractors are borne by the Project Company, and costs incurred by the Project Company that result from the occurrence of such risks constitute Project Implementation Work Costs payable by the KRRC from the Project Company Contingency hereunder, subject to the Guaranteed Maximum Price. All payments from the Project Company Contingency for costs incurred as a result of the occurrence of the risk of Subcontractor delay or non-performance shall be separately identified and recorded. In the event the Project Company, in the exercise of its mitigation duties under this Project Agreement, receives any judgment or settlement awards or otherwise makes any financial recoveries from Subcontractors or their guarantors or sureties on account of any such delays or non-performance, the amounts so received (net of reasonable enforcement costs), whether before or after Project Final Completion, shall be paid by the Project Company first to KRRC, up to the amount of any Project Company Contingency payments made due to the occurrence of such risks. Any remaining amounts then may be retained by the Project Company for its own account. The obligation of the Project Company to take such mitigation measures and to make such payments to the KRRC shall survive termination of this Project Agreement.

The Klamath River Renewal Corporation

Appendix 8
Attachment 8D
Initial Monthly Cash Flow Schedule

ATTACHMENT 8D

INITIAL MONTHLY CASH FLOW SCHEDULE

[Note: The Initial Monthly Cash Flow Schedule will be finalized on the GMP Contract Amendment Date based on the GMP Project Submittal, and attached to Appendix 8 as part of this Attachment 8D]

APPENDIX 9
INSURANCE REQUIREMENTS

APPENDIX 9**INSURANCE REQUIREMENTS****9.1. INSURANCE REQUIREMENTS GENERALLY****9.1.1 Maintenance of Insurance.**

The Project Company shall obtain and keep in force, or cause to be obtained and kept in force, the policies of insurance described below in accordance with the terms of this Appendix and Article 13 (Insurance) of this Project Agreement. By requiring the insurance herein, the KRRC does not represent that the insurance coverage and limits will necessarily be adequate to protect the Project Company and such coverage and limits shall not be deemed as a limitation on the Project Company's liability under the indemnities granted to the KRRC in this Project Agreement. Each policy shall be obtained and be in force prior to the performance of any work or commencement of any activity intended to be insured by each policy. To the extent permitted by Applicable Law, the KRRC reserves the right to adjust or waive any insurance requirements contained in this Appendix and applicable to the Project Agreement.

9.1.2 Compliance with Insurance and Bonding Requirements.

The Project Company's failure to comply with all insurance and bonding requirements set forth in this Project Agreement shall not relieve the Project Company from any liability under this Project Agreement. The Project Company's obligations to comply with all insurance and bonding requirements set forth in this Project Agreement shall not be construed to conflict with or limit the Project Company's indemnification obligations under this Project Agreement.

9.2. INSURANCE DURING THE PRELIMINARY SERVICES PERIOD

The insurance requirements described in this Section 9.2 reflect the parties' expectations as of the Contract Date. The parties intend to continue to consider the optimal insurance program throughout the Preliminary Services Period, including the specific structure of the project-specific professional liability/errors or omissions liability insurance policy contemplated by Section 9.2.1. The parties acknowledge and agree that the requirements set forth in this Section 9.2 may be revised during the Preliminary Services Period, by the mutual agreement of the KRRC and the Project Company. The KRRC shall, consistent with the KHSA, consult with the States and PacifiCorp before agreeing to any changes to this Section 9.2.

During the Preliminary Services Period, the Project Company shall provide the insurance required by this Section 9.2 through the general corporate policies of the Project Company or its Affiliates, except as provided in Section 9.2.1 (Professional Liability/Errors or Omissions Liability Insurance) of this Appendix with respect to a project-specific policy of a professional liability/errors or omissions liability insurance policy.

The Project Company shall obtain, by itself or through a Subcontractor, and keep in force throughout the Preliminary Services Period:

9.2.1 Professional Liability/Errors or Omissions Liability Insurance.

A professional liability/errors or omissions liability insurance policy, covering liabilities arising out of all professional services rendered by or on behalf of the Project Company related to professional, advisory, architectural, engineering, environmental, design and survey services for the Project, which policy shall be provided under the Project Company's corporate policy. For as long as the Project is covered by the Project Company's professional liability/errors or

omissions corporate policy, the Project Company shall not make any material changes to such corporate policy after the Contract Date without the KRRC's approval, acting reasonably.

The parties acknowledge and agree that a project-specific professional liability/errors or omissions liability insurance policy will likely be required before the Project Implementation Contract Amendment Date. The parties intend to continue to consider the specific structure and requirements of the project-specific professional liability/errors or omissions liability insurance policy. Such policy shall at a minimum (A) ensure that the KRRC is able to make a claim under such insurance policy; (B) be in an amount not less than \$25 million per claim and in the aggregate (this shall be a single non-reinstating limit) on a "claims-made" basis; and (C) have a retroactive date effective before the commencement of any design, including preliminary design, and shall not include any exclusionary language relating to prior acts applying to any pre-award professional services provided by any insured. The parties shall work together, given market conditions and requirements, to acquire such project-specific professional liability/errors or omissions liability insurance policy at the appropriate time. The KRRC shall pay the Project Company for the cost of the project-specific policy when it is acquired by the Project Company. The Project Company shall not acquire such project-specific policy without the KRRC's consent, acting reasonably.

9.2.2 Business Automobile Liability.

A business automobile liability insurance policy with limits of liability of not less than \$10 million combined single limit for bodily injury and property damage, each accident, which requirement may be met by any combination of primary and excess coverage so long as the excess is as broad as specified for underlying coverage. The insurance must cover liability arising from any motor vehicle, including owned, hired or non-owned vehicles or those assigned to or used in connection with the performance of the Project Implementation Work and include a Motor Carrier Act Endorsement and contractual liability coverage. The policy must provide pollution cover and evidence financial responsibility pursuant to CA 9948 and MCS 90.

Named Insured: Project Company

Additional Insured: KRRC and all other Project Company Indemnitees

9.2.3 Commercial General Liability.

A commercial general liability insurance policy (coverage shall be as broad as provided by Insurance Services Office Commercial General Liability coverage ("occurrence" form CG 0001)) written on an occurrence basis and covering liabilities arising out of the performance of the Preliminary Services Work, including independent liability contractors, products and completed operations, personal and advertising liability, premises/operations, bodily injury and property damage liability and liability assumed under an insured contract. The policy shall not contain exclusions for property damage from explosion, collapse or underground hazard, or construction defects. The insurance shall apply separately for each insured against whom a claim is made or a lawsuit is brought, subject only to the insurance policy limits of liability. This insurance policy shall:

- (a) have coverage for any one occurrence or claim of not less than \$2 million per occurrence, \$4 million products completed operations, and a \$4 million aggregate limit applicable solely to the performance of the Project Implementation Work, which requirement may be met with any combination of primary and excess coverage so long as the excess coverage is as broad as specified for underlying coverage;

- (b) be maintained throughout the Term until Project Final Completion;
- (c) the products and completed operations liability coverage shall be maintained for a period of not less than 10 years following Project Final Completion or the Termination Date, whichever occurs first;
- (d) provide that defense costs are outside the limits;
- (e) provide for sudden and accidental pollution 240 hour detection and 240 hour reporting; and
- (f) provide for broad form named insured.

Named Insured: Project Company

Additional Insured: KRRC and all other Project Company Indemnities

9.2.4 Worker's Compensation and Employer's Liability.

A worker's compensation insurance policy as required by Applicable Law, and employer's liability insurance policy having coverage limits of \$1,000,000 for each accident, \$1,000,000 for disease (each employee), and \$1,000,000 for disease (policy limit). Coverage is to also include USL&H (United States Longshore and Harbor Worker's Compensation Act) when required by Applicable Law, voluntary compensation (WC 00 03 11 A) and alternative employer (WC 00 03 01 A).

9.2.5 Excess Liability.

An excess liability insurance policy with limits of liability of not less than \$200,000,000. The insurance coverage shall be as broad as and follow form of the commercial general liability, business automobile liability, and employer's liability coverages required pursuant to Sections 9.2.2 (Business Automobile Liability), 9.2.3 (Commercial General Liability), and 9.2.4 (Worker's Compensation and Employer's Liability) of this Appendix. The policy shall include a drop down provision over the primary policies and a priority of coverage endorsement.

Named Insured: Project Company

Additional Insured: KRRC and all other Project Company Indemnities

9.3. INSURANCE DURING THE PROJECT IMPLEMENTATION PERIOD

[Note: The insurance described in this Section 9.3 reflects the parties' expectations as of the Contract Date. The parties intend, in particular, to continue to study the advantages and disadvantages of utilizing a contractor controlled insurance policy compared to corporate policies with dedicated limits. The parties acknowledge and agree that the requirements set forth in this Section 9.3 may be revised on the GMP Contract Amendment Date, based on changes suggested by the Project Company in the GMP Project Submittal, with the KRRC's approval. The KRRC shall, consistent with the KHSA, consult with the States and PacifiCorp before agreeing to any changes to this Section 9.3.]

The Project Company shall obtain and keep in force, or cause to be obtained and kept in force, upon the earlier of (a) any Early Work Package Amendment Date which requires physical Project Implementation Work at the Project Site, or (b) the Project Implementation Contract

Amendment Date, and throughout the Project Implementation Period the following insurance coverage:

9.3.1 Professional Liability/Errors or Omissions Liability Insurance.

A project-specific professional liability/errors or omissions liability insurance policy that meets the requirements set forth in Section 9.2.1 (Professional Liability/Errors or Omissions Liability Insurance) of this Appendix.

9.3.2 Business Automobile Liability.

A business automobile liability insurance policy, provided through the general corporate policies of the Project Company or its Affiliates, a project-specific policy, or a contractor controlled insurance program, that meets the requirements set forth in Section 9.2.2 (Business Automobile Liability) of this Appendix. If the general corporate policy of the Project Company or its Affiliates is used to satisfy the insurance required by this Section 9.3.2, an endorsement for dedicated limits for the Project, equal to the amounts described herein, shall be provided.

9.3.3 Contractor Controlled Insurance Policy.

A project-specific contractor controlled insurance policy composed of a commercial general liability insurance policy, a worker's compensation and employer's liability insurance policy and an excess liability insurance policy meeting the following requirements:

- (a) A commercial general liability insurance policy covering liabilities that arise out of the performance of the Project Implementation Work that meets the requirements set forth in Section 9.2.3 (Commercial General Liability) of this Appendix;
- (b) A worker's compensation insurance policy and an employer's liability insurance policy that meets the requirements set forth in Section 9.2.4 (Worker's Compensation and Employer's Liability) of this Appendix and includes FEL on an "if any" basis; and
- (c) An excess liability insurance policy that follows form to the general liability, workers compensation and employer's liability coverage and which provides for worldwide coverage, priority of coverage, no contractor limitation, drop down coverage, "pay on behalf of" wording, and defense costs out of the policy limits.

9.3.4 Builder's Risk/Inland Marine.

An "all-risk" builder's risk/inland marine insurance policy obtained on a basis to be agreed upon by the KRRC and the Project Company prior to the Project Implementation Contract Amendment Date, with a limit in an amount not less than the probable maximum loss (PML). The limits for flood, earthquake/earth movement, and soft costs should also be on a PML basis. Coverage shall include all Project Work. The all other perils deductible shall not exceed \$100,000; the flood deductible shall not exceed \$500,000; and the earthquake/earth movement deductible shall not exceed 2% of values at risk at time of loss, subject to a minimum of \$100,000.

Named Insured: Project Company, the KRRC, all other Project Company Indemnitees, and Subcontractors of all tiers performing work at the Project Site or off-site locations covered by the policy

9.3.5 Watercraft and Aircraft Liability.

If the Project Company or any Subcontractor intends to utilize any watercraft, aircraft, helicopters or drones as part of the Project Implementation Work, the Project Company or such Subcontractor must procure and maintain insurance, through the general corporate policies of the Project Company or its Affiliates, project-specific policies, a contractor controlled insurance program or a combination of the foregoing, for claims arising from bodily injury and property damage, with limits not less than the following amounts:

- (a) Watercraft \$5,000,000 per occurrence
- (b) Aircraft \$5,000,000 per occurrence
- (c) Helicopters \$10,000,000 per occurrence
- (d) Drones \$5,000,000 per occurrence

Named Insured: Project Company

Additional Insured: KRRC and all other Project Company Indemnitees

If the general corporate policy of the Project Company or its Affiliates is used to satisfy the insurance required by this Section 9.3.5, an endorsement for dedicated limits for the Project, equal to the amounts described herein, shall be provided.

Watercraft and aircraft liability insurance is not required if the Project Company or a Subcontractor is exclusively using drones under 10 kilograms in weight, so long as such smaller drones are covered by the commercial general liability policy described in Section 9.3.2 (Contractor Controlled Insurance Policy) of this Appendix.

9.3.6 Machinery, Tools and Equipment Insurance.

The Required Insurance hereunder is not intended to cover machinery, tools or equipment owned or rented by the Project Company or its Subcontractors, which are utilized in the performance of the Project Implementation Work but not incorporated into the permanent improvements. The Project Company and its Subcontractors shall, at their own expense, purchase and maintain property insurance coverage for owned, leased or rented machinery, tools or equipment. The Project Company hereby waives, and shall cause its Subcontractors to waive, all rights against the KRRC and all other Project Company Indemnitees for property damage to or loss of use of such machinery, tools or equipment to the extent that such property damage or loss of use is covered by the Project Company's or the Subcontractor's property or equipment floater insurance or other similar property insurance maintained by the Project Company or its Subcontractors. The policies shall provide such waivers of subrogation by endorsement.

9.4. OTHER INSURANCE**9.4.1 In General.**

The Project Company shall obtain and keep in force, or cause to be obtained and kept in force, any other form of insurance and with such limits, in such form, in amounts and for risks as the KRRC, acting reasonably, may require from time to time. The Preliminary Services Fee and Base Guaranteed Maximum Price, as applicable, shall be adjusted through a direct payment from the KRRC to reflect the cost of any such additionally required insurance.

9.4.2 KRRC Provided Contractor's Pollution Liability and Fixed Site Pollution Liability.

The KRRC shall be responsible for acquiring a contractor's pollution liability insurance policy and a fixed site pollution liability insurance policy, each to be written on occurrence and claims made forms, respectively, with limits of not less than \$100 million for each pollution condition and a \$100 million project aggregate limit, covering liability due to pollution caused by or exacerbated by Project Implementation Work and including coverage for clean-up, removal, transportation and disposal and for any sudden and accidental pollution. The policies shall not exclude from coverage claims relating to injuries arising from the presence of lead or asbestos. The policies shall continue such coverage, either through policy renewals or purchase of an extended discovery period, if such coverage is available, for not less than 10 years following Project Final Completion.

9.5. OTHER POLICY REQUIREMENTS**9.5.1 Project Company Waiver of Subrogation.**

All Required Insurance, except the professional liability/errors or omissions liability insurance acquired under Section 9.2.1 and Section 9.3.1 must contain a waiver of subrogation in favor of the KRRC and all other Project Company Indemnitees. The waiver of subrogation endorsement must be attached to the certificate of insurance in order to effectuate waiver of subrogation required hereunder. The Project Company shall require similar waivers by its Subcontractors.

9.5.2 Non-Recourse to KRRC.

All insurance policies shall provide that the insurers shall have no recourse against the KRRC for payment of any premium or assessment and shall contain a severability of interest provision in regard to mutual coverage liability policies.

9.5.3 Additional Insured Requirements.

Required additional insureds are identified for commercial general liability, business automobile liability, builder's risk/inland marine, excess liability and pollution liability insurance in this Appendix.

Additional insured coverage for the KRRC (and all other Project Company Indemnitees) shall apply for defense of claims and damages for injury to persons, including bodily injury, death or any form of personal or advertising injury, or property damage arising out of or resulting from the performance of the work or product, whether caused or alleged to be caused in whole or in part by any negligent act or omission of the Project Company, or any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them or the KRRC or its agents or employees may be liable. See below for acceptable forms. The multiple forms combination shown below, or their equivalent, shall be provided by the Project Company that would be considered Project Implementation Work as defined in ISO form CG 0001. Other Subcontractors or vendors shall provide additional insured status per form CG 2010 or its equivalent. The additional insured endorsements must be attached to the certificate of insurance in order to effectuate the additional insured status required hereunder.

The Project Company's insurance, shall not include any design-build or similar exclusions that would compromise coverages because of the design-build nature of the work to be performed pursuant to this Project Agreement.

The following combinations of ISO forms, or their equivalent, shall be acceptable:

- (a) CG 2010 entitled “Additional Insured - Owners, Lessees or Contractors - Scheduled Person or Organization” and CG 2037 entitled “Additional Insured - Owners, Lessees or Contractors - Completed Operations”; or
- (b) CG 2033 entitled “Additional Insured - Owners, Lessees or Contractors - Automatic Status When Required in Construction Agreement With You” and CG 2037 entitled “Additional Insured - Owners, Lessees or Contractors - Completed Operations”.

9.5.4 Claims Made Liability Insurance.

If any liability insurance purchased by the Project Company has been issued on a “claims made” basis, the Project Company shall comply with the following additional conditions. The limits of liability and extensions as described elsewhere in this Appendix shall remain the same. The Project Company shall either:

- (a) agree to provide certificates of insurance evidencing the required coverages for a period of 10 years after final payment under this Project Agreement. Such certificates shall evidence a retroactive date, no later than the beginning of the Project Company’s or Subcontractor’s work under this Project Agreement; or
- (b) purchase an extended (minimum 10 years) reporting period endorsement for the policy or policies in force during the Term and evidence the purchase of this extended reporting period endorsement by means of a certificate or insurance or a copy of the endorsement itself.

9.6. GENERAL POLICY REQUIREMENTS

Each policy of insurance required under this Appendix shall:

- (a) be issued by a company or companies with a rating of not less than A-VIII in the last available Best’s Rating Guide unless otherwise approved by the KRRC and be authorized to conduct and transact insurance business in the States;
- (b) be in a form approved by the KRRC, such approval not to be unreasonably withheld;
- (c) with the exception of professional liability/errors or omissions liability, worker’s compensation and employers liability, be primary and non-contributing;
- (d) contain an undertaking by the insurers or the insurer’s designated representative to notify the KRRC in writing not less than 30 days before any material change, cancellation or termination (except 10 days for non-payment of premiums); and
- (e) where the KRRC is an additional insured, insure the Project Company Indemnitees (except Subcontractors who are indemnified parties).

If the KRRC is damaged by the failure or neglect of the Project Company to purchase or maintain Required Insurance, without so notifying the KRRC, then the Project Company shall bear all reasonable costs properly attributable thereto.

9.7. EVIDENCE OF INSURANCE**9.7.1 Certificates, Endorsements and Policies.**

The Project Company shall deliver to the KRRC a copy of certificates and policy endorsements (i.e., additional insured, waiver of subrogation) provided by its insurance broker or agent for all Required Insurance within 10 days after receipt of a notice of award of this Project Agreement. All such certificates and policy endorsements must be issued and approved by the KRRC.

Upon the issue of a policy of insurance and annually thereafter, the Project Company shall deliver to the KRRC a copy of certificates and policy endorsements provided by its insurance broker or agent for all Required Insurance. Upon request by the KRRC, the Project Company shall also deliver to the KRRC a copy of policy endorsements and certificates maintained by its Subcontractors. Upon request by the KRRC, the Project Company shall also deliver to the KRRC a copy of the policies, or in lieu thereof, a copy of the declarations pages, main coverage forms and endorsements applicable to this Project Agreement; provided that the Project Company, acting reasonably, may redact proprietary information from such copies. Upon request by the KRRC, the Project Company shall deliver proof of payment of premiums for insurance required to be effected pursuant to this Appendix. No review or approval of any insurance certificate or insurance policy by the KRRC shall derogate from or diminish the KRRC's rights under this Project Agreement.

Before an exposure to loss may occur, the Project Company shall file with the KRRC a copy of each policy that includes insurance coverages required by this Appendix. Each policy shall contain all conditions, definitions, exclusions and endorsements applicable to the coverage for this Project.

9.7.2 Notification of Cancellation or Non-Renewal

A minimum of 30 days written notification must be given by an insurer of any alteration, material change or cancellation or non-renewal of any insurance required under this Project Agreement. Such required notification must be sent via Registered or Certified Mail to the address indicated below:

Klamath River Renewal Corporation
2001 Addison Street, #317
Berkeley, CA 94704

9.8. PREMIUM PAYMENTS, DEDUCTIBLES/RETENTIONS AND COMMISSION ACCEPTANCE

The premium to be expended for all of the above-referenced policies of insurance (and any other Security Instruments) shall be paid by the Project Company. Payment of any deductibles or self-insured retentions applying under any policies shall be the responsibility of the Project Company. The KRRC shall have the right to approve any such deductible or self-insured retention amount designated by the Project Company, such approval not to be unreasonably withheld. The policies of insurance, certificates of insurance and the insurance company or insurance companies issuing such policies (or other Security Instruments) must be acceptable to the KRRC. All companies providing such coverage, for all contracts, regardless of size, must be allowed to conduct and transact business in the States.

9.9. SUBCONTRACTORS

The Project Company shall not allow any Subcontractor to start work on any Subcontract until all insurance required of the Subcontractor has been obtained and approved by the Project Company. The Project Company shall require all Subcontractors to maintain workers compensation and employer's liability, business automobile, commercial general liability, excess liability and any other applicable coverage in the same manner, as applicable, as specified for the Project Company hereunder.

APPENDIX 10

KEY PERSONNEL AND APPROVED SUBCONTRACTORS

APPENDIX 10**KEY PERSONNEL AND APPROVED SUBCONTRACTORS****10.1. PURPOSE**

The purpose of this Appendix is to identify (1) the key management and supervisory personnel proposed to be used by the Project Company in performing the Contract Services and (2) those Subcontractors that the KRRC has approved for use by the Project Company in performing the Contract Services.

10.2. KEY PERSONNEL**10.2.1 Key Personnel Generally.**

As referenced in Section 8.1 (Management) of this Project Agreement, certain key management and supervisory personnel were proposed by the Project Company and shall be used by the Project Company in connection with the performance of the Contract Services (the “Key Personnel”). The Key Personnel are identified in the Project Company’s organization chart(s) as set forth in Attachment 10A to this Appendix. Any change in the Key Personnel shall be subject to review and approval of the KRRC in accordance with Section 8.1 (Management) of this Project Agreement. Resumes for the Key Personnel are included in Attachment 10B and establish the general level of qualifications for the role identified.

10.2.2 Key Personnel.

At a minimum, the Key Personnel shall include the following:

	Project Company Party	Position	Name
1.	Project Company	Project Company Contract Representative	[Insert Name]
2.	Project Company	Project Executive	[Insert Name]
3.	Project Company	Project Manager	[Insert Name]
4.	Project Company	Senior Supervisor	[Insert Name]
5.	[Subcontractor]	Construction Design Coordinator	[Insert Name]
6.	[Subcontractor]	Construction Manager	[Insert Name]
7.	[Subcontractor]	Health and Safety Representative	[Insert Name]
8.	[Subcontractor]	Engineer of Record	[Insert Name]
9.	[Subcontractor]	Civil Design Lead	[Insert Name]
10.	[Subcontractor]	River Restoration Design Lead	[Insert Name]
11.	[Subcontractor]	Habitat Restoration Design Lead	[Insert Name]
12.	[Subcontractor]	Environmental Compliance Lead	[Insert Name]
13.	[Subcontractor]	QA/QC Manager	[Insert Name]
14.	[Subcontractor]	Safety Manager	[Insert Name]
15.	[Subcontractor]	[Insert Position]	[Insert Name]

10.3. SUBCONTRACTORS**10.3.1 Required Subcontractors.**

The Subcontractors with whom the KRRC requires the Project Company to enter into a Subcontract for the performance of certain aspects of the Project Implementation Work are the following: **[Note: To be completed on the GMP Contract Amendment Date.]**

	Subcontractor	Role
1.	[Insert Name/Entity]	[Insert Role]
2.	[Insert Name/Entity]	[Insert Role]
3.	[Insert Name/Entity]	[Insert Role]

10.3.2 Approved Subcontractors.

The Subcontractors that the KRRC has approved as of the Contract Date, and the Project Company is permitted to engage for the Contract Services in accordance with Section 8.4 (Self-Performance and Subcontractor Selection) of this Project Agreement, are the following: **[Note: To be completed on the GMP Contract Amendment Date.]**

	Subcontractor	Role
1.	[Insert Name/Entity]	[Insert Role]
2.	[Insert Name/Entity]	[Insert Role]
3.	[Insert Name/Entity]	[Insert Role]

ATTACHMENT 10A

KEY PERSONNEL ORGANIZATION CHART

[Note: To be completed on the GMP Contract Amendment Date].

ATTACHMENT 10B

KEY PERSONNEL ROLES

[Note: To be completed on the GMP Contract Amendment Date].

ATTACHMENT 10C

SUBCONTRACTING PLAN

[Note: To be completed on the GMP Contract Amendment Date].

Attachment F

Parent Company Guaranty

REPORT ON
RISK MITIGATION AND INSURABILITY
FOR THE
KLAMATH RESTORATION PROJECT

NOVEMBER 13, 2015

PREPARED BY:
HAWKINS DELAFIELD & WOOD LLP

ON BEHALF OF:
AMERICAN RIVERS
CALIFORNIA TROUT
SUSTAINABLE NORTHWEST
TROUT UNLIMITED

EXECUTIVE SUMMARY

This report identifies the major risks associated with the removal of several dams in the Klamath River and site restoration in the Klamath Basin, and assesses the commercial mechanisms available to mitigate such risks. Based on the analysis contained in this report, we believe it is reasonable to draw the following conclusions:

(1) It is likely that the parties will negotiate and execute a series of agreements containing the terms and conditions under which the dam removal and site restoration will be carried out, including an agreement governing the funding of the dam removal and site restoration, an agreement transferring ownership from PacifiCorp to the new owner prior to commencement of the dam removal and site restoration, and an agreement between the new owner and a contractor governing the physical work related to the dam removal and site restoration.

(2) The dam removal and site restoration agreement may be procured on an integrated project delivery basis. Integrated project delivery contracting (a competitive proposal and qualifications-based procurement process which establishes a single point of accountability and transfers, price, performance and schedule risk to the contractor performing the work absent certain defined circumstances) is likely to produce the least cost, least risk dam removal and site restoration agreement.

(3) The Klamath Hydroelectric Settlement Agreement provides for \$450 million in funding for the dam removal and site restoration. The broad definition of the dam removal and site restoration work provides latitude for workscope adjustments (and concomitant re-allocations of the budget) in a manner that would allow the core objectives of the project to be achieved while remaining within this affordability ceiling. For example, if during the procurement process the cost proposed under the most advantageous proposal exceeds the affordability ceiling, the scope of the dam removal and site restoration can be re-defined and the work can be re-bid, subject to stakeholder approval. The dam removal and restoration agreement may also be amended once the physical work has begun to reduce the scope of the work should it become apparent that the original workscope will not be completed within the affordability ceiling. Market sounding surveys can be conducted in advance of commencing a procurement to obtain contractor market commentary on the affordability ceiling.

(4) An advanced planning stage cost analysis appears to have been conducted by the U.S. Department of Interior, heightening its reliability over less developed desktop or rule of thumb estimates. We are not cost estimators and do not assume any responsibility with respect to the accuracy of USDO's project cost estimates or the adequacy of the \$450 million project cost affordability ceiling discussed in item (3). Furthermore, actual costs cannot be known until a procurement process for the actual project contractor is conducted and concluded. Based on our experience with similar projects, however, and taking USDO's project cost estimates at face value, the budget for contingencies on a percentage basis (such as those necessary to deal with uncontrollable circumstances and other risks identified in this report) is at the high end of the range typically established by cost estimators on other projects.

(5) It is reasonable to expect that a performance bond and a comprehensive insurance package can be put in place that will protect the contractor (together with the new owner and other stakeholders as additional insureds) from loss and expense resulting from injury or damage to persons and property resulting from carrying out the dam removal and site restoration work. The comprehensive insurance package would be specifically tailored to the work, and would include core insurance policies such as a commercial general liability policy as well as environmental and professional policies. Further, it is customary to require a contractor to furnish a performance bond from a recognized surety that will serve to protect the new owner against a failure of the contractor to complete the entire work as a result of the contractor's

financial distress. Although the performance bond would not protect against the specific risks identified in this report, it would protect the owner in the event that the contractor's inability to complete the entire work results from one or more of risks identified herein. Special environmental liability contractual indemnities are also available for extraordinary environmental and other risks excluded from insurance coverage.

(6) Accordingly, there is a sound basis for the stakeholders to determine that the risks of the dam removal and site restoration can be reasonably managed, mitigated and insured and that the dam removal and site restoration project may proceed from the planning stage to the contract, procurement and implementation stages.

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1. PURPOSE AND OVERVIEW

1.1 Purpose. The purpose of this report is to identify and assess major risks associated with the proposed removal of four hydroelectric dams on the Upper Klamath River owned by PacifiCorp: the Iron Gate Dam, Copco No. 1 Dam, Copco No. 2 Dam, and J.C. Boyle Dam and certain appurtenant works (collectively, the “Project Assets”). The report also discusses commercial mechanisms by which such risks can be managed, mitigated and insured.

1.2 Klamath Agreements. The Klamath Hydroelectric Settlement Agreement (KHSA), executed on February 18, 2010, the Klamath Basin Restoration Agreement (KBRA), executed on February 18, 2010, and the Upper Klamath Basin Comprehensive Agreement (UKBCA), executed on March 5, 2014 (the “Klamath Agreements”) address the removal of the Project Assets, plus related environmental and economic measures to increase flows for fish in the Klamath River; improvement of the reliability of irrigation water deliveries for agriculture; reintroduction of salmon above the dams and into and above Upper Klamath Lake; investment in site restoration in the Klamath Basin, and in tribal economic revitalization; development of a power program for farmers and ranchers; mitigation to counties for the effects of dam removal; and settlement of water rights disputes. There are currently 45 parties to the KHSA and 43 parties to the KBRA, including Federal agencies, California and Oregon, tribes, counties, irrigators, and conservation and fishing groups. There are 16 parties to the UKBCA comprising the Klamath tribes, the State of Oregon, and Upper Klamath Basin irrigators. The KHSA requires Congressional authorization. An authorizing bill to implement the KHSA is currently pending in Congress (S. 133, “Klamath Basin Water Recovery and Economic Restoration Act of 2015”).

1.3 Hawkins’ Perspective; Limitations. This report has been prepared at the request and for the benefit of our clients, American Rivers, California Trout, Sustainable Northwest and Trout Unlimited. It provides an analysis of Project risk issues and potential mitigation measures from our perspective as legal advisors with national experience in large water infrastructure project procurements and contract negotiations on behalf of governmental project owners. We note that while we have extensive experience as attorneys on projects that are similar to this Project in terms of risk management, we are not providing financial, insurance, environmental, engineering or technical opinions or advice, which should be sought from qualified advisory firms with appropriate professional expertise. In particular, we are not cost estimating experts and nothing in this report should be construed as providing economic or cost estimating advice. A brief firm overview is presented in Attachment 5 (Hawkins Delafield & Wood Firm Description).

1.4 Information Provided by Other Advisors. The portions of this report addressing insurance matters have been prepared by or with the assistance of Willis, a nationally recognized insurance advisory and brokerage firm. Additional information about Willis can be found in Attachment 6 (Willis Firm Description). Environmental Liability Transfer, Inc. provided the information in this report discussing contract indemnification against uninsured environment liabilities and the material in Attachment 2 (Klamath Restoration Project Risk Matrix) concerning available indemnities. Additional information about Environmental Liability Transfer, Inc. can be found in Attachment 7 (Environmental Liability Transfer, Inc. Firm Description). Water and Power Law Group PC furnished the section on permit shields.

1.5 Terminology. This report uses the following terminology:

- Dam Removal and Restoration Agreement: the agreement that will set forth the terms and conditions under which the Project Contractor will remove the dams and restore the site.

- New Project Assets Owner (referred to in the Klamath Agreements as the “dam removal entity” or “DRE”): the entity that will own the Project Assets and cause the Project to be carried out.
- PacifiCorp: the current owner of the Project Assets.
- Project: the activities that will be undertaken by the New Project Assets Owner, including dam removal and site restoration.
- Project Assets: the dams and appurtenant works.
- Project Assets Acquisition Agreement: the agreement that will establish the terms and conditions under which ownership of the Project Assets will be transferred from PacifiCorp to the New Project Assets Owner.
- Project Contractor: the entity that will perform the dam removal and site restoration.
- Project Funders: the State of California and the State of Oregon.
- Project Funding Agreements: the agreements that will set forth the terms and conditions by which the Project Funders will fund the Project.

2. PROJECT IMPLEMENTATION CONTRACT STRUCTURE

2.1 Ownership Risk and Transfer Generally. As a beginning proposition, the owner generally bears the risk of insufficient funding in any project. Owners of large public works as a general rule contract out all or most of the responsibility for performing design and construction work. Once the contract price is established, the degree of cost uncertainty is substantially reduced. Liabilities resulting from the dam removal also will generally attach to the property owner. The Klamath Agreements and proposed federal legislation anticipate the transfer of the Federal Regulatory Energy Commission (FERC) license and Project Assets ownership from PacifiCorp to a dam removal entity or DRE, referred to in this report as the New Project Assets Owner. The New Project Assets Owner, which has not yet been identified, could include a new special purpose entity (for profit or not-for-profit) or an existing or newly formed corporate or governmental entity.

2.2 Contract Structure. Under a likely Project contract structure, the New Project Assets Owner would enter into Project Funding Agreements with the Project Funders and a Project Assets Acquisition Agreement with PacifiCorp; obtain Regulatory Approvals from federal and state agencies; and enter into a Dam Removal and Restoration Agreement with the Project Contractor. A diagram of this Project implementation contract structure is presented in Attachment 1. Short descriptions of these agreements and approvals follow.

2.3 Project Funding Agreements. The New Project Assets Owner can be expected to enter into Project Funding Agreements with California and Oregon. The KHSA provides for \$450 million in funding for the Project. The first source of funding is from PacifiCorp’s ratepayers in California and Oregon. The public utilities commissions in PacifiCorp’s service areas have approved the KHSA and authorized rate recovery, which will total \$200 million by 2020. The ratepayer funds are currently owned by PacifiCorp and held in escrow. In 2014, California voters passed the 2014 Water Bond, which includes \$475 million for performance of certain water settlement agreements. In the event that the initial \$200 million funded by ratepayer surcharges is exhausted, an additional \$250 million is designated from the 2014 Water Bond proceeds. Such bond proceeds are not specifically earmarked for the Project, but the California principal

stakeholders indicate that \$250 million of the \$475 million designated for water settlement agreements will be available for the Project. The bond proceeds are controlled by the California Natural Resources Agency under statute and an appropriation is required before the funds will be available for use for the Project. It is likely that California and Oregon will enter into contractual or regulatory agreements with respect to escrow and use of the funds. These Project Funding Agreements will establish the requirements and process for disbursements of funds from the ratepayer surcharges and the bond proceeds for Project purposes.

2.4 Project Assets Acquisition Agreement. Once the funding structure is established, PacifiCorp is likely to enter into a Project Assets Acquisition Agreement with the New Project Assets Owner. The Project Assets Acquisition Agreement will transfer the FERC license and ownership of the Project Assets to the New Project Assets Owner. As the owner of the Project Assets, the New Project Assets Owner will be the entity that primarily bears the cost and risk of completing the work.

2.5 Regulatory Approvals and Environmental Review. The regulatory process has commenced and will be ongoing throughout Project implementation. In addition, the New Project Assets Owner is generally expected to obtain various local and state approvals, all depending upon the final configuration of the transaction. Those approvals include a point source discharge permit and a dredge permit under the Clean Water Act. Federal approvals also include the §404 U.S. Army Corps of Engineers permit and transfer of the FERC license, which will need to be surrendered in order to effectuate the transaction. The FERC license for the Project Assets expired in 2006. PacifiCorp's new license application is pending before FERC and the Project Assets are currently operating under annual licenses. The U.S. Department of the Interior has completed a final Environmental Impact Statement. The California Environmental Impact Report prepared under the California Environmental Quality Act is drafted, but has not yet been certified. Equivalent environmental regulatory actions will also need to be completed by Oregon.

2.6 Dam Removal and Restoration Agreement. In order to effectuate the dam removal and site restoration, the New Project Assets Owner is likely to enter into a Dam Removal and Restoration Agreement with a Project Contractor under a contract procurement process that is still to be established. The Dam Removal and Restoration Agreement may be procured on an integrated project delivery basis, as further described below under "Integrated Project Delivery Generally", a procurement method that can transfer substantial risk to the Project Contractor.

3. SEQUENCING CONSIDERATIONS

3.1 Activities Prior to the License Transfer. The KHSa anticipates that the transfer of the FERC license for the Project Assets will occur on December 31, 2019, at which point physical dam removal activities can commence. PacifiCorp thus will retain title to the Project Assets while certain planning and development work takes place, and the Project Contractor will begin demolition work on the Project Assets concurrently with the cessation of PacifiCorp's utility operations. Various contracting arrangements are expected to be put in place prior to title transfer and sequenced in a way that permits a procurement for the Project Contractor to be conducted by the New Project Assets Owner before actual ownership of the Project Assets is transferred. Further, it is expected that a considerable period of time (perhaps years) may elapse between the time the FERC licensee (PacifiCorp) files a request to surrender its license and the time a decommissioning order is issued by FERC. The Project Funding Agreements can be expected to be in place as the process of seeking final regulatory approvals proceeds, so that the necessary funds are available for that purpose.

3.2 Term Sheets. In order to manage and coordinate the timing of regulatory approvals, procurement, and title transfer so that Project commencement may begin in 2020, the parties initially could enter into term sheets outlining the principal terms of each agreement and the expected timing. One approach would be to make the Project Funding Agreements and

the Project Assets Acquisition Agreement effective upon execution, but provide that certain conditions must be met before the key obligations to perform begin. If such conditions do not occur by a specified date, the parties could have the right to terminate. This structure would enable the parties to engage in development activities and prepare for dam removal before the New Project Assets Owner actually receives title to the Project Assets. The Dam Removal and Restoration Agreement could have similar conditions subsequent, so that, for example, the Project Contractor could commence design activities in preparation for the title transfer. The term sheets could also include various provisions protecting the interests of the parties in the Project Contractor selection process, such as allowing for input from the primary stakeholders on the definition of workscope and overseeing execution of the work.

4. CONTRACTING FOR DAM REMOVAL AND THE BENEFITS OF INTEGRATED PROJECT DELIVERY

4.1 Integrated Project Delivery Generally. Removing the dams is likely to involve three discrete areas of work: planning and design; actual demolition; and site restoration, including sediment investigation and treatment. It may be possible to arrange for this work to be done separately in segments, or to be aggregated in part or in whole. The industry uses the phrase “integrated project delivery” (IPD) to describe circumstances where multiple aspects of the work are carried out in a single contract. IPD procurements are typically carried out on a competitive proposal basis (where selection is based on the best value proposal, with technical merit and price both considered), rather than on a low bid basis (with price as the only selection factor). Because potential contractors submit competitive proposals and guarantee price, performance and schedule, they are responsible for completing the project and performing the work to specified technical standards by a guaranteed completion date, and for absorbing any costs above a stated total contract price for the work. Daily liquidated damages are payable to the owner for unexcused delay, and the owner is not responsible for cost overruns except those caused by uncontrollable circumstances. Thus, if none of the Project uncontrollable circumstance risks or other relief events noted in this report occur, the Project will be completed by the Project Contractor for a fixed price agreed to at the time the Dam Removal and Restoration Agreement is signed. A parent company guarantor often assures performance of the entire job, and typically provides a performance bond to assure project completion. IPD delivery methods, including traditional design-build and progressive design-build, are described in Attachment 3.

4.2 Benefits of Integrated Project Delivery. IPD may be particularly useful for this Project because it mitigates several elements of project completion risk. It involves a self-selected team of highly qualified firms whose business interests are aligned, decreasing the risk of disputes amongst team members. By addressing multiple aspects of the work in a single contract, IPD also has the key advantage of creating a single point of accountability. This increased integration of the contractual obligations solves the issue of disputes between the designer and the builder, and, through the transfer of design liability, allows for the owner to bring a single claim against both the designer/ builder for flawed work (e.g. if there is an issue with the work as designed, the owner does not have to bring a separate claim against the engineering firm). Furthermore, considering that dam removal is an emerging market, IPD gives teams the freedom to propose to do the work in a creative and innovative manner. Additional benefits of IPD include accelerated delivery, economies of scale and quality.

5. PROJECT DEFINITION AND CONTRACT WORKSCOPE

It is important to recognize that the Dam Removal and Restoration Agreement will define the Project, establish the contractual workscope, and obligate the Project Contractor to perform the work and complete the Project for the contract price on a guaranteed schedule. The definition of the core Project, as set forth in the KHSA, is “physical removal of all or part of each of the [Project Assets] to achieve at a minimum a free-flowing condition and volitional fish passage” (the “Core Project”). The KHSA and the related planning documentation also anticipate an extensive amount of related work, including efforts to restore the site, minimize adverse downstream

impacts resulting from the removal of the Project Assets, and dispose of sediment and debris (“Related Project Work”). The Dam Removal and Restoration Agreement can be structured so as to establish a fixed price for the entirety of the Project; separate fixed prices for the Core Project and the Related Project Work; or even separate fixed prices for various elements of the Related Project Work, together with separate notices to proceed for such elements. Thus, depending on funding availability, work can proceed by segment with known prices for each.

6. RISK OVERVIEW

A general listing of the risks involved in the implementation of the Project is set forth in Attachment 2 (Klamath Restoration Project Risk Matrix). The Risk Matrix blocks out the risks by general category, and indicates the party that will bear the risk and be responsible for its consequences should the risk occur. The responsible party will generally be the Project Contractor, who will be required to complete the Project in a timely manner for a fixed price and on a fixed schedule irrespective of the occurrence of risk. It is generally not commercially reasonable to transfer to the Project Contractor certain risks that are outside the Project Contractor’s ability to manage and control. Such risks (“Uncontrollable Circumstances”) are not priced in the fixed contract price. If they occur, the price (and schedule) will be adjusted appropriately, resulting in potential extra expense to the owner. The Risk Matrix also indicates whether a particular risk is insurable, and the type of insurance policy that would provide the coverage. The following sections of this report discuss the risks itemized in the Risk Matrix.

7. RISK OF OBTAINING GOVERNMENTAL APPROVALS

7.1 Risk Description. The Project requires a range of permits, licenses and other governmental approvals. These include approvals relating to the FERC license, approvals by the States of California and Oregon and local permits. Environmental reviews by the federal and state governments also must be finalized and certified. Risks relating to governmental approvals include the inability to obtain required approvals; delays in securing the approvals; and terms and conditions in the approvals that may increase the cost of the Project.

7.2 Risk Responsibility, Insurability and Mitigation. The New Project Assets Owner is likely to retain this risk. In general, it is not transferrable or insurable. Mitigants include comprehensive permitting and environmental due diligence, planning and research work in order to identify all required approvals and reviews, and establishing likely timetables and terms and conditions. In the sequencing of Project implementation, the general practice is for the New Project Assets Owner (or before title transfer, the Project Funders) to do as much advancement work as practicable at their own expense to identify and apply for the governmental approvals, assisted by technical and legal advisors. Once title is transferred, and the Project Contractor is obligated to proceed under the Dam Removal and Restoration Agreement, the Project Contractor typically has the duty to complete the process of obtaining the governmental approvals, to the extent they have not yet been obtained. It is likely that the Project Contractor will not be allowed or required to commence dam removal work until all of the major governmental approvals are in hand. In such circumstances, the Project Contractor or the New Project Assets Owner’s technical advisors, or some combination of both, funded by the Project Funders, will need to secure such governmental approvals before any physical work can begin under the Dam Removal and Restoration Agreement.

8. RISK OF PERFORMANCE OF THE WORK

8.1 General Project Contractor Responsibilities. The risk of contract compliance and proper performance of the Project workscope will be borne by the Project Contractor, subject to the occurrence of carefully defined Uncontrollable Circumstances and other relief events, as described below. The Project Contractor’s risks thus include the risk of unexcused delays; scope changes that the Project Contractor needs to request and make to carry out the work; availability

of materials; non-compliance with the pre-established dam removal plan, applicable law and governmental approvals; intellectual property infringement; and the risk of creating hazardous substances or other pollution conditions, or exacerbating existing hazardous substances or other pollution conditions. The New Project Assets Owner, on the other hand, will retain the risk of any delays caused by Uncontrollable Circumstances; any workscope changes directed by the New Project Assets Owner; and, in general, the inaccuracy of any information provided by the New Project Assets Owner to the Project Contractor that formed the basis of the dam removal plan and that could not reasonably be verified by the Project Contractor. Thus, in general, if accurate information is supplied to the Project Contractor, no scope changes are requested by the New Project Assets Owner after contract execution, and no Uncontrollable Circumstances or other relief events occur, the Project workscope will be completed by the Project Contractor for a fixed price known at contract signing.

8.2 Mitigating Performance Risk Through Qualifications-Based Selection and Competitive Proposals. In order to protect owners and stakeholders, it is standard industry practice to conduct a competitive procurement process. At the request of PacifiCorp or the Project Funders, the New Project Assets Owner can be expected to conduct such a competitive procurement process to select the Project Contractor. The competition will include a price competition for the work and, in order to better assure its performance, would ordinarily also include a qualifications competition. Qualifications include technical expertise and financial strength, including basic financial metrics such as corporate net worth and profitability. Strong Project Contractor qualifications significantly reduce the risk to the New Project Assets Owner of Project Contractor non-performance. Further, the teams submitting proposals in response to an request for qualifications/request for proposals process ordinarily compete on “technical merit” as well as on price. The request for proposals can require detailed submittals on the proposed means and methods of dam removal. Means and methods that offer greater promise of lessening potential liability can be scored higher in determining best value. Taking all possible measures to assure that the dam removals are executed with the least risk of additional expense or liability can be of significant value in crafting an overall risk mitigation program.

8.3 Mitigating Performance Risk Through Performance Bonds and Letters of Credit. The Project Contractor will furnish a conventional performance bond from a financially sound surety company, assuring the New Project Assets Owner and the Project Funders that the Dam Removal and Restoration Agreement will be performed as required. The performance bond operates to further mitigate the risk of Project Contractor non-performance of the responsibilities and risks undertaken in the Dam Removal and Restoration Agreement. A performance bond is not “insurance” in a strict legal sense, but in broad general terms operates in a similar fashion. The surety’s liability does not extend to Uncontrollable Circumstances or other risks that constitute Project Contractor relief events, and the New Project Assets Owner will continue to bear such risks. As an alternative or in addition to a performance bond, the Project Contractor may also be asked to furnish a standby letter of credit securing performance of the Dam Removal and Restoration Agreement. The New Project Assets Owner will have the right to draw on any such letter of credit in the event of a Project Contractor failure to perform, and use the proceeds of the draw as immediate payment for any non-performance damages it is owed under the Dam Removal and Restoration Agreement.

8.4 Mitigating Performance Risk Through Integrated Project Delivery. If the New Project Assets Owner chooses an integrated approach to delivering the Project, as described above under “Contracting for Dam Removal and the Benefits of Integrated Project Delivery”, under which both the design and the demolition and restoration work responsible are performed under a single contract, the risk of having multiple Project Contractors responsible for completing the Project is eliminated. The risk of separate Project Contractors includes the risk of disputes between the Project Contractors and the risk of improper design of the work. With traditional design-bid-build (low bid construction price) project delivery, the New Project Assets Owner retains those risks (having only an “errors and omissions” professional negligence claim against

the design engineer). With integrated project delivery, by contrast, those risks are transferred to the Project Contractor, and the presence or absence of design engineer professional negligence is irrelevant to the Project Contractor's responsibility for the performance of the work.

8.5 Indemnification by Project Contractor. The Project Contractor typically will indemnify an owner for any loss or expense resulting from a breach of the contract or any negligence or willful misconduct. (Since the occurrence of Uncontrollable Circumstances relieves the performance obligation, their occurrence will not be a breach triggering an indemnification.) The Project Contractor's specific duties with respect to dam removal and the handling of sediments will need to be carefully developed with the indemnity provisions in mind. These indemnity obligations can be expected to be limited to some extent by limitations on liability for consequential damages, as described below under "Limitations on Project Contractor Indemnity".

9. RISK OF UNCONTROLLABLE CIRCUMSTANCES AFFECTING PERFORMANCE OF THE WORK

9.1 Project Contractor Generally Relieved. The Dam Removal and Restoration Agreement, as noted above, will generally relieve the Project Contractor from its performance, price and schedule obligations should an Uncontrollable Circumstance occur. More particularly, the occurrence of any of these events will entitle the Project Contractor to additional time and additional compensation above the fixed contract price and beyond the guaranteed completion date, and thus are New Project Assets Owner-retained risks. Uncontrollable Circumstances include changes in law and force majeure events such as acts of God, floods, earthquakes, armed conflicts, terrorism and epidemics. They also include a variety of other acts, events or circumstances beyond the reasonable control of the Project Contractor, such as the unavailability of utilities necessary to perform the work; encountering archaeological, cultural or historical resources; geotechnical or dam structural conditions different than those assumed when the work was priced; and the presence of hazardous substances or other pollution conditions. The risk of Uncontrollable Circumstances is borne by the New Project Assets Owner because, by definition, they are beyond the Project Contractor's control and cannot reasonably be priced in the Project Contractor's fixed price. If consideration for such risks were to be included in the contract price, it would essentially constitute an insurance premium and the Project Contractor would be acting as an insurance company as to risks that insurance companies do not ordinarily insure. Further, were an uncontrollable risk to be priced and never occur, the owner would have unnecessarily borne the expense. Thus, the owner will not be able to avoid paying the actual costs of dealing with any uncontrollable circumstances that may occur. To deal with this risk, appropriate reserves or other contingent funding arrangements are usually established. The budget projections provided in the October 2012 USDO report acknowledge this risk, and the Project Funding Agreements are likely to recognize it as well.

9.2 Mitigation of Uncontrollable Circumstance Risks. Some Uncontrollable Circumstance risks, such as changes in law, cannot be prevented, and can only be mitigated after they occur. Others, however, can be mitigated in advance of occurrence through extensive due diligence investigations to determine existing dam structural conditions and existing site conditions, such as the presence of archaeological, cultural and historical resources and hazardous substances or other pollution conditions. A significant amount of the investigative work has been performed already in the planning efforts leading to the KHSA, increasing the knowledge of the parties as to the presence or absence of such conditions and helping to mitigate the likelihood that some of these types of risks will impose significant unexpected costs on the New Project Assets Owner.

9.3 Insurability of Uncontrollable Circumstance Risks. Force majeure events can be insured (with certain exceptions, such as armed conflict, terrorism and epidemics). Changes in law are generally uninsurable. Differing site and dam structural conditions, as well as the discovery of archaeological, cultural and historical resources, also are generally uninsurable.

See “Insurance” below in this report, as well as Attachment 4 (Insurance), for a more detailed discussion on the insurability of Project risks.

10. LABOR RISKS AFFECTING THE PERFORMANCE OF THE WORK

Labor risks include the risk of strikes, injuries to workers, a need to pay prevailing wages, and shortages in the supply of labor required for the work. In general, labor risks will be borne by the Project Contractor, and consideration for such risks will be included in the contract price payable under the Dam Removal and Restoration Agreement. Because the performance bond will assure completion of the work, the surety also will effectively be assuming the risk of the occurrence of these labor-related risks, making such risks “insurable”.

11. GENERAL TRANSACTION RISKS

Several risks can affect the transaction generally. These include the risk of:

11.1 Litigation. Third party litigation could invalidate the transaction contracts or enjoin their performance. This risk is not insurable and is borne both by the New Project Assets Owner and the Project Contractor, as well as the Project Funders and PacifiCorp. Construction contracts normally are not signed if there is any material litigation that may delay or increase the cost of the project. The pendency of any such litigation and the resulting delay in contract signing could increase estimated project costs.

11.2 Eminent Domain. The Project Assets could be taken by eminent domain. This risk is remote. The Federal Powers Act does not permit a third party to condemn lands and waters subject to a license, and further the federal and state governments are agreeing to proceed with the Project.

11.3 Failure of Title. PacifiCorp’s title to the Project Assets could be questioned. This risk again is remote, but title insurance may be available. PacifiCorp would ordinarily represent in the Project Assets Acquisition Agreement that it has good title to the Project Assets. As between the New Project Assets Owner and the Project Contractor, the New Project Assets Owner would bear the risk of failure of title.

11.4 Impermissible Encumbrances. The Project Contractor will covenant in the Dam Removal and Restoration Agreement not to create impermissible encumbrances (such as liens on the Project Assets) and, accordingly, will bear risk of any such occurrence.

12. RISK OF THIRD-PARTY LOSSES – NOT CAUSED BY HAZARDOUS SUBSTANCES OR OTHER POLLUTION CONDITIONS

12.1 General. Carrying out the Project may expose the New Project Assets Owner to third-party claims for losses attributable to the performance of the work under the Dam Removal and Restoration Agreement. Such potential claims generally involve property damage and bodily injury, and may include damage claims related to diminution in property values; loss of property use; economic losses to businesses; and damage to natural resources. Damage claims may also be brought relating to sediment deposits; the possible expansion of the 100-year flood plain; any impact on water rights and their value; and any impact of electric power availability and its cost. Third party loss claims may be based on any legal theory, including tort, environmental impairment, breach of contract or common law duties or inverse condemnation, and actions could be brought by injured or damaged parties not only against the New Project Assets Owner but also against the Project Contractor and the federal and state governments. Collateral issues such as disputes concerning the ownership of the land underlying the reservoirs may also arise.

If the dams are partially removed, liabilities may be associated with the continuing existence of the unremoved portions of the dams.

12.2 Limitations on Project Contractor Indemnity. In general, the costs associated with any such valid claims will be borne by the New Project Assets Owner, as the owner of the demolished property which caused the liability. If the Project Contractor was negligent in performing the work, the Project Contractor is likely to be obligated under the Dam Removal and Restoration Agreement to indemnify the New Project Assets Owner for some of such losses and expenses. Project Contractor indemnities usually do not extend to “consequential damages”, and the extent to which any third-party loss or liability may constitute consequential damages can be expected to constitute a consequential damage is usually an important element in the contract negotiations.

12.3 Insurance. Insurance should be available to respond to most such third-party claims of loss and liabilities, protecting both the New Project Assets Owner and the Project Contractor, as well as other named insureds. Likely insurance coverage is discussed below under “Insurance”, and in Attachment 4 (Insurance).

13. RISK OF THIRD-PARTY LOSSES - CAUSED BY HAZARDOUS SUBSTANCES OR OTHER POLLUTION CONDITIONS

13.1 Risk, Indemnity and Insurance. The New Project Assets Owner also may be exposed to third-party claims of the type discussed above under “Risk of Third Party Losses – Not Caused by Hazardous Substances Or Other Pollution Conditions” based on hazardous substances, pollution or contamination claims. This report discusses hazardous substances, pollution, or contamination-based claims separately from other claims because the insurance market fundamentally differentiates these two types of claims by writing separate policies, as described in Attachment 4. In general, the risks associated with these occurrences, and the indemnities available from the Project Contractor, will be similar for either type of occurrence. The insurance coverage for each type of occurrence differs to some extent, and is discussed below under “Insurance”, and in Attachment 4 (Insurance). Under CERCLA, PacifiCorp, as the original owner, could be subject to strict liability for damages and clean-up costs resulting from the release of such sediments, even after title is transferred.

13.2 Mitigation of Hazardous Substances and Other Pollution Conditions. Due to concerns expressed by both the New Project Assets Owner and the Project Contractor, best practice is to investigate the potential presence of hazardous substances and other pollution conditions as thoroughly as possible (phase 1 and phase 2 environmental assessments) before a contract is executed in order to mitigate risk to the maximum extent practicable. The extensive site investigations and analysis that appear to have been undertaken in recent years would suggest that progress has been made towards identifying any potential risks arising from hazardous substances or other pollution conditions, and that the risk is limited. As stated in the October 2012 U.S. Department of Interior report, any areas that are contaminant-heavy that were not identified in the environmental assessments will likely be small and localized, and could be dealt with inexpensively if the contaminants remained in the reservoir basin following drainage.

14. INSURANCE

14.1 General. A variety of insurance policies to deal with potential losses and liabilities that may result from the Project, including any damage to third parties, are commercially available. Standard insurance arrangements generally are reasonably priced and are ordinarily considered to be sufficient to protect the owner and Project Contractor from all but extraordinary classes of risk, subject to the appropriate policy limits. The exact cost of the aggregate Project insurance premiums would depend on the composition, terms and conditions of the insurance

policy package. Based on its industry experience, however, Willis' estimates that the aggregate insurance premiums (including the surety's performance and payment bond premiums) would total approximately \$16.5 million, with \$10 million allocated to the consolidated insurance program ("CIP") (worker's compensation/employer's liability, commercial general liability, automobile liability, umbrella liability and pollution liability), \$5 million allocated to non-CIP coverages (professional liability and commercial property), and \$1.5 million allocated to the surety bond (performance bond and payment bond). Insurance premiums do not appear to be expressly broken out in the cost estimates provided in the 2012 USDOJ report, and therefore it is not clear whether or not insurance premiums should be considered to have been estimated as part of the contract price of the work or as part of the contingency allowances. Ultimately, the insurance package put in place for the Project will be based on extensive Project-specific due diligence investigations and can be tailored to address the greatest risks associated with the Project.

14.2 Types of Insurance and Parties Insured. The types of insurance policies available to respond to Project risks are set forth and described by Willis in Attachment 4 (Insurance). These include (1) worker's compensation/employer's liability; (2) commercial general liability; (3) builders' risk/inland marine; (4) automobile liability; (5) umbrella liability (excess coverage for general liability and automobile liability); (6) pollution liability (contractors' pollution liability and pollution legal liability); and (7) professional liability. The New Project Assets Owner and the principal stakeholders generally can be additional insureds on the required insurance policies.

14.3 Approaches to the Procurement of Insurance. The traditional approach to the procurement of insurance is to require insurance coverage to be provided by the Project Contractors and all subcontractors. An alternative approach, recommended by Willis for projects of this size, is to use a CIP. A CIP consolidates all insurance policies provided by the subcontractors into one package, comprised of commercial general liability, worker's compensation, employer's liability, and an additional layer of excess liability coverage. This combined approach facilitates claims management and administration and provides the greatest risk coverage.

14.4 Insurability of Specific Risks. Attachment 2 (Klamath Restoration Project Risk Matrix) sets forth a list of major Project risks. The Attachment also indicates generally which risks Willis has determined are insurable, and under what type of insurance policy.

14.5 Insurance Covering Hazardous Substances and Other Pollution Conditions. Willis advises that the insurance industry generally divides coverage between the risks of "known" and "unknown" hazardous substance and other pollution conditions. "Unknown" pollution risks (that is, unknown conditions after a full site investigation) that may be discovered or created later are generally insurable; known pollution risks are not. For example, unexpected additional costs of remediating pollution conditions identified in the full site investigation report generally are not insurable. Although the USDOJ report generally indicates that only small and localized pollution conditions are likely to be present, if any unexpected additional remediation costs are incurred, the New Project Assets Owner would need to pay for such costs from available reserves. Alternatively, the New Project Assets Owner could contract for a private contractual indemnity for such costs and related liabilities in the manner described in the following section.

15. CONTRACT INDEMNIFICATION AGAINST UNINSURED ENVIRONMENTAL LIABILITIES

15.1 General. Environmental Liability Transfer, Inc., a private corporation, has advised the stakeholders that contractual arrangements could be established under which the United States, the States of Oregon and California, and PacifiCorp would be indemnified by a specialty corporate indemnitor against any environmental or other liabilities they may incur that are not covered by insurance or performance bonds. These liabilities may include those arising from regulatory changes, hazardous substances or other pollution conditions, sediment release (to the

extent not covered by insurance), diminution of value, loss of use and enjoyment, or any other risk not covered contractually or by insurance. This risk transfer could be accomplished by transferring ownership of the Project Assets to ELT or a similar firm, or by transferring solely the responsibility for the liability to the clean-up firm. The price and terms of any such contract indemnity, and the process under which the corporate indemnitor is selected, would need to be negotiated and established by the stakeholders. This type of contract indemnification is generally provided in conjunction with other risk control measures, such as fixed price contracting or insurance products

15.2 Contract Indemnification Premium Estimates. ELT estimates that as a general matter, the risk premium associated with these types of contract indemnifications ranges from 7% to 18% of the anticipated total cost associated with the project being indemnified. Factors which impact the risk premium include: uncertainty with respect to project cost estimates, the likelihood that the risk will be realized, the number of parties that will be indemnified, the length of the period of performance, and the limit of financial protection backing the indemnification. The corporate indemnitor providing the indemnification must have some control over the work, and the degree to which the indemnitor has control may impact the risk premium (e.g. the risk premium is typically lower when the indemnitor is the owner rather than the owner's representative). Given the unusual nature of such contract indemnification premiums in a project not involving extensive hazardous waste remediation, it is unlikely that the 2012 USDOJ cost estimates included any specific consideration for such environmental indemnity payments. We believe it is reasonable to assess the prospect of such payments against the likelihood of such risks occurring and the extent of the contingency budget available to address such risks.

16. PERMIT SHIELD FOR DAMAGE TO NATURAL RESOURCES

16.1 General Permit Shield Unavailability. Compliance with regulatory permits for dam removal will not avoid or affect the New Project Assets Owner's potential liability for injury or death of a third party, or damages to private property of a third party, arising under applicable law. See Federal Power Act section 10(c), 16 U.S.C. § 803(c). This follows from the basic principle that a regulatory permit runs between the permitter and permittee and may not modify the property and other individual rights of a third party.

16.2 Permit Shield Availability for Natural Resources Damages. Regulatory permits will probably limit the New Project Assets Owner's potential liability for natural resources damages resulting from performance of a permitted activity. This follows from the basic principle that a regulatory permit under an environmental law permits an activity despite foreseeable adverse impacts. For example, the New Project Assets Owner will not be liable for damages (or response costs) resulting from the release of reservoir sediments, provided a federal permit and the associated Environmental Impact Statement (EIS) identified the release as an irretrievable commitment of natural resources and met other criteria. As another example, the New Project Assets Owner will not be liable for temporary exceedances of water quality standards resulting from the discharge of reservoir sediments, provided that the certification under applicable Clean Water Act sections permits such exceedances in consideration for the long-term enhancement of water quality.

17. RISK OF THE ADEQUACY OF THE \$450 MILLION FUNDING COMMITMENT

17.1 Cost Overrun Risk Generally. In general, an owner will face "cost overrun" risks if (1) the Project Contractor's bid price is higher than the planning estimates, (2) after a contract is executed, additional costs are incurred under the terms of the contract due to the occurrence of risks that were retained by the owner by the terms of the contract, or (3) the Project Contractor fails to perform. We believe that the industry has developed market-tested practical approaches to managing and mitigating these risks and that, absent unusual, extraordinary or unforeseen

circumstances, well-planned and well-executed public works procurements will ordinarily achieve the expected results.

17.2 Cost Estimating and Actual Project Contractor's Cost. Any public work that an owner undertakes necessarily involves an increasingly refined series of cost estimates. These are made by technical experts and begin typically as desktop, benchmark or rule of thumb projections. They then proceed to more developed estimates as the project definition is clarified and more detailed information is developed concerning the elements of work; the performance standards to be achieved; project goals and objectives; site conditions; legal requirements; timetable; and similar topics that constitute the foundation of the transaction. These projections are variously referred to as "engineer's estimates" or "planning stage estimates". The accuracy of planning stage estimates depends directly on the skill of the estimator, the clarity and completeness of the definition of the project, and the degree of development of all of the information that bears upon possible costs. Cost estimating accuracy also depends fundamentally on the state of the Project Contractor market that will perform the work. "Owner markets" will constrain actual bid costs; "contractor markets" will inflate actual bid costs. Volatile contractor markets can cause actual bid prices for the work to be somewhat or even significantly lower or higher than engineers' estimates. The actual cost of the dam removal project will be set with a high degree of certainty only when a contract is executed following a competitive procurement process.

17.3 Project-Specific Cost Overrun Risk. With respect to this Project, cost overrun risk can be reduced through a comprehensive effort to price possible risks in the planning and cost estimating stage, as indicated in the October 2012 U.S. Department Of Interior report relating to this Project. Project-specific challenges identified in the Department's report that could increase cost overrun risk include high flows in the Klamath River during dam removal, severe or prolonged cold temperatures or icy conditions, difficulty in opening the existing tunnels and structures for reservoir drawdown, presence of special status species, or uncovering culturally significant sites, most or all of which may constitute Uncontrollable Circumstances.

17.4 U.S. Department of Interior Cost Estimates – Full Removal of Project Assets. In its report, the Department also presented a summary of estimated costs relating to both the full removal of the Project Assets and the partial removal of the Project Assets. USDOl estimated that the full removal of the Project Assets could cost anywhere from \$238 million to \$493 million, with the cost most likely totaling approximately \$292 million. With respect to field costs resulting from the full removal of the Project Assets, USDOl provided the following estimates, totaling \$188 million: dam facilities removal - approximately \$77 million; reservoir restoration - approximately \$22 million; recreational facilities removal - approximately \$1 million; modifications to the Yreka water supply - approximately \$1.75 million; mobilization and contingencies (including mobilization of construction equipment to the dam site, design contingencies and construction contingencies) - approximately \$51 million; and escalation to 2020 dollars - approximately \$36.5 million. USDOl further estimated that engineering costs (including design data, engineering designs, permitting, procurement, construction management, and closeout activities) would constitute approximately 20% of the total Project cost and would likely total approximately \$37.5 million, and costs relating to mitigation (including environmental mitigation, monitoring and other cultural resources preservation) would constitute approximately 35% of the total Project cost and would likely total approximately \$66 million. Considering, for example, that \$66 million of USDOl's budget is dedicated to cost mitigation and \$36.5 million is set aside for general inflation, it is worth noting that while USDOl's estimates provided a substantial budget for the core work relating to the removal of the dams and the restoration of the site, their estimates also dedicated a significant portion of the overall budget to risk and cost mitigation measures.

17.5 U.S. Department of Interior Cost Estimates – Partial Removal of Project Assets. USDOl estimated that partial removal of the Project Assets could cost anywhere from \$185 million to \$403.5 million, with the cost most likely totaling approximately \$234.5 million. With

respect to field costs resulting from the partial removal of the Project Assets, USDOl provided the following estimates, totaling \$143 million: dam facilities removal – approximately \$52 million; reservoir restoration – approximately \$22 million; recreational facilities removal – approximately \$1 million; modifications to the Yreka water supply – approximately \$1.75 million; and mobilization and contingencies – approximately \$27.5 million. USDOl further estimated that engineering costs would constitute approximately 20% of the total Project cost and would likely total approximately \$28.5 million, and mitigation costs would constitute approximately 45% of the total Project cost and would likely total \$63.5 million.

17.6 Reasonableness of Affordability Ceiling. The Project Funders have established an affordability ceiling of \$450 million in the KHSA, and expressed their intention to provide funds for the Project up to this level if required. In addition, the USDOl has provided Project cost estimates in the ranges described above in “U.S. Department of Interior Cost Estimates – Full Removal of Project Assets” and “U.S. Department of Interior Cost Estimates – Partial Removal of Project Assets”, including a most likely Project cost estimate of \$292 million for full removal and \$234.5 million for partial removal. The basis of, and assumptions and methodology involved in, the preparation of this cost estimate are explained in the USDOl’s summary memorandum. They are self-explanatory, and we are not in a position to assess their reasonableness. We do observe, however, that the estimators appear to have made a considerable effort to include a substantial contingency for potential costs that could arise from general inflation before the work is performed and from unexpected and unforeseen events or circumstances (e.g. attributing 35% of the Project budget to cost mitigation) such that budget exceedance for certain core elements of the work may be diminished through the redirection of budget funds originally dedicated to non-core work. We also note that USDOl provided an estimate for the partial removal of the Project Assets, discussed above in “U.S. Department of Interior Cost Estimates – Partial Removal of Project Assets” – this estimate indicates that partial removal is an option that the parties may utilize in the event that full removal may exceed the \$450 million affordability ceiling, the affordability ceiling is reduced or the funds are otherwise unavailable. USDOl’s projections appear to be based on comparable projects and upon peer-reviewed studies of the amount of work likely to be involved. It may therefore reasonably be considered to be an advanced planning stage estimate. The actual costs, as we have stressed, will be known only when a contract for the work is let containing a competitively established price, and when and if uncontrollable circumstances occur in the performance of the contracted work.

17.7 Project Definition. Defining the Project more or less expansively fundamentally sets the terms of the analyses. The USDOl estimates, in addition to including allowances for contingencies, seem to reflect a determined effort to define the project as expansively as possible. If the cost overrun question is presented as a question of overrunning the Project Contractor’s bid price, the analysis offered above in this memorandum will have applicability. If, on the other hand, the cost overrun question is presented as a question of the Project Contractor’s bid price overrunning the Project Funder’s \$450 million cap, the evident answer lies in modifying the project definition and re-bidding the contract. This is common practice when construction contract bids received on public works projects exceed an owner’s budget that was established based on an engineer’s estimate.

17.8 Practicability of Revising the Project Definition. The KHSA contemplates revising the project definition in the event the budget cap is exceeded. This is a customary and prudent step typically taken by owners to enforce legislatively-established project affordability ceilings. Based on what we have learned about the Project and its apparently expansive definition, it appears that the Project Contractor’s workscope could potentially be reduced if necessary for cost cap reasons without sacrificing the core objectives. This, of course, is for the various stakeholders to determine. It may indeed be the case that stakeholder consensus can be preserved only by retaining a project definition that effectuates each and every element of the present project definition as priced by the estimators.

17.9 Funding Adequacy Risk Is Non-Transferable. The risk of the adequacy of the \$450 million funding commitment from the States is not insurable, and will not be transferable to the Project Contractor. It will be borne by the New Project Assets Owner and, indirectly, by the Project Funders. The New Project Assets Owner will bear the risk of the adequacy of funding, as well as (indirectly) the Project Contractor and the Project Funders. The risk has several facets, each discussed below.

17.10 Certainty of Funding and Enforceability of Commitment. Completion of the Project will be directly related to the certainty of funding by the Project Funders. It can be expected that the Project Funders will enter into definitive Project Funding Agreements with the New Project Assets Owner to provide the funds necessary to make payments under the Dam Removal and Restoration Agreement, and to pay other costs such as the technical, legal and financial advisory costs and the costs of obtaining the required governmental approvals. If these Project Funding Agreements are not definitive, certain and enforceable, funding shortfalls may occur. Further, the terms of California's bond funding program may allow bond funds to be used for other projects. To the extent that such bond proceeds are unavailable to fund the Project due to their allocation to other projects, or due to other uncertainties, funding for the Project may be insufficient.

17.11 Grant Payment Conditions Not Met. The Project Funding Agreements are likely to contain conditions to the making of the grant payments. These may include receipt of governmental approvals; performance of work; meeting schedule milestones; absence of litigation; and similar conditions established to assure that the work is carried out as intended. If these conditions are not met, the Project Funders may withhold payment, thereby triggering funding shortfalls.

17.12 Subject to Appropriation Conditions or Regulatory Approval. If the use of bond proceeds or ratepayer funds is subject to legislative appropriation or to PUC regulatory approval, Project funding shortfalls may result from legislative or regulatory inaction.

17.13 Insufficiency to Pay Project Contractor's Entitlement to Compensation for Uncontrollable Circumstances. Project completion will be in jeopardy if the New Project Assets Owner does not have funding to pay the costs above the fixed price payable under the Dam Removal and Restoration Agreement that are due to the Project Contractor as a result of Uncontrollable Circumstances or other relief events.

17.14 Insufficiency to Pay Indemnity or Other Obligations to PacifiCorp. The New Project Assets Owner's obligations in connection with the Project may include various covenants to PacifiCorp in the Project Assets Acquisition Agreement, including possible indemnities if PacifiCorp incurs unanticipated Project-related costs even though it has conveyed the Project Assets to the New Project Assets Owner. Any payments due under such covenants will constitute Project costs which the terms of the Project Funding Agreements may need to take into account.

17.15 Insurance Deductibles and Exceedances. Deductibles provided for under any insurance policies maintained by the New Project Assets Owner, as well as costs exceeding policy limits, may affect the sufficiency of available Project funds.

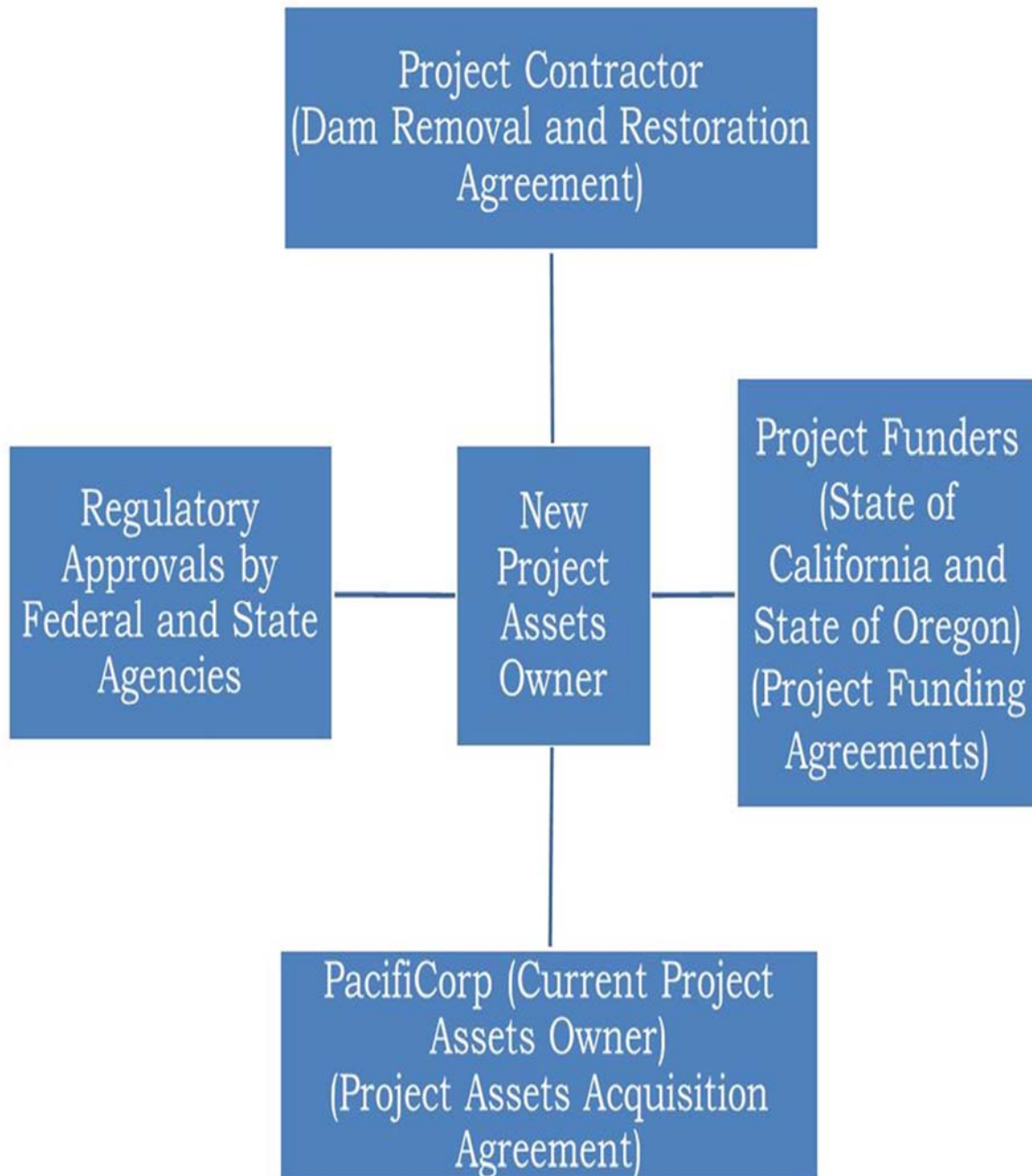
17.16 Uninsurable Events. Some Uncontrollable Circumstance risks are uninsurable, and the possible costs of dealing with any such occurrences will need to be taken into account in assessing funding sufficiency.

17.17 Limitations on Liability in the Dam Removal and Restoration Agreement and Performance Bond. The Dam Removal and Restoration Agreement is likely to contain a stated maximum dollar limit on the liability of the Project Contract for any contract breach (such as liability limited to an amount equal to 50% of the contract price). The surety providing the

performance bond will have an equivalent limit on its liability. If the Project Contractor defaults, and the cost of finishing the uncompleted work exceeds any such liability limit, the Owner will need to have the additional funds necessary to complete the Project.

ATTACHMENT 1

PROJECT IMPLEMENTATION CONTRACT STRUCTURE DIAGRAM



ATTACHMENT 2**KLAMATH RESTORATION PROJECT
RISK MATRIX****INSURANCE KEY**

BR	Builders Risk
EF	Equipment Floater
CGL	Commercial General Liability
WC/EL	Workers Compensation/Employers Liability
AUTO	Automobile Liability
UMB	Umbrella Liability
FSPLL	Fixed Site Pollution Liability
CPL	Contractors Pollution Liability
PL	Professional Liability/Errors & Omissions Liability
PB	Performance Bond

*The insurance coverages included in this Insurance Key are defined in Attachment 4 (Insurance). Please note that Performance Bonds are referred to as Surety Bonds in Attachment 4.

**KLAMATH RESTORATION PROJECT
RISK MATRIX**
(continued)

RISK	RESPONSIBLE PARTY	INSURANCE AVAILABLE	TYPE OF POLICY	INDEMNITY AVAILABLE
Note: The Dam Removal Project Contractor Will Assume Complete Responsibility for the Work, except where out-of-scope or specifically excused or limited. O = New Project Assets Owner. C = Project Contractor.				Note: Negotiated indemnities from specialty corporations may be available to protect against the risks indicated herein.
1. GOVERNMENTAL APPROVALS				
1.1 Inability to Obtain	O	N	—	Y
1.2 Delays	O	N	—	Y
1.3 Unexpected Terms and Conditions	O	N	—	Y
1.4 Environmental Reviews	O	N	—	Y
2. PERFORMANCE OF THE WORK				
2.1 Defective Work/Contract Compliance	C	Y – Limited Coverage	PB	Y
2.2 Inaccurate Information at Base of Removal Plan	O	Y – Limited Coverage	PL	Y
2.3 Unexcused Delays	C	Y	PB	Y
2.4 Excused Delays	O	N	—	Y

2.5	Design Errors or Omissions	C	Y – DB	PB/PL	
2.6	Disputes Between Designer and Project Contractor	C	Y – DB	PB/PL	
2.7	Scope Change Directed by Owner	O	N	—	
2.8	Scope Change Requested by Project Contractor	C	N	—	
2.9	Availability of Materials	C	Y	PB	
2.10	Non-Compliance with Dam Removal Plan	C	Y	PB	
2.11	Dam Removal Project Contractor Financial Distress	C	Y	PB	
2.12	Non-Compliance with Applicable Law	C	Y	PB	
2.13	Intellectual Property Infringement	C	Y	PB	
2.14	Newly Created, or Exacerbation of Pre-Existing, Hazardous Substances or other Pollution Conditions by the Project Contractor	C	Y	FSPLL/CPL	
<p>NOTE: Performance bonds protect the owner against a failure of the contractor to complete work as a result of the contractor's financial distress. The performance bond does not protect the owner against any of the specific risks identified in this section but rather against an entire failure to complete the work, which may result from one or more of these individual risks which the contractor assumes.</p>					

3. UNCONTROLLABLE CIRCUMSTANCES AFFECTING WORK PERFORMANCE					
3.1	Change in Law	O	Y – Limited Coverage	FSPLL	
3.2	Force Majeure	O	Y – Limited Coverage	Various	
3.3	Flood	O	Y – Limited Coverage	Various	
3.4	Seismic/Earthquake	O	Y – Limited Coverage	Various	
3.5	War/Civil War/Armed Conflict	O	N	—	
3.6	Terrorism - Nuclear, Radioactive, Chemical or Biological Contamination	O	Y – Limited Coverage	Various	
3.7	Epidemics	O	N	—	
3.8	Unavailability of Utilities	O/C	N	—	
3.9	Differing Geotechnical Site Conditions	O	Y – Limited Coverage	PL	
3.10	Differing Dam Structural Conditions	O	Y – Limited Coverage	PL	
3.11	Archeological/Cultural/Historical Resources	O/C	N	—	
3.12	Pre-Existing Hazardous Substances or other Pollution Conditions	O/C	Y - Generally	FSPLL/CPL	
3.13	Newly Created Hazardous Substances or other Pollution Conditions	O/C	Y – Generally	FSPLL/CPL	

4. LABOR					
4.1	Strikes	C	N	—	
4.2	Injuries	C	Y – Generally	WC/EL	
4.3	Prevailing Wage Claims	C	N	—	
4.4	Labor Supply Shortage	C	N	—	
5. GENERAL TRANSACTION RISKS					
5.1	Litigation/Injunction	O	Y – Limited Coverage	Various	
5.2	Failure of Title	O	Y – Generally	Title Insurance	
5.3	Eminent Domain	O	N	—	
5.4	Impermissible Encumbrances	C	N	—	
6. THIRD PARTY LOSSES NOT CAUSED BY HAZARDOUS SUBSTANCES OR OTHER POLLUTION CONDITIONS					
6.1	Property Damage and Bodily Injury Claims	O/C	Y - Generally	CGL/AUTO / PL	
6.2	Diminution of Land/Property Value	O/C	N	—	
6.3	Loss of Use of Land/Property	O/C	Y – Limited Coverage	CGL	
6.4	Economic Loss to Businesses	O/C	Y – Limited Coverage	CGL	

6.5	Damage to Natural Resources	O/C	N	—	
6.6	Clean Up/Sediment Removal	O/C	N	—	
6.7	Downstream Flooding from Work Performance	O/C	Y – Limited Coverage	CGL	
6.8	Sediment Release/Overbank Deposits from Work Performance	O/C	N	—	
6.9	Off-site Disposal Liabilities	O/C	N	—	
6.10	Expansion of 100-Year Flood Plain	O	N	—	
6.11	Impact on Water Rights, Value	O/C	Y – Limited Coverage	CGL	
6.12	Impact on Power Availability, Costs	O	Y – Limited Coverage	CGL	
6.13	Partial Dam Removal-Continuing Operational Responsibility	O	Y – Limited Coverage	CGL	
7. THIRD PARTY LOSSES CAUSED BY HAZARDOUS SUBSTANCES OR OTHER POLLUTION CONDITIONS					
7.1	Property Damage and Bodily Injury	O/C	Y – Generally	FSPLL/CPL	
7.2	Diminution of Land/Property Value	O/C	Y – Limited Coverage	FSPLL/CPL	
7.3	Loss of Use of Land/Property	O/C	Y – Limited Coverage	FSPLL/CPL	

7.4	Economic Loss to Businesses	O/C	Y – Limited Coverage	FSPLL/CPL /PL	
7.5	Damage to Natural Resources	O/C	Y – Limited Coverage	FSPLL/CPL	
7.6	Impact on Water Rights, Value	O/C	Y – Limited Coverage	FSPLL/CPL	
7.7	Impact on Power Availability, Costs	O	N	—	
7.8	Partial Dam Removal-Continuing Operational Responsibility	O	Y – Limited Coverage	FSPLL/CPL	
8. ADEQUACY OF \$450MM FUNDING COMMITMENT					
8.1	Certainty of Funding and Enforceability of Commitment	O+	N	—	
8.2	Grant Payment Conditions Not Met	O+	N	—	
8.3	Subject to Appropriation or Regulatory Approval	O+	N	—	
8.4	Insufficiency To Pay Project Contractor's Entitlement to Compensation for Uncontrollable Circumstances	O+	N	—	
8.5	Insufficiency to Pay Indemnity or Other Obligations to Former Owner	O+	N	—	
8.6	Insurance Deductibles,	O+	N	—	

	Exclusions and Exceedances				
8.7	Uninsurable Events	O+	N	—	
8.8	Limitations on Liability in the Dam Removal Agreement and Performance Bond	O+	Y – Limited Coverage	PL	
NOTE: O+ indicates that the adequacy of funds may affect not only the owner but other stakeholders as well.					

ATTACHMENT 3

PROJECT DELIVERY METHODS

Four Possible Approaches. Four basic contracting approaches can be used: design-bid-build (DBB); construction manager at risk (CMAR); design-build (DB) and progressive design-build (PDB). If a governmental body is the New Project Assets Owner, applicable federal, state or local procurement law will govern which of these approaches may legally be used to implement the proposal.

Traditional Project Delivery

- Design-Bid-Build. DBB is the traditional low bid construction contracting method. The owner lets an engineering contract for design, and a separate contract for construction. There is no competition in design or constructability, no qualifications basis to selecting the construction Project Contractor, and no collaboration among the designer and builder. DBB is prone to bid protests and change orders and the construction/demolition price is not known until construction bids are received after the design (which ordinarily costs about 10% of the construction price) is complete.

Integrated Project Delivery

- Construction Manager at Risk. CMAR, like DBB, involves two separate contracts (for design and for construction), no design competition, and no transfer of design liability to the builder. The CMAR (construction Project Contractor) is selected on qualifications and participates in constructability reviews. CMAR is usually done on a “guaranteed maximum price” basis, where the GMP is estimated as the design progresses and ultimately agreed upon at the 60% design level. The CMAR competitively bids out most of the construction work.
- Design-Build. DB involves a single contract for both design and construction, under which design liability is transferred to the DB Project Contractor. DB procurements are typically carried out on a qualifications-based competitive proposal basis (with selection based on the best value proposal, with technical merit and price both considered), rather than on a low bid basis (with price as the only selection factor). DB has the key advantage of creating a single point of accountability. It also involves a self-selected team whose business interests are aligned, and protects the owner against disputes between team members.
- Progressive Design-Build. PDB is a newer procurement approach which concludes with the execution of a design-build contract. Instead of conducting a full competitive process involving across-the-board competition on qualifications, technical approach and a lump-sum price, however, PDB involves less competition, more collaboration by the owner in the advancement of the design, and a GMP, not a lump sum. Some owners select PDB over DB because they want to be more involved in the full details of what the project will be and are willing to sacrifice design and constructability competition to have that greater degree of involvement.

ATTACHMENT 4

INSURANCE

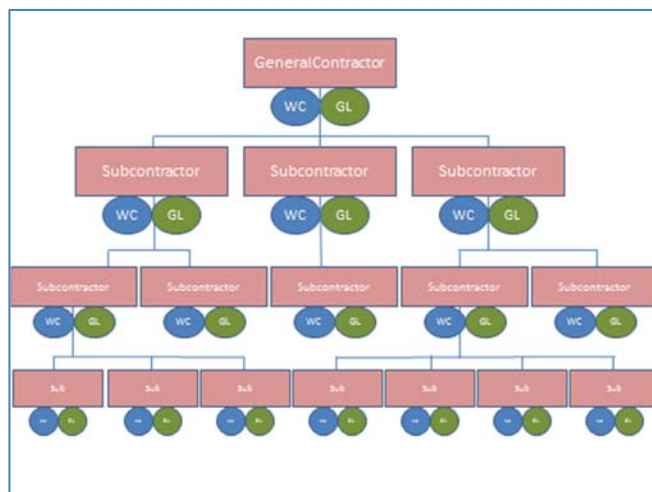
Traditional Insurance Approach

For a project of this size and scope, there are two insurance procurement approaches to risk management related to the insurance procurement process. The first, and most popular is known as the **tradition procurement approach**. In this case, the DRE would transfer the construction risk downstream to the contractor(s) responsible for deconstructing the dams. The DRE would require each contractor to provide their own insurance to cover any insurable construction risks attributed to their work. It would be the contractors' responsibility to likewise ensure that any of their own subcontractors also provide the proper insurance coverage. To ensure proper coverage is in place for each contractor and all subcontractors working on-site, a Certificate of Insurance is provided by the respective entity to evidence their own insurance program.

This approach transfers the risk downstream, away from the DRE, in exchange for an insurance line item that will be charged to the DRE by the awarded contractor(s). The insurance policies that would likely be available within the insurance line item in this approach are listed below;

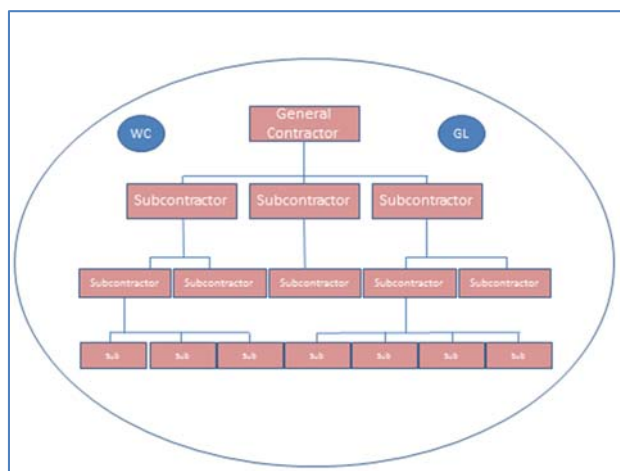
1. Workers Compensation / Employer's Liability / USL&H – coverage for injuries that occur on the dam deconstruction site to individual workers
2. Commercial General Liability – third-party property damage and third-party bodily injury that occurs from activity performed at the dam deconstruction site
3. Builder's Risk / Inland Marine – property coverage for damage to any equipment or components of the dam that will be restored or salvaged
4. Automobile Liability – coverage for third-party property damage and third-party bodily injury that auto fleet used related to the construction activities
5. Umbrella Liability – excess coverage for General Liability and Automobile Liability
6. Pollution Liability – coverage for remediation costs and third-party property damage and third-party bodily injury arising out of pollution conditions
7. Professional Liability – coverage to protects an insured in the event their client is financially harmed from the professional (including lack of which the insured liable

rendering of their services or advice thereof) and for is held legally



Consolidated Insurance Program Approach

The second approach, oftentimes used on construction projects above \$100 million in construction costs is the **consolidated insurance program**. This approach is also called a consolidated insurance program (CIP), an owner controlled insurance program (OCIP), or Wrap-up program. With a CIP, one party, usually the owner or prime contractor, purchases the General Liability insurance and Workers Compensation insurance for all the contractors involved in the project. The contractual allocations of risk usually remain the same as with the traditional procurement approach, but there is a single consolidated liability insurance program in place rather than a host of separate contractor-purchased insurance programs.



Recommended Approach

The CIP approach is recommended for a project of this magnitude. It is critical that all core insurance policies are specifically designed for this unique project. It is the most responsible method to maximize coverage enhancements and minimize uninsurable risks. The DRE should be supported by a nationally established insurance advisor to assist with the design and implementation of such an insurance program.

Other Considerations

Most nationally acclaimed builders already have a CIP program infrastructure in place. Their coverage may also be afforded to the DRE at a much discounted price due to their buying power in the insurance market place. The DRE should consider this during their contractor selection process as it may directly generate savings to the Klamath project budget.

There are other insurance policies aside from CGL, WC/EL and Automobile coverage that should be purchased directly by the DRE on behalf of the contractor(s) and subcontractors. These include project-specific Pollution (as detailed below), Builder's Risk and Professional policies. These should be project specific so the limits are dedicated to your project and no other contractor or subcontractor can put these limits at risk for work performed on other project sites.

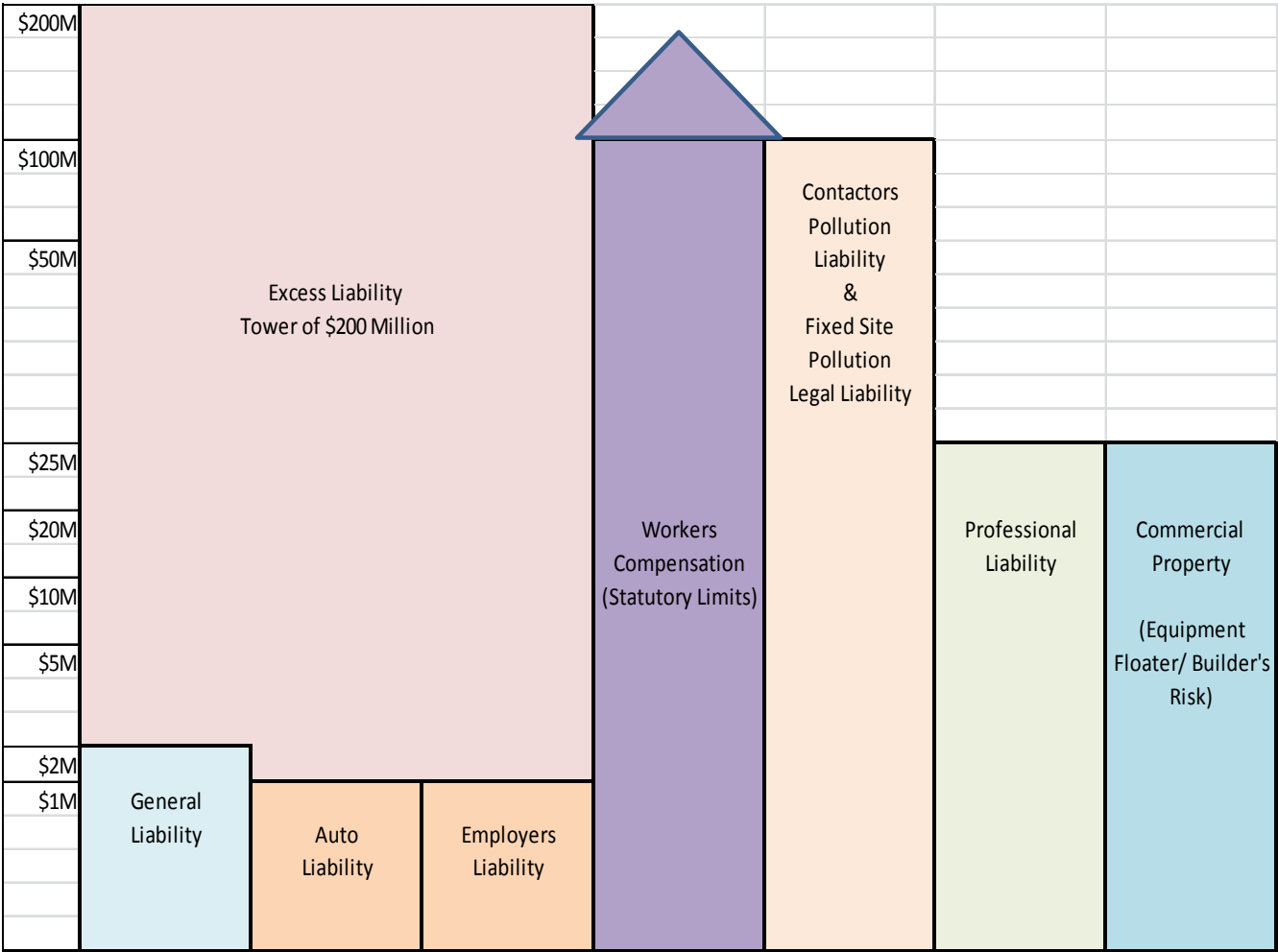
The DRE and project team stakeholders should take an active role in the insurance procurement process. When these insurance policies are being designed and communicated to the insurance marketplace by your selected insurance advisor, it is in the DRE's best interest to be actively involved.

Pollution Specific Considerations

Similar to the project specific program noted above for the CGL, Auto and Workers Compensation liabilities, claims for pollution conditions arising out of the contractor's performance can be insured on a CIP platform as well. Known as a Contractors Pollution Liability policy (CPL), this form of insurance is offered on a claims-made or occurrence basis and provides third-party coverage for clean-up/remediation costs, bodily injury, property damage (including natural resource damages, loss of use and diminution in value) and legal defense expenses, as a result of pollution conditions arising from contracting operations performed by or on behalf of the contractor. Coverage applies to new pollution conditions first commencing during the policy period and the aggravation or disruption of historical contamination directly arising from the contractor's operations. Coverage can be purchased by the Owner (OCIP) or the Contractor (CCIP).

Another environmental liability policy is known as a Fixed Site Pollution Liability (PLL) and is purchased by the owner to insure claims arising from Pollution Conditions on, at, under, migrating to and migrating from property owned or leased by the Insured. On a project such as Klamath this policy would seek to insure the losses not otherwise addressed by the CPL (i.e. Pollution Conditions not caused or exacerbated by the contractors). Core coverage includes on-site & off-site clean-up/remediation costs, third-party claims for bodily injury & property damage (including natural resource damages, loss of use and diminution in value) and defense expenses/legal costs. Subject to the availability of underwriting information, coverage can apply to both new and pre-existing (unknown) pollution conditions whether sudden & accidental in nature or gradual contamination. Limited coverage for "known" contamination may be available from certain markets.

Map of Insurance Coverages



Klamath Restoration Project - Insurance Glossary

Builder's Risk policy

A property insurance policy that is designed to cover property in the course of construction. There is no single standard builders risk form; most builders risk policies are written on inland marine (rather than commercial property) forms. Coverage is usually written on an all risks basis and typically applies not only to property at the construction site, but also to property at off-site storage locations and in transit. Builders risk insurance can be written on either a completed value or a reporting form basis; in either case, the estimated completed value of the project is used as the limit of insurance.

Equipment Floater

Property insurance covering equipment that is often moved from place to place. A form of inland marine insurance.

Inland Marine Insurance

Property insurance for property in transit over land, certain types of moveable property, instrumentalities of transportation (such as bridges, roads, and piers, instrumentalities of communication (such as television and radio towers), and legal liability exposures of bailees. Many inland marine coverage forms provide coverage without regard to the location of the covered property; these are sometimes called "floater" policies. As a group, inland marine coverage forms are generally broader than property coverage forms.

Commercial General Liability (CGL) policy

A standard insurance policy issued to business organizations to protect them against liability claims for bodily injury (BI) and property damage (PD) arising out of premises, operations, products, and completed operations; and advertising and personal injury (PI) liability. The CGL policy was introduced in 1986 and replaced the "comprehensive" general liability policy.

Controlled insurance program (CIP) – Project Specific CGL

A centralized insurance program under which one party procures insurance on behalf of all (or most) parties performing work on a construction project or on a specific site. Commonly referred to as "wrap-ups," CIPs are most commonly used on single projects, but other uses include contract maintenance on a large plant or facility or on an ongoing basis for multiple construction projects. Typically, the coverages provided under a CIP include builders risk (for construction wrap-ups), commercial general liability (CGL), workers compensation, and umbrella liability. CIPs offer a number of benefits, including greater control of the scope of coverage, potentially lower project insurance costs, and reduced litigation. CIPs can be purchased by the owner (OCIP) or contractor (CCIP) or a combination of participating parties.

Workers Compensation and Employers Liability policy

An insurance policy that provides coverage for an employer's two key exposures arising out of injuries sustained by employees. Part One of the policy covers the employer's statutory liabilities under workers compensation laws, and Part Two of the policy covers liability arising out of employees' work-related injuries that do not fall under the workers compensation statute. In most states, the standard workers compensation and employers liability policy published by the National Council on Compensation Insurance (NCCI) is the required policy form.

Umbrella Liability policy

A policy designed to provide protection against catastrophic losses. It generally is written over various primary liability policies, such as the business auto policy (BAP), commercial general liability (CGL) policy, watercraft and aircraft liability policies, and employers liability coverage. The umbrella policy serves three purposes: it provides excess limits when the limits of underlying liability policies are exhausted by the payment of claims; it drops down and picks up where the underlying policy leaves off when the aggregate limit of the underlying policy in question is exhausted by the payment of claims; and it provides protection against some claims not covered by the underlying policies, subject to the assumption by the named insured of a self-insured retention (SIR).

Longshore and Harbor Workers' Compensation Act of 1927 - USL&H Coverage

A federal law that provides no-fault workers compensation benefits to employees other than masters or crew members of a vessel injured in maritime employment—generally, in loading, unloading, repairing, or building a vessel. Employers can obtain coverage under a standard workers compensation policy by purchasing an LHWCA coverage endorsement.

Automobile Liability Insurance

Insurance that protects the insured against financial loss because of legal liability for automobile-related injuries to others or damage to their property by an auto.

Fixed Site Pollution Legal Liability (PLL)

A claims-made insurance policy designed to insure loss arising from pollution conditions on, at, under, migrating to and from defined/scheduled properties. Core coverage includes clean-up/remediation costs, third-party claims for bodily injury & property damage (including natural resource damages, loss of use and diminution in value) and defense expenses/legal costs. Subject to the availability of underwriting information, coverage can apply to both new and pre-existing (unknown) pollution conditions whether sudden & accidental in nature or gradual contamination. Limited coverage for “known” contamination may be available from certain markets.

Contractors Pollution liability (CPL)

A contractor-based policy, offered on a claims-made or occurrence basis, that provides third-party coverage for clean-up/remediation costs, bodily injury, property damage (including natural resource damages, loss of use and diminution in value) and legal defense expenses, as a result of pollution conditions arising from contracting operations performed by or on behalf of the contractor. Coverage applies to new pollution conditions first commencing during the policy period and the aggravation or disruption of historical contamination directly arising from the contractor's operations. Coverage can be purchased on a Controlled Insurance Program (CIP) similar to the CGL.

Professional liability insurance

Also known as errors and omissions insurance (E&O), it is a coverage for businesses that offer professional and personal services to others for a fee. E&O insurance protects an Insured in the event their client is financially harmed from the rendering of their professional services or advice (including lack thereof) and for which the Insured is held legally liable.

Surety Bond

A contract under which one party (the surety) guarantees the performance of certain obligations of a second party (the principal) to a third party (the obligee). For example, most construction contractors must provide the party for which they are performing operations with a bond guaranteeing that they will complete the project by the date specified in the construction contract in accordance with all plans and specifications.

ATTACHMENT 5

HAWKINS DELAFIELD & WOOD FIRM DESCRIPTION

Experience. Hawkins is a 90-lawyer public works procurement, contract and finance legal boutique. Ten of the firm's lawyers practice full time as owner's lead counsel in the alternative project delivery and P3 field. The number of projects (over 250, in 25 states, including 14 in California and Oregon) on which Hawkins has represented municipalities in design-build, design-build-operate, and design-build-finance-operate project procurements across all infrastructure sectors is unsurpassed among American law firms. The firm has extensive expertise and experience in alternative project delivery and P3 transactions both regionally and nationally, has maintained a substantial specialized legal practice for more than 25 years in this field, and is widely recognized as an industry leader. The firm's attorneys are transactional attorneys, and the heart of Hawkins' practice is representing state and local governments in alternative project delivery, public-private partnership, public contract, and public finance matters.

Project Profiles. Notable transactions in which Hawkins has served as special counsel to municipal utilities and public agencies include the following:

San Diego County Water Authority. Carlsbad seawater desalination plant at a power plant site. Twenty-year service contract for design, financing, construction, operation, maintenance and water purchase.

San Antonio Water System. Vista Ridge Regional Water Supply P3 Project, involving \$3.4 billion in total payments over 35 years and consisting of transmission pipelines and well field facilities for the production and delivery of potable water from 140 miles northeast of San Antonio.

State of California (Administrative Office of the Courts). New Long Beach Court Building P3 Project (DBFO). The first major social infrastructure P3 project in the United States.

Woodland-Davis Clean Water Agency. Surface water treatment plant and transmission pipelines. Twenty-year service contract for facility and pipeline design, construction, operation and maintenance.

City of Phoenix. Design-build-operate selected for the new 80 MGD, \$200 million Lake Pleasant water treatment plant, raw water intake and raw water transmission line; traditional design-bid-build chosen for finished water pipeline.

Wilsonville, Oregon. Design-build, with contract operations, selected for an upgraded and expanded wastewater treatment plant.

ATTACHMENT 6**WILLIS
FIRM DISCRIPTION****WILLIS CORPORATE BACKGROUND**

Willis is one of the world's leading risk management and insurance intermediaries, with over 18,000 professionals in more than 400 offices across 131 countries. Willis offers our clients superior expertise, teamwork, innovation, and market-leading products and professional services in risk management and risk transfer. Our experts rank among the world's leading authorities on analytics, modeling and mitigation strategies at the intersection of global commerce and extreme events. Across geographies, industries and market segments, Willis provides its local and multinational clients with dedicated teams to meet their unique and evolving needs.

WILLIS GROUP STATISTICS

KEY STATISTICS (2014)	
Premium Volume	\$45B
Brokerage Revenues	\$3.8B
Clients	50,000+
Carrier Relationships	5,000+
North America Offices	118
U.S. Premium Volume	\$13B+

WILLIS CAPABILITIES IN CONSULTING ENGINEERING, ENVIRONMENTAL CONSULTING AND CONSTRUCTION**WILLIS CONSTRUCTION:**

- Over 13,000 construction, engineering, environmental and consulting clients
- Seven of the top ten contractors worldwide
- 27% of Engineering News Records Top 100 Contractors

WILLIS ARCHITECTS AND ENGINEERS

- Expertise in complex Professional Liability coverages
- Longstanding direct carrier relationships
- In-house professional liability claims expertise
- In-house contract review support
- National Certified Education Provider

WILLIS ENVIRONMENTAL

Willis is one of the largest global environmental insurance brokers with a formal practice consisting of more than 90 specialists worldwide including 20+ dedicated resources in Canada, United States and Europe. We service over 2,000 clients with a large market share of environmental remediation, environmental consulting and construction firms. Our clients range in size from the middle market sector to multi-billion dollar diverse global businesses. We've developed a broad knowledge base to understand the particular environmental and professional risks facing firms of different scales and complexities. We use this breadth of experience to identify and assist in quantifying exposure to catastrophic loss, help to mitigate the financial impact of such losses and assist in developing prudent risk transfer approaches and risk management practices.

Our investment in technical expertise benefits our clients every day. Our teams comprise a cross-section of professional backgrounds and credentials, including environmental attorneys, regulators, engineers, geologists and consultants, as well as specialists in risk management, underwriting, insurance and claims. Our global footprint and multinational knowledge allow us to anticipate trends and changing regulations around the world and afford easy access to relevant information about any location in which our clients do business.

WILLIS HYDRO EXPERIENCE (USA ONLY)

Operational Hydo Plants in U.S.		
Year Appointed Risk Advisor	Name	Value
2005	Merrill Creek Reservoir	217,000,000
2007	Upper American River Project	1,030,000,000
2009	Toledo Bend Project	325,000,000
2009	Hannibal Locks and Dam	56,000,000
2010	Bar Harbor, Eastport, Medway, Veazie C, Basin Mills, and Bango Pacific Projects	50,000,000
2011	Hatfield, Minominee, Oconto Falls, and Thunder Bay Projects	60,000,000

ATTACHMENT 7

ENVIRONMENTAL LIABILITY TRANSFER, INC. FIRM DESCRIPTION

Experience. ELT is a comprehensive risk and liability assumption company providing its clients complete and final risk transference services. With industry leading financial backing and a unique blend of expertise – environmental liability, legal liability, ecological restoration, demolition, and insurance – ELT has successfully assumed, backstopped, and alleviated over \$1 billion in risk for its clients throughout North America.

Clients such as Shell Global, Asarco, Caterpillar, General Motors, Kinder Morgan, Textron, Kraft General Foods, Uniroyal, Kaiser Aluminum, Fruit Of The Loom, PMX, ABB, Millennium Chemicals, BAE Aerospace and many more have effectively transferred and disposed risk through ELT programs.

Project Profiles. Notable transactions in which ELT assumed and abated risk associated with the environment, demolition, legal liability, and ecology:

Federated Metals – Houston TX. At the request of Texas Commission of Environmental Quality, ELT took ownership of the property and negotiated and entered into an order with TCEQ to assume and address all site liabilities. Liabilities included, but were not limited to, radioactive contamination and contaminated groundwater including impact to adjacent interstate system. ELT posted financial assurance for a project that exceeded \$30 million.

Shell Global Canadian Portfolio. At the request of Shell Global ELT took ownership of a 136 site portfolio consisting primarily of former oil transfer and bulk storage sites. ELT is actively working with the Canadian Ministry of the Environment and 9 separate Provincial regulatory agencies. ELT has reserved \$100 million for project completion.

RG Steel – Baltimore, MD. ELT purchased the former Bethlehem Steel Mill located in Baltimore, MD consisting of 3,100 acres and 14 million square feet of structure under roof. The purchase was made in and through the United States Bankruptcy Court. As conditioned with the Court, ELT worked with and entered a consent order with EPA Region 3 in addition to entering the site in the Maryland Department of the Environment's Voluntary Cleanup Program. \$48 million in financial assurance has been posted and cleanup activities are ongoing. The 14 million square feet of structures have all been demolished.

ASARCO – Perth Amboy, NJ. At the request of the New Jersey Department of Environmental Protection, ELT took ownership of the property and negotiated and entered into an order with NJDEP to assume and address all site liabilities including but not limited sediments located within the Arthur Kill.

Attachment G

**Hawkins Delafield & Wood,
“Report on Risk Mitigation and Insurability for the Klamath Restoration Project”
(November 13, 2015)**

Execution Version

CORPORATE GUARANTY

Kiewit Infrastructure West Co. (the “Contractor”) entered into a Project Agreement (the “Agreement”) dated April 24, 2019, with Klamath River Renewal Corporation (“Company”), (collectively, the “Parties”).

WHEREAS, Contractor is a wholly-owned subsidiary of Kiewit Infrastructure Group, Inc. (the “Guarantor”); and

WHEREAS, Guarantor will derive benefit from Contractor entering into the Agreement; and

WHEREAS, as a condition to Company’s entering into the Agreement, Company requires that Guarantor execute this Corporate Guaranty.

NOW THEREFORE, Guarantor agrees as follows:

1. Guarantor irrevocably guarantees the full and timely performance by Contractor of all its obligations under the Agreement, as now or hereafter amended, and hereby undertakes that if Contractor shall in any respect fail to perform and observe all of the terms, provisions, conditions, and stipulations of the Agreement, Guarantor shall perform or have performed all such obligations as required by the Agreement without any requirement that Company first proceed against Contractor.
2. The obligations of Guarantor under this Corporate Guaranty shall be primary, absolute and unconditional obligations of Guarantor, shall not be subject to any counterclaim, set-off, deduction, diminution, abatement, recoupment, suspension, deferment, reduction or defense based upon any claim Guarantor may have against Contractor. To the fullest extent permitted by applicable law, this Corporate Guaranty shall remain in full force and effect without regard to, and shall not be released, discharged or in any way affected by:
 - (a) any termination, amendment or modification of or deletion from or addition to or other change in the Agreement or any other instrument or agreement applicable to any of the parties to the Agreement;
 - (b) any voluntary or involuntary bankruptcy, insolvency, reorganization, arrangement, readjustment, assignment for the benefit of creditors, composition, receivership, conservatorship, custodianship, liquidation, marshaling of assets and liabilities or similar proceedings with respect to Contractor, Guarantor or any other person or any of their respective properties or creditors, or any action taken by any trustee or receiver or by any court in any such proceeding;
 - (c) any merger or consolidation of Contractor or Guarantor into or with any other entity, or any sale, lease or transfer of any of the assets of Contractor or Guarantor to any other person;

- (d) any change in the ownership or control of any interests of Contractor or any change in the relationship between Contractor and Guarantor, or any termination of such relationship.
- 3. Guarantor agrees that during the term of this Corporate Guaranty it will maintain its corporate existence, will not dissolve or otherwise dispose of all or substantially all of its assets and will not consolidate with or merge into another entity or permit one or more other entities to consolidate with or merge into it unless the successor is Guarantor; provided, however, that Guarantor may consolidate with or merge into another entity, or permit one or more other entities to consolidate with or merge into it, or sell or otherwise transfer to another entity all or substantially all of its assets as an entirety and thereafter dissolve if the successor entity (if other than Guarantor): (a) assumes in writing all the obligations of Guarantor hereunder and, if required by law, is duly qualified to do business in the State of California; (b) delivers to Company an opinion of counsel to the effect that its obligations under this Corporate Guaranty are legal, valid, binding and enforceable subject to applicable bankruptcy and similar insolvency or moratorium laws; and (c) has a net worth at the time of any such transaction at least equal to the net worth of Guarantor immediately prior to such time.
- 4. If a consolidation, merger or sale or other transfer is made as permitted by Section 3, this Corporate Guaranty shall continue in full force and effect and no further consolidation, merger or sale or other transfer shall be made except in compliance with the provisions of Section 3. No such consolidation, merger or sale or other transfer shall have the effect of releasing the initial Guarantor from its liability hereunder unless a successor entity has assumed responsibility for this Corporate Guaranty as provided in Section 3.
- 5. Guarantor agrees to pay Company on demand all fees and costs incurred by or on behalf of Company in successfully enforcing by legal proceeding observance of the covenants, agreements and obligations contained in this Corporate Guaranty against Guarantor, other than the fees and costs that Company incurs in performing any of its obligations under the Agreement.
- 6. The Guarantor unconditionally waives, to the extent permitted by applicable law:
 - (a) notice of any of the matters referred to in Section 2;
 - (b) notice to Guarantor of any breach or default with respect to the Agreement or any other notice that may be required, by statute, rule of law or otherwise, to preserve any rights of Company against the Guarantor;
 - (c) any requirement to exhaust any remedies;
 - (d) any other circumstance whatsoever which might otherwise constitute a legal or equitable discharge, release or defense of a guarantor or surety or which might otherwise limit recourse against Guarantor.
- 7. Guarantor agrees that any and all present and future debts or obligations of any nature whether arising in connection herewith or otherwise of Contractor to Guarantor are subordinated to the claims of Company with respect to the Agreement.

8. The obligations of Guarantor set forth herein constitute the full recourse obligations of Guarantor enforceable against it to the full extent of all its assets and properties.
9. This Corporate Guaranty shall inure to the benefit of Company and its permitted successors and assigns and shall be binding upon Guarantor and its successors and assigns.
10. Notwithstanding any other provision of this Corporate Guaranty, Guarantor's undertakings and obligations hereunder with respect to the Agreement are derivative of and not in excess of the Contractor's obligations under the Agreement, and the Guarantor retains all rights, claims, defenses, and limitations of liability possessed by Contractor under the terms of the Agreement or arising from the parties' performance or failure to perform thereunder and shall be entitled to assert any contractual defenses that would have been available to the Contractor under the Agreement.
11. This Corporate Guaranty shall be governed by and construed in accordance with the laws of the State of California, excluding any law or rule that would require the application of the law of another jurisdiction.
12. This Corporate Guaranty shall remain in full force and effect from the date of execution and delivery hereof until all of the obligations of the Contractor under the Agreement have been fully paid and performed.
13. Except as provided in Section 3, this Corporate Guaranty may not be assigned by Guarantor without the prior written consent of Company.
14. This Corporate Guaranty may not be amended, changed or modified or terminated, and none of its provisions may be waived, except with the prior written consent of Company and Guarantor.
15. All notices, demands or written communications given pursuant to the terms of this Corporate Guaranty shall be: (1) in writing and delivered in person; (2) transmitted by certified mail, return, receipt requested, postage prepaid or by overnight courier utilizing the services of a nationally-recognized overnight courier service with signed verification of delivery; or (3) given by email transmission, if a signed original of the emailed letter or other communication is deposited in the United States mail within two days after transmission. Notices shall be deemed given only when actually received at the address first given below with respect to each party. Either party may, by like notice, designate further or different addresses to which subsequent notices shall be sent.

(a) Notices required to be given to Company shall be addressed as follows:

The Klamath River Renewal Corporation
2001 Addison St., #317
Berkeley, CA 94704
Attn: Laura Hazlett
Telephone No.: (415) 820-4441
Email Address: lhazlett@klamathrenewal.org

with a copy to:

The Klamath River Renewal Corporation
2140 Shattuck Avenue, Suite 801
Berkeley, CA 94704
Attn: Richard Roos-Collins
Telephone No.: (510) 296-5589
Email Address: rrcollins@waterpowerlaw.com

(b) Notice required to be given to Guarantor shall be addressed as follows:

Kiewit Infrastructure Group, Inc.
3555 Farnam Street
Omaha, NE 68131
Attn: David J. Miles
Telephone No.: (402) 342-2052
Email Address: david.miles@kiewit.com

with a copy to:

Kiewit Infrastructure West Co.
2200 Columbia House Blvd
Vancouver, WA 98661
Attn: Jamie D. Wisenbaker
Telephone No.: (360) 693-1478
Email Address: Jamie.wisenbaker@kiewit.com

IN WITNESS WHEREOF, Guarantor has caused this Corporate Guaranty to be signed in the name and on behalf of Guarantor by its authorized representative as of this _____ day of July, 2019.

KIEWIT INFRASTRUCTURE GROUP, INC,
as Guarantor

By: David J. Miles

Name: David J. Miles

Title: Executive Vice President

ACCEPTED AND AGREED TO BY:

KLAMATH RIVER RENEWAL
CORPORATION, as Company

By: Laura Hazlett

Name: Laura Hazlett

Title: Chief Financial Officer

Attachment H

Qualifications of Aon Risk Insurance Services West, Inc.

Aon's Credentials and Experience

Aon is a leading global professional service firm providing a broad range of risk, retirement and health solutions. Our 50,000 colleagues in 120 countries empower results for clients by using proprietary data and analytics to deliver insights that reduce volatility and improve performance. Our client focus and dedication has made us a global leader within our industry as recognized by publications, industry observers, and most importantly, our clients. Aon is recognized globally by clients and industry specialists as the preeminent infrastructure risk advisor; having received the P3 Bulletin's Gold Award for Insurance/Risk Advisor for four of the last five years and having served as the risk advisor on over 600 projects globally. Our success lies in our distinctive client focus and tailored risk mitigation solutions for construction, infrastructure, and public entity clients engaged in complex infrastructure projects.

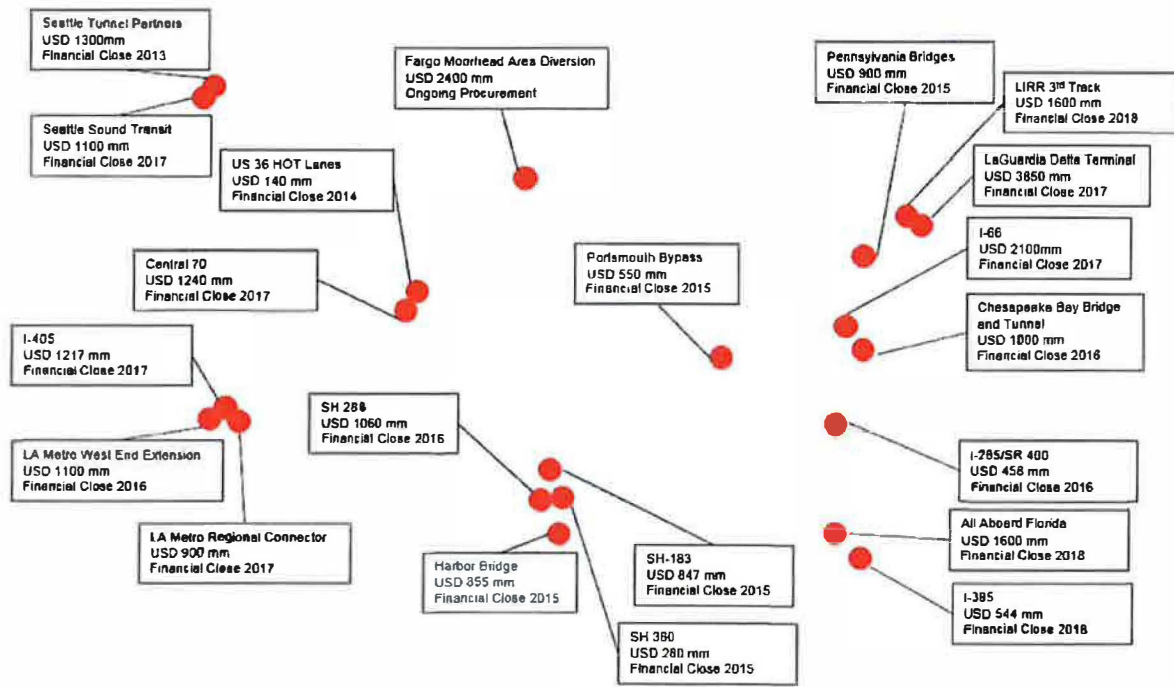
Aon has recently been directly engaged in providing transactional, advisory services and/or brokerage services on projects in North America valued at over USD \$20 billion.

Aon will call upon its North American infrastructure project experience, outlined below, to provide KRRC with a comprehensive and exclusive team of professionals who are experts in advising on risk management across infrastructure assets.

Additionally, Aon's Actuarial and Analytics practice will conduct a Risk Finance Decision Platform (RFDP) workshop with KRRC. This practice consists of a team of highly skilled and experienced professionals in the risk quantification, modeling and analysis field, providing independent actuarial consulting services in a professional and cost-effective manner. The Aon practice, if viewed on a stand-alone basis, would be the third largest Property and Casualty actuarial consulting firm in North America, inclusive of more than 100 consultants and 45 Fellows and Associates of the Casualty Actuarial Society. We also have a number of consultants with recognized professional designations such as ARM, CPCU, CPA, CFA and CFP. Many of our professionals have advanced degrees including MS, MBA and PhD.

We understand that environmental issues are of particular concern with this Project. Aon invested early on to build a specialist environmental group before almost any other broker. This investment attracts the top risk management and insurance brokerage talent to our organization and allows us to provide superior service to our clients including creative, innovative risk transfer solutions. In addition to traditional insurance brokerage services, Aon's Environmental Services Group (ESG) can also assist KRRC with developing specifications and a Request for Proposal document for a Liability Transfer Company, where that solution makes sense. As this Project is not a traditional remediation project, KRRC and Aon may determine that there are portions of the Project that can be transferred to a Liability Transfer Company, other exposures that are more suitable for traditional insurance risk transfer, and portions of the Project that may benefit from involving a natural resource mitigation banking alternative. Aon ESG will work with KRRC and the broader Aon team to determine where and when these solutions are best deployed for the maximum risk transfer and financial benefit for KRRC.

Relevant Recent Major US Project Experience



Relevant Recent Environmental Capabilities

- Negotiated the environmental insurances, including both site pollution and contractors pollution, for habitat restoration along the Willamette River Superfund Site in Oregon. The Project included demolition and removal of an abandoned industrial facility, removal of earthen berms, and flooding of the former industrial site to recreate the historical wetlands environment. The Project generated Natural Resource Damage Mitigation Credits that provided future revenue generation.
- Placed site pollution coverage for a portfolio of juvenile salmon habitat restoration along the Duwamish Superfund Site in Seattle, Washington. These restorations were to assist with the reestablishment of the salmon population in the Duwamish River area. This portfolio of restoration was also used to generate Natural Resource Damage Mitigation Credits to provide future revenue.
- Assisted a San Francisco Bay Area Insured with developing and implementing a Request for Proposal for an Environmental Liability Transfer partner. Aon Environmental worked with the insured to develop the selection criteria and evaluation of the transfer firm, as well as coordinating the firm interviews and presentations.
- Aon was selected to provide risk management services and insurance solutions to facilitate the removal of the Milltown Dam near Missoula, Montana. Unlike many other dam removal projects, the primary concern at Milltown was the potential for release of contaminants in sediments that

accumulated behind the dam from nearby copper mining and milling operations from the Butte Open Pit Mine and the Anaconda Smelter. Aon was asked by our client and its remediation contractor to develop an environmental insurance program for the work at the Milltown Dam Superfund Site. The products/solutions provided by Aon included:

- Project-specific Contractors Pollution Liability (CPL) insurance with limits of \$100 million/\$100 million covering the GC and all other contractors providing demolition, remediation, transportation, treatment and disposal services. Covered activities included infrastructure construction involving upgrading and installation of roads, bridges, rail service, a sediment dewatering plant and landfills where non-hazardous wastes were disposed. The policy was written for a 20-year term.
- Project-specific Pollution Legal Liability (PLL) insurance with limits of \$100 million/\$100 million covering releases of pollutants at the jobsite, dewatering plant, landfills, rail facilities and other specific sites due to causes unrelated to the contractors' activities. The policy provided coverage for a term of 20 years, which included the expected remediation and redevelopment periods, plus 10 years of completed operations.
- Remediation Cost Overrun (Cost Cap) insurance with a limit of \$100 million over the expected costs of \$116 million. This insurance was also provided with a policy term of 20 years.

Note: Cost Cap insurance is no longer available in the environmental marketplace and policies with terms longer than 10 years are not generally available.

Attachment I

Qualification of Resources Environmental Solutions, LLC

Company Overview & Introduction

RES is neither an investment fund, environmental consulting firm, nor a traditional “mitigation banker.” We do not seek to sell a standard set of repeatable services or products. Rather, we pride ourselves on our unique ability to deliver customized solutions tailored to our clients’ needs. This is enabled by a deep and diverse set of internal resources and capabilities that spans from planning, research and analysis, to design and engineering, to implementation and long-term management. RES’ internal resources include environmental, health, safety, and security (EHS&S) staff, land acquisition specialists, stream designers, professional wetland scientists, species experts, engineers, hydrologists, QA/QC oversight teams, field ecologists, regulatory project managers, analysts, certified foresters, arborists, landscape architects, construction managers, superintendents, and field crew members as well as supporting project controls, government affairs, public relations, financial, legal and analytical staff.

RES has earned a reputation as a reliable, responsible ecological offset solution provider with keen knowledge of regulatory agency requirements and the flexibility to deliver successful compensatory mitigation and affect liability transfer. We are client-driven, seek synergies that enable multiple solutions per land-acre as allowed by regulatory agencies, and are vertically-integrated to enable team execution and lower operating costs and deliver high quality, successful ecological offset sites.

RES’ experience includes:

- Restoration, enhancement, and preservation of over 55,000+ acres of wetlands
- Restoration of over 294 miles of streams
- Rehabilitation and preservation of over 9,100 acres of endangered species habitats
- Permitting and development of 350 mitigation sites, completed or in process
- Design, permitting and development of 68 wetland, stream, and conservation banks
- Successful close-out over 100 mitigation sites
- Delivery of 20,000 acres of custom, turnkey mitigation solutions
- Design and construction of over 350 stormwater management facilities
- Maintenance of 600 commercial, municipal and residential stormwater management facilities
- Reductions of over 240 tons of water quality nutrients
- Planting of over 14,000,000 trees across all operating regions
- Development and operation of nurseries in three states including the largest coastal nursery in Louisiana
- Supplying compensatory wetland and stream mitigation for over 1,850 federal and state permits primarily for clients in the energy, power, and industrial sectors.

Bois d'Arc Lake Mitigation Project*Fannin County, Northeast Texas / North Texas Municipal Water District*

is developing a 16,500-acre reservoir to provide new water services to 13 cities; the first surface water reservoir to be permitted in Texas in almost 30 years. RES is restoring 15,000 acres of habitats, including 70 miles of streams, to offset the environmental impacts of building this new lake.

RES is delivering complete stewardship of the Lower Bois d'Arc Creek Reservoir (LBCR) mitigation sites, from design and implementation through monitoring and maintenance over the next 20+ years. The project addresses:

- 369,000+ LF (70 miles) of stream restoration/enhancement
- 1,026 acres of forested wetland enhancement
- 3,875 acres of forested wetland restoration
- 1,560 acres of emergent wetland enhancement
- 1,200 acres of emergent wetland restoration
- 150 acres of shrub wetland restoration
- 1,146 acres of upland forest restoration
- 3,677 acres of native grassland restoration
- Planting over 5 million trees

RES' presence on the project is 24/7, with a full-time staff living on the property. Site performance success is measured by restoration of aquatic and terrestrial species. RES bonded the entire project and all mitigation and transferred liability from the North Texas Municipal Water District to RES.

North Texas Municipal Water District

Construction Period

Construction complete by
February 2022, Monitor for 20
years post construction

Project Highlights

- 15,000-acre aquatic and terrestrial mitigation
- Nation's largest permittee-responsible mitigation (PRM), offsetting impacts of a large municipal reservoir serving 13 cities in North Texas



Robinson Fork Custom Mitigation Bank – Phase I

Washington County, PA

In 2017, RES completed construction on the largest floodplain restoration project in the northeastern United States completed to date, encompassing over 30% of the Robinson Fork Watershed. The project included several new and innovative approaches for stream enhancement, and headwater system restoration with the Robinson Fork Mitigation Bank – Phase I (RFMB-I), which allowed for the re-establishment of high quality, inter-connected stream floodplain complexes on gradients steeper than have previously been accomplished. The project was constructed under contract with CONSOL Energy for mitigation of their Bailey mine, the largest coal mine in the United States. RES recommended the custom construction of a mitigation bank to CONSOL to speed up permitting timelines on the phased expansion of the mine. The entire project was developed with the goal of meeting specific permitting timelines for CONSOL as they developed each mine phase.

The restoration efforts within RFMB1 focused on the creation of an integrated and dynamic stream and floodplain system; restoring localized groundwater aquifers, reconnecting floodplains to the water table and streams, optimizing and diversifying habitat, and creating a hydrologic system that allows for the retention of nutrients, stream bed material and organic carbon, such as leaves and twigs. This design approach provided the basis for the continued evolution of ecological complexity and long-term stability at the site. In the short-term, this restoration has already shown ecological uplift and improvement of the hydrology of the restored stream and floodplain complex, increased baseflow conditions in the stream, additional in-stream and floodplain habitat, increase in large-woody debris (LWD) and carbon retention, and an increase in floral and faunal biodiversity.

This site had significant design and construction challenges from past anthropogenic impacts within the restoration parcels. Overall, the design approach focuses on creating a highly stable, low-shear stress stream and wetland floodplain complex, which allows for the long-term evolution of ecological complexity at the site. The re-established wetlands are integrated with the active valley wide hyporheic zone to have water within a foot of the surface for the majority of the growing season. This drives a high diversity plant community, ensures wetland hydrology criterion are met, and encourages optimal floodplain tree and shrub growth. The stability of the site, and the increase in LWD, floodplain micro and macro habitat, and in-stream micro and macro habitat allow for the quick recolonization and expansion of fish and macro-invertebrate populations. Several stream reaches that did not previously have conditions conducive to fish populations were noted as having new fish populations less than a year after.



Drone photo of Beham Run, which is an approximately 8,000 LF reach of floodplain restoration with about a 10-mile drainage area. This picture was taken at the start

Construction Period

2015 – 2017

Project Highlights

- 148,727 LF Stream Creation, Enhancement & Preservation
- Restoration & Enhancement:
- 35 acres of Forested Wetlands
- 5 acres of Emergent Wetlands
- 42 acres of Native Grasslands
- 410 acres of Riparian Forest
- 68,350 Trees Planted
- 900 Potential Roosts for the Endangered Indiana Bat and Threatened Northern Long-Eared (NLE) Bat

Pennsylvania Statewide Bat Conservation Bank

Greene County, PA | U.S. Fish and Wildlife Service

RES received conditional approval in March 2017 and formal approval in December 2018 from the USFWS for the northeast region's first species conservation bank, in Greene County, PA. This approval represents several years of close coordination with the USFWS to define and create greater certainty and predictability for projects requiring bat habitat mitigation. To create the Pennsylvania Statewide Bat Conservation Bank, we coordinated with the USFWS Pennsylvania field office over the course of three years to select a site, develop a crediting methodology, and finalize the first endangered species conservation banking instrument in the State.

The bank is located within the known range of the federally listed Indiana bat (*Myotis sodalis*) and includes more than 438 contiguous acres of high-quality habitat used by two Indiana bat maternity colonies. Although Indiana bats have experienced significant population declines due to a malady known as white-nose syndrome, the Indiana bat maternity colonies in Washington and Greene Counties persist.



Conservation banking creates a collaborative incentive-based approach where habitat for listed species is treated as an asset rather than a liability. By permanently protecting high-quality forested habitat in a critical Indiana bat habitat zone, the bank provides an advanced compensatory mitigation mechanism to support economic development while complying with the Endangered Species Act and the relevant federal mitigation initiatives. The conservation bank provides high-quality, self-sustaining bat habitat to offset statewide impacts to the Indiana bat and its habitat in a biologically significant area. The availability of released bat habitat credits facilitates an expedited path to construction for our clients' projects, where costly and time-consuming permittee responsible mitigation processes are avoided.

The maternity area includes three partially conjoined maternity colonies consisting of primary and alternate roost trees and the surrounding 2.5–3-mile foraging habitat (USFWS 2016). Acoustic surveys on the site indicate the likely presence of eight bat species in addition to Indiana bats, including northern long-eared (*Myotis septentrionalis*) and tri-colored bats (*Perimyotis subflavus*).

In addition to providing extremely high-quality bat habitat, the bank site abuts two known Biodiversity areas identified by the Pennsylvania Department of Conservation and Natural Resources, and hosts the only known Mixed-Mesophytic Forest Target Plant Community (an extremely rich terrestrial community type on deep soils in protected concave coves or lower slopes) in Greene County, PA. The site is also within the known range of one endangered plant (Nuttall's hedge-nettle, *Stachys cordata*) and at least three special concern plant species (single-headed pussy-toes (*Antennaria solitaria*), American beakgrass (*Diarrhena americana*), and leaf-cup (*Smallanthus uvedalius*)).

Contract Period

2015 – Present

Project Highlights

- First conservation bank in the Northeast Region
- One of the nation's first bat conservation banks

Pineywoods Mitigation Bank

Sponsor: Neches River Corridor, LP c/o GMO Renewable Resources

Pineywoods Mitigation Bank is one of the largest approved mitigation banks in the US at 19,079 acres of bottomland hardwood and was established in July 2008. The bank is located in the middle of the Neches River basin and provides a corridor between the Davy Crocket and the Angelina National Forests in East Texas.

The Mitigation Banking Instrument Bank was complex and required approval of both USACE Fort Worth and Galveston Districts. The bank was developed using older Wildlife Habitat Assessment ratios (WHAP) that later converted to an Interim Hydrogeomorphic Assessment Method (HGMi).

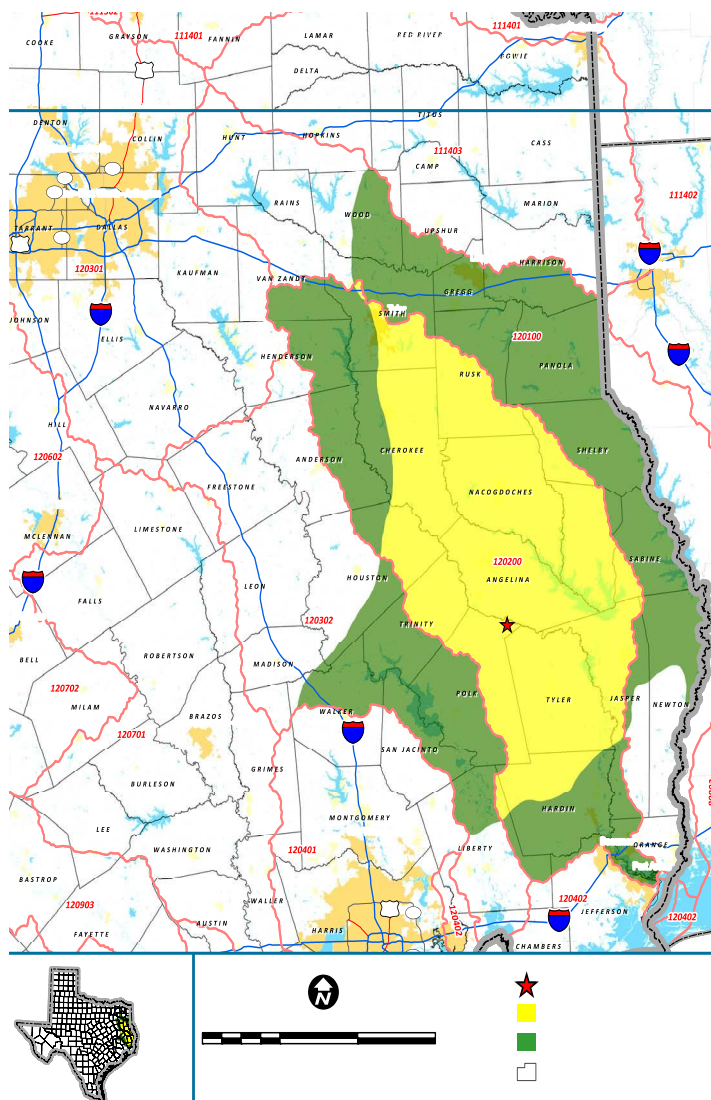
RES was named the Exclusive Credit Sales Agent, March 2009 through July 2010. This agreement included documentation of sale and pre-enabled discounts for credit sales exceeding target credit volumes sold per transaction. Sales transactions were kept confidential and later made available by USACE via FOIA. The Agreement terminated when GMO, the bank sponsor, decided to sell the bank.

Contract Period

March 2009 – July 2010

Project Highlights

- 19,079 Acres of Bottomland Hardwood
- Various Credit Clients



RES engaged permittee clients with unavoidable project-related impacts and negotiated resulting credit sales transactions and credit sales reservations. Mitigation bank credit client permittees included Texas Department of Transportation, oil and gas developers, pipeline operators, and land developers, sought out following rigorous market demand and competitive coverage analysis studies of the mitigation bank's service areas and neighboring geographies.

The Prince William Environmental Bank – P3 Contract for Stream Restoration

Prince William County, VA | Prince William County Department of Parks and Recreation

In 2007, RES partnered with Prince William County Department of Parks and Recreation (PWC) to restore approximately 147,000LF– well over 20 miles – of stream and riparian buffer on almost 2,000 acres of parklands. RES established a **public-private partnership (P3) with PWC to enable stream restoration across the County at no cost to the County** by combining the benefits of stream restoration and preservation within the County Park system with the need for stream mitigation credits in the watershed. The Prince William Environmental Bank (PWEB) is the only P3 agreement of its kind in the Virginia. All design, permitting, planning, and construction are being implemented by RES, and credit revenues are shared with the County. RES manages the bank ledgers and ensures annual monitoring reports are submitted to maintain compliance with regulatory agencies. RES also does regular demand forecasting and analysis for the County.

Contract Period

- Permitting, Design, and Construction: 2007 – 2013
- Ecological Monitoring Ongoing Until 2023

Project Highlights

- Only P3 of its kind in Virginia
- Extensive Public Outreach
- Two Design-Build Stream Restorations Completed
- Restored 20 Miles of Stream in PWC Parks

Initial Stream Condition Assessments and Design Feasibility Studies

RES performed a comprehensive feasibility and needs assessment of the streams within 10 PWC parks. Opportunities were identified to address stream degradation and improve water quality through the implementation of various natural stream design (NSD) techniques and stormwater BMPs, including bio-retention basins, infiltration trenches, riparian buffers, invasive plant controls, bank stabilization with natural materials, bankfull bench creation, root wads, and in-stream structures, such as log/rock vanes and step pools. For each of the 10 PWC Parks which contain potential stream restoration sites, RES performed the following:

- WOTUS Wetland Delineations and USACE Confirmation
- Perennial Flow Determinations
- Geomorphic and Resource Protection Area (RPA) Assessments
- Threatened and Endangered (T&E) Species Surveys (where required)

Status of P3 Implementation

RES developed a Mitigation Banking Instrument (MBI) for PWEB, an umbrella bank, as well as Bank Development Plans (BDP) for sites included in Phase I of the project. RES received MBI approval from the Interagency Review Team (IRT) and has completed construction of two of the identified projects. RES is currently developing a third project under this P3 agreement with PWC.

- *Locust Shade Park, Triangle, VA:* Completed in May 2012, restored 5,160LF of stream channel.
- *James S. Long Park, Haymarket, VA:* Completed in October 2013, restored over 7,215LF of stream channel.

Public Education and Outreach Planning

RES recognized the tight-knit communities that utilize and cherish the parks of Prince William County. Both the Locust Shade and James Long Park stream restorations took place in areas highly utilized by the public, especially the stream restoration in James Long Park, which is adjacent to Battlefield High School and contains several ball fields. Thus, RES understood its responsibility to develop quality, on-time restoration projects while remaining responsive to the needs and concerns of project stakeholders along the way. During stream restoration at both Locust Shade and James Long Parks, RES met with interest groups to address concerns and offer information on why construction was occurring. RES also developed multiple public resources to educate the community on stream restoration. RES recognized both an obligation to alleviate public concerns as well as an opportunity to educate the community on ecological restoration. Prior to construction activities at Locust Shade Park and James Long Park, RES posted onsite signage detailing the stream restoration project and directing the public to an online resource for more information. In conjunction, RES created online pages that presented the science of stream restoration. On this site, community members could view pictures of each project before, during, and after construction, as well as submit questions or concerns to RES or County staff directly.



Hull Springs Farm Mitigation & Nutrient Banks

Westmoreland County, VA | The Longwood University Foundation

In October 2011, The Longwood University Foundation (The Foundation) received approval from the Interagency Review Team to create the Hull Springs Farm Mitigation Bank on a 214-acre farm owned by Longwood University in Westmoreland County, VA. The goal for the property was to generate revenue for the University through credit sales, while conserving open space and offering educational opportunities for students and professors.

In 2013, The Foundation selected RES to complete data analysis; final stream and wetland design; construction; as-built reporting; performance monitoring, maintenance, credit sales and management of the bank. This involves managing the bank ledgers and ensuring annual monitoring reports are submitted to maintain compliance with regulatory agencies.

The stream component of the bank consists of 1,454 LF of stream restoration, 6,012 LF of stream enhancement/preservation, and 16.14 AC of riparian buffer plantings. The wetland component of the project consists of 22.27 AC of wetland restoration, 44.8 AC of wetland enhancement, 85.15 AC of wetland preservation, and 22.79 AC of upland buffer plantings.

In addition, RES has established a Nutrient Bank on the property for the sale of TMDL nutrient offset credits. This project, which was implemented in 2017, consists of 57.71 AC of historic agricultural field that has been planted to achieve a forested condition. This project has generated additional revenue for the University in addition to expanding the extents of conserved land on the property.

The bank areas, which were predominantly farm land, are now thriving ecosystems that contribute valuable functional uplift to the Potomac River Watershed while providing learning opportunities and revenue for Longwood University.

Northern Virginia Regional Environmental Bank (NVREB) – Miller Farm, Keaton Farm, & Peters Farm

Fauquier County, VA| Wetlands Development, LLC

RES has provided complete turnkey services for the Northern Virginia Regional Environmental Bank (NVREB), a three-site wetland mitigation umbrella-bank in Fauquier County, Virginia. Tasks for all three sites have included preliminary site feasibility analysis; landowner contract coordination; a delineation of jurisdictional features; IRT coordination and bank approval; hydrologic modeling; wetland design; and county construction plan development and approval.

RES has completed all aspects of construction for the three sites, Miller Farm, Keaton Farm, and Peters Farm. Construction tasks include initial clearing and grading; micro-topography grading to create habitat diversity; hydrologic berm, geotechnical fabric and weir installation; access-road construction; containerized plantings; wetland tree and shrub seed dispersal; and emergent wetland seed mix hydroseeding.

To date, RES has created/restored more than 90 acres of wetlands on these sites, which entailed the planting of over 40,000 trees. RES currently performs ecological success criteria monitoring and reporting to the USACE and the Virginia Department of Environmental Quality (DEQ).

RES’ innovative approach to wetland mitigation monitoring includes ‘real-time’ updates to vegetation and hydrology information in RES’ mitigation monitoring database. This includes management and maintenance protocols that keep the entire project team apprised of the changing onsite conditions.

Contract Period

2014– 2028

Project Highlights

- 1,238LF stream restoration
- 26.5-acre wetland restoration
- Currently in construction stage
- Credit sales and marketing on behalf of Longwood University Foundation
- Educational outreach

Contract Period

2009 – 2019

Project Highlights

- Three Site Wetland Mitigation Bank
- Design-Build
- 90 AC of Created/Restored Wetlands
- 40,000 Trees Planted



Attachment J

**RES, Summary of Risk and Liability Transfer Approach
(July 12, 2019)**



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6575 West Lop South, Suite 300
Bellaire, TX 77401
Main: 713.520.5400

Resource Environmental Solutions (“RES”) reviewed key areas of project risk, as described in RES’ Risk Management and Liability Transfer Plan, and estimated the cost to mitigate those risks. For purposes of this exercise “mitigation” means taking actions to eliminate or significantly reduce KRRC’s potential damages rather than preventing the risk from materializing.

Risk¹	Mitigation Cost (indicative)
Flooding impacts on downstream properties²	<ul style="list-style-type: none"> The estimated cost of purchasing flood easements, which is a percent of the market value for potentially impacted properties - <i>[redacted]</i>³
Sediment impacts on downstream infrastructure	<ul style="list-style-type: none"> Cost of actions needed to mitigate impacts on infrastructure and for woody debris removal - <i>[redacted]</i>
Impacts to groundwater wells	<ul style="list-style-type: none"> Well replacement for the wells identified in RES’ report - <i>[redacted]</i>
Impacts on natural resources	<ul style="list-style-type: none"> Fixed fee for long term maintenance and monitoring and adaptive management (estimated cost could go down with successfully negotiated permit conditions) - <i>[redacted]</i>

RES considered two primary methods for mitigating risks:

- Local Impact Mitigation Fund – A fund administered by a third party to pay impacted landowners for damages. Based on discussions we have had with third-party advisors, this is a very cost-effective way to address potential litigation, even where there are valid defenses against claims in litigation (as is the case here). To determine the funding amount for the Local Impact Mitigation Fund, we used the Estimated Mitigation Costs above as a guide, taking the low end for flooding impacts. We also included a residual amount to defend claims not settled by the Local Impact Mitigation Fund (additional contingency is included in the project contingency). RES would directly assume liability for the impacts on natural resources for a fixed fee outside of the proposed fund.
- RES assumes risks – RES could assume the obligation to implement mitigation and provide an indemnity. This would be priced using the Mitigation Costs above, but taking the high end for flooding impacts and adding a fee to cover risk and uncertainty, profit and SG&A. A residual defense fund to address other risks would not be included in this price. RES would still separately assume liability for the impacts on natural resources for a fixed fee.

RES recommended the Local Impact Mitigation Fund option as the most cost effective, and robust, method for addressing the risks described above. A summary of indicative costs for that option is described below:

¹ Other risks such as sediment contamination, contractor-caused fire, etc. will be covered by insurance.

² Bridges and harbor impacts not included and subject to ongoing discussions.

³ This is based on the market value of the properties, which is *[redacted]* (increased from an appraised value of *[redacted]*). Flood easements cost a percentage of market value that can vary depending on the specific facts surrounding a project.

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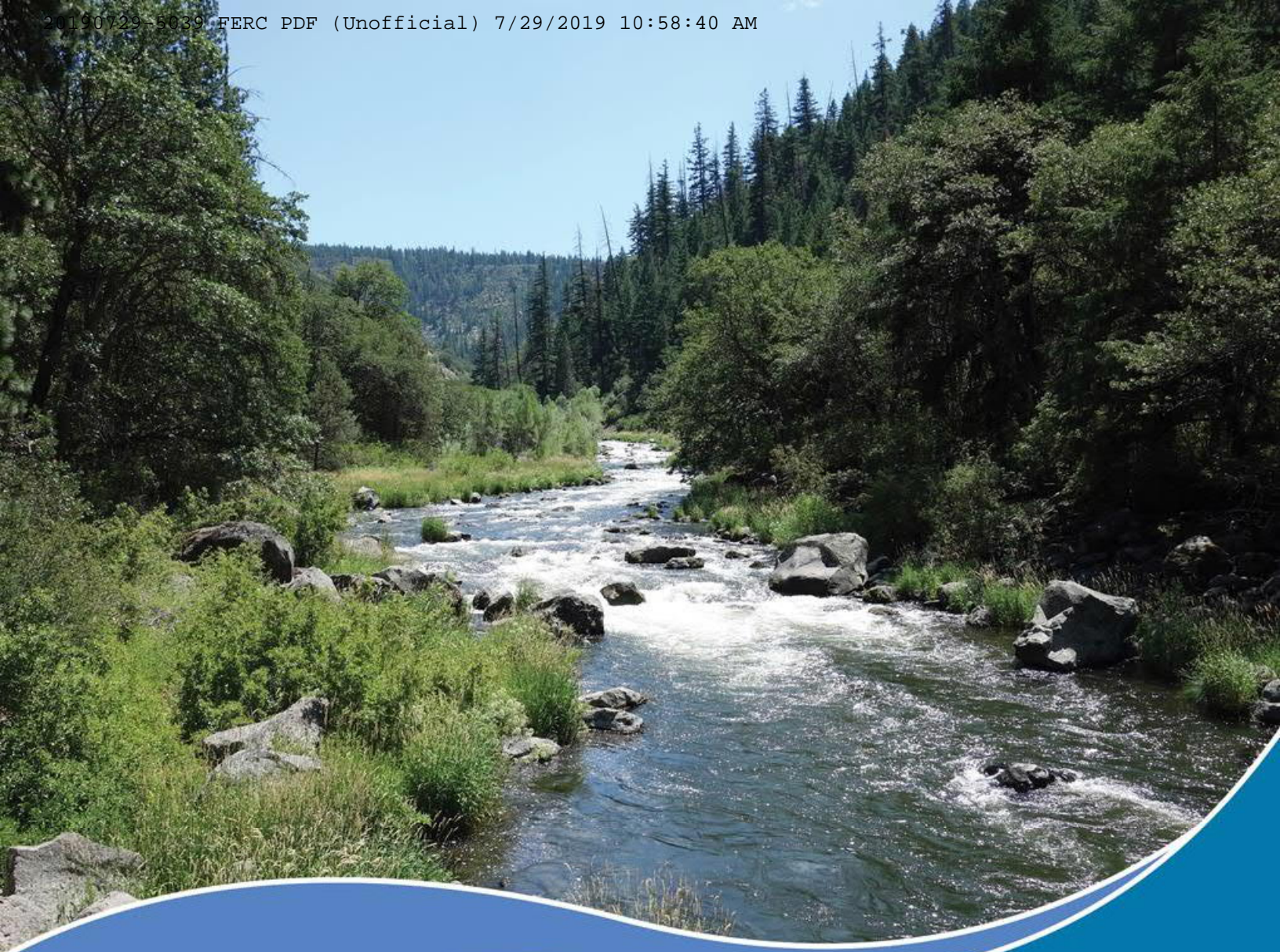
Summary – Local Impact Mitigation Fund

- *[redacted]* – fund to compensate landowners for flooding impacts, impacts to ground water wells and sediment impacts. Includes a reserve to defend other claims.
- *[redacted]* – administrative costs for third parties to administer fund
- *[redacted]* – RES fee for assuming natural resource impacts risks (sediment, force majeure impacting success criteria, etc.).

Total: \$35.7 million

Attachment K

**AECOM, Amended Estimate of Project Costs Report
(July 2019)**



Definite Plan for the Lower Klamath Project

Appendix P –Amended Estimate of Project Costs

July 2019





Prepared for:

Klamath River Renewal Corporation

Prepared by:

KRRC Technical Representative:

AECOM Technical Services, Inc.
300 Lakeside Drive, Suite 400
Oakland, California 94612

CDM Smith
1755 Creekside Oaks Drive, Suite 200
Sacramento, California 95833

River Design Group
311 SW Jefferson Avenue
Corvallis, Oregon 97333

List of Preparers:

Eric Jones (AECOM) – Cost Estimator
Laura Hazlett (KRRC) – COO and CFO Klamath River Renewal Corporation
Seth Gentzler, PE (AECOM) – Project Management and Hydraulic Engineer
Shannon Leonard, PE (AECOM) – Civil Engineer
John Roadifer, PE (AECOM) – Geotechnical Engineer
Scott Wright, PE, PMP (RDG) – River Restoration Engineer
George Strnad, RLA (AECOM) – Habitat Restoration
Kate Stenberg, Ph.D. (CDM) – Permitting and Compliance
Tuna Tanriover (AECOM) – Quantitative Risk Assessor
Shashank Reddy (AECOM) - Quantitative Risk Assessor
Stuart Green (AECOM) – Project Controls

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Acronyms and Abbreviations

AR	Aquatic Resources
BOC	Board of Consultants
CA	California
CADD	Computer Aided Design and Drafting
CEQA	California Environmental Quality Act
CM	Construction Management
EIS	Environmental Impact Statement
EIR	Environmental Impact Report
ENR	Engineering News Record
FERC	Federal Energy Regulatory Commission
FTE	Full Time Equivalent
FY	Fiscal Year
GIS	Geographic Information System
GMP	Guaranteed Maximum Price
KRRC	Klamath River Renewal Corporation
KHSA	Klamath Hydroelectric Settlement Agreement
lbs	pounds
LF	Linear Feet
LVPP	Looting and Vandalism Protection Program
m³	cubic meters
MDS	Monitored Detection System
MPE	Most Probable Estimate

MW	Mega Watt
MWh	Mega Watt hour
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
OC	On center
ODC	Other Direct Cost
OR	Oregon
PDB	Progressive Design-Builder
PLS	Pure live seed
QRA	Quantitative Risk Assessment
RES	Resource Environmental Solutions, LLC
SF	Square Foot
SWRCB	State Water Resource Control Board
TCP	Traditional Cultural Properties
TER	Terrestrial Resources
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USGS	United States Geological Survey
YOC	Year of Construction

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Chapter 1: Introduction

1. INTRODUCTION

This report documents the estimated project cost for the Lower Klamath Project (Project), which in addition to construction cost, includes costs for management, administration and legal support, insurance, liability transfer, environmental compliance and permitting, engineering design, procurement, mitigation and monitoring before, during and following construction, as well as construction management. The estimated project cost is based on the preliminary design presented in the Definite Plan for the Lower Klamath Project (KRRRC 2018) (the Definite Plan), in addition to ongoing coordination and consultation with Project stakeholders and regulatory agencies.

1.1 Report Objectives

Section 7.2 of the Klamath Hydroelectric Settlement Agreement (KHSa), as amended sets forth required elements of the Definite Plan, which include:

- A detailed estimate of the actual or foreseeable costs associated with: the physical performance of Facilities Removal¹ consistent with the Detailed Plan; each of the tasks associated with the performance of the Klamath River Renewal Corporation's (KRRRC) obligations as stated in Section 7.1; seeking and securing permits and other authorizations; and insurance, performance bond, or similar measures, as set forth in Appendix L to this Settlement;
- The KRRRC's analysis demonstrating that the total cost of Facilities Removal is likely to be less than the State Cost Cap, which is the total of Customer Contribution and California Bond Funding as specified in Section 4²; and
- A detailed statement of the estimated costs of Facilities Removal.

This report addresses these elements of the KHSa and documents both the engineer's opinion of construction cost, based on the project design elements and construction plan summary provided in the Definite Plan, and the total estimated project implementation cost. In addition to reporting the estimated project costs, an estimate of a P80 contingency (defined in greater detail in Section 2.7) was prepared using a Monte Carlo analysis to account for uncertainties associated with the estimated project costs and identified project risks. The P80 contingency considered probabilities and impacts associated with risks

¹ "Facilities Removal" is defined in the KHSa as the "physical removal of all or part of each of the Facilities to achieve at a minimum a free-flowing condition and volitional fish passage, site remediation and restoration, including previously inundated lands, measures to avoid or minimize adverse downstream impacts, and all associated permitting for such actions."

² The State Cost cap is \$450,000,000.



included in the amended Risk Management Plan (KRRC 2019), in addition to accounting for price uncertainty and cost of schedule impacts.

1.2 Project Scope

The proposed Project (also referred to as the Full Removal alternative) is described in Sections 1, 4, 5, 6 and 7 of the Definite Plan. The Project involves the physical removal of each of the four dam developments (Iron Gate, Copco No. 1 and No. 2, and J.C. Boyle) to achieve at a minimum a free-flowing condition and volitional fish passage, site remediation and restoration, including previously inundated lands, measures to avoid or minimize adverse downstream impacts, and all associated permitting for such actions. Table 1-1 provides an overview of the four dam developments. The Project is located on the Klamath River approximately 200 miles from the Pacific Ocean in the states of Oregon (OR) and California (CA) (see Figure 1-1).

While the proposed Project includes full removal of all four developments, the Definite Plan also describes a “Partial Removal” alternative which is presented for purposes of environmental review. Under the Partial Removal alternative, the objectives of free-flowing river conditions and volitional fish passage will be achieved, but portions of each dam will remain in place, along with ancillary buildings and structures such as powerhouses, foundations, tunnels, and pipes. Section 5 of the Definite Plan discusses the details of infrastructure to remain under this alternative.

Prior to removal of the dams and hydropower facilities, KRRC’s contractor will draw down the water surface elevation in each reservoir as low as possible to facilitate accumulated sediment evacuation and to create a dry work area for development removal activities. A few infrastructure modifications will be necessary to facilitate drawdown. In general, drawdown will begin on January 1 of the drawdown year, and will extend through mid-March of the same year.

Table 1-1 Existing Dam Development Overview

Dam (State)	Description	Year Built	Capacity/Average Annual Production	Max. Surface Area of Reservoir (acres)	Reservoir Storage Capacity (acre-feet)	Dam Type	Dam Height/Length (feet)
J.C. Boyle (OR)	Reservoir, dam, fish ladder, power canal, two turbines and powerhouse	1958	98 MW/ 329,000 MWh	420	3,495 (total) 1,724 (active)	Earthfill	68/ 693
Copco No. 1 (CA)	Reservoir, dam, two turbines and powerhouse	1918	20 MW/ 106,000 MWh	1,000	46,900 (total) 6,235(active)	Concrete	126/ 415
Copco No. 2 (CA)	Division dam, small impoundment, two turbines and powerhouse	1925	27 MW/ 135,000 MWh	40	73 (total) negligible (active)	Concrete	33/ 278
Iron Gate (CA)	Reservoir, dam, one turbine, powerhouse and fish hatchery	1962	18 MW/ 116,000 MWh	944	58,800 (total) 3,790 (active)	Earthfill	173/ 740

After drawdown is accomplished, remaining reservoir sediments will be stabilized to the extent feasible and dam and hydropower facility removal will begin. Full reservoir area restoration will begin after drawdown, extend throughout the year, and possibly extend into the subsequent year. Vegetation establishment could extend several years.

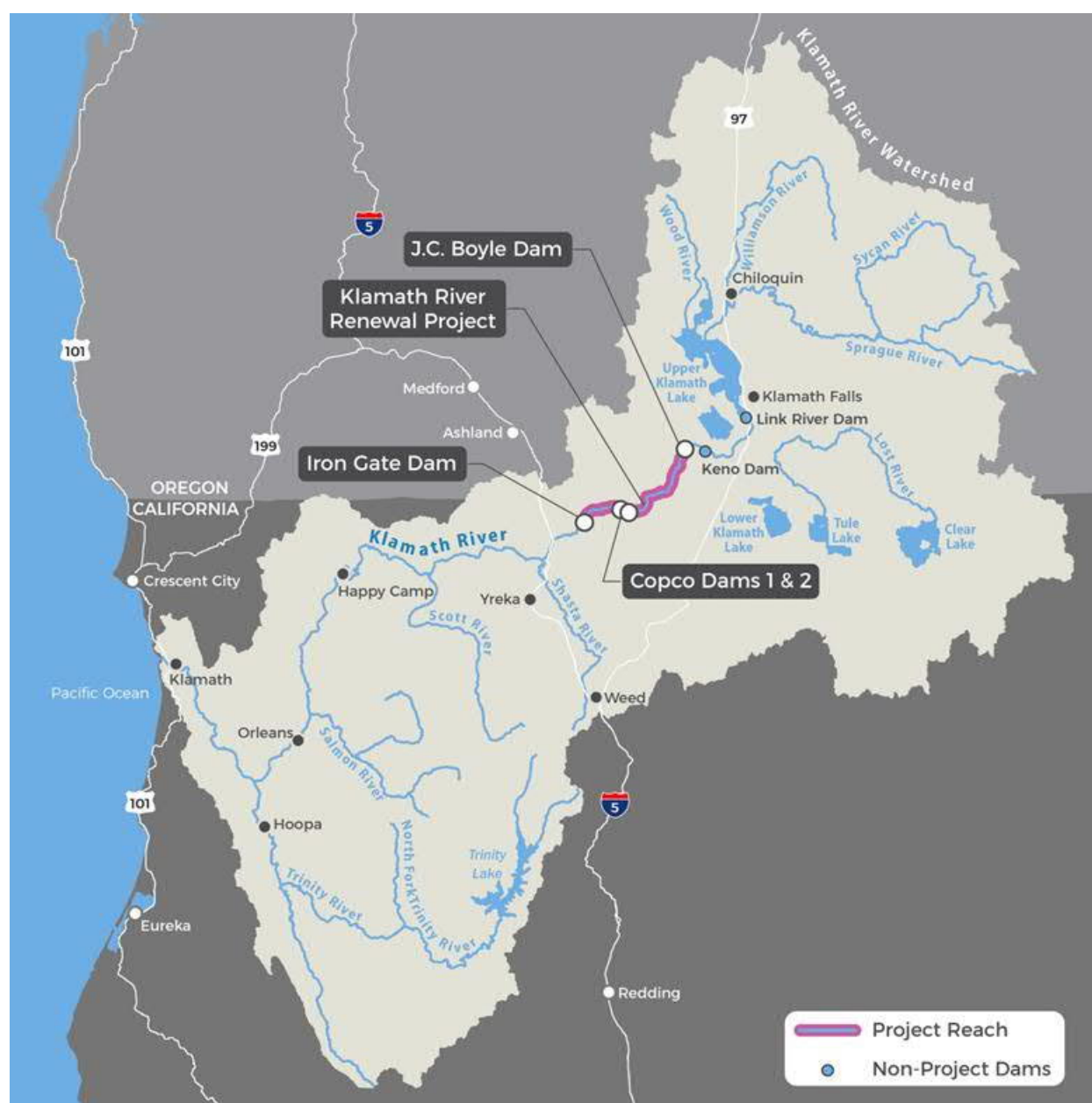


Figure 1-1 Klamath River Watershed and Facilities Locations



Other key project components include measures to reduce Project-related effects to aquatic and terrestrial resources, road and bridge improvements, relocation of the City of Yreka's pipeline across Iron Gate Reservoir and associated diversion facility improvements, as well as demolition of various recreation facilities adjacent to the reservoirs. This estimate does not include costs associated with design and construction of any hatchery improvements associated with the Project (as described in the Definite Plan), and as per the KHSa, these will be funded separately by PacifiCorp.³

1.3 Changes Since Previous Estimate

This amended version of the Estimate of Project Costs report has been refined from previous versions based on several activities and input, including the following:

1. Formal and informal input from the Federal Energy Regulatory Commission (FERC) Board of Consultants (BOC): The BOC completed a review of the Definite Plan (KRRC 2018) and the associated estimate of project costs, which resulted in Letter Report No. 1 to present their findings, conclusions and recommendations. This followed their first BOC meeting of October 24, 2018, as well as the informal meeting and site visit of October 23, 2018. Matters addressed included the Definite Plan, the feasibility and cost associated with the Definite Plan, as well as the capacity of the KRRC to accept transfer of license from PacifiCorp. After receiving BOC Letter Report No. 1, additional informal cost submittals have been made to the BOC and discussions have been completed to address the BOC input of Letter Report No. 1. The KRRC believe that all BOC input has been incorporated or addressed in this amended Estimate of Project Costs report.
2. Latest Project Understanding: Over the past year, risk management strategies have been implemented, project details have been refined, and informal agency consultations have allowed a more comprehensive understanding of project components, likely permit requirements, and other mitigations required for project implementation. The estimate herein considers this updated information.
3. Input from insurance and liability transfer experts: The KRRC has contracted with insurance and risk management companies in the past year to obtain refined input into the question of project insurance and liability transfer. This input has informed the approach to insurance and risk for the Project and the associated costs and is summarized herein.
4. Input from Progressive Design-Builder (PDB): The KRRC has contracted with a PDB contractor, Kiewit, to complete the final design and construction for the Project. Kiewit will complete their initial proof of concept deliverable and associated initial cost model in early July 2019. While limitations associated with these two early PDB submittals do not allow for their use as backup to the estimate

³ See Section 7.6.6 of the KHSa.

of costs provided herein, the numbers will be reviewed to confirm they are in alignment and that Kiewit is comfortable with the design and construction budgets summarize herein.

1.4 Limitations

The opinion of estimated project costs presented in this report is based on information in the Definite Plan, ongoing coordination and consultation with project stakeholders and regulatory agencies, and market conditions at the time of preparation of the estimate. The construction cost was estimated with the use of a combination of built-up unit prices and statistical unit prices from published and internally developed and maintained historical databases factored for location, contractor markups, and other project-specific criteria. Logic, methods, and procedures for developing costs are typical for the construction industry.

Various limitations need to be considered in the use of both built-up and statistical unit prices. These limitations include the potential for changes in technology, methods, and construction applications; the impact of short-term economic cycles; and the time-lag of reporting databases. Any estimate of unit prices is not intended to predict the outcome of hard dollar results from open and competitive bidding.

AECOM represents that the services were conducted in a manner consistent with the standard of care ordinarily applied as the state of practice in the profession, given the amount of design information available at the time of estimate preparation. No other warranties, either expressed or implied, are included or intended.

Other implementation costs presented in this report, outside of the preliminary design and construction activities, should be considered preliminary, due to the fact that:

- Permitting coordination is currently ongoing. The understanding of anticipated mitigation, monitoring and reporting requirements should be considered preliminary until feedback is received from the agencies on the draft permit applications. KRRC will obtain additional clarity on mitigation, monitoring and reporting once the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) processes are complete.
- While KRRC has executed a PDB agreement for preliminary design services with Kiewit, a Guaranteed Maximum Price (GMP) agreement amendment for construction has not been executed. The GMP agreement is anticipated by February 2020.

KRRC is undertaking additional due diligence on construction costs, measures to lower construction costs, and measures to manage construction risk. These measures include risk management, negotiation of permit requirements for natural resources, and negotiation of a PDB GMP for construction. Many risks considered in the Monte Carlo analysis that deal with design and regulatory compliance will be managed or better understood when this process is completed, likely lowering the P80 contingency. These results of these inquiries will be further informed by ongoing review and recommendations of the FERC approved independent BOC for the Lower Klamath Project.



1.5 Results Summary

Table 1-2 below summarize the estimate of Project costs for both Full Removal and Partial Removal of the four dams.

The summary includes an estimate of the P80 contingency, which was prepared using a Monte Carlo analysis to account for uncertainties associated with the estimated project costs and identified project risks. The P80 contingency (likely final project cost in 80% of all scenarios) considered probabilities and impacts associated with risks included in the amended Risk Management Plan (KRRC 2019), in addition to accounting for price uncertainty and cost of schedule impacts. Details on these methods are described further in Section 2.7 (Quantitative Risk Assessment) of this report.

Table 1-2 Results Summary

Line Item / Cost Category	Estimate of Project Costs (Year of Construction Dollars)	
	Full Removal	Partial Removal
Project Oversight (non PDB)	40,718,000	40,718,000
Liability Transfer	35,530,000	35,530,000
Environmental Compliance (KRRC-Managed)	8,097,000	8,097,000
Technical Support	14,220,000	14,220,000
Construction Management	13,167,000	13,167,000
Progressive Design-Build Contract	237,612,000	219,150,000
Mitigation Measures	17,141,000	17,141,000
Monitoring & Reporting (KRRC)	4,406,000	4,406,000
Subtotal	370,891,000	352,429,000
Contingency	62,757,000	58,621,000
TOTAL	433,648,000	411,050,000

The Full Removal Estimate total with a P80 contingency is currently approximately \$16.3M below the funding cost cap of \$450M. As shown later in Section 4 (Results), the P99 (99% Confidence Level) is only slightly above the State cost cap at approximately \$452M.

A decorative banner with a wavy, undulating shape. It consists of two main color sections: a lighter blue top section and a darker blue bottom section, separated by a thin white line. The banner curves upwards at both ends.

Chapter 2: Basis of Estimate

2. BASIS OF ESTIMATE

2.1 Cost Categories

For organizational purposes, the project costs have been summarized using the following cost categories:

- **Project Oversight:** Support services providing administration, project management and controls, contract management, BOC, outreach, corporate insurance and legal support.
- **Liability Transfer:** Specialty corporate indemnitor agreement for compliance and impacts to natural and cultural resources, and local impact mitigation fund for mitigation and property damage associated with downstream flooding and sediment, groundwater, reservoir rim stability.
- **Environmental Compliance and Permitting:** Environmental compliance support and permitting.
- **Technical Support:** Field studies, preliminary engineering design, vegetation test plots and initial seed collection, PDB procurement, and PDB management and design review (Owner's Representative).
- **Construction Management:** Full construction management services for implementation of all project components.
- **Progressive Design-Build Contract:**
 - + Final Design and Permitting Support: PDB field investigations, seed collection and propagation, invasive seed control, development of 30%, 60%, 90% and 100% design packages, and compliance support
 - + Project Insurance: Contractor controlled insurance package
 - + Dam removals: Sequential removal of all four dams, including dam modifications, reservoir drawdown and removal of all associated dam infrastructure (including spillways, fish ladders, intake structures, penstocks, turbine units, electrical installations, buildings) and demolition of existing recreation areas
 - + Reservoir area improvements: Removal, grading and shaping of portions of reservoir sediment, bank stability measures
 - + Reservoir area restoration: Seeding, planting, weeding, monitoring and maintenance. Hydroseeding methods include by barge along the reservoir bank, by helicopter along steep

slopes, by airplane along uneven large areas and by trailer mounted blower for areas easily accessible by truck; Monitoring, maintenance and reporting costs associated with habitat restoration are now being covered through the specialty corporate indemnitor, as described in more detail in Section 2.3.

- + Yreka water supply improvements: Improvements to the City of Yreka's water supply intake and relocation of their water supply pipeline.
- + Transportation improvements: Improvements to, or replacement of, bridges, culverts and road resurfacing to mitigate any project or construction related impact and to accommodate necessary construction traffic.
- + Recreation improvements: New recreation infrastructure (e.g., water access, day-use areas, etc.) to avoid or minimize project impacts
- + Downstream flood improvements: Improvements to existing structures and facilities to avoid or minimize adverse downstream flood-related impacts. This cost is now being covered through a local impact mitigation fund, as described in more detail in Section 2.3.
- + Public Health and Safety Fencing: Fencing around reservoirs to prevent access by the public and certain wildlife
- + Fire Management Plan: Measures to limit the impact of the Project on fire management
- + Spawning Gravel Augmentation: Aquatic resource measure to install gravel in certain portions of the Klamath River to mitigate impacts to aquatic resources
- **Anticipated Mitigation Measures:** Anticipated cultural resource measures, groundwater analysis (to support potential improvements), and downstream water supply improvements that may be required by regulatory agencies to mitigate Project-related impacts. Costs associated with actual groundwater improvements are now being covered through a local impact mitigation fund, as described in more detail in Section 2.3.
- **Monitoring and Reporting:** Baseline studies to support future aquatic resource, terrestrial resource, water quality, and sediment monitoring and reporting. Construction and post-construction monitoring and reporting are now being covered through the specialty corporate indemnitor, as described in more detail in Section 2.3.

2.2 Construction Procurement Approach

KRRC based estimates for the various cost categories on the executed PDB agreement with Kiewit, for construction of the dam removal work package, which includes construction access road and bridge accommodations, dam modifications, Yreka water supply improvements, dam and hydropower facility removal, recreation demolition/improvements, fire management plan implementation, spawning gravel installation, site fencing, and reservoir and other restoration. It is important to note that Kiewit is not responsible for downstream flood improvements/mitigation, groundwater improvements/mitigation or reservoir rim stability improvements/mitigation, which is being completed through management of a local impact mitigation fund, as described in more detail in Section 2.3.

Kiewit is responsible for final design of all components above, except for the Yreka water supply improvements, which are being designed by KRRC. KRRC used a qualifications-based selection approach to select Kiewit, who is currently completing field work and developing detailed design submittals.

2.3 Liability Transfer

Indicative pricing for liability transfer was developed by Resource Environmental Solutions, LLC (RES) and consist of two separate approaches to liability transfer. These approaches include utilization of a specialty corporate indemnitor and development and management of a local impact mitigation fund. Both approaches are discussed in detail in the amended Risk Management Plan (KRRC 2019) for the Project, and are summarized below, as they pertain to cost:

1. **Special Corporate Indemnitor:** The special corporate indemnitor (RES) will indemnify the KRRC, PacifiCorp and the States against harm associated with natural resource and cultural resource impact risks for a fee, through an indemnification agreement. This agreement will also require RES to complete all activities (monitoring, maintenance, reporting, and responding to unforeseen conditions) associated with habitat restoration and other natural resource-related permitting, CEQA and NEPA requirements, as well as cultural resource inadvertent discoveries.
2. **Local Impact Mitigation Fund:** The local impact mitigation fund would be a pool of capital independently administered by a third party following a methodology for compensating impacted parties. RES identified five key areas of property damage where insurance or indemnification was not available, and where a local impact mitigation fund would be a cost-effective solution to manage associated risks: (a) the potential for increased flooding, (b) impacts associated with the release of sediment, (c) the potential for instability around reservoir rims, (d) impacts to groundwater wells and (e) the potential for diminution in land value and similar claims.

2.4 Construction Pricing

The construction estimates summarized herein are intended to capture the most current pricing for materials, wages and salaries, equipment, accepted productivity standards, and typical construction

practices, procurement methods, current construction economic conditions, and site conditions for the current level of design. Detailed construction cost breakdowns for both Full Removal and Partial Removal alternatives are provided in Attachment A. Pay item cost detail worksheets, describing the calculation of individual cost estimate line items rates and prices are provided in Attachment B.

Construction cost estimates were prepared based on less than complete designs and have inherent levels of risk and uncertainties (as discussed in Section 2.7). The following sections discuss the various aspects and assumptions associated with construction pricing for the Project.

2.4.1 Construction Pricing - Direct Costs

Experienced construction cost estimators developed direct cost construction pricing using logic, methods, and procedures for pricing that are typical for the construction industry. Unit rates were established using input from RS Means database, Equipment Watch database and Davis Bacon Wage Determination database. Rates were further determined and validated with project data and awarded bids from similar projects including Oroville Spillway and Calaveras Dam, and other similar AECOM estimated projects including Sites Reservoir Project, Folsom Dams, Pine Flat Dam. Caltrans estimate data was also utilized to back-check unit rates and production where relationships could be determined. Overall prices were established by taking location, access and construction operation into consideration. Estimate items incorporate inefficiencies associated with breaks throughout the shifts. Benefits provided to the field staff are accounted for in the Field Overhead costs.

KRRC used the latest Davis Bacon Wage Determination for labor rates and fringes. The area used is based on Siskiyou County, CA. The Project is in a remote location which will require per diem for all employees. This consideration is included within the Field Overhead costs.

KRRC based equipment costs on the latest understanding of the equipment required to complete the work. Unit prices include equivalent/similar pieces of equipment with present day rates from Equipment Watch Blue Book and include equipment mobilization. In selecting the rates, Redding, CA was used as the nearest available location. Equipment hourly rates include fuel, which is a factored rate of \$3.00/gallon based on average retail prices from nearby gas stations. KRRC estimated equipment and material sales tax at 7.75% based on recent sales tax data in Siskiyou County.

The major features and/or items in the estimate, such as the dam modifications, dam removal, and reservoir restoration are well defined. KRRC estimated costs for these items using crew and equipment work-item analysis to develop unit costs, and then multiplied these by the quantity measurement to arrive at work item subtotals. Crew and equipment work-item analysis spreadsheets are presented in Attachment B.

KRRC used vendor quotes for materials such as gates for drawdown, pipelines, instrumentation, and hydroseeding. KRRC based costs for some of the smaller items of work within the estimate on the experience and judgment of the estimator using historical data from similar types of construction, factored for location, size, and other Project-specific criteria.



2.4.2 Construction General Requirements

As discussed in more detail below, the following markups were applied into the contractor's direct costs to account for general requirements:

- Markup by subcontractor, where work associated with direct costs will be performed by a subcontractor and not self-performed by PDB Contractor. The 15% markup by subcontractor is to reflect the supplemental overheads and profit incurred by the subcontractor and reflects the maximum allowable markup by subcontractor described in the PDB Contractor's Project Agreement.
- PDB Contractor's overhead, profit and risk (Project Company Fee) at 10% based on the negotiation Project Agreement with Kiewit
- Cost of PDB Contractor's Performance Bond and Payment Bond, calculated at 1% of total direct cost including markup by subcontractors and PDB Contractor overhead profit and risk.
- PDB Contractor's insurance is estimated based on indicative pricing received by Aon, which is a global professional services firm with a Commercial Risk Solutions' division that provides risk advisory, risk transfer and structured solutions to reduce the client's total cost of risk⁴. The specific Project insurance coverages are described in detail in the amended Risk Management Plan (KRRC 2019) and are summarized below.

Field Overhead

Project costs necessary to support the performance of the work, but not included in the itemized estimates for the measured work scope, are included in the estimate under the term of Field Overheads. Due to the expansive geographical limits of the project, Field Overheads facilities are addressed separately as four locations - Iron Gate dam, Copco dams (combined), JC Boyle dam and a fourth location to support work associated with bridges, roads, habitat restoration and Yreka water supply improvements.

Field Overheads are categorized and captured in separate elements as listed and described below:

- OH-01 Mobilization; accounts for mobilization of permanent materials, miscellaneous loads, and equipment
- OH-02 Project Staff; salaries, burdens, salaried employee per-diems, and salary uplifts associated with project staff including the disciplines of project management and administration, quality control, construction support, engineering, safety, survey and superintendents.

⁴ Additional information regarding this firm may be found at <https://www.aon.com>

- OH-03 Temporary Buildings; includes bunk house trailers, office trailers, storage containers and associated mobilization, demobilization, cleaning and maintenance. For contractor and owner's representative.
- OH-04 Temporary Utilities; accounts for utilities associated with temporary facilities including power, water, telephone, internet, sewer, drinking water. Also includes job radios, garbage disposal and portable toilets.
- OH-05 Temporary Construction; temporary access roads to temporary buildings, parking and laydown areas, fences, grading and maintenance of site and access areas, fuel stations and signage. Temporary work associated directly with construction is not included in field overheads and measured separately in their own estimate line items.
- OH-06 Transportation; road runner service including driver and vehicles, crew flat boats, all-terrain vehicles and maintenance.
- OH-07 Office Supplies; including routine office supplies, photocopy and printing facilities, computers and office furniture and office storage.
- OH-08 Safety Supplies; including safety supplies and an allowance for staff safety incentives.
- OH-09 Employee Expense; project staff travel costs based on two trips per month for 10 salary employees, and travel for business activities and internal audits.
- OH-10 Contract Services; associated training costs, at \$0.50 per manhour, and photography services for project record keeping purposes.
- OH-11 Employee Living Cost; field staff per diem. Salaried staff per diems included in OH-02
- OH-12 Winter and Summer Protection; allowances for winter protection. Equipment accounted for in OH-27.
- OH-13 Quality Assurance/ Quality Control; salary for quality control technician and support staff during construction periods. Includes allowances for laboratory equipment and testing.
- OH-14 Lost Production/Overtime/Travel Time; for field staff. Additional overtime above 50 hours/week (up to 50 hours/week accounted for in construction estimate line items). Also includes for loss of production associated with daily travel. Vacation travel already accounted for in labor rates.
- OH 16 Demobilization; accounts for demobilization of permanent materials, miscellaneous loads, and equipment



- OH 18 Survey; survey materials only. Survey staff included in OH-02.
- OH 21 Small Tools; field staff small tool allowance at \$2.50 per manhour.
- OH 22 Traffic Control; water truck and erosion control.
- OH 27 Project Equipment; project staff pickup trucks, field crew pickup trucks, site equipment (1 per site) including 19-ton boom truck, all terrain forklift, tool carrier, 900 CFM compressor, electric welder, highboy trailer, crew bus (1 for entire Project), box trailer, flatbed trailers, light plants.
- OH 28 Project Labor; operators and maintenance for equipment listed on OH-27.
- OH-99 Dead Rent; cost of equipment in idle status and standby status when not performing listed construction activities. Calculated on a per equipment item basis, as listed on the pay item cost sheets.

The Cost Estimate lists amounts for each Field Overhead category and is identified separately per project site. These costs are incorporate into the estimate by allocating them to all applicable estimate construction items proportionate to their cost. A separate column is identified on the Cost Estimate to identify the distribution of Field Overhead costs over the full estimate.

Contractor Overhead, Profit & Risk

The executed Project Agreement with Kiewit includes a Project Company Fee of 10% of the Project implementation work costs (other than the general conditions costs and the costs of the performance bond and the payment bond). The Project Company Fee is an amount attributable to profit and risk and includes consideration for all costs that Kiewit may incur in connection with or related to the Project that are not specifically compensable through the Project Agreement as Project implementation work costs.

Subcontractor Markups

The executed Project Agreement with Kiewit includes a maximum subcontractor markup of 15%.

Bond Markups

KRRC selected a bonding markup of 1% of direct construction cost as derived by using industry standard bond requirements on similar projects.

2.4.3 Quantities

Detailed quantity takeoffs made for the earthwork items (excavation, fill and erosion protection) were computer-generated (and independently checked) using the surfaces presented in the drawings, and

represent neat-line quantities. Earthwork volumes (cut, fill, balance) and other quantities are provided in Section 5 and associated figures of the Definite Plan.

2.4.4 Construction Schedule

KRRC based the estimate on the construction schedule provided as Attachment C, and the construction plan described in the Definite Plan. As shown on the schedule and/or discussed in the plan, the schedule is predicated on the following:

- Construction of City of Yreka water supply improvements will be completed in 2021 (prior to drawdown) by the PDB
- Construction of downstream flood control improvements will be completed in 2021 prior to drawdown) by the PDB
- Construction of the access road improvements will be completed in 2021 (prior to drawdown) by the PDB
- An effective Date of Agreement (GMP) for the dam removal PDB on or before February 15, 2020
- Lineal and concurrent activities
- Equipment application and production
- The ability to drawdown J.C. Boyle, Copco No. 1, Copco No. 2 and Iron Gate reservoirs at the beginning of 2022
- Major earthworks and removal activities are assumed to be performed using two 10-hour shifts, six days per week
- In-stream construction window in Oregon is assumed to be from July 1 through September 30
- In-stream construction window in California is assumed to be from June 15 through October 15

The duration of many of the schedule activities are determined from the labor and equipment productivity associated with the estimate pay item sheets.

The access road, dam modification, water supply, and downstream flood control construction will be completed during an estimated 6- to 8-month period in 2021, since these activities require completion prior to drawdown and facility removal. Subsequent dam removal and associated construction will occur during 8 months of work in 2022, with restoration related construction activities likely extending through 2022. Monitoring and reporting will extend for 5 years after construction completion. KRRC will encumber funds via the liability transfer approach (see Section 2.3) for post-2027 mitigation and monitoring, as appropriate.



2.5 Consulting Services Pricing

Outside of construction costs, other implementation activities such as project oversight, field studies, design, permitting, mitigation measures and monitoring generally involve labor and associated other direct costs (ODCs). ODCs can include office space, travel, meals, postage, specialty reproduction, and vendor quotes for materials, supplies or services. For each of the implementation activities referenced above, KRRC developed independent estimates using standard labor rates and ODC values based on the latest understanding of the scope or work for the life of the Project. Details for each cost category are provided in Section 3. KRRC used a standard labor rate sheet for an environmental/engineering consulting firm, as shown below in Table 2-1, to develop the majority of the other implementation costs listed above. In some cases, KRRC used specialty rates to develop estimates for specialty activities such as project oversight and legal support.

Table 2-1 Environmental/Engineering Labor Rate Sheet

Labor Classification	Hourly Rate	Labor Classification	Hourly Rate
Senior Technical Advisor	\$285.00	Field Technician	\$75.00
Principal	\$285.00	Junior Field Technician	\$55.00
Project Manager	\$230.00	Certified Industrial Hygienist	\$165.00
Principal Engineer	\$200.00	Senior Data Management	\$130.00
Senior Engineer	\$180.00	Data Management	\$85.00
Engineer	\$145.00	Senior GIS/CADD/Graphics	\$120.00
Junior Engineer	\$100.00	GIS/CADD/Graphics	\$90.00
Principal Scientist/Planner	\$180.00	Technical Editor	\$105.00
Senior Scientist/Planner	\$160.00	Community Relations Specialist	\$110.00
Scientist/Planner	\$120.00	Project Controls/Procurement	\$95.00
Junior Scientist/Planner	\$95.00	Administrative Assistant	\$75.00
Senior Field Technician	\$110.00	Clerical/Support	\$65.00

The hourly rates set forth in this schedule of fees and charges were valid from January 1, 2018 through December 31, 2018. The Hourly Rates are adjusted annually on January 1 of each subsequent year. The new Schedule of Fees and Charges will apply to existing and new assignments. For work extends beyond December 31, 2018 a 3% annual escalation on hourly rates was applied.

2.6 Escalation

KRRC based estimates on contemporary market information at the time of estimate preparation. As such it is necessary to include escalation to account for cost increases over the duration of the Project, particularly as this Project spans multiple years. KRRC escalated each line item in the cost estimate based on scheduled construction and other implementation activities.

KRRC used an escalation rate of 4% per year. This is based on cost index references and current cost trends observed in the industry. As shown in the below Engineering News Record (ENR) Historic Cost Index (Table 2-2), the last few years have seen a consistent uptrend in escalation, including the beginning of 2018.

Considering this trend, along with other published historical data and professional judgment, it is reasonable to expect escalation to average out at around 4% per year over the duration of the Project.

Table 2-2 ENR Historic Cost Index

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL AVG	AVERAGE ANNUAL INCREASE
1990	4680	4685	4691	4693	4707	4732	4734	4752	4774	4771	4787	4777	4732	
1991	4777	4773	4772	4766	4801	4818	4854	4892	4891	4892	4896	4889	4835	2.177%
1992	4888	4884	4927	4946	4965	4973	4992	5032	5042	5052	5058	5059	4985	3.102%
1993	5071	5070	5106	5167	5262	5260	5252	5230	5255	5264	5278	5310	5210	4.514%
1994	5336	5371	5381	5405	5405	5408	5409	5424	5437	5437	5439	5439	5408	3.800%
1995	5443	5444	5435	5432	5433	5432	5484	5506	5491	5511	5519	5524	5471	1.165%
1996	5523	5532	5537	5550	5572	5597	5617	5652	5683	5719	5740	5744	5620	2.723%
1997	5765	5769	5759	5799	5837	5860	5863	5854	5851	5848	5838	5858	5826	3.665%
1998	5852	5874	5875	5883	5881	5895	5921	5929	5963	5986	5995	5991	5920	1.613%
1999	6000	5992	5986	6008	6006	6039	6076	6091	6128	6134	6127	6127	6059	2.348%
2000	6130	6160	6202	6201	6233	6238	6225	6233	6224	6259	6266	6283	6221	2.674%
2001	6281	6272	6279	6286	6288	6318	6404	6389	6391	6397	6410	6390	6343	1.961%
2002	6462	6462	6502	6480	6512	6532	6605	6592	6589	6579	6578	6563	6538	3.074%
2003	6581	6640	6627	6635	6642	6694	6695	6733	6741	6771	6794	6782	6694	2.386%
2004	6825	6862	6957	7017	7065	7109	7126	7188	7298	7314	7312	7308	7115	6.289%
2005	7297	7298	7309	7355	7398	7415	7422	7479	7540	7563	7630	7647	7446	4.652%
2006	7660	7689	7692	7695	7691	7700	7721	7722	7763	7883	7911	7888	7751	4.096%
2007	7880	7880	7856	7865	7942	7939	7959	8007	8050	8045	8092	8089	7966	2.774%
2008	8090	8094	8109	8112	8141	8185	8293	8362	8557	8623	8602	8551	8310	4.105%
2009	8549	8533	8534	8528	8574	8578	8566	8564	8586	8596	8592	8641	8570	3.081%
2010	8860	8672	8671	8677	8761	8805	8865	8858	8857	8921	8951	8952	8857	3.349%
2011	8938	8998	9011	9027	9035	9053	9080	9088	9116	9147	9173	9172	9070	2.405%
2012	9176	9198	9268	9273	9290	9291	9324	9351	9341	9376	9398	9412	9308	2.624%
2013	9437	9453	9456	9484	9516	9542	9552	9545	9552	9689	9666	9668	9547	2.564%
2014	9664	9681	9702	9750	9796	9800	9835	9846	9870	9886	9912	9936	9806	2.716%
2015	9972	9962	9972	9992	9975	10039	10037	10039	10065	10128	10092	10153	10035	2.335%
2016	10132	10181	10242	10279	10315	10337	10379	10385	10403	10434	10442	10530	10338	3.019%
2017	10542	10559	10667	10678	10692	10703	10789	10826	10823	10817	10870	10873	10737	3.856%
2018	10878	10889	10959										10909	5.520%

Base: 1913=100

The Cost Estimate includes calculation of escalation on a line-by-line basis, but the detail of the calculation is omitted from this report in the interest of brevity. The method used to calculate the amounts in the 'Escalated YOC (year of construction) Estimate' column is illustrated in Table 2-3 below. The estimate identifies the baseline year of the estimate line item ('Est. Basis' column), then escalates based on the allocation of percentages ('Escalation - Percentage per Year' columns) and outputs escalated costs per year in the columns on the far right. These are then totaled in the 'Escalated YOC Estimate' column.



Table 2-3 Cost Estimate Escalation Example (Extract)

Est ID	Cost Sheet	Heading	Description	(\$) Estimate	Escalated YOC Estimate	Escalation - Percentage per Y					Est Basis	Escalation - Cost at Year of Construction				
						19	20	21	22	23		19	20	21	22	23
		Copco 1 Dam Removal														
41	2.001	Copco 1 Dam Removal	Furnish, Install, and Remove Barge-Mounted Crane in Reservoir	468,326	506,541		100				19	-	-	506,541	-	-
41	2.002	Copco 1 Dam Removal	Remove Sediment from Diversion Tunnel Intake to provide access	390,280	422,126		100				19	-	-	422,126	-	-
41	2.003	Copco 1 Dam Removal	Mobilize and Demob Large Crane on Right Abutment	104,387	117,421			100			19	-	-	-	117,421	-
41	2.004	Copco 1 Dam Removal	Remove Water from behind Tailrace Cofferdam	2,645	2,975			100			19	-	-	-	2,975	-
41	2.005	Copco 1 Dam Removal	Cofferdam Fill Material Production for Equipment Access	207,047	232,900			100			19	-	-	-	232,900	-
41	2.006	Copco 1 Dam Removal	Provide Dewatering behind Tailrace Cofferdam	261,629	294,297			100			19	-	-	-	294,297	-
41	2.007	Copco 1 Dam Removal	Remove Current Diversion Tunnel Plug	165,500	179,005		100				19	-	-	179,005	-	-
41	2.008	Copco 1 Dam Removal	Tailrace Cofferdam- Furnish & Unload Material	280,992	316,078			100			19	-	-	-	316,078	-
41	2.008.1	Copco 1 Dam Removal	Tailrace Cofferdam- Drive Pile	472,314	531,289			100			19	-	-	-	531,289	-
41	2.008.2	Copco 1 Dam Removal	Tailrace Cofferdam-Extract Pile	246,053	276,777			100			19	-	-	-	276,777	-
41	2.009	Copco 1 Dam Removal	Installation of 3 each 72" Blind Flanges	1,637,777	1,771,420		100				19	-	-	1,771,420	-	-
41	2.009.2	Copco 1 Dam Removal	Installation of 16.5 X 18.5 Roller Gate and Gate Structure	5,848,012	6,276,555		20	80			19	-	1,216,387	5,060,168	-	-

2.7 Quantitative Risk Assessment

KRRC completed a Quantitative Risk Assessment (QRA) to analyze uncertainties and risk, to be used as the basis for development of the Project contingency. The primary objective of the QRA is to provide KRRC with a confidence level for the Project contingency reserve and actionable recommendations based upon thorough research and best industry practices. The intent of QRA is to provide the Project and its stakeholder with information about the confidence levels in the present Project budget and schedule, and top project risks driving cost, so that timely, data-driven decisions can be made under the holistic umbrella of statistically-based confidence levels.

To get a comprehensive understanding of the risks, a thorough review of pertinent project documents was completed, including, but not limited to, the Definite Plan, AON's Risk and Insurance Due Diligence Report (Aon 2019), RES's Risk Transfer Plan, the Project estimate of project costs, and Project schedule through construction.

The process also involved working with the Project cost estimator to identify an account for the uncertainties and assumptions in the estimate. Several Estimate Uncertainty sessions were held and the uncertainties that are used as an input to the QRA were reached by consensus. Finally, the Project's planning and construction schedules were reviewed with the Project Team, simplified for the QRA and summarized in a Risk Fragnet.

These three elements are used as the skeleton of the Risk Model:

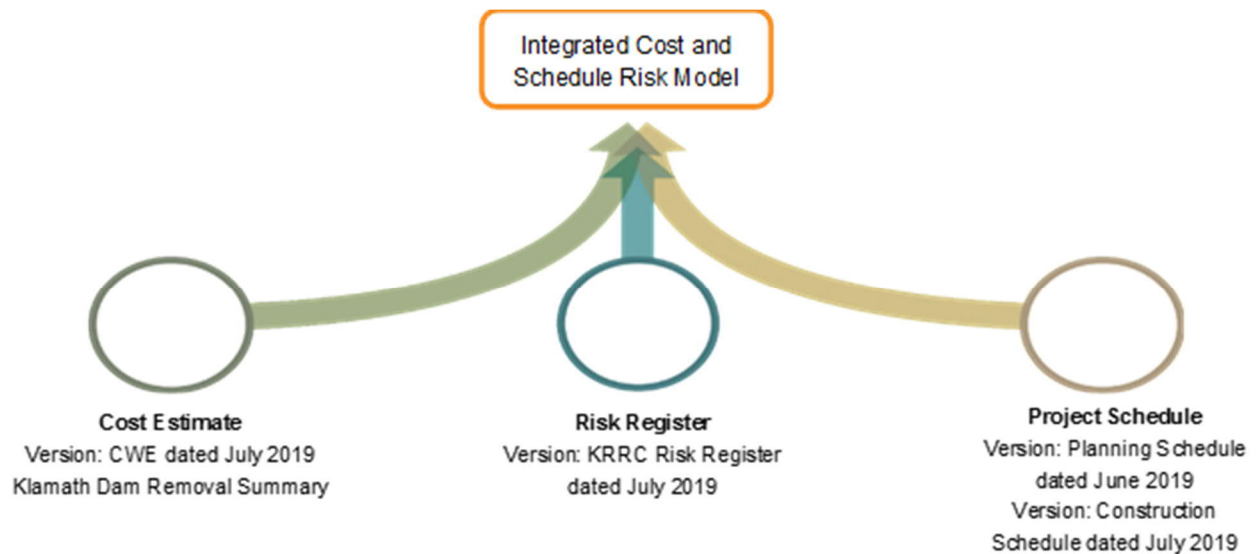


Figure 2-1 Risk Model Input Material Schematic

All collected data was used to develop an integrated cost and schedule risk model and perform a QRA. A Monte Carlo simulation was performed to develop the cumulative distributions of Project cost and schedule through which confidence levels were determined. This qualitative risk assessment was performed in compliance with the ISO 31000 Risk Management Framework. For additional details related to the QRA methodology, please refer to Attachment D.

The Monte Carlo Simulation seeks to develop a large number of randomly generated outcomes (scenarios) for cost and schedule using the risk data obtained throughout the assessment. Each of these outcomes represents a possibility that could occur. The Monte Carlo that was run for this risk assessment used 5,000 iterations of the risk set to arrive at a distribution of scenarios. These 5,000 scenarios are intended to represent an adequate set of all possible outcomes that can result from the risk data set.

Due to the unique nature of this Project and the KRRC, KRRC selected a conservative P80 to represent the appropriate level of contingency for the Project. An 80% confidence level means that of the 5,000 scenarios, 4,000 (80% x 5,000) will be less than or equal to the value selected for the cost or the schedule confidence level. Of course, 1,000 scenarios will be greater than the value at this level of confidence.



2.8 Ongoing Due Diligence

2.8.1 General

KRRC is undertaking additional due diligence on construction costs, measures to lower construction costs, and measures to manage construction risk. KRRC will complete additional engineering, manage the selected design-build contractor, establish a GMP for the work to be performed, implement its insurance programs, and enforce the Project Agreement requirements for all bid bonds, payment bonds, and the performance bond. Many risks considered in the Monte Carlo analysis that deal with design and regulatory compliance will be mitigated or better understood when this process is completed, likely lowering the contingency significantly.

2.8.2 Independent Board of Consultants (BOC)

The FERC approved the BOC for the Lower Klamath Project on May 22, 2018. Among other things, FERC's letter of approval included a plan and schedule to obtain BOC review of the estimate of project costs and contingency for the Full Removal alternative, adequacy of available funds for facilities removal, adequacy of the proposed contingency reserve, and adequacy of the proposed insurance and bonding arrangements. The five-member BOC includes Dan Hertel, PE (Engineering Solutions, LLC), James Borg, PE (D&H Concepts, LLC), Craig Findlay, PhD, PE, GE (Findlay Engineering, Inc.), Mary Louise Keefe, PhD (R2 Resource Consultants, Inc.), Ted Chant, PE (Chant Limited) and Steve Coombs (Risk Resources, Inc.).

The BOC completed a review of the Definite Plan (KRRC 2018) and the associated estimate of project costs, which resulted in a December 2019 Final Letter Report No. 1 to present their findings, conclusions and recommendations. This followed their first BOC meeting on October 24, 2018, as well as the informal meeting and site visit of October 23, 2018. Matters addressed included the Definite Plan, the feasibility and cost associated with the Definite Plan, as well as the capacity of the KRRC to accept transfer of license from PacifiCorp. After receiving BOC Letter Report No. 1, additional informal cost submittals have been made to the BOC and discussions have been completed to address BOC input from Letter Report No. 1. The KRRC believe that all BOC input has been incorporated or addressed in this amended Estimate of Project Costs report.

A decorative banner with a wavy, undulating shape. It consists of two main color sections: a lighter blue top section and a darker blue bottom section, separated by a white wavy line. The banner curves upwards from the left and downwards on the right.

Chapter 3: Cost Category Summaries



3. COST CATEGORY SUMMARIES

The following sections provide detailed summaries of methods, assumptions and results of the estimate development for the various cost categories and subcategories.

3.1 Project Oversight

Project oversight and administration costs generally include costs associated with KRRC set-up and corporate insurance, management labor and travel, accounting and administrative support, project controls, contract management, BOC participation and facilitation, legal support, and outreach. Oversight costs exclude technical services, engineering, mitigation measures, and construction contracting. Table 3-1 summarizes estimated project costs for project oversight across the various project phases. Project oversight costs are the same for the Full and Partial Removal alternatives.

KRRC developed labor estimates for each activity using the latest understanding of management requirements in any given year, and applicable industry labor rates. KRRC developed ODCs using an understanding of actuals spent to date and requirements to continue management efforts into the future. ODCs include office space, travel, meals, postage, specialty reproduction, and vendor quotes for materials, supplies or services.

Table 3-1 Project Oversight Estimate Per Phase

Est ID		Estimate at Year of Performance								
ID	Heading/Description	FY16/17	FY17/18	FY18/19	FY19/20	FY20/21	FY21/22	FY22/23	FY23/24	Total
	Project Oversight									
	Compensation & Benefits									
10	Compensation & Benefits	29,017	425,830	1,100,000	1,531,000	1,607,550	1,687,928	1,329,243	1,163,088	8,873,655
	Travel and Meetings									
10	Travel and Meetings	45,223	82,607	85,000	163,000	75,000	75,000	40,000	40,000	605,830
	Professional Services									
10	CEA Services & Expenses	1,054,732	1,120,224	755,000	712,000	360,000	180,000	-	-	4,181,956
10	Legal Services; General Counsel	1,109,894	1,373,774	430,000	540,000	540,000	250,000	250,000	100,000	4,593,668
10	Legal Services; Construction Counsel	-	170,824	1,400,000	1,210,000	250,000	250,000	250,000	50,000	3,580,824
10	Legal Services; Regulatory Counsel	-	-	850,000	1,340,000	250,000	50,000	50,000	50,000	2,590,000
10	Legal Services; Corporate Transaction Counsel	-	-	300,000	200,000	100,000	50,000	50,000	50,000	750,000
10	Board of Consultants	-	-	400,000	400,000	400,000	300,000	240,000	-	1,740,000
10	Land Survey/Title Work	-	-	750,000	723,000	250,000	-	-	-	1,723,000
10	Accounting and Audit Fees	-	59,395	120,000	75,000	120,000	50,000	50,000	50,000	524,395
10	Risk Management Services	-	30,000	160,000	272,000	200,000	-	-	-	662,000
10	Communications External Services	-	130,000	242,000	54,000	-	-	-	-	426,000
10	Other Professional Fees	-	-	225,000	576,000	500,000	50,000	25,000	25,000	1,401,000
	Admin, IT, Fees									
10	Admin, IT, Fees	64,717	83,800	200,000	201,000	211,050	221,603	174,512	122,158	1,278,840
	Owner's Technical Representative (excluding Permitting, Design Reviews, Outreach)									
10	Owner's Technical Representative	-	923,136	811,067	850,000	690,000	520,000	540,000	280,000	4,614,203
	Owner's Technical Representative (Outreach only)									
10	Owner's Technical Representative	-	696,604	226,115	71,324	62,114	63,977	65,897	67,873	1,253,904

Table 3-2 summarizes average Full Time Equivalent (FTE) staffing for the various activities and line items. FTE numbers give a general understanding of how many full-time staff may be working on each activity throughout each year or phase. KRRRC calculated FTEs by dividing annual labor costs by the total working hours per year/phase and the average labor rate for each activity. FTE values for the BOC were calculated using working hours for a quarter of any given year, since BOC members are not full-time employees.

Project oversight FTEs are generally highest from 2019 through 2021, as the KRRRC will be managing numerous contracts for engineering and construction of the various project components.

Table 3-2 Project Oversight Average FTEs Per Phase

Est ID		FTEs at Year of Performance							
ID	Heading/Description	FY16/17	FY17/18	FY18/19	FY19/20	FY20/21	FY21/22	FY22/23	FY23/24
	Project Oversight								
	Compensation & Benefits								
10	Compensation & Benefits	0.1	1.3	3.4	4.9	5.3	5.8	4.7	4.2
	Travel and Meetings								
10	Travel and Meetings	0.1	0.3	0.3	0.5	0.2	0.3	0.1	0.1
	Professional Services								
10	CEA Services & Expenses	3.1	3.4	2.4	2.3	1.2	0.6	-	-
10	Legal Services: General Counsel	3.3	4.2	1.3	1.7	1.8	0.9	0.9	0.4
10	Legal Services: Construction Counsel	-	0.5	4.4	3.9	0.8	0.9	0.9	0.2
10	Legal Services: Regulatory Counsel	-	-	2.7	4.3	0.8	0.2	0.2	0.2
10	Legal Services: Corporate Transaction Counsel	-	-	0.9	0.6	0.3	0.2	0.2	0.2
10	Board of Consultants	-	-	1.3	1.3	1.3	1.0	0.8	-
10	Land Survey/Title Work	-	-	2.3	2.3	0.8	-	-	-
10	Accounting and Audit Fees	-	0.2	0.4	0.2	0.4	0.2	0.2	0.2
10	Risk Management Services	-	0.1	0.5	0.9	0.7	-	-	-
10	Communications External Services	-	0.4	0.8	0.2	-	-	-	-
10	Other Professional Fees	-	-	0.7	1.9	1.7	0.2	0.1	0.1
	Admin, IT, Fees								
10	Admin, IT, Fees	0.2	0.3	0.6	0.6	0.7	0.8	0.6	0.4
	Owner's Technical Representative (excluding Permitting, Design Reviews, Outreach)								
10	Owner's Technical Representative	-	2.8	2.5	2.7	2.3	1.8	1.9	1.0
	Owner's Technical Representative (Outreach only)								
10	Owner's Technical Representative	-	2.1	0.7	0.2	0.2	0.2	0.2	0.2

3.2 Liability Transfer

Indicative pricing for liability transfer was developed by RES and consist of two separate approaches to liability transfer. These approaches include utilization of a specialty corporate indemnitor and development and management of a local impact mitigation fund. Section 2.3 provides a summary of these two proposed liability transfer solutions, and the amended Risk Management Plan for the Project (KRRRC 2019) provides a detailed description. The total indicative pricing for these is approximately \$35.5M.

3.3 Environmental Compliance and Permitting

KRRRC's plan for compliance with applicable laws and regulations is provided in Section 1.3 of the Definite Plan. Cost estimates reflected in this amended Appendix P are based upon implementation of that plan, and



further assume that the license surrender order to be issued by the FERC will authorize implementation of the Definite Plan (as proposed) and will not impose any conditions that conflict with or are materially inconsistent with the Definite Plan. In addition to FERC 's surrender order (which will incorporate any conditions or requirements of the National Environmental Policy Act, California § 401 Clean Water Act Water Quality Certification, Oregon § 401 Clean Water Act Water Quality Certification, the Endangered Species Act, the Magnuson-Stevens Fishery Conservation and Management Act and the National Historic Preservation Act). The California § 401 Clean Water Act Water Quality Certification to be issued by the California State Water Resources Control Board (SWRCB) will include and address any measures needed to comply with CEQA. This report also assumes that implementation of the Definite Plan will require a Section 404 individual permit from the United States Army Corps of Engineers (USACE), coverage under a National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permits for construction-related stormwater discharges to surface waters in California and Oregon, and various other state and local permits, as required by applicable law. Table 3-3 summarizes estimated environmental compliance and permitting costs across the applicable project years. Environmental compliance and permitting costs are the same for the Full and Partial Removal alternatives. It should be noted that the PDB will provide some level of support for compliance, and those costs are described separately in Section 3.5.

KRRC developed labor estimates for each activity using an understanding of actuals spent to date, as well as the latest understanding of management requirements in any given year, and applicable industry labor rates. KRRC developed ODCs using an understanding of actuals spent to date and requirements to continue permitting and associated field efforts into the future. ODCs include travel, meals, and vendor quotes for materials, supplies or services.

Table 3-4 summarizes average FTE staffing for the various activities and line items. FTE numbers give a general understanding of how many full-time staff may be working on each activity throughout each year or phase. KRRC calculated FTEs by dividing annual labor costs by the total working hours per year and the average labor rate for each activity.

Environmental compliance and permitting FTEs are generally highest in 2018 while numerous biological surveys are being completed along with development of materials to support FERC.

Table 3-3 Environmental Compliance Estimate Per Year

Est ID		Estimate at Year of Performance								
ID	Heading/Description	FY16/17	FY17/18	FY18/19	FY19/20	FY20/21	FY21/22	FY22/23	FY23/24	Total
	Permit Acquisition, CEQA/NEPA Support, Compliance QA During Construction									
	KRRC Agency Fees and Reimbursements									
20	See breakout in Cost Estimate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3,992,591
	Owner's Technical Representative (Permitting)									
20	Permitting	-	961,316	1,114,541	728,267	310,000	320,000	330,000	340,000	4,104,124

Table 3-4 Environmental Compliance Average FTEs Per Year

Est ID		FTEs at Year of Performance							
ID	Heading/Description	FY16/17	FY17/18	FY18/19	FY19/20	FY20/21	FY21/22	FY22/23	FY23/24
	Permit Acquisition, CEQA/NEPA Support, Compliance QA During Construction								
	KRRC Agency Fees and Reimbursements - See Estimate								
20	See breakout in Cost Estimate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Owner's Technical Representative (Permitting)								
20	Permitting	-	2.9	3.5	2.3	1.0	1.1	1.2	1.2

3.4 Technical Support

Technical Support services include all activities required to complete the preliminary engineering designs, procure the PDB, and to manage and complete design reviews of PDB work. Section 2.2 describes the construction procurement approach for the Project and is a basis for the procurement estimates provided herein.

The first step in the design process was to complete the necessary field work to obtain design data to support the design analyses and drawings. This work was primarily completed in 2017 and 2018. The following activities fall into this category:

- Preliminary Engineering Site Data:
 - + Topographic/Bathymetric Surveys: Obtain updated data of topographic and reservoir bathymetric conditions at the Project
 - + Geotechnical Investigations: Obtain geologic information to evaluate reservoir rim stability and other geologic conditions to support design components
 - + Hazardous Material Investigation: Complete phase 1 hazardous material assessments for existing hydropower and other pertinent project features
 - + Biological Reconnaissance: Obtain initial understanding of existing biological conditions that may affect proposed design layout
 - + Engineering Reconnaissance: Obtain understanding of existing site facilities and infrastructure to inform design and demolition activities
 - + Groundwater Monitoring: Obtain groundwater well data adjacent to reservoirs to assess potential impacts associated with reservoir drawdown
- Vegetation Test Plots: Complete pilot studies using construction test plots to help determine ideal conditions, timing and species associated with reservoir seeding and restoration

- Initial Seed Collection & Propagation: Complete early seed collection and propagation to aid the subsequent PDB effort to provide the required seed volumes for reservoir restoration

The next step in the design process is to refine the preliminary designs based on the latest field data and input from regulatory and other stakeholders. This refined design, which is ongoing, will serve as the basis for environmental and regulatory reviews. Primary project components are listed below and described in detail in the Definite Plan.

- Dam & hydropower demolition (including existing recreation facilities)
- Reservoir area improvements
- Reservoir area restoration
- City of Yreka's pipeline relocation across Iron Gate Reservoir and associated diversion facility improvements
- Transportation improvements (road, bridge and culvert) improvements
- Recreation improvements
- Downstream flood control improvements
- Public health and safety fencing
- Implementation of fire management plan
- Spawning gravel augmentation
- Fish hatchery modification and improvements (not included in estimate since funded separately by PacifiCorp)

After preliminary design, the final engineering plans and specifications will developed by the PDB and are summarized separately in Section 3.6.1.

Table 3-5 summarizes estimated technical support costs across the applicable project years. Technical support costs are the same for the Full and Partial Removal alternatives.

KRRC developed labor estimates for each activity using the latest understanding of engineering, procurement and owner's representative requirements in any given year, and applicable industry labor rates. KRRC developed ODCs using an understanding of actuals spent to date and requirements to continue engineering and procurement efforts into the future. ODCs include travel, meals, and vendor quotes for materials, supplies or services.

Table 3-5 Engineering & Procurement Estimate Per Year

Est ID		Estimate at Year of Performance								
ID	Heading/Description	FY16/17	FY17/18	FY18/19	FY19/20	FY20/21	FY21/22	FY22/23	FY23/24	Total
	Preliminary Engineering (Technical Representative)									
	Technical Preparation	-	3,956,821	4,791,235	-	-	-	-	-	8,748,056
	Yreka Water Line Design	-	-	-	477,000	-	-	-	-	477,000
	Construction Procurement									
	Dam removal construction procurement	-	54,057	644,386	297,874	100,000	-	-	-	1,096,317
	Owner's Representative (Design Oversight)									
	Design reviews	-	115,243	513,831	260,000	-	-	-	-	889,074
	PDB Management	-	-	-	744,317	370,000	-	-	-	1,114,317
	Engineer of Record (Yreka Water Line)	-	-	-	-	145,000	-	-	-	145,000

Table 3-6 summarizes average FTE staffing for the various activities and line items. FTE numbers give a general understanding of how many full-time staff may be working on each activity throughout each year or phase. KRRRC calculated FTEs by dividing annual labor costs by the total working hours per year and the average labor rate for each activity.

FTEs are highest for engineering design in 2019, when multiple engineering design teams will be developing final design packages for the various project components.

Table 3-6 Engineering & Procurement FTEs Per Year

Est ID	Estimate at Year of Performance								
ID	Heading/Description	FY16/17	FY17/18	FY18/19	FY19/20	FY20/21	FY21/22	FY22/23	FY23/24
	Preliminary Engineering (Technical Representative)								
	Technical Preparation	-	12.0	15.0	-	-	-	-	-
	Yreka Water Line Design	-	-	-	1.5	-	-	-	-
	Construction Procurement								
	Dam removal construction procurement	-	0.2	2.0	1.0	0.3	-	-	-
	Owner's Representative (Design Overs)								
	Design reviews	-	0.3	1.6	0.8	-	-	-	-
	PDB Management	-	-	-	2.4	1.2	-	-	-
	Engineer of Record (Yreka Water Line)	-	-	-	-	0.5	-	-	-

3.5 Construction Management

The estimate and proposed construction management (CM) approach for the Project is based on the information available at the time of the development of this analysis and on the assumption that most Project construction will be performed under the current PDB Agreement.

KRRRC estimated construction management to support all construction commencing with mobilization in early 2021, including dam modifications and commencement of work on construction of other components such as access road and bridge work, waterline relocation and downstream flood control improvements. Support continues through reservoir drawdowns into 2022 and ramps-up in the second year of construction for the parallel demolition of dams, and reservoir area restoration.

The proposed CM approach assumes that two construction management offices located at the Iron Gate and Copco areas will be established for 2021, with a third office established in 2022 for the J.C. Boyle area. The estimate also reflects the traveling constraints between each of the sites under the prospective contracts.

The principal construction management office will be located near the existing Copco No. 1 dam, where the Senior Construction Manager is located. There will be one Assistant Construction Manager, one Administrative Assistant, and one Project Control Manager to support the Senior Construction Manager, who will be located in the Copco No. 1 dam offices. Secondary construction management offices will each be headed up by a separate Construction Manager. Costs for these facilities are included in the construction Contractor's general conditions.

Third-party inspection oversight on the PDB is an important factor in construction management of a sensitive high-visibility project such as this. Inspectors will provide oversight of Contractors' safety, quality, environmental, cultural and scope compliance. They will also make timely observations of construction progress and conditions, to support identification of potential productivity issues, and support avoidance and evaluation of potential change work.

KRRC assumed that some construction work may occur outside normal working hours and is likely required for excavation of Iron Gate dam and demolition of Copco No. 1 dam. A second shift Inspector has been included for 5 months to allow for this likelihood.

A Safety Manager and Quality Manager are included at 20 hours/month each to provide audits of contractor and construction management practices against established procedures and standards.

KRRC calculated labor costs based on applicable industry contract rates where available and escalated them at 3% annually. KRRC based all labor costs on a 40-hour work week, except for construction manager and inspector labor costs which are based on a 50-hour work week. An allowance of 20% on labor has been included to cover ODCs including travel, lodging and other remuneration associated with the remote sites.

The estimated project cost assumes that cultural resources and environmental monitoring will be required. These costs are not captured in the CM section but are included elsewhere in this estimate.

Table 3-7 Table 3-7 summarizes estimated construction management costs on a per-year basis, per labor category and shows ODCs included in the estimate. Construction management costs are the same for the Full and Partial Removal alternatives.

Table 3-8 show staff included in this estimate, where 1.00 = one FTE for one month.

Table 3-7 Construction Management Estimate Per Year

Construction Management Staff	FTEs	Hrs/Week	2021	2022	2023	Subtotal
Sr. Construction Manager	1	40	\$ 497,611	\$ 554,718	\$ 281,458	\$ 1,333,787
Assistant Construction Manager	1	50	\$ 426,109	\$ 380,047	\$ 135,004	\$ 941,160
Administrative Assistant	1	40	\$ 177,555	\$ 252,584	\$ 140,872	\$ 571,011
Project Control Engineer	1	40	\$ 340,887	\$ 346,725	\$ 150,691	\$ 838,303
Construction Manager	varies	50	\$ 1,538,675	\$ 1,302,831	\$ 481,105	\$ 3,322,612
Inspector	varies	50	\$ 963,492	\$ 1,014,729	\$ 531,337	\$ 2,509,558
Second Shift Inspector	varies	50	\$ 140,345	\$ 308,758	\$ 168,414	\$ 617,516
Scheduler	0.5	40	\$ 144,619	\$ 132,608	\$ 49,441	\$ 326,668
Safety Manager	0.5	40	\$ 170,444	\$ 156,288	\$ 58,270	\$ 385,002
Quality Manager	0.5	40	\$ 170,444	\$ 156,288	\$ 58,270	\$ 385,002
ODCs at 20%	-	-	\$ 729,292	\$ 734,162	\$ 327,680	\$ 1,791,134
TOTAL			\$ 5,299,473	\$ 5,339,737	\$ 2,382,543	\$ 13,021,753

Table 3-8 Construction Management FTEs Per Month

		2021												2022												2023
CONSTRUCTION MANAGEMENT		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Role	Responsibility																									
Iron Gate																										
Construction Manager	Dam Mods/Removal CM	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.5
Inspector	Dam Mods/Removal	-	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-	-	-	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.5
Second Shift Inspector	Dam Removal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	1.00	1.00	1.00	1.00	1.00	-	-	-	-
Construction Manager	Yreka Water Supply CM	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Inspector	Yreka Water Supply	-	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Inspector	Downstream Flood Improvements	-	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Inspector	Specialty Inspection	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.33	0.33	0.33	0.33	0.33	0.33	0.33	-	-	-	-
Scheduler	Schedule management	-	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.5
Safety Manager	Safety manager	-	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.5
Quality Manager	Quality manager	-	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.5
ODCs at 20%																										
Copco 1 & 2																										
Sr. Construction Manager	Overall CM Oversight	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.0
Assistant Construction Mana	Assistant to Sr. CM	-	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.5
Administrative Assistant	Main Office Admin.	-	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.0
Project Control Engineer	Project Controls Lead	-	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.5
Construction Manager	Dam Mods/Removal CM	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.5
Inspector	Dam Mods/Removal	-	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-	-	-	-	-	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.0
Second Shift Inspector	Dam Removal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	1.00	1.00	1.00	1.00	-	-	-	-
Inspector	Roads & Bridges	-	0.25	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Inspector	Specialty	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.33	0.33	0.33	0.33	0.33	0.33	0.33	-	-	-	-
ODCs at 20%																										
JC Boyle																										
Construction Manager	Site Lead Construction Manager	-	-	-	-	-	-	-	-	-	-	-	-	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.5
Administrative Assistant	Extra Admin. at Remote Site	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.50	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.5
Inspector	Dam Removal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
Inspector	Specialty	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.33	0.33	0.33	0.33	0.33	0.33	0.33	-	-	-	-
ODCs at 20%																										

3.6 Progressive Design-Build Contract

3.6.1 Final Design & Permitting Support

As part of the existing Agreement with Kiewit, the preliminary services scope includes the primary tasks listed below. The current allocated budget for these scope items is approximately \$18M, which was negotiated through the competitive RFP process.

- Project Management
- Project Site and Project Conditions Verification
- Permitting Support and Compliance Program
- Initial Cost Model and Schedule
- Design Criteria Report
- 30% Design Completion Documents
- 60% Design Completion Documents
- GMP Project Submittal and Supporting Cost Estimates
- 90% Design Completion Documents

Subsequent tasks for 100% design, seed collection and propagation, and invasive weed management have been estimated at approximately \$3.7M and will be negotiated with Kiewit in the coming months.

3.6.2 Dam Removal

The dam removal scope for Full and Partial Dam Removal alternatives is defined in Section 5 of the Definite Plan and was used as the basis for this estimate. Estimates were developed using the methods and schedule constraints summarized in Section 2.4 of this report. Escalation was applied per Section 2.6.

Pertinent assumptions from the Definite Plan are as follows:

- KRRC confirmed or updated quantities where new information was available, and as described in Section 5 of the Definite Plan.
- Estimate and schedule assumes that a second shift will be required for Copco No. 1 and Iron Gate demolition. KRRC assumed two 10-hour shifts, 5 days a week.



- Estimate and schedule assumes that work days are 8 hours per day, 6 days a week for Copco No. 2 and J.C. Boyle demolition.
- All concrete demolition debris will be hauled to onsite disposal area as described in more detail in Section 5 of the Definite Plan for Decommissioning (KRRC 2018).
- All earth work material from excavation activities will be hauled to onsite disposal area as described in more detail in Section 5 of the Definite Plan for Decommissioning (KRRC 2018).
- All concrete and earthwork demolition material will be processed during demolition activity and there is no process equipment (crusher, screener, and stacker) operated at disposal areas.
- While Kiewit will manage the entire design build process as the prime, it is assumed that subcontractors will be used for certain specialized activities.

For any electrical or transmission facility demolition that is attached to existing or future electrical facilities to remain online and under the ownership of PacifiCorp, costs associated with design and construction are assumed to be the responsibility of PacifiCorp and are not included herein.

The savings associated with the partial removal alternative is detailed in Attachment A and includes the net savings after considering maintenance costs over a 10-year period for those facilities that remain in place.

3.6.3 Reservoir Area Improvements

This estimate assumes that a small percentage of sediment that remains in the reservoirs after drawdown will be mechanically excavated and placed elsewhere in the proposed floodplain area. Earthwork excavation volumes within the reservoir are based on surface models from historical site surveys compared to recently collected bathymetric data. KRRC developed labor rates, equipment rates, and materials costs from a combination of actual costs from past similar projects and RS Means Heavy Civil publication. Construction cost data used from past restoration projects with similar complexity, construction techniques and size include:

1. Snake River restoration near Boise, Idaho constructed in 2016
2. Kootenai River restoration near Bonners Ferry, Idaho constructed in 2010 – 2018
3. Rogue Basin restoration near Medford, OR constructed in 2010
4. Multiple helicopter large wood placement costs throughout Oregon on projects constructed in 2010 – 2018

Unit rates and quantities associated with the various activities that make up this work can be found in Attachment A. This estimate assumes the following:

- Earth excavation and subsequent fill (or disposal) will happen at the same time so that material is handled only once and placed on-site in the final location with minor grading and compaction. KRRC based volume estimates on neat line quantities using digital surface models.
- All excavated material is suitable for in-water disposal and will be disposed of on-site.
- Estimates include equipment and road access into site, assuming 3,000 linear feet (LF) on center (OC) or 0.56 miles per site (6 sites).

KRRC proposes elements for bank stability and channel fringe complexity and will include a process-based restoration and velocity variations along bank line by adding large wood complexity for resting zone, feeding seams, cover and velocity refugia. KRRC based restoration areas and treatments on expected conditions after drawdown and may change based on actual conditions.

Areas identified for reservoir earthwork activities and engineered stability elements are described and shown in plan in Appendix H, Restoration Plan, of the Definite Plan.

3.6.4 Reservoir Restoration

Restoration activities can be broken into three primary categories: (1) Earthwork/engineered improvements (Section 3.6.3 above), (2) pre-drawdown activities, and (3) post drawdown activities. The following text summarizes key assumptions that are pertinent to the estimate development for the second two categories. A full description of these components can be found in Appendix H, Restoration Plan, of the Definite Plan.

Pre-drawdown activities include seed collection, seed propagation and weed eradication, as further summarized below. In addition to the work described below, KRRC assumes completion of an RFP process to select a contractor or vendor for each activity.

1. **Seed Collection:** The main component of the revegetation process will be locally eco-typic seed of native plants for four different planting zones (bank wetland, bank riparian, floodplain riparian, and upland) based on hydrology. The seed will preserve the genetic integrity of the site and provide species and genetics best suited for this specific landscape. Collection of locally eco-typic seed subsequently grown by commercial growers to produce large amounts of seed or plant material will require advanced planning and will be implemented during the pre-dam removal period. To produce 50,000 lbs of pure live seed (PLS) in each of the four growing years before the 2023 fall season (totaling 200,000 lbs.), it is assumed that 3-7 lbs. of PLS/acre of wild collected seed will produce 2,000 lbs PLS/ acre. KRRC based this estimate upon propagation rate quotes obtained from BFI Native seed and Pacific Coast Seed. Conservatively, the higher seeding rate of 7 lbs PLS/acre is assumed to be planted on 25 acres at the seed propagation farm totaling the 175 lbs PLS of seed needed each year and resulting in the expected 50,000 lbs PLS if 2,000 lbs PLS is produced per acre on 25 acres. The cost of collecting 1 pound of wild seed ranges from low \$1,000 to high \$1,800. The seed must then be cleaned, stored in climate control warehouses and in some cases pre-treated. Seed pre-treatment may include scarification, stratification, imbibition, and others. Wild

collected seed will be substantially more expensive than propagated seed due to additional cleaning costs.

2. **Seed Propagation:** In order reach the goal of 200,000 lbs. of PLS over 4 years, 25 acres of land will need to be rented to propagate collected seed (with an assumed minimal yield of 2,000 lbs PLS/acre) to produce 50,000 lbs per year. KRRC based the yield and other unit cost estimates on information received from BFI, J Herbert Stone nursery, Pacific Coast Seed and the local forest service office.
3. **Weed Eradication:** The objective will be to implement a combination of weed control techniques that minimize the extent of environmental degradation and reduce the impact of chemical inputs on humans and non-target organisms. To identify the populations of existing invasive species, a field survey will be conducted at the site, geo-locating all invasive species. Assuming 100% of the project area outside of the existing reservoirs needs to be surveyed, it will take approximately 900 hours to survey the area. For a Scientist and Principal Scientist, the estimated cost is \$135,000 plus approximately \$2,247 for gas & mileage and \$21,000 for per diems and accommodations. In the years before drawdown, KRRC assumed that 30% of the site above the water line of the reservoir (85- acres) will require invasive species eradication. KRRC based this percentage on estimates from surveys performed in 2017-2018. Once drawdown occurs, the acreage of the site with vegetation will increase along with the need for invasive species control. For two years after drawdown, KRRC assumed 300 acres to potentially require weed eradication treatment.

Post-drawdown activities include pioneer seeding, pole cutting and salvaged plant collection, revegetation in each planting zone, followed by establishment period and long-term maintenance. Each activity is further summarized below:

1. **Pioneer Seeding:** Establishing a pioneer crop on the site soon after drawdown of the reservoirs is essential to prevent erosion, development of inhospitable substrate, and invasive species from establishing at the site, and building up soil biota and structure. The pioneer seed mix is intended to take advantage of less expensive native seed. The seed generated in large amounts during propagation (overstock), and sterile non-native seed (sterile wheat and Regreen) can readily establish in the sediment and will be less of a risk if it is washed out due to spring flooding or if it freezes in the early months of the year. Once river and soil conditions have stabilized, a fall broadcast seeding will be applied including locally ecotypic, native and diverse seed stock for each planting zone. Broadcast aerial seeding will be performed from helicopter(s) and is a very cost-efficient method of application. KRRC based pricing on an estimate from Ben Timberland (Timberland Helicopters, Inc, Ashland, OR) on the hourly rate of \$950/hr. at the rate at which the operator can distribute the seed. KRRC assumed that the seed weighs on average 14 lbs/cubic foot, with a seed bucket that holds 27 cubic feet of seed, 12 minutes is assumed for each bucket. For distributing 100 lbs. PLS per acre, KRRC estimated to be 140 hours totaling 133,000 for a medium cost. The cost of seed per pound is based on cost for readily available seed from nurseries that are anticipated be working within the Project (i.e., California brome = \$8-9 per PLS).

2. **Pole Cuttings and Salvaged Plants:** The establishment of habitat will greatly accelerate with the installation of pole cuttings, as well as transplantation of salvaged plants. These plants will also help prevent erosion and add species diversity to the site. KRRC's contractor will collect pole cuttings and potentially store them, short-term, prior to installation. 'Salvaged plants' will be transplanted on site therefore their costs are not associated with contract growing and nursery care. KRRC assumed that the contractor will absorb the cost of an expected 30% mortality rate of the pole cuttings. KRRC's contractor will collect pole cuttings from areas surrounding the site. To increase the number of pole cuttings available, in the year prior to drawdown, contractors will selectively cut back pole cutting species marked for plant salvage. This will promote an ample supply of young growth that can be harvested as needed the following year. It is assumed that the harvest and installation will be simultaneous, limiting the need for storage off-site. The number of pole cuttings allotted will vary by zone. Each 100 square foot (SF) area, for both the bank riparian and bank wetland zones, will include five pole cuttings. For the floodplain riparian zone, each 100 SF area will contain one pole cutting.
3. **Revegetation**
 - a) **Emergent Wetland Planting Zone:** Revegetation for emergent wetlands will be installed instream along the river's edge. This vegetation will consist of 100% salvaged plants, taken from the rim of the reservoirs. During the first year, KRRC assumes salvaged plants at 20 LF OC along the edges of the river. The following spring, once the plants have established, KRRC's contractor will harvest propagules from installed salvaged plants and will then be planted at 10 LF OC between the plants from the prior year. KRRC based cost estimates for plant layout per acre on estimates from Caltrans and RS Means.
 - b) **Bank Wetland Planting Zone:** Bank wetland zones will be delineated as areas suitable for plant growth approximately between the base flow and 2-year flood event water surface elevations (Q2) of the Klamath River. These areas will consist of salvaged plants and pole cuttings. KRRC expects 50 percent of this area to be restored. KRRC's contractor will transplant salvaged plants to this zone from the existing reservoir edge. KRRC based cost estimates for this work on RS Means and Caltrans data for the operation of a backhoe with a bucket and the plantings for pole cuttings. KRRC's contractor will install pole cuttings in this initial stage of planting in the spring after drawdown. KRRC's contractor will perform plant layout for all plants by the Contractor's crews marking each planting spot with a pinflag for an overall review by a restoration ecologist. KRRC's contractor will aerial seed the pioneer crop in all zones early in the drawdown year creating fast-growing erosion control before the river stabilizes. Once the pioneer crop has grown, KRRC's contractor will either roll or mow it to help open the soil to sunlight and create a habitat for the fall broadcasting of ecotypic native seed. In the early spring of the following year, KRRC's contractor will layout and install one pole cutting per 100 SF.
 - c) **Bank Riparian Planting Zone:** The Bank Riparian Zone will extend approximately from the 2-year (Q2) to the 25-year (Q25) flood water surface elevations (Q-lines) of the Klamath River. KRRC expects 50 percent of this area to be available for restoration. It will be the most critical zone for rapid re-establishment of riparian habitat, short-term stability of the channel and banks, and for

long-term establishment of an important transitional area between the riverine features and floodplain habitat areas. Planting densities within the riparian-bank areas will be variable, however, the substantial density of initial planting will be important to prevent invasion by reed canary grass (*Phalaris arundinacea*), a highly invasive non-native hybrid that is widespread around the reservoirs. The Bank Riparian zone will have a similar treatment to the Bank Wetland; with the same plant material and spacing. After drawdown, KRRC's contractor will transplant the plants from the rim of the reservoir to the river's edge. In the pioneer seeding process, KRRC's contractor will mainly apply mycorrhiza with the seed in this area. In the fall, the area will be broadcast seeded with ecotypic zone selected seed. KRRC's contractor will install an additional pole cutting in the following spring. Selected areas will be fenced off to deter deer predation and to serve as a seed bank to areas without fencing. Costs for fencing and installation is based on Caltrans data.

- d) **Floodplain Riparian Planting Zone:** Floodplain riparian zones will be delineated as those areas suitable for revegetation that occur approximately between the 25-year (Q25) and 100-year (Q100) flood water surface elevations of the Klamath River. The Riparian Floodplain Planting Zone will be planted similarly to the Bank Riparian Planting Zone; however, the plant densities will decrease, producing a decrease in plant layout costs for this zone. For each 100 SF area, there will be one pole cutting and one seed plant installation in the second year. The cost of construction/installation maintenance decreases slightly from Bank Riparian area; it will have an 18-month duration, until Plant Establishment. This section also includes emergency overhead irrigation in the high price estimate. Costs include \$60k for setup and design, \$40k/month to rent and \$30k to disassemble the irrigation system, and a 5-month rental (\$320K) and an uncertainty factor of 2 for 1,790 acres (costs pro-rated from the estimate for the Project). KRRC based costs for this on a quote from Rain for Rent for the entire site that includes design and rental of all equipment.
- e) **Uplands below Rocky Wake Zone:** The area between the upper edge of the Riparian Floodplain Planting Zone and the lower edge of the Rocky Wake Planting Zone constitutes the Uplands below the Rocky Wake Planting Zone. This area is the only formerly submerged area where upland vegetation will grow on sedimentary substrate. KRRC expects 50 percent of this area to be restored. The restoration process will be the same as for the planting zones below; mycorrhizal inoculant will be in the pioneer seed mix in the spring, broadcast seeding of the native ecotypic seed will be conducted in the fall 2022, and a final seeding in spring 2023 with deer fence, emergency irrigation, and construction/installation maintenance. However, plantings in this zone will consist of four woody plants per 100 SF. Species will include acorns, juniper berries, pine nuts fir and various shrubs. KRRC's contractor will install these plants with cocoon irrigation planters that will irrigate the plants and slowly deteriorate as the plant becomes self-sustainable. KRRC's contractor will use an auger to create a planting pit approximately 2 feet in diameter and 1 foot deep. KRRC based installation costs upon Saylor's installation cost.
- f) **Rocky Wake Planting Zone:** The Rocky Wake Planting Zone is the area of wake and wave action erosion around the edge of the existing reservoirs. Fluctuations of water level and wave action in the reservoir has eroded soil in a band or 'bathtub ring' leaving exposed rocky substrate, bedrock and areas that lack in vegetation. KRRC assumed that only 20% of this area is feasible to

restore. Soil amendments consisting of mycorrhizal inoculant will be added at the time of seeding. After the pioneer crop is broadcast seeded in the spring, the grown vegetation will be mowed or rolled in preparation for the fall broadcast seeding of the ecotypic seed. The plant selection and densities will be the same as the uplands below rocky wake zone. KRRC's contractor will place deer fence in selected areas within the zone to create areas free of deer predation. These areas will serve as seed banks for the rest of the site if predation becomes severe. Additionally, overhead irrigation is included in the high estimation cost.

- g) **Disturbed Uplands Planting Zone:** The Disturbed Uplands Planting Zone will consist of the existing developed areas proposed for demolition and recreational areas that will be removed after drawdown occurs. The revegetation schedule remains the same. However, the initial soil preparation may vary. These areas will most likely have highly compacted areas due to the existence of concrete or vehicular traffic on gravel areas. In these areas, it is assumed that 75% of the recreation area will need de-compaction. KRRC's contractor will cross rip compacted areas (before fall seeding) to a depth of 24 inches to loosen the soil and prepare it for seeding and planting. After de-compaction, KRRC expects this area to have healthy viable soils, so it is assumed that 90% of the area will be restored.
 - h) **Upland Stockpiles Planting Zone:** Upland Stockpiles Planting Zones include areas where materials from the dam removal will be deposited. The topsoil in these areas will be heavily compacted. The revegetation process for these areas will be the same as for the Disturbed Uplands Planting Zone, however, 100% of this zone will have to be de-compacted, slightly increasing it's per acre cost. KRRC based estimates for this treatment on RS Means data for \$110 to rip soil with a bulldozer.
 - i) **Undisturbed Uplands Planting Zone:** The Undisturbed Uplands Planting Zone will consist of areas above the Rocky Wake Zone that may be only minimally disturbed by the eradication of invasive exotic species. These areas will go through active weed removal for at least 3 years before drawdown. KRRC's contractor will reseed potential bare and disturbed patches resulting from invasive species eradication with a native upland seed mix via broadcasting. The majority of these areas will have existing native vegetation and only 30% is expected to need restoration.
4. **Establishment Period Maintenance:** KRRC assumes that the Project will be monitored and maintained for 5 consecutive years. Costs associated with this activity is covered by the Special Corporate Indemnitor, as summarized in Section 2.3.
 5. **Long-term Maintenance:** After Establishment Period Maintenance and Monitoring, long-term monitoring is assumed to continue for 4 years. Costs associated with this activity is covered by the Special Corporate Indemnitor, as summarized in Section 2.3.

3.6.5 Yreka Water Supply Improvements

KRRC assumed for development of this estimate that an underground pipeline will be constructed to relocate the City of Yreka's water supply line currently crossing Iron Gate reservoir. This relocation option is discussed in detail in Section 7.5 of the Definite Plan.

The scope for relocating the Yreka waterline will involve installation of two micro-tunneling pits on either side of the Klamath River. Once these pits are fully excavated and shored, micro tunneling equipment will install a 36" steel casing below the river bed. Once the casing is installed, a new 24-inch waterline will be installed to take the place of the river crossing section of the existing water line. On either side of the Klamath River, the new pipe will be installed using an open cut excavation method. Once the waterline is completely installed, tested and active, the micro tunneling pits and the open excavation are to be backfilled with existing material. Once the backfill operation is complete, the existing waterline will be removed and recycled.

The cost estimate for the Yreka Water Supply Improvements was developed using the RS Means database with a city cost index adjustment of Redding, CA. Crew output for each operation was adjusted to account for access, location, and construction operation. KRRRC assumed that a pile and lagging wall will be used to shore micro tunneling pits and it will be installed simultaneously with the excavation operation.

3.6.6 Transportation Improvements

This section describes the proposed road improvements and maintenance activities that are the basis for the estimate of project costs. It is based on design information provided in Sections 5 and 7.4 of the Definite Plan. Several road, intersection, structure and culvert improvements are proposed as part of the Project to:

- Facilitate access for project-related vehicles and equipment associated with dam removal
- Provide safety measures for both public and project roads used during the dam removals
- Return roads used by project-related vehicles to the respective owners and users in an acceptable state, restoring any reduction in function attributed to the Project

The improvements will be implemented at various phases throughout the Project. Some will require completion prior to the dam removals (related to construction access), and others will be contingent on a future assessment of road elements once reservoir drawdown or hauling activities are complete (maintenance activities). There will also be some ongoing activities throughout the Project to maintain roads heavily trafficked by project construction vehicles.

Table 3-9 provides a summary of all pertinent road segments, bridges, and culverts and the associated improvements or maintenance. Table 3-10 summarizes maintenance and rehabilitation cost assumptions associated with roads being used for construction access. Section references within the table refer to the sections within the Definite Plan.

Table 3-9 Transportation Improvements

Location	Improvements (Section References to Definite Plan (KRRC 2018))	Purpose		
		Construction Access	Drawdown Related	Maintenance/ Rehabilitation
J.C. Boyle				
The Dalles California Highway (US97)	• Pavement rehabilitation unlikely during or post-Project (Section 5.2.2)			X
Green Springs Highway (OR66)	• Pavement rehabilitation unlikely during or post-Project (Section 5.2.2)			X
Keno Worden Road	• Pavement rehabilitation unlikely during or post-Project (Section 5.2.2)			X
Topsy Grade Road	• Potential pavement rehabilitation during or post-Project (Section 5.2.2)			X
Culvert at Unnamed Creek	• Potential sediment removal and downstream erosion protection (Section 7.4.3)		X	
J.C. Boyle Dam Access Road from OR66	• Re-grading uneven or rutted areas (Section 5.2.2)	X		
Junction of OR66 and J.C. Boyle Dam Access Road	• Intersection widening (Section 5.2.2) • Tree removal (Section 5.2.2) • Signage (Section 5.2.2)	X		
Timber Bridge	• Remove (Section 5.2.2)	X		
Power Canal Access Road	• Periodic roadway maintenance grading during construction (Section 5.2.2)	X		
J.C. Boyle Disposal Access Road	• Re-grading (Section 5.2.2) • Minor widening (Section 5.2.2)	X		
Copco and Iron Gate				
Copco Road (I-5 to Ager Road)	• Potential pavement rehabilitation during or post-Project (Section 5.2.2)			X
Copco Road (Ager Road to Lakeview Road)	• Potential pavement rehabilitation during or post-Project (Section 5.2.2)			X

Location	Improvements (Section References to Definite Plan (KRRC 2018))	Purpose		
		Construction Access	Drawdown Related	Maintenance/ Rehabilitation
Dry Creek Bridge	• Temporary bridge for construction access during Project (Section 5.2.2)	X		
Copco Road (Lakeview Road to Daggett Road)	• Roadway maintenance during construction (Section 5.2.2) • Potential pavement rehabilitation during or post-Project (Section 5.2.2)	X		X
Unnamed Culverts between Brush Creek and Scotch Creek	• Potential rehabilitation or replacement post-construction (Section 7.4.3)			X
Scotch Creek Culvert	• Replace (Section 7.4.3)		X	
Camp Creek Culvert	• Replace with bridge (Section 7.4.3)		X	
Jenny Creek Bridge	• Replace (Section 7.4.3)		X	
Copco Road (Daggett Road to Copco Access Road)	• Potential road surface maintenance during or post-Project (Section 5.2.2)			X
Fall Creek Bridge	• Replace (Section 5.2.2)	X		
Copco Road (Copco Access Road to Copco Road Bridge)	• Potential road surface maintenance during or post-Project (Section 5.2.2)			X
Beaver Creek and E.F. Beaver Creek Culverts	• Potential erosion protection (Section 7.4.3)		X	
Raymond Gulch Culvert	• Potential erosion protection (Section 7.4.3)		X	
Copco Road Bridge	• Potential abutment erosion protection (Section 7.4.3)		X	
Copco Access Road	• Clear, grub and regrade (Section 5.2.2) • Minor widening into hillside if possible (Section 5.2.2) • Remove after construction is complete and restore area to native vegetation	X		
Copco Cove Access	• Minor works to enable barge mobilization (Section 5.2.2)	X		

Location	Improvements (Section References to Definite Plan (KRRC 2018))	Purpose		
		Construction Access	Drawdown Related	Maintenance/ Rehabilitation
Culverts at Unnamed Creeks (Copco Lake)	• Potential erosion protection (Section 7.4.3)		X	
Ager Beswick Road	• None (Section 5.2.2)			
Mallard Cove Boat Ramp Access	• Minor works to enable barge mobilization (Section 5.2.2)	X		
Daggett Road	• Minor grading improvements (Section 5.2.2) • Potential road surface maintenance during and post-Project (Section 5.2.2)	X		X
Daggett Road Bridge	• Replace (Section 5.2.2)	X		
Lakeview Road (Copco Road to Iron Gate disposal site)	• Potential road surface maintenance during and post-Project (Section 5.2.2)			X
Lakeview Road Bridge	• Replace (Section 5.2.2)	X		
Iron Gate Powerhouse Access Road	• Signage • Potential road surface maintenance during construction (Section 5.2.2) • Remove after construction is complete and restore area to native vegetation (Section 5.2.2)	X		X
Iron Gate Left Abutment Access Road	• Remove after construction is complete and restore area to native vegetation (Section 5.2.2)	X		
Iron Gate Upstream Left Abutment Access Road	• Remove after construction is complete and restore area to native vegetation (Section 5.2.2)	X		
Other Locations				
Pedestrian Bridge #1	• Will likely need to be removed by KRRC (Section 7.2). Cost estimate includes demolition only.			X

Location	Improvements (Section References to Definite Plan (KRRC 2018))	Purpose		
		Construction Access	Drawdown Related	Maintenance/ Rehabilitation
Pedestrian Bridge #2	<ul style="list-style-type: none"> Evaluation will be performed by KRRC to determine whether removal or replacement will be required (Section 7.2). Cost estimate includes demolition only. 			X

Table 3-10 Road Maintenance Assumptions

Location	Maintenance/Rehabilitation Assumptions
J.C. Boyle	
The Dalles California Highway (US97)	• None
Green Springs Highway (OR66)	• None
Keno Worden Road	• None
Topsy Grade Road	• Pre and post-construction 0.9 miles of 9-inch aggregate base section repair
J.C. Boyle Dam Access Road from OR66	• Pre-construction improvements include minor cut/fill, 0.25 miles of new 9-inch aggregate base section and 0.7 miles of 9-inch aggregate base section repair; Post-construction improvements include 0.6 miles of 9-inch aggregate base section repair
Power Canal Access Road	• Pre and post-construction 1.5 miles of 9-inch aggregate base section repair
Powerhouse Access Road	• None
J.C. Boyle Disposal Access Road	• Minor regrading & widening
Copco and Iron Gate	
Copco Road (I-5 to Ager Road)	• Post-construction 1-mile new asphalt overlay
Copco Road (Ager Road to Lakeview Road)	• Pre-construction improvements include 0.5 miles of crack sealer, and 0.75 miles of new asphalt section; Post-construction improvements include 1.0 miles of new asphalt overlay
Copco Road (Lakeview Road to Daggett Road)	• Pre-construction improvements include 1.0 mile of crack sealer, and 1.5 miles of new asphalt section; Post-construction improvements include 2.0 miles of new asphalt overlay
Copco Road (Daggett Road to Copco Access Road)	• Pre and post-construction 1.5 miles of 9-inch aggregate base section repair
Copco Road (Copco Access Road to Copco Road Bridge)	• Pre and post-construction 1.5 miles of 9-inch aggregate base section repair • Post-construction 0.25 mile overlay and minor riprap
Copco Access Road	• Pre-construction 2,500 CY cut/fill and 0.9 miles 9-inch aggregate base overlay • Remove after construction is complete and restore area to native vegetation
Ager Beswick Road	• None
Mallard Cove Boat Ramp Access	• Minor works to enable barge mobilization
Daggett Road	• None
Lakeview Road (Copco Road to Iron Gate disposal site)	• Post-construction improvements include 0.7 miles 6-inch aggregate base overlay
Iron Gate Powerhouse Access Road	• Remove after construction is complete and restore area to native vegetation



Location	Maintenance/Rehabilitation Assumptions
Iron Gate Left Abutment Access Road	<ul style="list-style-type: none"> • Remove after construction is complete and restore area to native vegetation
Iron Gate Upstream Left Abutment Access Road	<ul style="list-style-type: none"> • Remove after construction is complete and restore area to native vegetation

3.6.7 Recreation Plan

Costs associated with demolition of existing recreation facilities are included in the dam removal cost category. This section summarizes assumptions associated with construction of any new recreation facilities connected with the Project. Although the final recommendation for proposed recreation facilities has not been made, a list of possible improvements have been scoped for inclusion in this cost estimate.

Recreation costs were derived from itemized estimates for the various recreation facilities listed in Table 3-11. Rates and prices are derived from a combination of historical contracting information including Lake Berryessa Recreation Area Renovation project, and RS Means. Specific unit rates and quantities for the various activities involved at each site can be found in Attachment A.

Table 3-11 Proposed New Recreation Facilities

Site Name	Description
River Access Sites	
Keno River Access Site	The proposed Keno River Access Site would be located just downstream of Keno Dam on the river left. A river access launch site at this location would provide whitewater boating, fishing, general boating and informal shoreline recreation opportunities and mitigate Project whitewater boating and fishing impacts. The proposed river access launch (put-in) site includes an extension of the dam access road through the end of the existing Keno Camp parking area and a 10-foot wide, compacted gravel trail to a natural surface boat launch. In addition to the new access road improvements, trail, and gate, the site would include a turnaround and staging area for commercial vehicles, an information kiosk with angler box, a boat launch staging area, basalt retaining and seat wall, and basalt steps leading down the embankment to the river's edge.
Highway 66 Bridge River Access Site	The Highway 66 Bridge Crossing River Access Site would be located along the left bank of the Klamath River just south of the Highway 66 road crossing. A site at this location would provide river access for whitewater boating, fishing, general boating, and informal shoreline recreation opportunities. The proposed site includes both parking and launch facilities, and site amenities would include a paved parking area, boulders along the access road to prevent off-road driving, paved path to a universally accessible vault toilet, informational kiosk with angler box, bench, gathering area, garbage facilities, and trail down to the boat ramp.

Site Name	Description
Moonshine Falls River Access Site	The proposed Moonshine Falls River Access Site would be situated below the dam, at the power canal and south of the timber bridge crossing on the river right. A site at this location would provide whitewater boating, fishing, general boating, and picnicking/day use opportunities with upstream views of Moonshine Falls and downstream river views of the riparian corridor. The parking area would be in an area where former power canal facilities would be removed, resulting in less earthwork and disturbance needed. The parking area would include access road improvements, a paved path leading to 3 picnic sites and a universally accessible vault toilet, and garbage facilities.
Turtle Camp River Access Site	The Turtle Camp site is located along the right bank of the Klamath River within the Hell's Corner Reach of the river. Potential modifications to this site would provide a river access for whitewater and drift boating, fishing, and informal shoreline recreation opportunities. The proposed modifications to this site would include a new access road to a small parking area and formal boat launch and take-out site. Additional site amenities include paths to one picnic site, garbage facilities, a universally accessible vault toilet, information kiosk with angler box, and parking for 12 vehicles (including one space for ADA-accessible parking) and two oversized parking spaces for large vehicles and trailers.
Copco Valley River Access Site	The proposed Copco Valley River Access Site would be located on the right bank of the Klamath River in an area currently inundated by Copco Lake and near the existing Copco Cove recreation site, which would be removed during Project implementation. The proposed recreation site includes extensive parking areas for private and commercial boaters, as well as day use facilities and a boat launch.
Copco No. 2 Powerhouse River Access Site	The proposed Copco No. 2 Powerhouse River Access Site would be located on the river left on the south end of the existing powerhouse area near the maintenance buildings. The site would contain parking areas for 12-24 vehicles (including one space for ADA-accessible parking), 2 pull-through trailer parking spaces, an information kiosk with angler box, garbage facilities, and universally accessible vault toilet.
Camp Creek River Access Point	The Camp Creek River Access Site would be located on the right bank of the Klamath River in an existing user created area above and within the area currently inundated by Iron Gate Reservoir, near the existing Iron Gate Dispersed Site 3. Site amenities would include a trailhead and information kiosk with angler box, garbage facilities, universally accessible vault toilet, paved trail to 5 picnic sites, and compacted gravel surface trail to 2 river access areas. The parking area and picnic sites would be located on an existing hill while the trail to the river and 2 river access areas would be located within the reservoir drawdown area along the banks of the historic river channel.
Iron Gate Hatchery River Access Site	The Iron Gate Hatchery Day Use Area is an existing recreation site located downstream of the Iron Gate Dam and includes an undeveloped boat launch. The site would include a large parking area for 48 vehicles (including 2 spaces for ADA-accessible parking) and 4 vehicles with trailers and a boat launch. The site would also include infill vegetation, universally accessible vault toilet, garbage facilities, a beach, and an information kiosk with angler box.

3.6.8 Downstream Flood Control Improvements

Costs associated with mitigating potential flooding impacts to downstream properties are included in the budget allocated to the Local Impact Mitigation Fund, as described above in Section 2.3, so are not included here.



3.6.9 Public Health and Safety Measures

The estimate includes costs for cattle exclusion fencing at reservoir sites where the former reservoirs will no longer be able to serve as a natural barrier to livestock, and for the protection of revegetation efforts against damage. Fencing will likely be four-wire fence with metal T-posts at 12 LF intervals.

Fencing quantities have been determined from a detailed analysis of fencing lengths in GIS, focused on fencing the reservoir restoration areas while avoiding fencing along portions of the perimeter with steep topography above the reservoir, forest and housing. As the scope is developed further, additional definition may be obtained by considering where fences might need to tie into property boundary fences (if they exist) or where steep topography just below the reservoir surface might act as a barrier.

3.6.10 Fire Management Plan

The Fire Management Plan is currently being developed through close coordination with the various agencies listed below in Table 3-12.

Table 3-12 Fire Protection Agencies

Agency Name	Federal/State/Local	Jurisdiction
USDA Forest Service	Federal	National Forests, federally managed land
Bureau of Land Management	Federal	BLM lands, federally managed land
Cal Fire	State of California	State Resource Lands, California
Oregon Department of Forestry	State of Oregon	State Resource Lands, Oregon, BLM land in Klamath River Canyon
Klamath County Fire District	Local, County of Klamath	Unincorporated County Lands and the City of Klamath Falls
Colestine Rural Fire District	Local, County of Jackson	County Fire District in Jackson County, Oregon
Siskiyou County Fire Protection Districts: Copco Lake, Hornbrook, Montague, South Yreka, Tulelake, Etna, Ft. Jones, Weed	Local, County	Unincorporated County Lands throughout Siskiyou County, California
Mount Shasta Fire Department	Local, City of Mount Shasta	Mt. Shasta Municipal Boundaries
Yreka Fire Department	Local, City of Yreka	City of Yreka Municipal Boundaries

Kiewit will designate the Safety Officer, who will be available and on-call 24 hours a day, 7 days a week in the event of a fire. The Safety Officer will be the primary on-site communication linkage to ODF and Cal Fire foresters and will be responsible for managing all on-site fire prevention and suppression documentation, including the contact information of local emergency services, such as local fire departments and hospitals. The Safety Officer will be responsible for instructing other workers in the required fire prevention and suppression measures, including the use of fire suppression equipment and the protocols in the event of a

fire, and for communicating current fire hazards and any changes in prevention and suppression methods on a daily basis.

Proposed management resources that were accounted for in the estimate herein include the following:

- **Monitored Detection System (MDS):** The MDS is a powerful tool for rapidly detecting and locating wildfires. MDS cameras are proposed to be added to existing fire lookouts on Paradise Craggy, CA and Parker Mountain, OR and a MDS monitoring center at the CFSU headquarters in Yreka.
- **Chipper:** A chipper-dump bed trailer combo and a truck to haul it, previously owned and maintained by CFSU could provide frequent and consistent assistance with defensible space to the local community.
- **Pressurized Hydrant System:** The water supply for the existing pressurized hydrant system at Copco Lake is maintained by Copco dams. The system would be retrofitted to function without the dams.
- **Boat Launches:** These are accounted for in the proposed recreation features discussed above.
- **Tactical Water Tenders:** An opportunity to improve local department first response effectiveness is the addition of tactical water tenders, which have the capability to pump and store water, then transport it to rugged and remote areas in the rural Basin.
- **Aerial River Access Points:** In-channel locations that meet the requirements for helicopter drafting, will need to be developed and maintained in the former reservoirs specifically for fire suppression following the removal of the dams.

3.6.11 Spawning Gravel Implementation

To mitigate impacts to aquatic resource spawning habitat, approximately \$4 million in gravel augmentation will be completed at appropriate locations along the Klamath River. The actual amount necessary is likely less and will be based on surveys completed after drawdown.

3.7 Anticipated Mitigation Measures

The following sections summarize cost assumptions associated with anticipated regulatory mitigation measures for groundwater wells, downstream water intakes and cultural resources.

3.7.1 Groundwater Analysis

Groundwater well improvements adjacent to the reservoirs may be necessary if reservoir drawdown has a negative impact on existing well water levels. Costs associated with groundwater improvements are covered within the proposed Local Impact Mitigation Fund, as summarized in Section 2.3, so improvement costs are



not accounted for here. However, analysis to support a better understanding of likely impacts is currently underway and is the basis for this estimate.

The current estimates assume public outreach will be completed with relevant property owners, and subsequent installation and monitoring of up to five (5) new 60-foot deep, 3-inch diameter monitoring wells will be completed. Well drilling costs assume PVC casing and hard rock geology. Wells will be monitored monthly for water level and water quality constituents over a 3-year period.

3.7.2 Downstream Water Supply

Sediment buildup during reservoir drawdown may affect some downstream water supply intakes. The KRRC will excavate affected intakes as needed, to clear them of aggraded sediment materials, and provide temporary settling basins or groundwater wells if potable water supply is impacted. Jetting and vacuum technologies such as those used for cleaning storm drains and sewers will be used to remove sediment at intakes. Temporary settling basins may also be used to remove silt and sediment prior to the primary treatment performed by the water right holder. Table 3-13 summarizes the elements included in the estimate of Project Costs for downstream water supply.

There are approximately 50 water diversions off the Klamath River that could be affected. The United States Bureau of Reclamation (USBR) believed between 7 and 18 intakes would require maintenance. As some intakes have been added after the 2012 EIS/R, this estimate is based on the higher end of the range of the most probable number of intakes that could require maintenance actions.

In some cases, where diversions are used primarily for irrigation, the KRRC may need to pay for lost or damaged crops. Water rights holders reported alfalfa and pasture as the majority crop types irrigated with the diverted water during the drawdown period. In 2012, the average return for alfalfa produced in Siskiyou County was approximately \$1,200 per acre, where the average yield was approximately 6 tons per acre (UCCE 2012). Assuming all 129 acres will be affected, the cost will be approximately \$154,800.

Supplying livestock with water requires providing a stock water tank and water. A 500-gallon stock water tank is included in the estimate.

Table 3-13 Assumptions For Downstream Water Supply

Cost Level	Elements Included in Cost Estimate
Most Probable Estimate (MPE)	Intake excavation for 18 intakes Water supply for domestic use for 8 water rights (claimed or registered rights with reported diversions) Temporary settling basins at 18 intakes Temporary groundwater wells at 18 intakes
Direct Crop Loss Mitigation	Payment for lost hay crops on 129 acres of irrigated lands.
Stock watering	Provide 500-gallon water tank and 1,500 gallons of water per month.

References:

- UCCE (University of California Cooperative Extension). 2012. Sample Costs to Establish and Produce Alfalfa Hay – Intermountain Siskiyou County, Scott Valley- Mixed Irrigation. Accessed February 27, 2018. Available at: https://coststudyfiles.ucdavis.edu/uploads/cs_public/a6/b3/a6b35d9d-bd82-495c-86b1-1987dd6154ae/alfalfa_im_scott2012.pdf
- County Road 67 Sediment Trap Maintenance Pilot Project 2013-2014, Douglas County CO. CH2M, Denver CO. Available at: http://www.vactor.com/Portals/0/PDF/hxx/HXX_Brochure_WEB_11.16.pdf
- League of Oregon Cities and the Community Planning Workshop at the University of Oregon. Water, Wastewater and Stormwater Rate Survey. March 2015.
- Raftelis Financial Consultants, Inc. and California-Nevada Section of the American Water Works Association. 2015 California-Nevada Water and Wastewater Rate Survey.

3.7.3 Cultural Resources

Cultural resources mitigation and protective measures may be required during drawdown, throughout the dam removal and reservoir restoration durations, and post-construction. Activities will likely involve short- and long-term cultural site monitoring, inadvertent discovery of cultural resources, among others. Additional information about the potential scope of activities is available in Appendix L of the Definite Plan.

Site monitoring and resolution of inadvertent discoveries of cultural resources and human remains will follow protocols established during agency and tribal consultations, as documented in the Historic, Cultural, and Tribal Resources Management Plan discussed in Appendix L of the Definite Plan, as well as actions developed and approved during consultations under Section 106 and agreed to during consultations with California-recognized tribes.

The cultural resource mitigation and protective measures estimate is based on the following assumptions associated with agency and tribal outreach, drawdown and post-drawdown surveys/inspections, curation fees, discovery contingencies and associated protection and mitigation measures.

Agency and Tribal Outreach

During the two-year construction period starting with reservoir drawdown, management of cultural resources and associated mitigation will require ongoing agency and tribal outreach, consultation, and meeting attendance.

Post-construction, long-term cultural resources management and monitoring activities are estimated for a 3-year period, and based on the Historic, Cultural, and Tribal Resources Management Plan.

Drawdown Surveys

Archaeological and cultural inventories are planned for the J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate reservoir zones during (1) the course of drawdown activities, and (2) post-drawdown reservoir areas as soon as surface conditions permit. Cost assumptions associated with each are listed below:

- **Drawdown Shoreline Survey:** To the extent possible, and in consideration of safety factors, periodic pedestrian archaeological inventory will be conducted along the reservoir shorelines as drawdown occurs. The principal goal of this shoreline survey is to identify and reduce looting and disturbances of known and currently unknown cultural resources. Inventory methods for this shoreline survey are still under development but may include low-elevation aerial surveys (e.g., drones, helicopter) or barge surveys, if feasible, that target areas subject to slumping or those that are not sufficiently dried to allow safe access via foot-traffic and survey vehicles. Three 2-person teams consisting of one archaeologist and one tribal monitor will conduct the shoreline inventory at each reservoir (J.C. Boyle, Copco No. 1 and 2, and Iron Gate). The estimate allows for weekly reconnaissance for six people for a 2-month period before the post-drawdown pedestrian inventory of the reservoir areas can begin.
- **Post-drawdown Reservoir Survey:** Archaeological inventory will be conducted of the post-drawdown reservoir areas after water has receded and soils have sufficiently dried to allow for pedestrian survey. Based on current estimates, the former reservoir footprints encompass a total of 2,275 acres. Archaeological pedestrian inventory will focus on reservoir areas covered by 0-4 feet of sediment, where water-induced erosion has the greatest potential to reveal buried archaeological deposits. The 0-4-foot sediment area is estimated as encompassing about 1,500 acres. Selected deep probing may be used in areas of high archaeological sensitivity that exceed sediment depth of 4 feet. Using a standard rate of 25 acres per person per day, the 1,500-acre survey will require approximately 60 person/days to complete. Assuming an average of one site per every 50 acres inventoried, 30 archaeological sites would require recordation, which in turn will require an additional 60 person/days of effort.

Construction Surveys

Construction cultural resource monitoring is associated with implementation of the reservoir restoration plan during 2022 and 2023. The restoration plan involves removal of some portion of the remaining reservoir sediments to re-expose some high value pre-inundation river terraces. The Klamath River corridor and its associated terraces are areas of high archaeological and tribal resource sensitivity, and any subsurface disturbances associated with exposing the pre-inundation landscape (within approx. 5 vertical feet) will minimally require cultural resources monitoring.

Two teams comprised of archaeologists and tribal monitors will participate during any reservoir restoration actions. The estimate allows for monitoring for four people for a period of one year (FY 2022-2023). If cultural resources are inadvertently discovered during the restoration area monitoring activity, their recordation and evaluation will continue under Discovery Contingencies (see below).

Post-Construction Surveys

Post-construction cultural resources management and monitoring reflects compliance with mitigation of tribal cultural impacts. It will be developed in the Historic, Cultural and Tribal Resources Management Plan and will require ongoing consultation with affected tribes, including meetings to identify site-specific

mitigation as new sites are exposed or discovered. Requirements include needs for additional survey; development and implementation of a Looting and Vandalism Protection Program (LVPP), including long-term monitoring and site documentation; tribal issue facilitation; and long-term assistance with implementation of the Programmatic Agreement. These requirements are expected to include efforts beyond those covered under more routine agency and tribal consultation.

The LVPP provisions for archaeological and tribal monitoring are estimated to occur for a maximum of 3 years following completion of ground disturbance activities. Monitoring frequency is currently estimated at quarterly. The estimate for LVPP monitoring allows for two, 2-person crews, comprised of one archaeologist and one tribal monitor, for a 2-week period every quarter, for a total of 12 quarters. Additional non-field related costs are included for ongoing agency and tribal consultation and meetings.

Curation Fees

Curation fees have been included in the estimate for artifacts recovered during phase II and phase III fieldwork. As currently estimated, archaeological investigations involve excavation of 120 m³ for phase II efforts and 200 m³ for phase III efforts, for a total of 320 m³. The estimate allows for permanent curation of archaeological materials recovered during the phase II and phase III programs as 1 archive box per 2 m³ of excavated sediment, for 160 archive boxes. An additional 250 boxes may be required for discovery contingencies, for an estimated project total of 410 boxes. At an average of \$500/ft³ (2018 price quote from Oregon Museum of Natural and Cultural History), the curation of 410 archive boxes of cultural materials is estimated at \$205,000 excluding escalation. Curation support labor for final artifact and paperwork preparation is estimated at an average of 4 hours per archive box.

Inadvertent Discovery Contingencies

Two types of inadvertent discovery contingencies are anticipated during project implementation, including unanticipated exposure of archaeological resources and human remains. For purposes of this cost estimate, it is assumed that up to 160 discoveries (60 archaeological materials and 100 human remains) may occur in both short-term and long-term contexts. Additional information is provided below:

- **Archaeological Resources:** It is anticipated that up to 30 new archaeological resources may be discovered during inventory of the former reservoir areas. Stabilization and/or recovery work (excavation) may be required at the anticipated sites to reduce project-related effects, particularly those related to erosion. In addition, ground disturbances associated with the reservoir restoration actions may expose archaeological components when reservoir sediments are removed, and the pre-inundation landscape is exposed. The estimate allows for discovery, stabilization, and/or recovery work of up to an additional 30 new archaeological resources associated with restoration actions. The estimate allows a per unit rate of \$30,000 per resource for stabilization and/or recovery work for each of the 60 newly identified archaeological resources, to include recordation, archaeological excavation, analysis, and reporting.

- **Human Remains:** Drawdown, dam removal, and post-dam removal activities have the potential to expose human burials within the former reservoir areas, as well as in downriver contexts where elevated water levels and subsequent bank erosion may occur. The estimate allows a per resource rate of \$15,000 for recovery of 100 human remain locations. Discovery, removal, and/or relocation of human remains will require investigation and recovery by a 4-person team, comprised of one field supervisor (archaeologist or physical anthropologist), two archaeological technicians, and one tribal monitor for a period of two days in the field. Archaeological materials recovered from discovery situations will require reporting, analysis and curation.

Traditional Cultural Properties Reserve Fund

Current agency and tribal consultation efforts have not yet addressed issues related to mitigation of impacts to Traditional Cultural Properties (TCPs). Therefore, a conservative reserve fund of \$1,000,000 has been estimated for this possibility.

3.8 Monitoring & Reporting

3.8.1 Aquatic Resource Measures

Measures to benefit aquatic resources (AR) have been developed through coordination with state and federal regulatory agencies and have been incorporated into the Project. Aquatic resource activities will take place prior to, during, and after dam removal and are based on Appendix I of the Definite Plan. Costs associated with implementation of ARs (during and post-construction) will be covered by the Specialty Corporate Indemnitor as described in Section 2.3, so are not included here. Baseline field studies to inform the ARs are included, most of which align with previously completed work (actuals).

3.8.2 Terrestrial Resource Measures

Measures to benefit terrestrial resources (TER) have been developed through coordination with state and federal regulatory agencies and have been incorporated into the Project. Terrestrial resource activities will take place prior to, during, and after dam removal and are based on Appendix J of the Definite Plan. Costs associated with implementation of TERs (during and post-construction) will be covered by the Specialty Corporate Indemnitor as described in Section 2.3, so are not included here. Baseline surveys completed to date (actuals) and pre-construction surveys for nesting birds, eagles, and Western Pond Turtle (WPT), as well as bat mitigation features are included in this estimate.

3.8.3 Water Quality Monitoring

Water quality monitoring was estimated to include monitoring at up to ten main stem stations along the Klamath River. Eight of these are existing United States Geological Survey (USGS) stations, while two will be new stations. Existing stations have been upgraded with equipment to meet the project objectives, and associated costs are included herein.

All sites were equipped with a multi-parameter sonde to measure temperature, pH, dissolved oxygen, specific conductance and turbidity. In addition, all sites except Keno were equipped with a high-range turbidity sensor and side-looking acoustic profiler (for acoustic attenuation and backscatter measurements). A TSS and NTU laboratory relationship study was conducted using sediment samples collected from the reservoirs.

Analysis and reporting of data will be according to USGS guidelines. The primary final products of the monitoring network will be 15-minute time series of stage, discharge, temperature, pH, dissolved oxygen, specific conductance, turbidity, acoustic attenuation, acoustic backscatter, and suspended-sediment concentration (SSC, potentially discriminating between silt/clay and sand), and suspended-sediment flux.

This estimate includes monitoring completed prior to the start of construction. Rates and prices are based on a USGS proposal submitted in March 2018. Water quality monitoring and reporting during and post construction will be covered by the Specialty Corporate Indemnitor as described in Section 2.3, so are not included here.

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Chapter 4: Results

4. RESULTS

The following sections provide a summary of the results of the cost analyses described above. Detailed construction cost breakdowns for both Full Removal and Partial Removal alternatives are provided in Attachment A. Pay item cost detail worksheets, describing the calculation of individual cost estimate line items rates and prices are provided in Attachment B.

In addition to the estimated project cost results, a full range of results from the Monte Carlo analysis are provided in Section 4.2.

4.1 Total Cost Summary

Table 4-1 provides a summary of the estimate of project costs for Full and Partial Removal alternatives, respectively. As described in Section 4.2 below, a P80 risk contingency has been included in the estimates. As the detailed design advances toward final construction drawings and specifications, the pre-GMP portion of the contingency will decrease to near zero. While the post-GMP contingency may decrease as more field data and information becomes available, some level of construction contingency will persist throughout the construction phase.

Based on the Full Removal project estimate summarized below, the Project has adequate funding to implement all Project activities, with an approximately \$16.4M reserve (difference between \$450M funding ceiling and implementation estimate). The estimate includes over \$62.7M in risk contingency, as well as accounting for liability transfer and specialty insurance, both of which are beyond what is typically required or needed for successful project approval and implementation. The liability transfer and insurance, as well as the current reserve funds, will better protect all parties against possible cost overruns related to uncontrollable circumstances and other risks.

**Table 4-1 Results Summary - Full and Partial Removal**

Line Item / Cost Category		Estimate of Project Costs (Year of Construction Dollars)	
		Full Removal	Partial Removal
Project Oversight (non PDB)		40,718,000	40,718,000
10	Project Oversight	38,799,000	38,799,000
11	Corporate Insurance	1,919,000	1,919,000
Liability Transfer		35,530,000	35,530,000
15	Liability Transfer	35,530,000	35,530,000
Environmental Compliance (KRRC-Managed)		8,097,000	8,097,000
20	Permit Acquisition, CEQA/NEPA Support, Compliance QA During Construction	8,097,000	8,097,000
Technical Support		14,220,000	14,220,000
30	Preliminary Engineering (Technical Representative)	9,225,000	9,225,000
31	Vegetation Test Plots, Seed Collection, Seed Prop.	1,896,000	1,896,000
32	Construction Procurement	1,096,000	1,096,000
33	Owner's Representative (Design Oversight)	2,003,000	2,003,000
Construction Management		13,167,000	13,167,000
34	Construction Management	13,167,000	13,167,000
Progressive Design-Build Contract		237,612,000	219,150,000
40	Final Design & Permitting Support (PDB)	21,799,000	21,799,000
40A	Project Insurance	6,989,000	6,989,000
41	Dam Removals	97,751,000	79,289,000
42	Reservoir Area Improvements	21,779,000	21,779,000
43	Reservoir Area Restoration	32,821,000	32,821,000
44	Yreka Water Line Replacement	6,060,000	6,060,000
45	Transportation Improvements	32,717,000	32,717,000
46	Recreation Improvements	6,481,000	6,481,000
48	Public Health And Safety Fencing	2,665,000	2,665,000
49	Fire Management Plan	3,006,000	3,006,000
49A	Spawning Gravel Augmentation	5,544,000	5,544,000
Mitigation Measures		17,141,000	17,141,000
51	Groundwater Analysis	391,000	391,000
52	Downstream Water Supply/Rights	1,135,000	1,135,000
53	Cultural Resources	15,615,000	15,615,000
Monitoring & Reporting (KRRC)		4,406,000	4,406,000
61	Aquatic Resource Measures	288,000	288,000
62	Terrestrial Resources Measures	3,305,000	3,305,000
63	Baseline Water Quality Monitoring	813,000	813,000
Subtotal		370,891,000	352,429,000
Contingency (P80)		62,757,000	58,621,000
Estimate Uncertainty		9,474,000	8,687,000
Pre-GMP Contingency		18,208,000	17,209,000
Post GMP Contingency		35,075,000	32,725,000
TOTAL		433,648,000	411,050,000

4.2 Quantitative Risk Assessment Results

The QRA results show that the total project cost for Full Removal may range from \$401 million to \$452 million (see Table 4-2). At an 80% confidence level, the total project cost for Full Removal is approximately \$434 million, leaving approximately \$16M in cash reserve (up to funding limit). Given these calculations, there is over 95% probability of the current funding limit (\$450M) being maintained, as shown in Figure 4-1.

Table 4-2 QRA Results Summary (Full Removal)

	Risk Assessment				
	Optimistic ^[1]	80% C.L.	90% C.L.	95% C.L.	Pessimistic ^[2]
Project Implementation Cost	\$370,891,000	\$370,891,000	\$370,891,000	\$370,891,000	\$370,891,000
Contingency					
Pre-GMP Risk Contingency	\$6,093,000	\$18,208,000	\$19,435,000	\$21,378,000	\$24,020,000
Estimate Uncertainty	\$8,260,000	\$9,474,000	\$10,134,000	\$10,214,000	\$10,318,000
Post-GMP Risk Contingency	\$15,367,000	\$35,075,000	\$37,494,000	\$39,794,000	\$47,116,000
Total	\$400,611,000	\$433,648,000	\$437,954,000	\$442,277,000	\$452,345,000

^[1] 1% Confidence Level

^[2] 99% Confidence Level

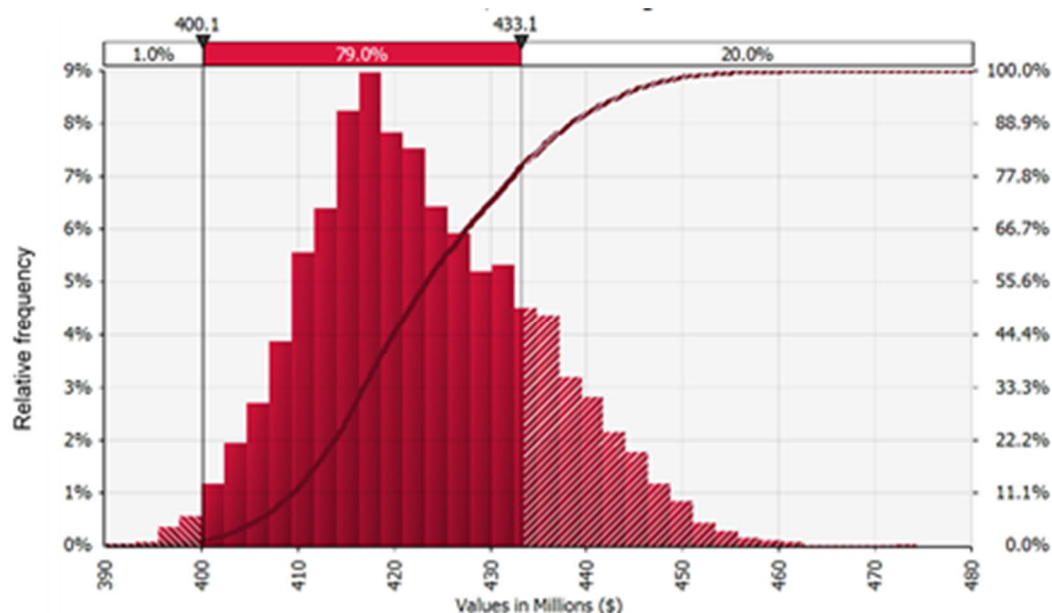


Figure 4-1 Relative Frequency of Total Project Cost (Full Removal)



Further breakdown on the QRA results for the optimistic, P80 and pessimistic scenarios are shown in Table 4-3 below.

Table 4-3 QRA Results Breakdown (Full Removal)

	Risk Assessment		
	Optimistic ^[1]	80% C.L.	Pessimistic ^[2]
Project Implementation Cost	\$370,891,000	\$370,891,000	\$370,891,000
Contingency			
Cost Estimate Uncertainty	\$8,260,000	\$9,474,000	\$10,318,000
Progressive Design Build	\$5,712,000	\$5,850,000	\$6,288,000
Soft Costs	\$208,000	\$1,912,000	\$2,247,000
Mitigations & Monitoring	\$2,340,000	\$1,656,000	\$1,703,000
Insurance	-	\$56,000	\$80,000
Risk Register	\$13,356,000	\$20,329,000	\$26,750,000
Pre-GMP Contingency	\$6,093,000	\$7,601,000	\$10,133,000
Post-GMP Contingency	\$7,263,000	\$12,728,000	\$16,617,000
Cost of Schedule Delay	\$8,103,000	\$32,955,000	\$44,386,000
Escalation - Start of Construction	-	\$10,607,000	\$13,887,000
Impact Cost - PDB	\$4,244,000	\$14,589,000	\$19,934,000
Impact Cost - Soft Cost	\$3,859,000	\$7,759,000	\$10,565,000
Total	\$400,611,000	\$433,648,000	\$452,345,000

^[1] 1% Confidence Level

^[2] 99% Confidence Level

Impacts to schedule are also quantified as part of the QRA and are utilized in determination of schedule related costs increases associated with certain risks. Table 4-4 below summarizes schedule impacts for the optimistic, P50, P80 and pessimistic scenarios from the QRA.

Table 4-4 QRA Schedule Results Summary (Full Removal)

	Risk Assessment - Schedule			
	Optimistic ^[1]	50% C.L.	80% C.L.	Pessimistic ^[2]
FERC Surrender Order Date	Sep-20	Jan-21	Feb-22	Aug-22
Construction Start Date	Apr-21	Jul-21	Jul-22	Feb-23
Construction Substantial Completion	Feb-23	Apr-24	Mar-25	Mar-26

^[1] 1% Confidence Level

^[2] 99% Confidence Level

A similar assessment was completed for the Partial Removal alternative and the results are summarized in Table 4-5 below. For Partial Removal, there is over 99% probability of the current funding limit (\$450M) being maintained.

Table 4-5 QRA Results Summary (Partial Removal)

	Risk Assessment				
	Optimistic ^[1]	80% C.L.	90% C.L.	95% C.L.	Pessimistic ^[2]
Project Implementation Cost	\$352,429,000	\$352,429,000	\$352,429,000	\$352,429,000	\$352,429,000
Contingency					
Pre-GMP Risk Contingency	\$6,969,000	\$17,209,000	\$19,391,000	\$21,022,000	\$23,151,000
Estimate Uncertainty	\$5,755,000	\$8,687,000	\$9,520,000	\$9,990,000	\$10,005,000
Post-GMP Risk Contingency	\$15,487,000	\$32,725,000	\$35,986,000	\$37,876,000	\$43,379,000
Total	\$380,640,000	\$411,050,000	\$417,326,000	\$421,317,000	\$428,964,000

^[1] 1% Confidence Level

^[2] 99% Confidence Level

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Chapter 5: References

5. REFERENCES

Aon, 2019. Risk and Insurance Due Diligence Report, Klamath River Renewal Project, July 2019.

KRRC 2018. Definite Plan for the Lower Klamath Project, Klamath River Renewal Corporation, June 2018.

KRRC 2019. Amended Appendix A - Risk Management Plan, to the Definite Plan for the Lower Klamath Project, Klamath River Renewal Corporation, July 2019.

UCCE 2012. University of California Cooperative Extension – Sample Costs to Establish and Produce Alfalfa Hay, Intermountain – Siskiyou County.



Attachment A Cost Estimate

FULL REMOVAL ESTIMATE

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
		PROJECT OVERSIGHT											
		Project Oversight											
		Compensation & Benefits											
10	-	Compensation & Benefits		1.00	EA	8,873,655	8,873,655	-	-	-	-	8,873,655	8,873,655
		Travel and Meetings											
10	-	Travel and Meetings		1.00	EA	605,830	605,830	-	-	-	-	605,830	605,830
		Professional Services											
10	-	CEA Services & Expenses	CEA Services & Expenses	1.00	EA	4,181,956	4,181,956	-	-	-	-	4,181,956	4,181,956
10	-	Legal Services	General Counsel	1.00	EA	4,593,668	4,593,668	-	-	-	-	4,593,668	4,593,668
10	-	Legal Services	Construction Counsel	1.00	EA	3,580,824	3,580,824	-	-	-	-	3,580,824	3,580,824
10	-	Legal Services	Regulatory Counsel (inc. Perkins Coie)	1.00	EA	2,590,000	2,590,000	-	-	-	-	2,590,000	2,590,000
10	-	Legal Services	Corporate-Transaction Counsel	1.00	EA	750,000	750,000	-	-	-	-	750,000	750,000
10	-	Board of Consultants	Board of Consultants	1.00	EA	1,740,000	1,740,000	-	-	-	-	1,740,000	1,740,000
10	-	Land Survey/Title Work	Land Survey/Title Work	1.00	EA	1,723,000	1,723,000	-	-	-	-	1,723,000	1,723,000
10	-	Accounting and Audit Fees	Accounting and Audit Fees	1.00	EA	524,395	524,395	-	-	-	-	524,395	524,395
10	-	Risk Management Services	Risk Management Services	1.00	EA	662,000	662,000	-	-	-	-	662,000	662,000
10	-	Communications External Services	Communications External Services	1.00	EA	426,000	426,000	-	-	-	-	426,000	426,000
10	-	Other Professional Fees	Yurok Wildlife Program Retirement Plan Svcs RLF TransTec etc. (N	1.00	EA	1,401,000	1,401,000	-	-	-	-	1,401,000	1,401,000
		Admin, IT, Fees											
10	-	Admin, IT, Fees	Admin, IT, Fees	1.00	EA	1,278,840	1,278,840	-	-	-	-	1,278,840	1,278,840
		Owner's Technical Representative (excluding Permitting, Design Reviews, Outreach)											
10	-	Project Management (1.1, 1.3-1.5)	AECOM FY17/18 Planning	1.00	YR	923,136	923,136	-	-	-	-	923,136	923,136
10	-	Project Management (1.1, 1.3-1.5)	AECOM FY18/19 Planning	1.00	YR	811,067	811,067	-	-	-	-	811,067	811,067
10	-	Project Management (1.1, 1.3-1.5)	AECOM FY19/20 Prelim Services	1.00	YR	850,000	850,000	-	-	-	-	850,000	850,000
10	-	Project Management (1.1, 1.3-1.5)	AECOM FY20/21 Prelim Services / Dam Mods	1.00	YR	690,000	690,000	-	-	-	-	690,000	690,000
10	-	Project Management (1.1, 1.3-1.5)	AECOM FY21/22 Dam Mods / Dam Removal	1.00	YR	520,000	520,000	-	-	-	-	520,000	520,000
10	-	Project Management (1.1, 1.3-1.5)	AECOM FY22/23 Dam Removal & Restoration	1.00	YR	540,000	540,000	-	-	-	-	540,000	540,000
10	-	Project Management (1.1, 1.3-1.5)	AECOM FY23/24+ Post Construction	1.00	YR	280,000	280,000	-	-	-	-	280,000	280,000
		Owner's Technical Representative (Outreach only)											
10	-	Outreach (1.2)	AECOM FY17/18 Planning	1.00	YR	696,604	696,604	-	-	-	-	696,604	696,604
10	-	Outreach (1.2)	AECOM FY18/19 Planning	1.00	YR	226,115	226,115	-	-	-	-	226,115	226,115
10	-	Outreach (1.2)	AECOM FY19/20 Prelim Services	1.00	YR	71,324	71,324	-	-	-	-	71,324	71,324
10	-	Outreach (1.2)	AECOM FY20/21 Prelim Services / Dam Mods	1.00	YR	62,114	62,114	-	-	-	-	62,114	62,114
10	-	Outreach (1.2)	AECOM FY21/22 Dam Mods / Dam Removal	1.00	YR	63,977	63,977	-	-	-	-	63,977	63,977
10	-	Outreach (1.2)	AECOM FY22/23 Dam Removal & Restoration	1.00	YR	65,897	65,897	-	-	-	-	65,897	65,897
10	-	Outreach (1.2)	AECOM FY23/24+ Post Construction	1.00	YR	67,873	67,873	-	-	-	-	67,873	67,873
		Insurances (KRRC)											
11	-	Corporate Insurance	Corporate Insurance	1.00	EA	719,007	719,007	-	-	-	-	719,007	719,007
11	-	Contractor's Pollution Liability / Pollution Legal Liability	Contractor's Pollution Liability / Pollution Legal Liability	1.00	EA	1,200,000	1,200,000	-	-	-	-	1,200,000	1,200,000
		Libality Transfer		1.00	LS	35,530,000	35,530,000	-	-	-	-	35,530,000	35,530,000
		ENVIRONMENTAL COMPLIANCE (KRRC MANAGED)											
		Permit Acquisition, CEQA/NEPA Support, Compliance QA During											
		KRRC Agency Fees and Reimbursements											
20	-	Army Corps of Engineers	Generally, no charge.	1.00	EA	-	-	-	-	-	-	-	-
20	-	California State Water Resources Control Board (SWRCB)	401 Certification	1.00	EA	174,000	174,000	-	-	-	-	174,000	174,000
20	-	California State Water Resources Control Board (SWRCB)	Still Water Sciences	1.00	EA	3,203,228	3,203,228	-	-	-	-	3,203,228	3,203,228
20	-	California State Water Resources Control Board (SWRCB)	NPDES Stormwater Program	1.00	EA	4,852	4,852	-	-	-	-	4,852	4,852
20	-	California Dept of Fish and Wildlife (CDFW) Permit Reviews	Streambed alteration agreement	1.00	EA	19,126	19,126	-	-	-	-	19,126	19,126
20	-	California Dept of Fish and Wildlife (CDFW) Permit Reviews	California Endangered Species Act (CESA)	1.00	EA	31,963	31,963	-	-	-	-	31,963	31,963
20	-	Division of Safety of Dams (DSOD) Filing Fees	Filing Fees	1.00	EA	426,000	426,000	-	-	-	-	426,000	426,000
20	-	Federal Energy Regulatory Commission (FERC)	National Environmental Policy Act (NEPA)	1.00	EA	-	-	-	-	-	-	-	-
20	-	Oregon Dept Environmental Quality (ODEQ)	Generally	1.00	EA	130,000	130,000	-	-	-	-	130,000	130,000
20	-	Oregon Dept Environmental Quality (ODEQ)	NPDES Stormwater Program	1.00	EA	2,130	2,130	-	-	-	-	2,130	2,130
20	-	Oregon Dept State Lands (ODSL)	Permit	1.00	EA	1,292	1,292	-	-	-	-	1,292	1,292
		Owner's Technical Representative (Permitting)											
20	-	Permitting (4.1, 4.3-4.5)	AECOM FY17/18 Planning	1.00	YR	961,316	961,316	-	-	-	-	961,316	961,316
20	-	Permitting (4.1, 4.3-4.5)	AECOM FY18/19 Planning	1.00	YR	1,114,541	1,114,541	-	-	-	-	1,114,541	1,114,541
20	-	Permitting (4.1, 4.3-4.5)	AECOM FY19/20 Prelim Services	1.00	YR	728,267	728,267	-	-	-	-	728,267	728,267
20	-	Permitting (4.1, 4.3-4.5)	AECOM FY20/21 Prelim Services / Dam Mods	1.00	YR	310,000	310,000	-	-	-	-	310,000	310,000
20	-	Permitting (4.1, 4.3-4.5)	AECOM FY21/22 Dam Mods / Dam Removal	1.00	YR	320,000	320,000	-	-	-	-	320,000	320,000
20	-	Permitting (4.1, 4.3-4.5)	AECOM FY22/23 Dam Removal & Restoration	1.00	YR	330,000	330,000	-	-	-	-	330,000	330,000
20	-	Permitting (4.1, 4.3-4.5)	AECOM FY23/24+ Post Construction	1.00	YR	340,000	340,000	-	-	-	-	340,000	340,000
		TECHNICAL SUPPORT											
		Preliminary Engineering (Technical Representative)											

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
30	-	Technical Preparation (2.1-2.4, 2.7, 2.8, 3.1-3.7)	AECOM FY17/18 Planning	1.00	YR	3,956,821	3,956,821	-	-	-	-	3,956,821	3,956,821
30	-	Technical Preparation (2.1-2.4, 2.7, 2.8, 3.1-3.7)	AECOM FY18/19 Planning	1.00	YR	4,791,235	4,791,235	-	-	-	-	4,791,235	4,791,235
30	-	AECOM Yreka Water Line Design (3.3)	AECOM FY19/20 Prelim Services	1.00	YR	477,000	477,000	-	-	-	-	477,000	477,000
30	-	AECOM Hatchery Design (3.7)	AECOM FY19/20 Prelim Services - excluded from scope	1.00	YR	-	-	-	-	-	-	-	-
		Vegetation Test Plots, Seed Collection, Seed Propagation											
		Vegetation Test Plot											
31	-	Vegetation Test Plot (KRRC/Hanford)	Chain-link fence, 7 LF high	404	LF	65	26,260	-	-	-	-	26,260	26,260
31	-	Vegetation Test Plot (KRRC/Hanford)	Chain-link fence gate, 7LF high x 10LF long	1.00	EA	3,260	3,260	-	-	-	-	3,260	3,260
31	-	Vegetation Test Plot (KRRC/Hanford)	Bank Wetland planting beds	8.00	EA	2,000	16,000	-	-	-	-	16,000	16,000
31	-	Vegetation Test Plot (KRRC/Hanford)	Bank Riparian planting beds	8.00	EA	2,000	16,000	-	-	-	-	16,000	16,000
31	-	Vegetation Test Plot (KRRC/Hanford)	Floodplain Riparian planting beds	8.00	EA	2,000	16,000	-	-	-	-	16,000	16,000
31	-	Vegetation Test Plot (KRRC/Hanford)	Uplands planting beds	8.00	EA	2,400	19,200	-	-	-	-	19,200	19,200
31	-	Vegetation Test Plot (KRRC/Hanford)	Irrigation system	1.00	EA	39,880	39,880	-	-	-	-	39,880	39,880
31	-	Vegetation Test Plot (KRRC/Hanford)	Irrigation lines, including trench and backfill	1,000	LF	9	9,000	-	-	-	-	9,000	9,000
31	-	Vegetation Test Plot (KRRC/Hanford)	Planting bed irrigation lines and nozzles	32.00	EA	450	14,400	-	-	-	-	14,400	14,400
31	-	Vegetation Test Plot (KRRC/Hanford)	Pressure supply line	100	LF	25	2,500	-	-	-	-	2,500	2,500
31	-	Vegetation Test Plot (KRRC/Hanford)	Electrical Supply	1.00	EA	27,013	27,013	-	-	-	-	27,013	27,013
31	-	Vegetation Test Plot (KRRC/Hanford)	Equip to backfill planting beds	1.00	EA	7,520	7,520	-	-	-	-	7,520	7,520
31	-	Vegetation Test Plot (KRRC/Hanford)	Negotiated Cost Saving	1.00	EA	-7,487	(7,487)	-	-	-	-	(7,487)	(7,487)
31	-	Vegetation Test Plot (KRRC/Hanford)	Site restoration	1.00	EA	100,000	100,000	-	-	-	-	100,000	100,000
31	-	Vegetation Test Plot	2019 Maintenance w/2-man crew, one 12-hr day ea. visit to 3 sites, r	1.00	YR	27,360	27,360	-	-	-	-	27,360	28,454
31	-	Vegetation Test Plot	2020 Maintenance w/2-man crew, one 12-hr day ea. visit to 3 sites, r	1.00	YR	27,360	27,360	-	-	-	-	27,360	29,593
		Native Seed Collection											
31	-	Native Seed Collection (KRRC/PCS)	2018 Seed collection, preparation, storage	117	LB	1,334	155,726	-	-	-	-	155,726	155,726
		Seed Propagation											
31	-	Seed Propagation (KRRC/BFI)	Phase 1 Scope 2019-2021	7,055	LB	75	529,569	-	-	-	-	529,569	529,569
31	-	Seed Propagation (KRRC/S&S)	Phase 1 Scope 2019-2021	1,462	LB	260	380,012	-	-	-	-	380,012	380,012
31	-	Seed Propagation (KRRC/BFI)	Phase 3 Scope 2019-2021	23,055	LB	21	483,127	-	-	-	-	483,127	483,127
		Construction Procurement											
32	-	Dam Removal Procurement (5.1-5.5)	AECOM FY17/18 Dam Removal Procurement	1.00	YR	54,057	54,057	-	-	-	-	54,057	54,057
32	-	Dam Removal Procurement (5.1-5.5)	AECOM FY18/19 Dam Removal Procurement	1.00	YR	644,386	644,386	-	-	-	-	644,386	644,386
32	-	Dam Removal Procurement (5.1-5.5)	AECOM FY19/20 Dam Removal Procurement	1.00	YR	297,874	297,874	-	-	-	-	297,874	297,874
32	-	Dam Removal Procurement (5.1-5.5)	AECOM FY20/21 Prelim Services / Dam Mods	1.00	YR	100,000	100,000	-	-	-	-	100,000	100,000
		Owner's Representative (Design Oversight)											
33	-	Design Reviews (6.1)	AECOM FY17/18 Planning	1.00	YR	-	-	-	-	-	-	-	-
33	-	Design Reviews (6.1)	AECOM FY18/19 Planning	1.00	YR	115,243	115,243	-	-	-	-	115,243	115,243
33	-	Design Reviews (6.1)	AECOM FY19/20 Prelim Services	1.00	YR	513,831	513,831	-	-	-	-	513,831	513,831
33	-	Design Reviews (6.1)	AECOM FY20/21 Prelim Services / Dam Mods	1.00	YR	260,000	260,000	-	-	-	-	260,000	260,000
33	-	PDB Management (6.2)	AECOM FY19/20 Prelim Services	1.00	YR	744,317	744,317	-	-	-	-	744,317	744,317
33	-	PDB Management (6.2)	AECOM FY20/21 Prelim Services / Dam Mods	1.00	YR	370,000	370,000	-	-	-	-	370,000	370,000
34	-	Engineer of Record (Yreka Water Supply)	AECOM FY20/21 Prelim Services / Dam Mods	1.00	YR	145,000	145,000	-	-	-	-	145,000	145,000
		Construction Management											
34	-	Construction Management	AECOM FY20/21	1.00	YR	2,342,278	2,342,278	-	-	-	-	2,342,278	2,342,278
34	-	Construction Management	AECOM FY21/22	1.00	YR	5,914,390	5,914,390	-	-	-	-	5,914,390	5,914,390
34	-	Construction Management	AECOM FY22/23	1.00	YR	4,765,085	4,765,085	-	-	-	-	4,765,085	4,765,085
		PROGRESSIVE DESIGN-BUILD CONTRACT											
		Final Design & Permitting Support (PDB)											
		Engineering (PDB)											
40	-	Engineering (PDB)	Project Management	1.00	EA	3,830,881	3,830,881	-	-	-	-	3,830,881	3,830,881
40	-	Engineering (PDB)	Site & Conditions Verification	1.00	EA	1,859,749	1,859,749	-	-	-	-	1,859,749	1,859,749
40	-	Engineering (PDB)	Initial Cost Model and Schedule	1.00	EA	49,880	49,880	-	-	-	-	49,880	49,880
40	-	Engineering (PDB)	Design Criteria Report	1.00	EA	281,328	281,328	-	-	-	-	281,328	281,328
40	-	Engineering (PDB)	30% Design Completion Documents	1.00	EA	4,335,923	4,335,923	-	-	-	-	4,335,923	4,335,923
40	-	Engineering (PDB)	60% Design Completion Documents	1.00	EA	4,113,785	4,113,785	-	-	-	-	4,113,785	4,113,785
40	-	Engineering (PDB)	GMP Project Submittal	1.00	EA	168,080	168,080	-	-	-	-	168,080	168,080
40	-	Engineering (PDB)	90% Design Completion Documents	1.00	EA	2,396,186	2,396,186	-	-	-	-	2,396,186	2,396,186
40	-	Engineering (PDB)	Seed Collection & Propagation (included in 43 for now)	1.00	EA	-	-	-	-	-	-	-	-
40	-	Engineering (PDB)	100% Design Completion Documents	1.00	EA	1,797,140	1,797,140	-	-	-	-	1,797,140	1,797,140
40	-	Engineering (PDB)	Allowance for extended project schedule	1.00	EA	1,915,441	1,915,441	-	-	-	-	1,915,441	1,915,441
		Permit Acquisition (PDB)											
40	-	Permit Acquisition (PDB)	Permitting Support and Compliance Program	1.00	EA	1,051,068	1,051,068	-	-	-	-	1,051,068	1,051,068
		CCIP Insurance											
40A	-	Insurances (PDB)	Builder's risk	1.00	EA	488,750	488,750	-	-	-	-	488,750	488,750
40A	-	Insurances (PDB)	CCIP	1.00	EA	6,500,000	6,500,000	-	-	-	-	6,500,000	6,500,000

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
40A	-	Insurances (PDB)	Commercial Auto (corporate programs)	1.00	EA	-	-	-	-	-	-	-	-
40A	-	Insurances (PDB)	Professional liability (use of corporate policy)	1.00	EA	-	-	-	-	-	-	-	-
40A	-	Insurances (PDB)	Watercraft and aircraft liability TBD	1.00	EA	-	-	-	-	-	-	-	-
		Field Overheads (to be distributed over the following PDB Sections)											
		Copco 1 & 2											
NA	-	Copco 1 & 2	OH 01 Mobilization	1.00	LS	100,000	100,000	-	-	-	NA	100,000	-
NA	-	Copco 1 & 2	OH 02 Project Staff	1.00	LS	310,375	310,375	-	31,038	3,414	NA	344,827	-
NA	-	Copco 1 & 2	OH 03 Temporary Buildings	1.00	LS	173,000	173,000	-	-	1,730	NA	174,730	-
NA	-	Copco 1 & 2	OH 04 Temporary Utilities	1.00	LS	184,000	184,000	-	-	1,840	NA	185,840	-
NA	-	Copco 1 & 2	OH 05 Temporary Construction	1.00	LS	935,420	935,420	-	-	9,354	NA	944,774	-
NA	-	Copco 1 & 2	OH 06 Transportation	1.00	LS	-	-	-	-	-	NA	-	-
NA	-	Copco 1 & 2	OH 07 Office Supplies	1.00	LS	16,500	16,500	-	-	165	NA	16,665	-
NA	-	Copco 1 & 2	OH 08 Safety Supplies	1.00	LS	107,773	107,773	-	-	1,078	NA	108,851	-
NA	-	Copco 1 & 2	OH 09 Employee Expense	1.00	LS	-	-	-	-	-	NA	-	-
NA	-	Copco 1 & 2	OH 10 Contract Services	1.00	LS	53,887	53,887	-	-	539	NA	54,425	-
NA	-	Copco 1 & 2	OH 11 Employee Living Cost	1.00	LS	600,000	600,000	-	60,000	6,600	NA	666,600	-
NA	-	Copco 1 & 2	OH 12 Winter and Summer Protection	1.00	LS	50,000	50,000	-	-	500	NA	50,500	-
NA	-	Copco 1 & 2	OH 13 Quality Assurance/ Quality Control	1.00	LS	50,000	50,000	-	5,000	550	NA	55,550	-
NA	-	Copco 1 & 2	OH 14 Lost Production/Overtime/Travel Time	1.00	LS	459,113	459,113	-	45,911	5,050	NA	510,075	-
NA	-	Copco 1 & 2	OH 16 Demobilization	1.00	LS	90,000	90,000	-	-	900	NA	90,900	-
NA	-	Copco 1 & 2	OH 18 Survey	1.00	LS	75,000	75,000	-	-	750	NA	75,750	-
NA	-	Copco 1 & 2	OH 21 Small Tools	1.00	LS	269,433	269,433	-	-	2,694	NA	272,127	-
NA	-	Copco 1 & 2	OH 22 Traffic Control	1.00	LS	200,272	200,272	-	-	2,003	NA	202,275	-
NA	-	Copco 1 & 2	OH 27 Project Equipment	1.00	LS	724,904	724,904	-	72,490	7,974	NA	805,368	-
NA	-	Copco 1 & 2	OH 28 Project Labor	1.00	LS	60,228	60,228	-	6,023	663	NA	66,913	-
NA	-	Copco 1 & 2	OH 99 Dead Rent	1.00	LS	640,117	640,117	-	64,012	7,041	NA	711,170	-
		Iron Gate											
NA	-	Iron Gate	OH 01 Mobilization	1.00	LS	300,000	300,000	-	-	3,000	NA	303,000	-
NA	-	Iron Gate	OH 02 Project Staff	1.00	LS	2,463,153	2,463,153	-	246,315	27,095	NA	2,736,563	-
NA	-	Iron Gate	OH 03 Temporary Buildings	1.00	LS	970,000	970,000	-	-	9,700	NA	979,700	-
NA	-	Iron Gate	OH 04 Temporary Utilities	1.00	LS	354,500	354,500	-	-	3,545	NA	358,045	-
NA	-	Iron Gate	OH 05 Temporary Construction	1.00	LS	1,063,040	1,063,040	-	-	10,630	NA	1,073,670	-
NA	-	Iron Gate	OH 06 Transportation	1.00	LS	377,040	377,040	-	-	3,770	NA	380,810	-
NA	-	Iron Gate	OH 07 Office Supplies	1.00	LS	53,000	53,000	-	-	530	NA	53,530	-
NA	-	Iron Gate	OH 08 Safety Supplies	1.00	LS	69,721	69,721	-	-	697	NA	70,418	-
NA	-	Iron Gate	OH 09 Employee Expense	1.00	LS	34,000	34,000	-	3,400	374	NA	37,774	-
NA	-	Iron Gate	OH 10 Contract Services	1.00	LS	54,861	54,861	-	-	549	NA	55,410	-
NA	-	Iron Gate	OH 11 Employee Living Cost	1.00	LS	600,000	600,000	-	60,000	6,600	NA	666,600	-
NA	-	Iron Gate	OH 12 Winter and Summer Protection	1.00	LS	50,000	50,000	-	-	500	NA	50,500	-
NA	-	Iron Gate	OH 13 Quality Assurance/ Quality Control	1.00	LS	220,000	220,000	-	22,000	2,420	NA	244,420	-
NA	-	Iron Gate	OH 14 Lost Production/Overtime/Travel Time	1.00	LS	297,011	297,011	-	29,701	3,267	NA	329,979	-
NA	-	Iron Gate	OH 16 Demobilization	1.00	LS	270,000	270,000	-	-	2,700	NA	272,700	-
NA	-	Iron Gate	OH 18 Survey	1.00	LS	75,000	75,000	-	-	750	NA	75,750	-
NA	-	Iron Gate	OH 21 Small Tools	1.00	LS	174,303	174,303	-	-	1,743	NA	176,046	-
NA	-	Iron Gate	OH 22 Traffic Control	1.00	LS	608,656	608,656	-	-	6,087	NA	614,743	-
NA	-	Iron Gate	OH 27 Project Equipment	1.00	LS	1,697,004	1,697,004	-	169,700	18,667	NA	1,885,371	-
NA	-	Iron Gate	OH 28 Project Labor	1.00	LS	381,920	381,920	-	38,192	4,201	NA	424,313	-
NA	-	Iron Gate	OH 99 Dead Rent	1.00	LS	403,446	403,446	-	40,345	4,438	NA	448,229	-
		JC Boyle											
NA	-	JC Boyle	OH 01 Mobilization	1.00	LS	250,000	250,000	-	-	2,500	NA	252,500	-
NA	-	JC Boyle	OH 02 Project Staff	1.00	LS	1,297,328	1,297,328	-	129,733	14,271	NA	1,441,332	-
NA	-	JC Boyle	OH 03 Temporary Buildings	1.00	LS	634,000	634,000	-	-	6,340	NA	640,340	-
NA	-	JC Boyle	OH 04 Temporary Utilities	1.00	LS	230,900	230,900	-	-	2,309	NA	233,209	-
NA	-	JC Boyle	OH 05 Temporary Construction	1.00	LS	731,236	731,236	-	-	7,312	NA	738,548	-
NA	-	JC Boyle	OH 06 Transportation	1.00	LS	238,224	238,224	-	-	2,382	NA	240,606	-
NA	-	JC Boyle	OH 07 Office Supplies	1.00	LS	33,800	33,800	-	-	338	NA	34,138	-
NA	-	JC Boyle	OH 08 Safety Supplies	1.00	LS	60,000	60,000	-	-	600	NA	60,600	-
NA	-	JC Boyle	OH 09 Employee Expense	1.00	LS	26,000	26,000	-	-	260	NA	26,260	-
NA	-	JC Boyle	OH 10 Contract Services	1.00	LS	42,000	42,000	-	-	420	NA	42,420	-
NA	-	JC Boyle	OH 11 Employee Living Cost	1.00	LS	360,000	360,000	-	36,000	3,960	NA	399,960	-
NA	-	JC Boyle	OH 12 Winter and Summer Protection	1.00	LS	50,000	50,000	-	-	500	NA	50,500	-
NA	-	JC Boyle	OH 13 Quality Assurance/ Quality Control	1.00	LS	161,600	161,600	-	16,160	1,778	NA	179,538	-
NA	-	JC Boyle	OH 14 Lost Production/Overtime/Travel Time	1.00	LS	255,600	255,600	-	25,560	2,812	NA	283,972	-
NA	-	JC Boyle	OH 16 Demobilization	1.00	LS	225,000	225,000	-	-	2,250	NA	227,250	-

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
NA	-	JC Boyle	OH 18 Survey	1.00	LS	75,000	75,000	-	-	750	NA	75,750	-
NA	-	JC Boyle	OH 21 Small Tools	1.00	LS	150,000	150,000	-	-	1,500	NA	151,500	-
NA	-	JC Boyle	OH 22 Traffic Control	1.00	LS	319,825	319,825	-	-	3,198	NA	323,023	-
NA	-	JC Boyle	OH 27 Project Equipment	1.00	LS	939,094	939,094	-	93,909	10,330	NA	1,043,333	-
NA	-	JC Boyle	OH 28 Project Labor	1.00	LS	178,556	178,556	-	17,856	1,964	NA	198,376	-
NA	-	JC Boyle	OH 99 Dead Rent	1.00	LS	352,335	352,335	-	35,233	3,876	NA	391,444	-
		Bridges, Roads, Veg, Waterline											
NA	-	Bridges, Roads, Veg, Waterline	OH 01 Mobilization	1.00	LS	250,000	250,000	-	-	2,500	NA	252,500	-
NA	-	Bridges, Roads, Veg, Waterline	OH 02 Project Staff	1.00	LS	861,953	861,953	-	86,195	9,481	NA	957,630	-
NA	-	Bridges, Roads, Veg, Waterline	OH 03 Temporary Buildings	1.00	LS	477,000	477,000	-	-	4,770	NA	481,770	-
NA	-	Bridges, Roads, Veg, Waterline	OH 04 Temporary Utilities	1.00	LS	144,000	144,000	-	-	1,440	NA	145,440	-
NA	-	Bridges, Roads, Veg, Waterline	OH 05 Temporary Construction	1.00	LS	429,628	429,628	-	-	4,296	NA	433,924	-
NA	-	Bridges, Roads, Veg, Waterline	OH 06 Transportation	1.00	LS	134,112	134,112	-	-	1,341	NA	135,453	-
NA	-	Bridges, Roads, Veg, Waterline	OH 07 Office Supplies	1.00	LS	25,700	25,700	-	-	257	NA	25,957	-
NA	-	Bridges, Roads, Veg, Waterline	OH 08 Safety Supplies	1.00	LS	60,000	60,000	-	-	600	NA	60,600	-
NA	-	Bridges, Roads, Veg, Waterline	OH 09 Employee Expense	1.00	LS	20,000	20,000	-	2,000	220	NA	22,220	-
NA	-	Bridges, Roads, Veg, Waterline	OH 10 Contract Services	1.00	LS	36,000	36,000	-	-	360	NA	36,360	-
NA	-	Bridges, Roads, Veg, Waterline	OH 11 Employee Living Cost	1.00	LS	180,000	180,000	-	-	1,800	NA	181,800	-
NA	-	Bridges, Roads, Veg, Waterline	OH 12 Winter and Summer Protection	1.00	LS	50,000	50,000	-	-	500	NA	50,500	-
NA	-	Bridges, Roads, Veg, Waterline	OH 13 Quality Assurance/ Quality Control	1.00	LS	101,000	101,000	-	10,100	1,111	NA	112,211	-
NA	-	Bridges, Roads, Veg, Waterline	OH 14 Lost Production/Overtime/Travel Time	1.00	LS	255,600	255,600	-	25,560	2,812	NA	283,972	-
NA	-	Bridges, Roads, Veg, Waterline	OH 16 Demobilization	1.00	LS	225,000	225,000	-	-	2,250	NA	227,250	-
NA	-	Bridges, Roads, Veg, Waterline	OH 18 Survey	1.00	LS	75,000	75,000	-	-	750	NA	75,750	-
NA	-	Bridges, Roads, Veg, Waterline	OH 21 Small Tools	1.00	LS	150,000	150,000	-	-	1,500	NA	151,500	-
NA	-	Bridges, Roads, Veg, Waterline	OH 22 Traffic Control	1.00	LS	240,746	240,746	-	-	2,407	NA	243,153	-
NA	-	Bridges, Roads, Veg, Waterline	OH 27 Project Equipment	1.00	LS	543,492	543,492	-	54,349	5,978	NA	603,820	-
NA	-	Bridges, Roads, Veg, Waterline	OH 28 Project Labor	1.00	LS	114,576	114,576	-	11,458	1,260	NA	127,294	-
		Dam Removals											
		Drawdown control & monitoring											
41	-	Drawdown control & monitoring		1.00	LS	1,012,800	1,012,800	-	101,280	11,141	included	1,125,221	1,265,720
		Copco 1 Dam Removal											
41	2.001	Copco 1 Dam Removal	Furnish, Install, and Remove Barge-Mounted Crane in Reservoir for	1.00	Is	358,915	358,915	-	35,891	3,948	69,571	468,326	506,541
41	2.002	Copco 1 Dam Removal	Remove Sediment from Diversion Tunnel Intake to provide access	1,000	CY	299	299,102	-	29,910	3,290	57,977	390,280	422,126
41	2.003	Copco 1 Dam Removal	Mobilize and Demob Large Crane on Right Abutment	1.00	LS	80,000	80,000	-	8,000	880	15,507	104,387	117,421
41	2.004	Copco 1 Dam Removal	Remove Water from behind Tailrace Cofferdam	200,000	GAL	0	2,027	-	203	22	393	2,645	2,975
41	2.005	Copco 1 Dam Removal	Cofferdam Fill Material Production for Equipment Access	4,000	CY	40	158,677	-	15,868	1,745	30,757	207,047	232,900
41	2.006	Copco 1 Dam Removal	Provide Dewatering behind Tailrace Cofferdam	1.00	LS	200,507	200,507	-	20,051	2,206	38,866	261,629	294,297
41	2.007	Copco 1 Dam Removal	Remove Current Diversion Tunnel Plug	195	cy	650	126,836	-	12,684	1,395	24,585	165,500	179,005
41	2.008	Copco 1 Dam Removal	Tailrace Coffe Dam- Furnish & Unload Material	25.00	LD	8,614	215,346	-	21,535	2,369	41,742	280,992	316,078
41	2.008.1	Copco 1 Dam Removal	Tailrace Coffe Dam- Drive Pile	12,080	SF	30	361,972	-	36,197	3,982	70,164	472,314	531,289
41	2.008.2	Copco 1 Dam Removal	Tailrace Coffe Dam-Extract Pile	12,080	SF	16	188,570	-	18,857	2,074	36,552	246,053	276,777
41	2.009	Copco 1 Dam Removal	Installation of 3 each 72" Blind Flanges	38,000	LBS	33	1,255,158	-	125,516	13,807	243,297	1,637,777	1,771,420
41	2.009.2	Copco 1 Dam Removal	Installation of 16.5 X 18.5 Roller Gate and Gate Structure	1.00	LS	4,481,794	4,481,794	-	448,179	49,300	868,739	5,848,012	6,276,555
41	2.009.3	Copco 1 Dam Removal	Removal of 16.5 X 18.5 Roller Gate and Gate Structure	300	CY	662	198,699	-	19,870	2,186	38,515	259,270	291,643
41	2.010	Copco 1 Dam Removal	Remove Concrete Dam down to Elev. 2463.5	36,000	cy	129	4,636,534	-	463,653	51,002	898,734	6,049,923	6,805,341
41	2.011	Copco 1 Dam Removal	Remove Concrete Intake Structure on Right Abutment	16,400	cy	144	2,361,194	-	236,119	25,973	457,688	3,080,974	3,465,677
41	2.012	Copco 1 Dam Removal	Remove Structural Steel from Spillway	55,000	LBS	1	73,760	-	7,376	811	14,297	96,245	108,262
41	2.013	Copco 1 Dam Removal	Install Diversion Tunnel Plugs	30.00	CY	3,278	98,349	-	9,835	1,082	19,064	128,330	144,354
41	2.014	Copco 1 Dam Removal	Remove Diversion Tunnel Control Structure Concrete	350	CY	995	348,092	-	34,809	3,829	67,473	454,203	491,266
41	2.015	Copco 1 Dam Removal	Remove & Dispose of Hand Rails at dam	11,000	LBS	0	4,986	-	499	55	967	6,506	7,037
41	2.016	Copco 1 Dam Removal	Remove & Dispose of Radial Gates	140,500	LBS	1	93,906	-	9,391	1,033	18,202	122,532	132,531
41	2.017	Copco 1 Dam Removal	Remove & Dispose Radial Gate Stop logs	18,000	LBS	0	5,104	-	510	56	989	6,660	7,204
41	2.018	Copco 1 Dam Removal	Remove & Dispose Stop log hoist, track and supports	26,000	LBS	0	9,809	-	981	108	1,901	12,799	13,843
41	2.019	Copco 1 Dam Removal	Remove & Dispose of 3 sections of 23' of 72" Dia. steel lining (emb	54,000	LBS	4	228,843	-	22,884	2,517	44,358	298,603	322,969
41	2.020	Copco 1 Dam Removal	Remove & Dispose of 3 - 72" butterfly valves (embedded)	55,000	LBS	4	207,267	-	20,727	2,280	40,176	270,449	292,518
41	2.021	Copco 1 Dam Removal	Remove & Dispose of 3 - 72" flapper valves with remote mechanical	78,000	LBS	2	151,723	-	15,172	1,669	29,410	197,974	214,128
41	2.022	Copco 1 Dam Removal	Remove & Dispose of Spillway gate motor & control panel	1.00	EA	5,354	5,354	-	535	59	1,038	6,986	7,556
41	2.023	Copco 1 Dam Removal	Remove & Dispose Distribution equipment, panelboards	1.00	EA	5,839	5,839	-	584	64	1,132	7,619	8,571
41	2.024	Copco 1 Dam Removal	Remove Powerhouse Concrete down to top of rock under the Power	3,100	CY	170	527,781	-	52,778	5,806	102,304	688,668	774,658
41	2.025	Copco 1 Dam Removal	Remove Powerhouse Structural Steel	110,000	LBS	1	62,180	-	6,218	684	12,053	81,135	91,266
41	2.026	Copco 1 Dam Removal	Remove & Dispose of 2 - Governor Oil Systems	38,000	LBS	1	37,584	-	3,758	413	7,285	49,041	55,164
41	2.027	Copco 1 Dam Removal	Remove & Dispose of Cooling water and bearing oil systems	11,000	LBS	1	11,189	-	1,119	123	2,169	14,600	16,423
41	2.028	Copco 1 Dam Removal	Remove & Dispose of 4 - Horizontal Tandem Francis Turbines	452,000	LBS	1	226,133	-	22,613	2,487	43,833	295,067	331,910
41	2.029	Copco 1 Dam Removal	Remove & Dispose of 2 - 40 Ton indoor cranes	140,000	LBS	0	60,442	-	6,044	665	11,716	78,868	88,715

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
41	2.030	Copco 1 Dam Removal	Remove & Dispose of Compressed Air System	1,000	LBS	1	1,371	-	137	15	266	1,789	2,013
41	2.031	Copco 1 Dam Removal	Remove & Dispose of 2 - CO2 Systems	3,100	LBS	1	2,795	-	279	31	542	3,647	4,102
41	2.032	Copco 1 Dam Removal	Remove & Dispose of Plant Water and Fire Protection	2,600	LBS	1	2,302	-	230	25	446	3,004	3,379
41	2.033	Copco 1 Dam Removal	Remove & Dispose of Transformer Oil Fire Protection	5,400	LBS	1	5,879	-	588	65	1,139	7,671	8,628
41	2.034	Copco 1 Dam Removal	Remove & Dispose of Unwatering Piping	27,000	LBS	0	8,994	-	899	99	1,743	11,736	13,201
41	2.035	Copco 1 Dam Removal	Remove & Dispose of Drainage Piping	5,000	LBS	0	1,810	-	181	20	351	2,362	2,656
41	2.035a	Copco 1 Dam Removal	Remove petroleum products from mechanical equipment	1,250	GAL	3	3,313	-	331	36	642	4,322	4,862
41	2.036	Copco 1 Dam Removal	Remove & Dispose of Horizontal AC Generator, Indoor Open Frame	2.00	EA	67,269	134,538	-	13,454	1,480	26,079	175,550	197,470
41	2.037	Copco 1 Dam Removal	Remove & Dispose of Excitation equipment for 12.5 MVA Generator	1.50	EA	7,271	10,907	-	1,091	120	2,114	14,231	16,008
41	2.038	Copco 1 Dam Removal	Remove & Dispose of Surge protection equip. for 12.5 MVA Generator	2.00	EA	2,257	4,515	-	451	50	875	5,891	6,627
41	2.039	Copco 1 Dam Removal	Remove & Dispose of Neutral grounding equip. for 12.5 MVA Generator	2.00	EA	1,937	3,874	-	387	43	751	5,054	5,685
41	2.040	Copco 1 Dam Removal	Remove & Dispose of Generator Switchgear, 5kV-includes unit breakers	1.00	EA	16,056	16,056	-	1,606	177	3,112	20,950	23,566
41	2.041	Copco 1 Dam Removal	Remove & Dispose of Station Service Switchgear, 600 volt - (5 sections)	1.00	EA	9,002	9,002	-	900	99	1,745	11,746	13,213
41	2.042	Copco 1 Dam Removal	Remove & Dispose of Unit and plant control switchboard	1.00	EA	4,364	4,364	-	436	48	846	5,695	6,406
41	2.043	Copco 1 Dam Removal	Remove & Dispose of Battery System	1.00	EA	14,110	14,110	-	1,411	155	2,735	18,411	20,710
41	2.044	Copco 1 Dam Removal	Remove & Dispose of Raceways, Conduit and Cable	1.00	EA	12,596	12,596	-	1,260	139	2,442	16,435	18,488
41	2.045	Copco 1 Dam Removal	Remove & Dispose of Msc. power & control boards	1.00	EA	5,030	5,030	-	503	55	975	6,563	7,383
41	2.046	Copco 1 Dam Removal	Remove & Dispose of Step-up Transformers, indoor, oil-filled, 1-phase	3.00	EA	32,682	98,045	-	9,804	1,078	19,005	127,933	143,907
41	2.047	Copco 1 Dam Removal	Remove & Dispose of Step-up Transformers, indoor, oil-filled, 1-phase	3.00	EA	32,682	98,045	-	9,804	1,078	19,005	127,933	143,907
41	2.048	Copco 1 Dam Removal	Remove & Dispose of Seven 40-Ton Travelling Crane motors - hoist	1.00	EA	2,965	2,965	-	297	33	575	3,869	4,352
41	2.049	Copco 1 Dam Removal	Remove & Dispose of 40-Ton Travelling Crane control equipment	1.00	EA	2,931	2,931	-	293	32	568	3,825	4,302
41	2.050	Copco 1 Dam Removal	Remove & Dispose of 40-Ton Travelling Crane Festoon Cable	1.00	EA	1,394	1,394	-	139	15	270	1,819	2,046
41	2.051	Copco 1 Dam Removal	Remove & Dispose of Four 15-Ton Overhead Crane Motors - hoist	1.00	EA	682	682	-	68	8	132	891	1,002
41	2.052	Copco 1 Dam Removal	Remove & Dispose of 15-Ton Overhead Crane control equipment	1.00	EA	899	899	-	90	10	174	1,174	1,320
41	2.053	Copco 1 Dam Removal	Remove & Dispose of 15-Ton Overhead Crane Festoon Cable	1.00	EA	1,408	1,408	-	141	15	273	1,837	2,066
41	2.053a	Copco 1 Dam Removal	Remove petroleum products from mechanical equipment	10,500	GAL	4	38,124	-	3,812	419	7,390	49,745	55,956
41	2.054	Copco 1 Dam Removal	Remove & Dispose of 69kV circuit breakers, oil filled, PCB	2.00	EA	1,966	3,931	-	393	43	762	5,130	5,770
41	2.055	Copco 1 Dam Removal	Remove & Dispose of 69kV disconnect switches, group-operated	2.00	EA	1,966	3,931	-	393	43	762	5,130	5,770
41	2.056	Copco 1 Dam Removal	Remove & Dispose of 60-foot wood poles	12.00	EA	1,010	12,119	-	1,212	133	2,349	15,814	17,788
41	2.057	Copco 1 Dam Removal	Remove & Dispose of 30-foot wood cross arms	24.00	EA	251	6,017	-	602	66	1,166	7,851	8,831
41	2.058	Copco 1 Dam Removal	Remove & Dispose of 69-kV insulator strings	12.00	EA	226	2,715	-	272	30	526	3,543	3,985
41	2.059	Copco 1 Dam Removal	[PacifiCorp Cover] Remove & Dispose of Transmission Line No. 3	-	-	-	-	-	-	-	-	-	-
41	2.060	Copco 1 Dam Removal	[PacifiCorp Cover] Remove & Dispose of Transmission Line No. 15	-	-	-	-	-	-	-	-	-	-
41	2.061	Copco 1 Dam Removal	Remove & Dispose of Transmission Line No. 26-1	0.07	MLE	28,438	1,991	-	199	22	386	2,598	2,922
41	2.062	Copco 1 Dam Removal	Remove & Dispose of Transmission Line No. 26-2	0.07	MLE	28,438	1,991	-	199	22	386	2,598	2,922
41	2.063	Copco 1 Dam Removal	Remove gate house #1 from top of dam	720	SF	15	10,965	-	1,096	121	2,125	14,307	16,093
41	2.064	Copco 1 Dam Removal	Remove gate house #2 from top of dam	690	SF	16	10,817	-	1,082	119	2,097	14,114	15,876
41	2.065	Copco 1 Dam Removal	Remove Concrete Items associated with 10 ft. diam. Penstocks, rebar	1,050	cy	91	95,337	-	9,534	1,049	18,480	124,400	139,933
41	2.066	Copco 1 Dam Removal	Plug 14-foot diameter penstock with concrete	38.00	CY	3,331	126,594	-	12,659	1,393	24,539	165,185	185,810
41	2.067	Copco 1 Dam Removal	Remove & Dispose of 8 screens	18,000	LBS	1	19,893	-	1,989	219	3,856	25,957	29,199
41	2.068	Copco 1 Dam Removal	Remove & Dispose of 8 Water Gates	18,000	LBS	1	18,499	-	1,850	203	3,586	24,138	27,152
41	2.069	Copco 1 Dam Removal	Remove & Dispose of 3 - 30" Dia. x 25' stand pipes	6,000	LBS	1	4,966	-	497	55	963	6,480	7,289
41	2.070	Copco 1 Dam Removal	Remove & Dispose of 14' Dia. penstock pipe	256,000	LBS	1	353,199	-	35,320	3,885	68,463	460,867	518,413
41	2.071	Copco 1 Dam Removal	Remove & Dispose of 10' Dia. penstock pipe	270,000	LBS	1	282,769	-	28,277	3,110	54,811	368,967	415,038
41	2.081	Copco 1 Dam Removal	Site work - Clear and Grub Disposal Area	4.00	AC	5,226	20,904	-	2,090	230	4,052	27,277	30,683
41	2.082	Copco 1 Dam Removal	Sitework - Concrete Processing and Soil Cover for Disposal Area	12,000	cy	17	206,327	-	20,633	2,270	39,994	269,223	302,839
41	2.085	Copco 1 Dam Removal	Access/Haul Road Improvements - Soil Excavation	1,600	cy	16	24,822	-	2,482	273	4,811	32,388	36,433
41	2.089	Copco 1 Dam Removal	Mallard Cove - Concrete total	106	CY	161	17,079	-	1,708	188	3,311	22,285	25,068
41	2.090	Copco 1 Dam Removal	Mallard Cove - 25'x5' Dock made of composite decking and poly floor	1.00	EA	2,146	2,146	-	215	24	416	2,800	3,150
41	2.091	Copco 1 Dam Removal	Mallard Cove - 20'x5' Gangway w/ aluminum grate and railings	1.00	EA	1,987	1,987	-	199	22	385	2,593	2,916
41	2.092	Copco 1 Dam Removal	Mallard Cove - Signs to be removed and hauled away	6.00	EA	114	684	-	68	8	133	892	1,004
41	2.093	Copco 1 Dam Removal	Mallard Cove - Wood plank tables to be removed and hauled away	8.00	EA	83	667	-	67	7	129	870	979
41	2.094	Copco 1 Dam Removal	Mallard Cove - Parking area to be regraded	2.50	AC	5,059	12,647	-	1,265	139	2,451	16,502	18,563
41	2.095	Copco 1 Dam Removal	Copco Cove - Concrete Total	84.00	CY	173	14,517	-	1,452	160	2,814	18,943	21,308
41	2.096	Copco 1 Dam Removal	Copco Cove - Dock abutment railing made of 2.5" dia. steel pipe	1.00	EA	1,327	1,327	-	133	15	257	1,732	1,948
41	2.097	Copco 1 Dam Removal	Copco Cove - Signs to be removed and hauled away	6.00	EA	290	1,740	-	174	19	337	2,271	2,554
41	2.098	Copco 1 Dam Removal	Copco Cove - Wood plank tables to be removed and hauled away	2.00	EA	167	334	-	33	4	65	435	490
41	2.099	Copco 1 Dam Removal	Copco Cove - Regrade	2.30	AC	5,368	12,347	-	1,235	136	2,393	16,111	18,122
41	2.100	Copco 1 Dam Removal	Diversion Tunnel Lining (Reinforced Shotcrete)	1.00	LS	228,613	228,613	-	22,861	2,515	44,314	298,303	335,550
41	5.006	Copco 1 Dam Removal	Remove Frame dead end structures 60-80 ft high @ Switchyard	4.00	EA	11,850	47,402	-	4,740	521	9,188	61,852	69,575
41	5.007	Copco 1 Dam Removal	Remove Power Circuit Breakers 69KV @ Switchyard	2.00	EA	6,116	12,233	-	1,223	135	2,371	15,962	17,955
41	5.008	Copco 1 Dam Removal	Remove Disconnect Switches @ Switchyard	4.00	EA	8,710	34,841	-	3,484	383	6,753	45,462	51,138
41	5.009	Copco 1 Dam Removal	Remove all associated auxiliary equipment @ Switchyard (Allowance)	1.00	LS	53,473	53,473	-	5,347	588	10,365	69,774	78,486
41	5.010	Copco 1 Dam Removal	Remove Distribution lines 69 Kv between Copco 1 Switchyard and H	6.00	EA	3,307	19,841	-	1,984	218	3,846	25,889	29,122

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
41	5.011	Copco 1 Dam Removal	Remove Distribution Poles 2.4 Kv between Copco#1 HE Plant and C	8.00	EA	1,795	14,359	-	1,436	158	2,783	18,736	21,076
41	5.012	Copco 1 Dam Removal	Remove "Production Poles" in general area Copco#1	7.00	EA	3,600	25,200	-	2,520	277	4,885	32,882	36,988
41	5.013	Copco 1 Dam Removal	Remove "Village Houses Distribution Poles" near dam (assumed 10	10.00	EA	2,433	24,333	-	2,433	268	4,717	31,751	35,715
41	5.014	Copco 1 Dam Removal	Remove 69 KV Distribution line 1.6 miles (30 poles)	30.00	EA	4,195	125,842	-	12,584	1,384	24,393	164,203	184,706
41	5.015	Copco 1 Dam Removal	[PacifiCorp Cover] Remove Transmission conductors on poles 1X/0	-	-	-	-	-	-	-	-	-	-
41	5.016	Copco 1 Dam Removal	[PacifiCorp Cover] Remove Transmission conductors 1.3 miles Cop	-	-	-	-	-	-	-	-	-	-
41	5.034	Copco 1 Dam Removal	Remove Maintenance Building, North & South Residence	6,030	SF	14	84,565	-	8,457	930	16,392	110,344	124,122
41	3.001	Copco 2 Dam Removal	Right Side Coffor Dam- Furnish & Unload Material	20.00	LD	2,009	40,187	-	4,019	442	7,790	52,437	58,985
41	3.001.1	Copco 2 Dam Removal	Right Side Coffor Dam- Drive Pile	7,500	SF	28	210,113	-	21,011	2,311	40,728	274,164	308,397
41	3.001.2	Copco 2 Dam Removal	Right Side Coffor Dam- Extract Pile	7,500	SF	9	64,691	-	6,469	712	12,539	84,411	94,951
41	3.002	Copco 2 Dam Removal	Access Trestle- Furnish & Unload Material	78.00	LD	6,266	488,720	-	48,872	5,376	94,732	637,700	717,326
41	3.002.1	Copco 2 Dam Removal	Access Trestle- Drive Pile	1,120	LF	179	200,090	-	20,009	2,201	38,785	261,085	293,686
41	3.002.2	Copco 2 Dam Removal	Access Trestle - Fabricate Trestle Platform	8,000	SF	12	98,807	-	9,881	1,087	19,152	128,927	145,025
41	3.002.3	Copco 2 Dam Removal	Access Trestle - Remove Trestle Platform	8,000	SF	6	48,606	-	4,861	535	9,422	63,423	71,343
41	3.002.4	Copco 2 Dam Removal	Access Trestle- Extract Pile	1,120	LF	53	59,316	-	5,932	652	11,498	77,397	87,061
41	3.002.5	Copco 2 Dam Removal	Access Trestle- Load & Hauloff Material	78.00	LD	1,856	144,768	-	14,477	1,592	28,062	188,899	212,486
41	3.003	Copco 2 Dam Removal	Provide Dewatering behind Cofferdams	1.00	LS	178,729	178,729	-	17,873	1,966	34,644	233,212	262,332
41	3.004	Copco 2 Dam Removal	Remove Water from behind Cofferdams	241,000	GAL	0	5,679	-	568	62	1,101	7,410	8,335
41	3.005	Copco 2 Dam Removal	Left Side Coffor Dam- Furnish & Unload Material	15.00	LD	6,989	104,841	-	10,484	1,153	20,322	136,800	153,882
41	3.005.1	Copco 2 Dam Removal	Left Side Coffor Dam- Drive Pile	7,500	SF	28	210,113	-	21,011	2,311	40,728	274,164	308,397
41	3.005.2	Copco 2 Dam Removal	Left Side Coffor Dam- Extract Pile	7,500	SF	7	50,691	-	5,069	558	9,826	66,143	74,402
41	3.005.3	Copco 2 Dam Removal	Left Side Coffor Dam- Load & Hauloff Material	15.00	LD	1,158	17,372	-	1,737	191	3,367	22,668	25,499
41	3.006	Copco 2 Dam Removal	Coffor Dam Backfill allowance	1.00	LS	50,000	50,000	-	5,000	550	9,692	65,242	73,388
41	3.007	Copco 2 Dam Removal	Provide Dewatering behind left Side Cofferdam	1.00	LS	89,445	89,445	-	8,945	984	17,338	116,711	131,284
41	3.008	Copco 2 Dam Removal	Remove Water from behind Cofferdams	36,000	GAL	0	4,602	-	460	51	892	6,005	6,755
41	3.009	Copco 2 Dam Removal	Remove Water from behind Tailrace Cofferdam	400,000	GAL	0	9,919	-	992	109	1,923	12,943	14,559
41	3.010	Copco 2 Dam Removal	Provide Dewatering behind Tailrace Cofferdam	1.00	LS	54,620	54,620	-	5,462	601	10,587	71,270	80,169
41	3.011	Copco 2 Dam Removal	Tailrace Coffor Dam- Furnish & Unload Material	10.00	LD	6,918	69,180	-	6,918	761	13,410	90,268	101,540
41	3.011.1	Copco 2 Dam Removal	Tailrace Coffor Dam - Drive Pile	5,400	SF	35	187,260	-	18,726	2,060	36,298	244,344	274,854
41	3.011.2	Copco 2 Dam Removal	Tailrace Coffor Dam - Extract Pile	5,400	SF	7	38,177	-	3,818	420	7,400	49,815	56,035
41	3.014	Copco 2 Dam Removal	Remove Concrete in Dam	4,430	cy	169	746,509	-	74,651	8,212	144,701	974,072	1,095,699
41	3.015	Copco 2 Dam Removal	Remove concrete equipment slab from top of embankment wing dam	5.00	CY	365	1,827	-	183	20	354	2,384	2,682
41	3.016	Copco 2 Dam Removal	Remove Concrete Wing wall	240	CY	184	44,193	-	4,419	486	8,566	57,664	64,864
41	3.017	Copco 2 Dam Removal	Right Abutment Removal - Random Fill	1,510	CY	21	31,726	-	3,173	349	6,150	41,398	46,567
41	3.018	Copco 2 Dam Removal	Right Abutment Removal - Remove Hand Placed Riprap	5,400	SF	2	9,895	-	989	109	1,918	12,911	14,523
41	3.019	Copco 2 Dam Removal	Right Abutment Removal - Gunite Curtain Wall	180	CY	191	34,421	-	3,442	379	6,672	44,913	50,521
41	3.020	Copco 2 Dam Removal	Remove & Dispose - Hand rails and Light Poles	5,000	LBS	1	3,825	-	382	42	741	4,991	5,614
41	3.021	Copco 2 Dam Removal	Remove & Dispose - Radial Gates and Hoists	66,000	LBS	1	38,356	-	3,836	422	7,435	50,048	56,298
41	3.022	Copco 2 Dam Removal	Remove & Dispose - 5-Radial Gate Stoplogs & Slots (steel)	95,800	LBS	0	34,294	-	3,429	377	6,648	44,748	50,336
41	3.023	Copco 2 Dam Removal	Remove & Dispose - Spillway intake gate motor & control panel	1.00	EA	1,347	1,347	-	135	15	261	1,758	1,977
41	3.024	Copco 2 Dam Removal	Remove & Dispose - Spillway radial gate motor & control panel	1.00	EA	1,347	1,347	-	135	15	261	1,758	1,977
41	3.025	Copco 2 Dam Removal	Remove & Dispose - Spillway trashrake motor, festoon cable & cont	1.00	EA	558	558	-	56	6	108	728	819
41	3.026	Copco 2 Dam Removal	Remove & Dispose - Distribution equipment, panelboards	1.00	EA	4,889	4,889	-	489	54	948	6,379	7,175
41	3.027	Copco 2 Dam Removal	Remove Copper Shingles from Roof of Powerhouse	7,000	SF	2	12,790	-	1,279	141	2,479	16,689	18,773
41	3.028	Copco 2 Dam Removal	Remove Powerhouse Concrete down to spring-line of turbine	1,110	cy	146	161,932	-	16,193	1,781	31,389	211,295	237,678
41	3.029	Copco 2 Dam Removal	Remove Structural Steel items associated with Powerhouse	220,000	LBS	1	141,804	-	14,180	1,560	27,487	185,031	208,134
41	3.030	Copco 2 Dam Removal	Remove Control House Concrete	30.00	CY	261	7,834	-	783	86	1,519	10,222	11,499
41	3.031	Copco 2 Dam Removal	Remove Control House Structural Steel Items	3,500	LBS	1	2,785	-	278	31	540	3,633	4,087
41	3.032	Copco 2 Dam Removal	Remove Shop Building	4,300	SF	17	73,655	-	7,365	810	14,277	96,107	108,108
41	3.033	Copco 2 Dam Removal	Remove & Dispose - 2 - Governor oil systems	38,000	LBS	1	22,355	-	2,235	246	4,333	29,169	32,812
41	3.034	Copco 2 Dam Removal	Remove & Dispose - Cooling water and bearing oil systems	13,300	LBS	1	6,852	-	685	75	1,328	8,941	10,057
41	3.035	Copco 2 Dam Removal	Remove & Dispose - Oil / Water separator tank and piping	2,700	LBS	0	1,338	-	134	15	259	1,745	1,963
41	3.036	Copco 2 Dam Removal	Remove & Dispose - 12 - Cast Iron Columns	54,000	LBS	0	17,472	-	1,747	192	3,387	22,797	25,644
41	3.037	Copco 2 Dam Removal	Remove & Dispose - 2 - Francis Turbines	660,000	LBS	1	333,413	-	33,341	3,668	64,628	435,049	489,371
41	3.038	Copco 2 Dam Removal	Remove & Dispose - 2 - 40 Ton indoor cranes	140,000	LBS	1	86,374	-	8,637	950	16,742	112,704	126,777
41	3.039	Copco 2 Dam Removal	Remove & Dispose - Compressed Air Systems	1,000	LBS	1	1,227	-	123	14	238	1,602	1,802
41	3.040	Copco 2 Dam Removal	Remove & Dispose - 2 - CO2 Systems	2,100	LBS	1	2,266	-	227	25	439	2,957	3,326
41	3.041	Copco 2 Dam Removal	Remove & Dispose - Plant Water and Fire Protection	3,100	LBS	1	2,970	-	297	33	576	3,875	4,359
41	3.042	Copco 2 Dam Removal	Remove & Dispose - Transformer Oil Fire Protection	6,500	LBS	1	4,289	-	429	47	831	5,596	6,295
41	3.043	Copco 2 Dam Removal	Remove & Dispose - Unwatering Piping	32,000	LBS	0	15,367	-	1,537	169	2,979	20,051	22,555
41	3.044	Copco 2 Dam Removal	Remove & Dispose - Drainage Piping	10,000	LBS	1	8,231	-	823	91	1,595	10,740	12,081
41	3.044a	Copco 2 Dam Removal	Remove & Dispose - Petroleum Products from Mechanical Equip.	3,300	GAL	5	15,652	-	1,565	172	3,034	20,424	22,974
41	3.044b	Copco 2 Dam Removal	Remove & Dispose - Remove Petroleum Products at or near the Poy	3,300	GAL	5	15,652	-	1,565	172	3,034	20,424	22,974

KRRC Cost Estimate - Full Removal

July 2019

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41	3.045	Copco 2 Dam Removal	Remove & Dispose - AC Generator, Indoor Vertical	2.00	EA	65,757	131,514	-	13,151	1,447	25,492	171,604	193,031
41	3.046	Copco 2 Dam Removal	Remove & Dispose - Excitation equipment for 15 MVA Generator	2.00	EA	7,007	14,013	-	1,401	154	2,716	18,285	20,568
41	3.047	Copco 2 Dam Removal	Remove & Dispose - Surge protection equip. for 15 MVA Generator	2.00	EA	1,882	3,764	-	376	41	730	4,911	5,524
41	3.048	Copco 2 Dam Removal	Remove & Dispose - Neutral grounding equip. for 15 MVA Generator	2.00	EA	1,750	3,499	-	350	38	678	4,566	5,136
41	3.049	Copco 2 Dam Removal	Remove & Dispose - Generator Switchgear, 7.2kV-includes unit breakers	1.00	EA	11,215	11,215	-	1,122	123	2,174	14,634	16,461
41	3.050	Copco 2 Dam Removal	Remove & Dispose - Station Service Switchgear, 600-volt (5 section)	1.00	EA	10,051	10,051	-	1,005	111	1,948	13,114	14,752
41	3.051	Copco 2 Dam Removal	Remove & Dispose - Unit and plant control switchboard	1.00	EA	5,714	5,714	-	571	63	1,108	7,456	8,388
41	3.052	Copco 2 Dam Removal	Remove & Dispose - Battery system	1.00	EA	8,584	8,584	-	858	94	1,664	11,201	12,600
41	3.053	Copco 2 Dam Removal	Remove & Dispose - Raceways, Conduit and Cable	1.00	EA	14,077	14,077	-	1,408	155	2,729	18,368	20,661
41	3.054	Copco 2 Dam Removal	Remove & Dispose - Msc. Power & Control Boards	1.00	EA	2,952	2,952	-	295	32	572	3,852	4,333
41	3.055	Copco 2 Dam Removal	Remove & Dispose - 7 - 40-Ton Travelling Crane motors-hoist (2-30)	1.00	EA	2,485	2,485	-	248	27	482	3,242	3,647
41	3.056	Copco 2 Dam Removal	Remove & Dispose - 40-Ton Travelling Crane control equipment	1.00	EA	3,672	3,672	-	367	40	712	4,791	5,389
41	3.057	Copco 2 Dam Removal	Remove & Dispose - 40-Ton Travelling Crane Festoon Cable	1.00	EA	1,653	1,653	-	165	18	320	2,157	2,426
41	3.058a	Copco 2 Dam Removal	Remove Oil from Oil-Filled Step-up Transformers	23,000	GAL	0	10,581	-	1,058	116	2,051	13,807	15,531
41	3.061	Copco 2 Dam Removal	Remove Intake Structure Concrete	1,650	cy	195	322,442	-	32,244	3,547	62,501	420,735	473,270
41	3.062	Copco 2 Dam Removal	Remove Concrete Items associated with 16-foot I.D. Wood Stave Pipe	1,310	cy	100	131,584	-	13,158	1,447	25,506	171,696	193,134
41	3.063	Copco 2 Dam Removal	Place Concrete Plugs for Tunnels	100	cy	1,537	153,652	-	15,365	1,690	29,783	200,491	225,525
41	3.064	Copco 2 Dam Removal	Remove Concrete Items associated with Penstocks D/S from Tunnel	3,500	cy	132	460,672	-	46,067	5,067	89,295	601,102	676,158
41	3.065	Copco 2 Dam Removal	Remove & Dispose of Caterpillar Gate (steel)	50,000	LBS	1	33,075	-	3,307	364	6,411	43,157	48,546
41	3.066	Copco 2 Dam Removal	Remove & Dispose of Trash rack and trash rake (steel)	86,000	LBS	0	37,773	-	3,777	416	7,322	49,287	55,442
41	3.067	Copco 2 Dam Removal	Remove & Dispose of Stop Logs and slots for intake (steel)	220,000	LBS	1	120,510	-	12,051	1,326	23,359	157,246	176,880
41	3.068	Copco 2 Dam Removal	Remove & Dispose of Wood Staves Soaked in Creosote	1,100,000	LBS	1	646,878	-	64,688	7,116	125,389	844,070	949,464
41	3.069	Copco 2 Dam Removal	Remove & Dispose of Cradles (steel)	290,000	LBS	1	159,276	-	15,928	1,752	30,874	207,829	233,779
41	3.070	Copco 2 Dam Removal	Remove & Dispose of Bands (steel) Hauling Only	463,000	LBS	0	142,543	-	14,254	1,568	27,630	185,995	209,219
41	3.071	Copco 2 Dam Removal	Remove & Dispose of Penstock after bifurcation to butterfly valves	860,000	LBS	1	684,003	-	68,400	7,524	132,585	892,513	1,003,956
41	3.072	Copco 2 Dam Removal	Remove & Dispose of Bifurcated vent pipes and support structure	19,500	LBS	0	8,451	-	845	93	1,638	11,027	12,404
41	3.073	Copco 2 Dam Removal	Remove & Dispose of 2 - 138" Butterfly valves	148,000	LBS	1	145,180	-	14,518	1,597	28,141	189,436	213,090
41	5.017	Copco 2 Dam Removal	[PacifiCorp Cover] Disconnect and remove MV Transformers 115 KV	-	-	-	-	-	-	-	-	-	-
41	5.018	Copco 2 Dam Removal	[PacifiCorp Cover] Disconnect and remove Medium Voltage Circuit Breakers	-	-	-	-	-	-	-	-	-	-
41	5.019	Copco 2 Dam Removal	[PacifiCorp Cover] Disconnect and remove MV Transformers 12 KV	-	-	-	-	-	-	-	-	-	-
41	5.020	Copco 2 Dam Removal	[PacifiCorp Cover] Disconnect and remove cable connection between	-	-	-	-	-	-	-	-	-	-
41	5.021	Copco 2 Dam Removal	[PacifiCorp Cover] Remove all associated auxiliary equipment @ Substation	-	-	-	-	-	-	-	-	-	-
41	5.022	Copco 2 Dam Removal	Demolish overhead transmission line and structure 69 KV Copco#1	5.00	Mies	106,556	532,781	-	53,278	5,861	103,273	695,192	781,997
41	5.023	Copco 2 Dam Removal	Demolish transmission conductor from existing structure pole. Structure	1.50	Mies	7,132	10,698	-	1,070	118	2,074	13,960	15,703
41	5.024	Copco 2 Dam Removal	Remove structures between pole 2/007 and Iron Gate	6.00	EA	3,334	20,006	-	2,001	220	3,878	26,104	29,364
41	5.035	Copco 2 Dam Removal	Copco Village Building Demolition	31,680	SF	12	390,782	-	39,078	4,299	75,748	509,907	573,576
41	4.001	Iron Gate Dam Removal	Furnish, Install, and Remove Barge-Mounted Crane in Reservoir	1.00	Is	151,386	151,386	-	15,139	1,665	102,161	270,351	292,411
41	4.002	Iron Gate Dam Removal	Furnish, Install, and Remove Temporary Air Vent Hose from Barge to	1.00	LS	19,694	19,694	-	1,969	217	13,290	35,169	38,039
41	4.003	Iron Gate Dam Removal	Remove Reinforced Concrete Ring Located D/S of Closure Gate and	46.00	CY	332	15,257	-	1,526	168	10,296	27,247	29,471
41	4.004	Iron Gate Dam Removal	Remove Reinforced Concrete Stoplog Structure	6.00	CY	998	5,986	-	599	66	4,040	10,691	11,563
41	4.005	Iron Gate Dam Removal	Remove Water from behind Tailrace Cofferdam	300,000	GAL	0	4,988	-	499	55	3,366	8,908	10,021
41	4.006	Iron Gate Dam Removal	Provide Dewatering behind Tailrace Cofferdam for removal of Power	1.00	LS	25,776	25,776	-	2,578	284	17,394	46,031	51,779
41	4.007	Iron Gate Dam Removal	Tailrace Coffe Dam- Furnish & Unload Material	20.00	LD	8,671	173,413	-	17,341	1,908	117,026	309,687	348,356
41	4.007.1	Iron Gate Dam Removal	Tailrace Coffe Dam- Drive Pile	7,840	SF	32	254,723	-	25,472	2,802	171,898	454,895	511,695
41	4.007.2	Iron Gate Dam Removal	Tailrace Coffe Dam-Extract Pile	7,840	SF	16	124,240	-	12,424	1,367	83,842	221,873	249,577
41	4.010	Iron Gate Dam Removal	Upstream Cofferdam to be Removed in the Wet	10,000	cy	17	169,960	-	16,996	1,870	114,696	303,522	341,421
41	4.011	Iron Gate Dam Removal	Remove 9' dia. hinged blind flange	19,000	LBS	3	60,734	-	6,073	668	40,986	108,462	117,312
41	4.012	Iron Gate Dam Removal	Remove 18" plug valve and 7' of 18" drainage pipe	2,620	LBS	2	5,708	-	571	63	3,852	10,194	11,026
41	4.013.1	Iron Gate Dam Removal	Installation of 15.5w X 16.5t Roller Gate and Gate Structure	1.00	LS	3,791,300	3,791,300	-	379,130	41,704	2,558,523	6,770,657	7,266,811
41	4.013.2	Iron Gate Dam Removal	Remove Existing Sluice Gate and Grating by divers	110,000	LBS	3	295,107	-	29,511	3,246	199,150	527,014	570,109
41	4.013.3	Iron Gate Dam Removal	Remove New Roller Gate Structure	300	CY	424	127,339	-	12,734	1,401	85,934	227,408	255,803
41	4.014	Iron Gate Dam Removal	Remove Concrete in Observation Platform, Crest Wall and Wall Ext	780	cy	106	82,743	-	8,274	910	55,838	147,765	166,216
41	4.015	Iron Gate Dam Removal	Remove Concrete in Diversion Tunnel Intake Structure	715	cy	102	73,038	-	7,304	803	49,289	130,434	146,721
41	4.016	Iron Gate Dam Removal	Remove Concrete in Diversion Tunnel Gate Tower	650	CY	75	48,738	-	4,874	536	32,891	87,039	97,907
41	4.017	Iron Gate Dam Removal	Remove Steel Footbridge to Gate Tower	13,000	LBS	1	9,365	-	937	103	6,320	16,725	18,813
41	4.018	Iron Gate Dam Removal	Remove Concrete in Diversion Tunnel Footbridge Abutment	39.00	CY	133	5,183	-	518	57	3,498	9,256	10,011
41	4.019	Iron Gate Dam Removal	Place Concrete Plugs for Diversion Tunnel	86.00	CY	2,770	238,186	-	23,819	2,620	160,738	425,363	478,475
41	4.020	Iron Gate Dam Removal	Remove Concrete Closure Gates in Gate Tower	85.00	CY	409	34,758	-	3,476	382	23,456	62,073	67,138
41	4.021	Iron Gate Dam Removal	Remove Upstream Riprap (10' thick upstream side of Dam)	92,400	cy	6	574,262	-	57,426	6,317	387,536	1,025,541	1,153,594
41	4.022	Iron Gate Dam Removal	Remove Downstream Riprap	23,400	cy	6	150,090	-	15,009	1,651	101,287	268,036	301,504
41	4.023	Iron Gate Dam Removal	Dam Fill Excavation to Spillway	270,000	cy	6	1,643,543	-	164,354	18,079	1,109,129	2,935,105	3,301,594
41	4.023.1	Iron Gate Dam Removal	Dam Fill Excavation to Disposal Site	761,159	cy	4	3,151,693	-	315,169	34,669	2,126,890	5,628,421	6,331,208
41	4.024	Iron Gate Dam Removal	Cutoff Wall Concrete Demolition	2,440	cy	73	177,701	-	17,770	1,955	119,920	317,346	356,971

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41	4.025	Iron Gate Dam Removal	Earth Fill Crest Raise Demolition	13,000	cy	13	163,229	-	16,323	1,796	110,153	291,501	327,899
41	4.026	Iron Gate Dam Removal	Sheetpile Crest Raise Demolition	800	lf	286	229,123	-	22,912	2,520	154,622	409,178	460,269
41	4.027	Iron Gate Dam Removal	Remove 5 Reservoir Monitoring Wells	5.00	EA	2,204	11,018	-	1,102	121	7,435	19,676	22,133
41	4.028	Iron Gate Dam Removal	Remove and Dispose of Trash Sluice Gate - 10 ft x 9 ft H	4,500	LB	1	4,999	-	500	55	3,373	8,927	10,042
41	4.029	Iron Gate Dam Removal	Remove and Dispose of Intake Structure	72,000	LBS	1	54,179	-	5,418	596	36,562	96,754	108,835
41	4.031	Iron Gate Dam Removal	Remove and Dispose of Hoist Stem - 6" Dia. Sch 160' x150'	7,500	LBS	1	6,866	-	687	76	4,634	12,262	13,794
41	4.032	Iron Gate Dam Removal	Remove and Dispose of Air Vent Pipe - 8" Dia. Sch 40 x160'	4,650	LBS	1	5,834	-	583	64	3,937	10,419	11,720
41	4.034	Iron Gate Dam Removal	Remove and Dispose of Air Vent Pipe - 12" Dia. Sch 40 x560'	30,250	LBS	0	14,525	-	1,453	160	9,802	25,940	29,178
41	4.035	Iron Gate Dam Removal	Remove and Dispose of Outlet Works Stop Logs	2,670	LB	1	2,966	-	297	33	2,002	5,297	5,958
41	4.036	Iron Gate Dam Removal	Remove and Dispose of Hydraulic Pump Motor (10 HP est) & control	1.00	EA	457	457	-	46	5	309	817	919
41	4.037	Iron Gate Dam Removal	Remove and Dispose of Distribution Equipment, Junction Boxes	1.00	EA	2,222	2,222	-	222	24	1,499	3,967	4,463
41	4.038	Iron Gate Dam Removal	Remove and Dispose of Power Cable and 4" Conduit from Penstock	800	LF	17	13,560	-	1,356	149	9,151	24,217	27,241
41	4.039	Iron Gate Dam Removal	Remove Powerhouse Concrete down to spring-line of turbine	5,200	cy	156	812,563	-	81,256	8,938	548,350	1,451,108	1,632,299
41	4.040	Iron Gate Dam Removal	Remove and Dispose of Turbine Unit	344,058	LBS	0	163,016	-	16,302	1,793	110,010	291,121	327,472
41	4.041	Iron Gate Dam Removal	Remove and Dispose of Draft Tube Bulkheads	16,500	LBS	0	7,630	-	763	84	5,149	13,627	15,328
41	4.042	Iron Gate Dam Removal	Remove and Dispose of Crane	24,000	LBS	1	12,659	-	1,266	139	8,543	22,608	25,431
41	4.043	Iron Gate Dam Removal	Remove and Dispose of Governor	20,310	LBS	0	8,144	-	814	90	5,496	14,543	16,359
41	4.044	Iron Gate Dam Removal	Remove and Dispose of Bearing Oil System and Cooling Water Sys	9,182	LBS	1	6,479	-	648	71	4,372	11,571	13,016
41	4.045	Iron Gate Dam Removal	Remove and Dispose of CO2 Systems	2,568	LBS	1	1,851	-	185	20	1,249	3,305	3,718
41	4.046	Iron Gate Dam Removal	Remove and Dispose of Plant Water and Fire Protection System	9,182	LBS	1	6,479	-	648	71	4,372	11,571	13,016
41	4.047	Iron Gate Dam Removal	Remove and Dispose of Oil Sump Pumps	2,000	LBS	1	1,682	-	168	19	1,135	3,004	3,379
41	4.048	Iron Gate Dam Removal	Remove and Dispose of Pumps	22,000	LBS	1	14,988	-	1,499	165	10,115	26,766	30,109
41	4.049	Iron Gate Dam Removal	Remove and Dispose of Exposed Piping Around the Plant	19,291	LBS	1	13,278	-	1,328	146	8,961	23,713	26,674
41	4.050	Iron Gate Dam Removal	Remove and Dispose of Unwatering Piping	19,291	LBS	1	13,034	-	1,303	143	8,796	23,277	26,184
41	4.051	Iron Gate Dam Removal	Remove and Dispose of Drainage Piping	9,518	LBS	1	6,573	-	657	72	4,436	11,739	13,204
41	4.052	Iron Gate Dam Removal	Remove and Dispose of Transformer Oil and Fire Protection Pipes	9,182	LBS	1	8,633	-	863	95	5,826	15,418	17,343
41	4.053	Iron Gate Dam Removal	Remove and Dispose of Compressed Air System	1,450	LBS	1	1,145	-	114	13	773	2,045	2,300
41	4.053a	Iron Gate Dam Removal	Remove & Dispose - Petroleum Products from Mechanical Equip.	1,100	GAL	3	2,996	-	300	33	2,022	5,351	6,019
41	4.054	Iron Gate Dam Removal	Remove and Dispose of AC Generator, Outdoor Horizontal	1.00	EA	67,376	67,376	-	6,738	741	45,468	120,323	135,347
41	4.055	Iron Gate Dam Removal	Remove and Dispose of Excitation equipment for 18.975 MVA Gene	1.00	EA	2,263	2,263	-	226	25	1,527	4,042	4,547
41	4.056	Iron Gate Dam Removal	Remove and Dispose of Surge protection equip. for 18.975 MVA Ge	1.00	EA	2,989	2,989	-	299	33	2,017	5,337	6,004
41	4.057	Iron Gate Dam Removal	Remove and Dispose of Neutral grounding equip. for 18.975 MVA G	1.00	EA	2,738	2,738	-	274	30	1,847	4,889	5,500
41	4.058	Iron Gate Dam Removal	Remove and Dispose of Station Service Switchgear, 600 volt - (5 se	1.00	EA	5,178	5,178	-	518	57	3,494	9,247	10,401
41	4.059	Iron Gate Dam Removal	Remove and Dispose of Unit and plant control switchboard	1.00	EA	21,611	21,611	-	2,161	238	14,584	38,594	43,412
41	4.060	Iron Gate Dam Removal	Remove and Dispose of Battery System - assume 60 batteries, char	1.00	EA	7,115	7,115	-	712	78	4,802	12,706	14,293
41	4.061	Iron Gate Dam Removal	Remove and Dispose of Raceways, Bus, Conduit and Cable	1.00	EA	9,279	9,279	-	928	102	6,262	16,570	18,639
41	4.062	Iron Gate Dam Removal	Remove and Dispose of Unit and plant control switchboard	1.00	EA	2,918	2,918	-	292	32	1,969	5,212	5,862
41	4.063	Iron Gate Dam Removal	Remove and Dispose of Unit and plant control switchboard	1.00	EA	6,566	6,566	-	657	72	4,431	11,727	13,191
41	4.064	Iron Gate Dam Removal	Remove and Dispose of Unit and plant control switchboard	1.00	EA	1,010	1,010	-	101	11	682	1,804	2,029
41	4.065	Iron Gate Dam Removal	Remove and Dispose of Vertical Motors, outdoor, (480V, 100 HP est	4.00	EA	784	3,136	-	314	35	2,117	5,601	6,301
41	4.066	Iron Gate Dam Removal	Remove and Dispose of Transformer (3 phase, 300 kVA, 6600/480V	1.00	EA	4,954	4,954	-	495	54	3,343	8,847	9,952
41	4.067	Iron Gate Dam Removal	Remove and Dispose of Step-up Transformer, outdoor, oil-filled, 3-p	1.00	EA	37,331	37,331	-	3,733	411	25,192	66,667	74,991
41	4.068	Iron Gate Dam Removal	Remove and Dispose of Lattice steel structure, with 69-kV disconn	1.00	EA	7,870	7,870	-	787	87	5,311	14,054	15,809
41	4.069	Iron Gate Dam Removal	Remove and Dispose of Generator Switchgear, outdoor, 7.2kV includ	1.00	EA	22,734	22,734	-	2,273	250	15,342	40,598	45,668
41	4.070	Iron Gate Dam Removal	Remove and Dispose of Single Phase Pole Transformers (25 kVA e	3.00	EA	2,254	6,763	-	676	74	4,564	12,078	13,586
41	4.071	Iron Gate Dam Removal	Remove Concrete in Penstock Intake Structure	460	cy	106	48,666	-	4,867	535	32,842	86,910	97,762
41	4.072	Iron Gate Dam Removal	Remove Concrete in Penstock Encasement	710	cy	104	73,588	-	7,359	809	49,660	131,416	147,825
41	4.073	Iron Gate Dam Removal	Remove Concrete in 3 Penstock Anchors and 7 Penstock Supports	3,110	cy	96	298,491	-	29,849	3,283	201,434	533,057	599,617
41	4.074	Iron Gate Dam Removal	Remove Steel Footbridge to Intake Structure	11,000	LBS	1	10,829	-	1,083	119	7,308	19,338	21,753
41	4.075	Iron Gate Dam Removal	Remove Concrete in Intake Structure Footbridge Abutment	5.00	cy	876	4,378	-	438	48	2,955	7,819	8,795
41	4.076	Iron Gate Dam Removal	Remove and Dispose of Intake Structure	131,630	LBS	1	114,162	-	11,416	1,256	77,041	203,875	229,331
41	4.077	Iron Gate Dam Removal	Remove and Dispose of Gate Hoist Stem - 6" Sch160x40'	1,800	LB	1	1,999	-	200	22	1,349	3,571	4,017
41	4.078	Iron Gate Dam Removal	Remove and Dispose of Water Fill line- 12" Dia STD x 27'	1,350	LB	1	1,500	-	150	16	1,012	2,678	3,012
41	4.079	Iron Gate Dam Removal	Remove and Dispose of Air Vent - 12" Dia STD x 32'	1,600	LB	1	1,777	-	178	20	1,199	3,174	3,570
41	4.080	Iron Gate Dam Removal	Remove and Dispose of Gage Wells	2,612	LB	1	2,901	-	290	32	1,958	5,182	5,829
41	4.081	Iron Gate Dam Removal	Remove and Dispose of Penstock Vent - 46" Dia, 0.25" Thick x 60'	7,440	LBS	1	9,834	-	983	108	6,636	17,562	19,755
41	4.082	Iron Gate Dam Removal	Remove and Dispose of Penstock - 12' Dia, 0.25" Thick x 698'	294,428	LBS	1	306,205	-	30,621	3,368	206,640	546,833	615,113
41	4.083	Iron Gate Dam Removal	Remove and Dispose of Bypass Outlet - 96" Dia, 0.25" Thick x 50'	12,800	LBS	1	12,702	-	1,270	140	8,572	22,683	25,516
41	4.084	Iron Gate Dam Removal	Remove and Dispose of Outlet Valve on bypass outlet - 66" Dia.	18,000	LBS	2	39,904	-	3,990	439	26,929	71,262	80,160
41	4.085	Iron Gate Dam Removal	Remove and Dispose Overhead trolley Crane Motor (4hp est) & Cont	1.00	EA	1,307	1,307	-	131	14	882	2,334	2,625
41	4.086	Iron Gate Dam Removal	Remove and Dispose Distribution equipment, Junction Boxes	1.00	EA	3,267	3,267	-	327	36	2,205	5,835	6,563
41	4.087	Iron Gate Dam Removal	Remove and Dispose Power Cable and Conduit	1.00	EA	24,880	24,880	-	2,488	274	16,790	44,431	49,979
41	4.097	Iron Gate Dam Removal	Clear and Grub Disposal Area	29.00	AC	3,593	104,203	-	10,420	1,146	70,320	186,089	209,325
41	4.101	Iron Gate Dam Removal	Remove Building No. 2	800	SF	14	11,235	-	1,123	124	7,582	20,064	22,569

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
41	4.102	Iron Gate Dam Removal	Remove Building No. 3	1,088	SF	14	15,192	-	1,519	167	10,252	27,130	30,517
41	4.103	Iron Gate Dam Removal	Remove Concrete in Fish Ladder	1,240	cy	103	127,646	-	12,765	1,404	86,141	227,956	256,419
41	4.104	Iron Gate Dam Removal	Remove Concrete in Holding Ponds #1 thru #6	1,380	CY	99	135,964	-	13,596	1,496	91,754	242,810	273,128
41	4.105	Iron Gate Dam Removal	Remove Concrete in Fish Facility Items	1,200	CY	98	118,134	-	11,813	1,299	79,721	210,968	237,310
41	4.106	Iron Gate Dam Removal	Remove Miscellaneous Metalwork in Fish Facilities	12,000	LBS	1	8,390	-	839	92	5,662	14,984	16,855
41	4.107	Iron Gate Dam Removal	Remove Concrete Associated with 30" Dia. water supply line	80.00	CY	69	5,512	-	551	61	3,720	9,843	11,072
41	4.108	Iron Gate Dam Removal	Remove Concrete in Aerator Structure	65.00	CY	74	4,835	-	483	53	3,263	8,634	9,712
41	4.109	Iron Gate Dam Removal	Remove Wood in Aerator Structure	6,000	LB	1	5,489	-	549	60	3,704	9,802	11,026
41	4.110	Iron Gate Dam Removal	Remove Structural Steel in Aerator Structure	2,500	LB	1	2,777	-	278	31	1,874	4,959	5,579
41	4.111	Iron Gate Dam Removal	Remove Asphalt Pavement	3,900	SF	6	21,573	-	2,157	237	14,558	38,526	43,336
41	4.112	Iron Gate Dam Removal	Remove Restroom Building near Aerator Structure	340	SF	14	4,761	-	476	52	3,213	8,502	9,564
41	4.113	Iron Gate Dam Removal	Remove Storage Shed near Aerator Structure	90.00	SF	15	1,334	-	133	15	900	2,383	2,680
41	4.114	Iron Gate Dam Removal	Remove Toe Drain Pipe	260	LF	13	3,257	-	326	36	2,198	5,817	6,544
41	4.115	Iron Gate Dam Removal	Remove Toe Drain Manhole	25.00	LF	65	1,634	-	163	18	1,102	2,917	3,282
41	4.116	Iron Gate Dam Removal	Berm Removal	53,000	cy	4	196,609	-	19,661	2,163	132,680	351,112	394,953
41	4.117	Iron Gate Dam Removal	Remove and Dispose of Intake Structures Trashracks	5,000	LB	1	4,901	-	490	54	3,307	8,752	9,845
41	4.118	Iron Gate Dam Removal	Remove and Dispose of Pipe Conduit, 30" Dia. x 0.25" Thick x 960'	76,640	LBS	1	56,828	-	5,683	625	38,350	101,486	114,158
41	4.119	Iron Gate Dam Removal	Remove and Dispose of Sluice Gate Valve, 30" Dia.	3,000	LB	1	3,332	-	333	37	2,249	5,951	6,694
41	4.120	Iron Gate Dam Removal	Remove and Dispose of Sluice Gate Stem, 2" Dia. Sch160x45'	360	LB	1	400	-	40	4	270	714	803
41	4.121	Iron Gate Dam Removal	Remove and Dispose of Butterfly Valve, 30" Dia.	2,435	LB	1	2,705	-	270	30	1,825	4,830	5,434
41	4.122	Iron Gate Dam Removal	Remove and Dispose of Piping- 30-in. Dia. x 0.25 thick x 90'	7,200	LBS	0	2,581	-	258	28	1,742	4,609	5,185
41	4.123	Iron Gate Dam Removal	Remove and Dispose of Piping- 24-in. Dia. x 0.25 thick x 248'	15,872	LBS	0	5,035	-	503	55	3,398	8,991	10,114
41	4.124	Iron Gate Dam Removal	Remove and Dispose of Piping- 20-in. Dia. x 0.25 thick x 85'	4,505	LBS	0	1,763	-	176	19	1,190	3,149	3,542
41	4.125	Iron Gate Dam Removal	Remove and Dispose of Piping- 18-in. Dia. x 0.25 thick x 432'	29,088	LBS	0	10,646	-	1,065	117	7,184	19,012	21,386
41	4.126	Iron Gate Dam Removal	Remove and Dispose of Piping- 16-in. Dia. x 0.25 thick x 166'	6,972	LBS	0	2,566	-	257	28	1,732	4,583	5,155
41	4.127	Iron Gate Dam Removal	Remove and Dispose of Piping- 12-in. Dia. x 0.25 thick x 64'	2,176	LBS	0	1,047	-	105	12	707	1,870	2,103
41	4.128	Iron Gate Dam Removal	Remove and Dispose of Piping- 10-in. Dia. x 0.25 thick x 69'	1,932	LBS	1	1,019	-	102	11	688	1,820	2,048
41	4.129	Iron Gate Dam Removal	Remove and Dispose of Piping- 8-in. Dia. x 0.25 thick x 30'	3,588	LBS	0	971	-	97	11	655	1,733	1,950
41	4.130	Iron Gate Dam Removal	Remove and Dispose of Piping- 3-in. Dia. x STD x 30'	1,088	LBS	1	706	-	71	8	476	1,260	1,418
41	4.131	Iron Gate Dam Removal	Remove and Dispose of Gate Valves	21,792	LBS	0	9,221	-	922	101	6,223	16,468	18,524
41	4.132	Iron Gate Dam Removal	Remove and Dispose of Basin #1	2,880	LBS	1	2,577	-	258	28	1,739	4,602	5,177
41	4.133	Iron Gate Dam Removal	Remove and Dispose of Basin #2	3,660	LBS	1	3,365	-	337	37	2,271	6,010	6,761
41	4.134	Iron Gate Dam Removal	Remove and Dispose of Basin #3	2,880	LBS	2	6,871	-	687	76	4,637	12,271	13,804
41	4.135	Iron Gate Dam Removal	Remove and Dispose of Basin #4	3,580	LBS	2	6,871	-	687	76	4,637	12,271	13,804
41	4.136	Iron Gate Dam Removal	Remove and Dispose of Basin #5	1,440	LBS	5	6,871	-	687	76	4,637	12,271	13,804
41	4.137	Iron Gate Dam Removal	Remove and Dispose of Basin #6	1,440	LBS	5	6,871	-	687	76	4,637	12,271	13,804
41	4.138	Iron Gate Dam Removal	Remove and Dispose of Holding Tank	7,400	LBS	1	9,281	-	928	102	6,263	16,574	18,643
41	4.139	Iron Gate Dam Removal	Remove and Dispose of Misc.: Motors, control panels, cables, cond	1.00	EA	1,960	1,960	-	196	22	1,323	3,501	3,938
41	4.140	Iron Gate Dam Removal	Wanaka Springs - Concrete Total	28.00	CY	274	7,674	-	767	84	5,179	13,705	15,416
41	4.141	Iron Gate Dam Removal	Wanaka Springs - Double Pipe Railings	60.00	LF	52	3,136	-	314	35	2,117	5,601	6,301
41	4.142	Iron Gate Dam Removal	Wanaka Springs - Wood picnic tables to be removed and hauled	5.00	EA	131	653	-	65	7	441	1,167	1,313
41	4.143	Iron Gate Dam Removal	Wanaka Springs - 25'x5' Wooden floating dock	125	SF	26	3,267	-	327	36	2,205	5,835	6,563
41	4.144	Iron Gate Dam Removal	Wanaka Springs - Regrade	2.50	AC	5,925	14,812	-	1,481	163	9,996	26,452	29,755
41	4.145	Iron Gate Dam Removal	Wanaka Springs - Signs to be removed and hauled away	3.00	EA	392	1,176	-	118	13	794	2,100	2,363
41	4.146	Iron Gate Dam Removal	Wanaka Springs - 15'x5' Gangplank with Railings	75.00	SF	26	1,960	-	196	22	1,323	3,501	3,938
41	4.147	Iron Gate Dam Removal	Juniper Point - Concrete Total	19.00	CY	297	5,644	-	564	62	3,809	10,080	11,339
41	4.148	Iron Gate Dam Removal	Juniper Point - 2, 4x4 Toilet Vaults	32.00	SF	131	4,182	-	418	46	2,822	7,468	8,401
41	4.149	Iron Gate Dam Removal	Juniper Point - Wood picnic tables to be removed and hauled	8.00	EA	131	1,045	-	105	12	706	1,867	2,100
41	4.150	Iron Gate Dam Removal	Juniper Point - Signs to be removed and hauled away	4.00	EA	392	1,568	-	157	17	1,058	2,801	3,150
41	4.151	Iron Gate Dam Removal	Juniper Point - Dock pile railing	50.00	LF	52	2,614	-	261	29	1,764	4,668	5,250
41	4.152	Iron Gate Dam Removal	Juniper Point - 50'x5' Composite dock with poly floats	250	SF	22	5,568	-	557	61	3,758	9,944	11,185
41	4.153	Iron Gate Dam Removal	Juniper Point - 20'x5' Composite gangplank with railings	100	SF	26	2,614	-	261	29	1,764	4,668	5,250
41	4.155	Iron Gate Dam Removal	Juniper Point - Regrade to Natural Contour	2.00	AC	6,654	13,308	-	1,331	146	8,981	23,766	26,733
41	4.156	Iron Gate Dam Removal	Camp Creek - Concrete Total	110	CY	116	12,756	-	1,276	140	8,608	22,779	25,624
41	4.157	Iron Gate Dam Removal	Camp Creek - 180'Lx16'Wx8'D Earth jetty to remove and/or regrade	855	CY	92	78,402	-	7,840	862	52,909	140,014	157,497
41	4.158	Iron Gate Dam Removal	Camp Creek - Well house 10'x16' concrete block building	160	SF	14	2,253	-	225	25	1,520	4,023	4,525
41	4.159	Iron Gate Dam Removal	Camp Creek - 2, 20'x5' Composite decking gangplanks	200	SF	26	5,227	-	523	58	3,528	9,335	10,501
41	4.160	Iron Gate Dam Removal	Camp Creek - 2, 20'x5' Floating composite w/ aluminum frame	200	SF	26	5,227	-	523	58	3,528	9,335	10,501
41	4.161	Iron Gate Dam Removal	Camp Creek - Concrete block double toilet bldg 10'x16'	160	SF	14	2,253	-	225	25	1,520	4,023	4,525
41	4.162	Iron Gate Dam Removal	Camp Creek - Dump stations and approx. 2000 gal buried	1.00	EA	3,027	3,027	-	303	33	2,043	5,406	6,081
41	4.163	Iron Gate Dam Removal	Camp Creek - Power poles and lines	3.00	EA	2,563	7,690	-	769	85	5,190	13,734	15,448
41	4.164	Iron Gate Dam Removal	Camp Creek - Remove waterlines and 3 faucets and regrade	600	LF	7	3,921	-	392	43	2,646	7,001	7,876
41	4.166	Iron Gate Dam Removal	Camp Creek - Steel pipe/plank picnic tables to be removed and hauled	5.00	EA	131	653	-	65	7	441	1,167	1,313
41	4.167	Iron Gate Dam Removal	Camp Creek - Relocate concrete tables	12.00	EA	131	1,568	-	157	17	1,058	2,801	3,150

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
41	4.168	Iron Gate Dam Removal	Camp Creek - Regrade	4.00	AC	3,961	15,844	-	1,584	174	10,692	28,295	31,828
41	4.169	Iron Gate Dam Removal	Camp Creek - Signs to be removed and hauled away	7.00	EA	392	2,744	-	274	30	1,852	4,901	5,513
41	4.170	Iron Gate Dam Removal	Dutch Creek - 50'x3' Dock Concrete Abutment	22.00	CY	345	7,582	-	758	83	5,117	13,540	15,231
41	4.171	Iron Gate Dam Removal	Dutch Creek - Double Pipe Railing	100	LF	52	5,227	-	523	58	3,528	9,335	10,501
41	4.172	Iron Gate Dam Removal	Mmor Cove - Concrete Total	89.00	CY	89	7,924	-	792	87	5,347	14,151	15,918
41	4.173	Iron Gate Dam Removal	Mmor Cove - 10'x16' Toilet Vault	160	SF	14	2,253	-	225	25	1,520	4,023	4,525
41	4.174	Iron Gate Dam Removal	Mmor Cove - 2, 30'x5' Composite Gangplanks w/ aluminum	300	SF	16	4,867	-	487	54	3,285	8,692	9,778
41	4.175	Iron Gate Dam Removal	Mmor Cove - Double pipe railings on dock	80.00	LF	52	4,182	-	418	46	2,822	7,468	8,401
41	4.177	Iron Gate Dam Removal	Mmor Cove - Regrade site	3.00	AC	6,654	19,962	-	1,996	220	13,471	35,648	40,100
41	4.178	Iron Gate Dam Removal	Mmor Cove - Signs to be removed and hauled away	7.00	EA	392	2,744	-	274	30	1,852	4,901	5,513
41	4.179	Iron Gate Dam Removal	Overlook Point - 1 concrete picnic table base	1.00	CY	392	392	-	39	4	265	700	788
41	4.180	Iron Gate Dam Removal	Overlook Point - Steel frame table to be removed and hauled away	1.00	EA	131	131	-	13	1	88	233	263
41	4.181	Iron Gate Dam Removal	Overlook Point - Regrade steep access road and site to natural contours	0.50	AC	6,654	3,327	-	333	37	2,245	5,941	6,683
41	4.182	Iron Gate Dam Removal	Long Gulch - 80'x25'x4" Concrete boat ramp to be removed	25.00	CY	291	7,270	-	727	80	4,906	12,983	14,604
41	4.183	Iron Gate Dam Removal	Long Gulch - Remove picnic tables (steel frames with planks) and h	2.00	EA	131	261	-	26	3	176	467	525
41	4.184	Iron Gate Dam Removal	Long Gulch - Regrade ramp area to natural contours, rip, reseed	0.05	AC	32,671	1,634	-	163	18	1,102	2,917	3,282
41	4.185	Iron Gate Dam Removal	Concrete Lining Installation for Diversion Tunnel	1.00	LS	1,116,948	1,116,948	-	111,695	12,286	753,762	1,994,692	2,243,757
41	5.025	Iron Gate Dam Removal	Remove Distribution Poles near Iron Gate Hydro Plant	5.00	EA	1,732	8,659	-	866	95	5,843	15,463	17,394
41	5.026	Iron Gate Dam Removal	Remove 69kV/6.6kV Transformer @Substation	1.00	EA	2,319	2,319	-	232	26	1,565	4,142	4,659
41	5.027	Iron Gate Dam Removal	Remove 6.6kV Power Circuit Breaker @Substation	1.00	EA	3,396	3,396	-	340	37	2,292	6,065	6,822
41	5.028	Iron Gate Dam Removal	Remove Generator @Substation	1.00	EA	14,304	14,304	-	1,430	157	9,653	25,545	28,735
41	5.029	Iron Gate Dam Removal	Remove all auxiliary equipment @Substation (Allowance)	1.00	LS	30,514	30,514	-	3,051	336	20,592	54,493	61,297
41	5.030	Iron Gate Dam Removal	[PacifiCorp Cover] New Connection @Iron Gate Hatchery from Pacific	-	-	-	-	-	-	-	-	-	-
41	5.036	Iron Gate Dam Removal	Removal Of Residence Building (Spillway Bank)	7,707	SF	14	107,307	-	10,731	1,180	72,415	191,634	215,562
41	1.001	JC Boyle Dam Removal	Removal of Diversion Conduit Bulkheads	14.00	CY	1,567	21,933	-	2,193	241	13,011	37,379	42,046
41	1.002	JC Boyle Dam Removal	Remove Water from behind Tailrace Cofferdam	500,000	GAL	0	4,729	-	473	52	2,805	8,059	9,065
41	1.003	JC Boyle Dam Removal	Provide Dewatering behind Tailrace Cofferdam	1.00	LS	67,996	67,996	-	6,800	748	40,335	115,879	130,348
41	1.004	JC Boyle Dam Removal	Removal of Diversion Conduit Bulkheads	14.00	CY	1,567	21,933	-	2,193	241	13,011	37,379	42,046
41	1.005	JC Boyle Dam Removal	Remove Spillway Concrete	2,100	CY	73	154,015	-	15,402	1,694	91,362	262,473	295,246
41	1.006	JC Boyle Dam Removal	Remove Monorail Structural Steel Components	15,000	LBS	0	5,765	-	577	63	3,420	9,825	11,052
41	1.007	JC Boyle Dam Removal	Remove Fish Ladder Concrete	1,820	CY	94	170,333	-	17,033	1,874	101,042	290,283	326,529
41	1.008	JC Boyle Dam Removal	Remove Gravity Dam Section Concrete	600	CY	95	57,056	-	5,706	628	33,845	97,234	109,375
41	1.009	JC Boyle Dam Removal	Remove Timber Equipment Ramp on left side of Dam	10,500	LBS	0	3,990	-	399	44	2,367	6,800	7,649
41	1.010	JC Boyle Dam Removal	Remove Pressure-Treated Lumber from Footbridge around Intake St	3,600	SF	6	20,282	-	2,028	223	12,031	34,564	38,880
41	1.011	JC Boyle Dam Removal	Remove Storage Shed located on access road	4,480	SF	14	61,644	-	6,164	678	36,567	105,054	118,171
41	1.012	JC Boyle Dam Removal	Remove Warehouse, North Residence, and South Residence Near	8,965	SF	15	138,237	-	13,824	1,521	82,002	235,583	264,999
41	1.013	JC Boyle Dam Removal	Remove Fire System Control Bldg. on left abutment	520	SF	15	7,623	-	762	84	4,522	12,992	14,614
41	1.014	JC Boyle Dam Removal	Remove Dam Communication Bldg. on left abutment	490	SF	13	6,454	-	645	71	3,828	10,999	12,372
41	1.015	JC Boyle Dam Removal	Remove Concrete Slab on left abutment for former Control House	6.00	CY	698	4,185	-	419	46	2,483	7,132	8,023
41	1.016	JC Boyle Dam Removal	Remove 4'x5' Metal Hatch on top of Concrete Pull Box on left abutme	1.00	CY	1,749	1,749	-	175	19	1,038	2,981	3,353
41	1.017	JC Boyle Dam Removal	Remove Reservoir Level Gauge House on Dam Crest	24.00	SF	139	3,338	-	334	37	1,980	5,688	6,399
41	1.018	JC Boyle Dam Removal	Downstream Riprap	2,200	CY	14	30,909	-	3,091	340	18,335	52,674	59,252
41	1.019	JC Boyle Dam Removal	Upstream Riprap	1,300	CY	17	21,837	-	2,184	240	12,954	37,214	41,861
41	1.020	JC Boyle Dam Removal	Miscellaneous Excavation (Dam Earth Section)	132,500	CY	7	942,102	-	94,210	10,363	558,857	1,605,533	1,806,006
41	1.021	JC Boyle Dam Removal	Cutoff Wall Concrete Demolition	70.00	CY	126	8,829	-	883	97	5,237	15,046	16,925
41	1.022	JC Boyle Dam Removal	Cutoff Wall Anchors	285	EA	19	5,322	-	532	59	3,157	9,069	10,202
41	1.023	JC Boyle Dam Removal	Remove & Dispose Hand Rails and Light Poles	5,000	LBS	1	3,917	-	392	43	2,324	6,675	7,509
41	1.024	JC Boyle Dam Removal	Remove & Dispose Spillway Radial Gates and Hoists	124,000	LBS	0	52,024	-	5,202	572	30,861	88,659	99,729
41	1.025	JC Boyle Dam Removal	Remove & Dispose Stop Logs and Slots (steel)	92,000	LBS	0	40,649	-	4,065	447	24,113	69,274	77,924
41	1.026	JC Boyle Dam Removal	Remove & Dispose of 24" Slide Gate at Entrance to Fish Ladder Str	4,200	LBS	1	5,442	-	544	60	3,228	9,275	10,433
41	1.026a	JC Boyle Dam Removal	Remove petroleum products from Red Bam Area	1,600	GAL	12	18,961	-	1,896	209	11,248	32,313	36,348
41	1.027	JC Boyle Dam Removal	Remove & Dispose of Spillway gate motor & control panel	1.00	EA	1,151	1,151	-	115	13	683	1,962	2,207
41	1.028	JC Boyle Dam Removal	Remove & Dispose of Distribution equipment, panelboards	1.00	EA	3,726	3,726	-	373	41	2,210	6,350	7,143
41	1.029	JC Boyle Dam Removal	Remove Powerhouse Concrete down to Elevation 3324.0	1,500	CY	234	351,185	-	35,118	3,863	208,324	598,490	673,220
41	1.030	JC Boyle Dam Removal	Remove Structural Steel Item associated with Powerhouse	94,000	LBS	1	52,405	-	5,241	576	31,087	89,310	100,461
41	1.031	JC Boyle Dam Removal	Remove Warehouse near Powerhouse	5,060	SF	15	75,002	-	7,500	825	44,491	127,818	143,778
41	1.032	JC Boyle Dam Removal	Remove & Dispose of 2 - Governor oil systems	52,500	LBS	1	50,951	-	5,095	560	30,224	86,831	97,673
41	1.033	JC Boyle Dam Removal	Remove & Dispose of Cooling water and bearing oil systems	6,500	LBS	1	7,395	-	740	81	4,387	12,603	14,177
41	1.034	JC Boyle Dam Removal	Remove & Dispose of 2 - Francis Turbines	560,000	LBS	0	261,076	-	26,108	2,872	154,871	444,927	500,482
41	1.035	JC Boyle Dam Removal	Remove & Dispose of 150 Ton crane	240,000	LBS	0	102,116	-	10,212	1,123	60,575	174,026	195,756
41	1.036	JC Boyle Dam Removal	Remove & Dispose of Compressed Air systems	1,100	LBS	1	965	-	96	11	572	1,644	1,850
41	1.037	JC Boyle Dam Removal	Remove & Dispose of 2 - CO2 systems	6,600	LBS	1	4,520	-	452	50	2,681	7,702	8,664
41	1.038	JC Boyle Dam Removal	Remove & Dispose of Plant Water and Fire Protection	3,100	LBS	1	1,632	-	163	18	968	2,782	3,129

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
41	1.039	JC Boyle Dam Removal	Remove & Dispose of Transformer Oil Fire Protection	6,500	LBS	1	3,781	-	378	42	2,243	6,444	7,248
41	1.040	JC Boyle Dam Removal	Remove & Dispose of Unwatering Piping	33,000	LBS	0	15,783	-	1,578	174	9,362	26,897	30,255
41	1.041	JC Boyle Dam Removal	Remove & Dispose of Drainage Piping	10,000	LBS	1	5,255	-	525	58	3,117	8,956	10,074
41	1.042	JC Boyle Dam Removal	Remove & Dispose of 2-Oil Sump pumps	2,000	LBS	1	2,053	-	205	23	1,218	3,499	3,936
41	1.043	JC Boyle Dam Removal	Remove & Dispose of Draft Tube Bulk Head Gates and Hoists at the	65,000	LBS	0	23,704	-	2,370	261	14,061	40,396	45,440
41	1.043a	JC Boyle Dam Removal	Remove petroleum products from Mechanical Equipment	2,700	GAL	12	33,278	-	3,328	366	19,740	56,712	63,793
41	1.044	JC Boyle Dam Removal	Remove & Dispose of Outdoor Vertical AC Generator, Unit 1: 53 MW	2.00	EA	52,105	104,211	-	10,421	1,146	61,818	177,596	199,771
41	1.045	JC Boyle Dam Removal	Remove & Dispose of Excitation equipment for 53/50 MVA Generator	2.00	EA	10,372	20,744	-	2,074	228	12,306	35,352	39,767
41	1.046	JC Boyle Dam Removal	Remove & Dispose of Surge protection equip. for 53/50 MVA Generator	2.00	EA	5,719	11,438	-	1,144	126	6,785	19,492	21,926
41	1.047	JC Boyle Dam Removal	Remove & Dispose of Neutral grounding equip. for 53/50 MVA Generator	2.00	EA	2,259	4,517	-	452	50	2,680	7,699	8,660
41	1.048	JC Boyle Dam Removal	Remove & Dispose of Generator Switchgear, 15kV - (6 sections)	1.00	EA	14,213	14,213	-	1,421	156	8,431	24,221	27,246
41	1.049	JC Boyle Dam Removal	Remove & Dispose of Station Service Switchgear, 600 volt - (5 sections)	1.00	EA	7,794	7,794	-	779	86	4,623	13,282	14,941
41	1.050	JC Boyle Dam Removal	Remove & Dispose of Unit and plant control switchboard	1.00	EA	4,117	4,117	-	412	45	2,442	7,016	7,892
41	1.051	JC Boyle Dam Removal	Remove & Dispose - Battery system	1.00	EA	6,515	6,515	-	652	72	3,865	11,103	12,489
41	1.052	JC Boyle Dam Removal	Remove & Dispose of Raceways, Conduit and Cable	1.00	EA	9,227	9,227	-	923	101	5,473	15,724	17,688
41	1.053	JC Boyle Dam Removal	Remove & Dispose of Msc. power & control boards	1.00	EA	8,287	8,287	-	829	91	4,916	14,123	15,886
41	1.054	JC Boyle Dam Removal	Remove & Dispose of 5 Gantry Crane motors - hoist (50Hp*), aux hoist	1.00	EA	851	851	-	85	9	505	1,450	1,631
41	1.055	JC Boyle Dam Removal	Remove & Dispose of Gantry Crane control equipment (3 cubicles)	1.00	EA	2,503	2,503	-	250	28	1,485	4,285	4,798
41	1.056	JC Boyle Dam Removal	Remove & Dispose of Conduit and Cable	1.00	EA	5,957	5,957	-	596	66	3,534	10,152	11,420
41	1.057	JC Boyle Dam Removal	Remove & Dispose of Exterior Lighting	1.00	EA	7,198	7,198	-	720	79	4,270	12,267	13,798
41	1.058	JC Boyle Dam Removal	Remove & Dispose of Transmission Line No. 59	1.66	Mile	27,223	45,191	-	4,519	497	26,807	77,014	86,630
41	1.059	JC Boyle Dam Removal	Remove & Dispose of Transmission Line No. 98	0.24	Mile	21,481	5,155	-	516	57	3,058	8,786	9,883
41	1.060	JC Boyle Dam Removal	Remove & Dispose of Transmission Line No. 58	1.66	Mile	20,644	34,269	-	3,427	377	20,328	58,401	65,693
41	1.061	JC Boyle Dam Removal	Remove Intake Structure Concrete	1,610	CY	169	272,772	-	27,277	3,000	161,809	464,860	522,904
41	1.062	JC Boyle Dam Removal	Remove Fish Screen Building	2,010	SF	22	44,683	-	4,468	492	26,506	76,149	85,657
41	1.063	JC Boyle Dam Removal	Remove 24" Steel Fish Discharge Pipe	37,978	LBS	0	8,563	-	856	94	5,080	14,594	16,416
41	1.064	JC Boyle Dam Removal	Remove Concrete Items associated with the 14-ft-diameter Steel Pipe	1,100	CY	112	122,740	-	12,274	1,350	72,810	209,174	235,293
41	1.065	JC Boyle Dam Removal	Remove Open Concrete Flume	26,300	CY	106	2,794,622	-	279,462	30,741	1,657,777	4,762,603	5,357,280
41	1.065.1	JC Boyle Dam Removal	Power Canal Backfill	63,519	CY	6	366,379	-	36,638	4,030	217,337	624,384	702,348
41	1.065.2	JC Boyle Dam Removal	Power Canal Backfill Trucking From Disposal Site	39,144	CY	6	244,385	-	24,439	2,688	144,970	416,482	468,486
41	1.066	JC Boyle Dam Removal	Remove Structural Steel items associated with Forebay Trash Rack	11,500	LBS	0	2,492	-	249	27	1,478	4,247	4,777
41	1.067	JC Boyle Dam Removal	Remove Forebay Concrete	2,520	CY	105	265,124	-	26,512	2,916	157,272	451,824	508,241
41	1.068	JC Boyle Dam Removal	Place Concrete Plugs at Tunnel Portals	75.00	CY	2,160	161,972	-	16,197	1,782	96,083	276,034	310,501
41	1.069	JC Boyle Dam Removal	Remove Concrete Items associated with Penstocks D/S from Tunnel	1,800	CY	105	189,288	-	18,929	2,082	112,286	322,585	362,864
41	1.070	JC Boyle Dam Removal	Remove Head gate Control Building at Flume Entrance	500	SF	16	7,975	-	798	88	4,731	13,591	15,288
41	1.071	JC Boyle Dam Removal	Remove Fore bay Spillway Gate House	610	SF	15	9,315	-	931	102	5,525	15,874	17,856
41	1.072	JC Boyle Dam Removal	Remove Fore bay Control Building	560	SF	22	12,082	-	1,208	133	7,167	20,591	23,162
41	1.074	JC Boyle Dam Removal	Remove Insulated Generator Building next to Fore bay Control Building	90.00	SF	17	1,565	-	157	17	929	2,668	3,001
41	1.075	JC Boyle Dam Removal	Remove Fixed Wheel Gate (Gate, Frame, and Hoist)	55,000	LBS	0	20,109	-	2,011	221	11,929	34,270	38,549
41	1.076	JC Boyle Dam Removal	Remove Trash rack and trash rake (steel)	75,000	LBS	0	35,538	-	3,554	391	21,081	60,565	68,127
41	1.077	JC Boyle Dam Removal	Remove Stop Logs and Slots (steel)	136,000	LBS	0	57,720	-	5,772	635	34,240	98,367	110,649
41	1.078	JC Boyle Dam Removal	Remove Traveling Water Screen	124,000	LBS	0	48,607	-	4,861	535	28,834	82,837	93,180
41	1.079	JC Boyle Dam Removal	Remove Fish By-Pass and Supports (steel)	610,000	lb	0	146,159	-	14,616	1,608	86,702	249,085	280,187
41	1.080	JC Boyle Dam Removal	Remove Gates and Hoists	18,500	LBS	0	6,285	-	628	69	3,728	10,710	12,047
41	1.081	JC Boyle Dam Removal	Remove Trash rack and trash rake (steel)	47,249	LBS	0	21,336	-	2,134	235	12,657	36,361	40,901
41	1.082	JC Boyle Dam Removal	Remove stop Logs and slots (steel)	37,069	LBS	1	20,925	-	2,092	230	12,413	35,660	40,113
41	1.083	JC Boyle Dam Removal	Remove & Dispose 14' Diversion Pipe	484,200	LBS	1	650,032	-	65,003	7,150	385,601	1,107,786	1,246,108
41	1.083.1	JC Boyle Dam Removal	Remove & Dispose 9'-6" to 10'-6" Penstocks	953,250	LBS	1	770,240	-	77,024	8,473	456,908	1,312,645	1,476,547
41	1.084	JC Boyle Dam Removal	Remove & Dispose Surge Tank (steel)	79,000	LBS	1	61,152	-	6,115	673	36,276	104,216	117,229
41	1.085	JC Boyle Dam Removal	Remove & Dispose 2 - 108" Butterfly valves	148,000	LBS	1	78,546	-	7,855	864	46,594	133,858	150,572
41	1.086	JC Boyle Dam Removal	Remove & Dispose Gate, Stem and Frame	28,000	LBS	1	20,823	-	2,082	229	12,352	35,486	39,917
41	1.087	JC Boyle Dam Removal	Remove & Dispose of Steel Transition Manifolds on Upstream and	250,000	LBS	0	87,446	-	8,745	962	51,873	149,026	167,634
41	1.087a	JC Boyle Dam Removal	Remove petroleum products from Mechanical Equipment	380	GAL	18	6,860	-	686	75	4,069	11,691	13,151
41	1.088	JC Boyle Dam Removal	Install and Remove Temporary Access Roads for Penstock Demo	2.00	Mile	84,017	168,035	-	16,803	1,848	99,679	286,365	322,122
41	1.097	JC Boyle Dam Removal	Clear and Grub Disposal Area (Embankment)	10.00	AC	3,151	31,509	-	3,151	347	18,691	53,698	60,403
41	1.098	JC Boyle Dam Removal	Clear and Grub, 40' width for Haul Roads	2.40	AC	3,183	7,639	-	764	84	4,531	13,018	14,643
41	1.103	JC Boyle Dam Removal	Soil/ Rock Cover Relocation For Concrete Rubble at Scour Hole	13,000	CY	17	220,690	-	22,069	2,428	130,914	376,100	423,061
41	1.103.1	JC Boyle Dam Removal	Rock/Soil Cover Placement Over Concrete Rubble at Scour Hole	13,000	CY	6	73,673	-	7,367	810	43,703	125,554	141,231
41	1.107	JC Boyle Dam Removal	Process Demolished Concrete for Scour Hole	55,900	CY	12	657,398	-	65,740	7,231	389,970	1,120,339	1,260,229
41	1.107.1	JC Boyle Dam Removal	Haul Road Construction for Scour Hole Backfill	10,000	CY	25	247,780	-	24,778	2,726	146,984	422,268	474,994
41	1.107.2	JC Boyle Dam Removal	Backfilling Scour Hole With Processed Concrete	55,900	CY	4	245,052	-	24,505	2,696	145,366	417,619	469,764
41	1.107.3	JC Boyle Dam Removal	Scour Hole Backfill Haul Road Restoration	3,540	CY	32	114,590	-	11,459	1,260	67,975	195,284	219,668
41	1.108	JC Boyle Dam Removal	Topsy Recreational Area - Concrete total	68.00	CY	77	5,222	-	522	57	3,098	8,900	10,011
41	1.109	JC Boyle Dam Removal	Topsy Recreational Area - 6'x80' Floating dock made of lumber and	1.00	EA	6,727	6,727	-	673	74	3,990	11,464	12,895

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
41	1.110	JC Boyle Dam Removal	Topsy Recreational Area - 5'x20' Walkway leading to hex fishing platform	200	SF	7	1,487	-	149	16	882	2,534	2,851
41	1.111	JC Boyle Dam Removal	Topsy Recreational Area - Regrade to natural contour	300	SF	7	2,109	-	211	23	1,251	3,595	4,044
41	1.112	JC Boyle Dam Removal	Pioneer Park - Picnic tables to be removed and hauled away	12.00	EA	153	1,831	-	183	20	1,086	3,121	3,510
41	1.113	JC Boyle Dam Removal	Pioneer Park - 12 Concrete fire rings	5.00	CY	89	444	-	44	5	263	756	851
41	1.114	JC Boyle Dam Removal	Pioneer Park - Portable toilets to be removed and hauled away	2.00	EA	105	210	-	21	2	124	357	402
41	1.115	JC Boyle Dam Removal	Pioneer Park - Signs to be removed and hauled away	6.00	EA	115	687	-	69	8	408	1,172	1,318
41	1.116	JC Boyle Dam Removal	Pioneer Park - Dumpster to be removed and hauled away	1.00	EA	1,126	1,126	-	113	12	668	1,919	2,158
41	1.118	JC Boyle Dam Removal	Pioneer Park - Regrade to natural contour	0.50	AC	8,438	4,219	-	422	46	2,503	7,190	8,088
41	5.000	JC Boyle Dam Removal	Remove Frame dead end structures 60-80 ft high	2.00	EA	10,715	21,430	-	2,143	236	12,713	36,522	41,082
41	5.001	JC Boyle Dam Removal	Remove (incl foundation) and Save Transformers 230KV	2.00	EA	3,058	6,117	-	612	67	3,628	10,424	11,726
41	5.002	JC Boyle Dam Removal	Remove (incl foundation) and Save Power Circuit Breakers 230KV	2.00	EA	3,909	7,818	-	782	86	4,637	13,323	14,986
41	5.003	JC Boyle Dam Removal	[PacifiCorp Cover] Substation Tie Structure 230KV	-	-	-	-	-	-	-	-	-	-
41	5.004	JC Boyle Dam Removal	Remove Chain Link Fence	601	LF	17	10,206	-	1,021	112	6,054	17,394	19,566
41	5.005	JC Boyle Dam Removal	Demolish overhead distribution 2.5 miles (30-45 poles)	45.00	EA	1,764	79,376	-	7,938	873	47,086	135,272	152,163
41	5.032	JC Boyle Dam Removal	[PacifiCorp Cover] Install 230KV strain transmission structures outside	-	-	-	-	-	-	-	-	-	-
41	5.033	JC Boyle Dam Removal	Upstream Cofferdam to be Removed in the Wet	14,450	CY	16	238,147	-	23,815	2,620	141,269	405,851	456,527
		Reservoir Area Improvements											
		Copco 1 & 2											
42	-	Tributary Connectivity	Removal of sediment and similar obstructions to ensure volitional flow	7.00	EA	119,000	833,000	-	83,300	9,163	39,165	964,628	1,085,075
42	-	Wetlands, Floodplain and Off-channel Habitat Features Site 1 (11.2	Equipment & road access into site	3,000	LF	25	75,000	-	7,500	825	3,526	86,851	97,696
42	-	Wetlands, Floodplain and Off-channel Habitat Features Site 1 (11.2	Grading and shaping of floodplain sediments (no export)	81,367	CY	8	650,936	-	65,094	7,160	30,605	753,795	847,917
42	-	Wetlands, Floodplain and Off-channel Habitat Features Site 1 (11.2	Floodplain roughness for 50% of area	5.60	AC	30,000	168,000	-	16,800	1,848	7,899	194,547	218,839
42	-	Site 2 (25.5 acres)	Equipment & road access into site	3,000	LF	25	75,000	-	7,500	825	3,526	86,851	97,696
42	-	Site 2 (25.5 acres)	Grading and shaping of floodplain sediments (no export)	164,252	CY	8	1,314,016	-	131,402	14,454	61,781	1,521,653	1,711,652
42	-	Site 2 (25.5 acres)	Floodplain roughness for 50% of area	12.75	AC	30,000	382,500	-	38,250	4,208	17,984	442,941	498,249
42	-	Site 3 (13.9 acres)	Equipment & road access into site	3,000	LF	25	75,000	-	7,500	825	3,526	86,851	97,696
42	-	Site 3 (13.9 acres)	Grading and shaping of floodplain sediments (no export)	78,556	CY	8	628,448	-	62,845	6,913	29,548	727,753	818,623
42	-	Site 3 (13.9 acres)	Floodplain roughness for 50% of area	6.95	AC	30,000	208,500	-	20,850	2,294	9,803	241,446	271,594
42	-	Site 4 (10.5 acres)	Equipment & road access into site	3,000	LF	25	75,000	-	7,500	825	3,526	86,851	97,696
42	-	Site 4 (10.5 acres)	Grading and shaping of floodplain sediments (no export)	50,600	CY	8	404,800	-	40,480	4,453	19,032	468,765	527,297
42	-	Site 4 (10.5 acres)	Floodplain roughness for 50% of area	5.25	AC	30,000	157,500	-	15,750	1,733	7,405	182,388	205,161
42	-	Site 5 (4.2 acres)	Equipment & road access into site	3,000	LF	25	75,000	-	7,500	825	3,526	86,851	97,696
42	-	Site 5 (4.2 acres)	Grading and shaping of floodplain sediments (no export)	20,267	CY	8	162,136	-	16,214	1,783	7,623	187,756	211,200
42	-	Site 5 (4.2 acres)	Floodplain roughness for 50% of area	2.10	AC	30,000	63,000	-	6,300	693	2,962	72,955	82,065
42	-	Site 6 (5.3 acres)	Equipment & road access into site	3,000	LF	25	75,000	-	7,500	825	3,526	86,851	97,696
42	-	Site 6 (5.3 acres)	Grading and shaping of floodplain sediments (no export)	17,148	CY	8	137,184	-	13,718	1,509	6,450	158,861	178,697
42	-	Site 6 (5.3 acres)	Floodplain roughness for 50% of area	2.65	AC	30,000	79,500	-	7,950	875	3,738	92,062	103,558
42	-	Bank Stability and Channel Fringe Complexity	Bank Stability and Channel Fringe ComplexityDevelop process-based	2,500	LF	253	632,500	-	63,250	6,958	29,738	732,446	823,902
42	-	Large Wood Habitat Features	Ground-Based Placement	20.00	EA	27,990	559,800	-	55,980	6,158	26,320	648,258	729,202
42	-	Large Wood Habitat Features	Helicopter Placement (@ 50 members staged and placed per site)	8.00	EA	57,000	456,000	-	45,600	5,016	21,440	528,056	593,991
42	-	Habitat Restoration at dam footprint	Grading and shaping of floodplain sediments (no export)	8.00	EA	46,875	375,000	-	37,500	4,125	17,631	434,256	488,479
		Iron Gate											
42	-	Tributary Connectivity	Removal of sediment and similar obstructions to ensure volitional flow	5.00	EA	119,000	595,000	-	59,500	6,545	27,975	689,020	775,054
42	-	Site 1 (14.2 acres)	Equipment & road access into site	3,000	LF	25	75,000	-	7,500	825	3,526	86,851	97,696
42	-	Site 1 (14.2 acres)	Grading and shaping of floodplain sediments (no export)	60,000	CY	8	480,000	-	48,000	5,280	22,568	555,848	625,253
42	-	Site 1 (14.2 acres)	Floodplain roughness for 50% of area	7.10	AC	30,000	213,000	-	21,300	2,343	10,015	246,658	277,456
42	-	Site 2 (5.8 acres)	Equipment & road access into site	3,000	LF	25	75,000	-	7,500	825	3,526	86,851	97,696
42	-	Site 2 (5.8 acres)	Grading and shaping of floodplain sediments (no export)	19,000	CY	8	152,000	-	15,200	1,672	7,147	176,019	197,997
42	-	Site 2 (5.8 acres)	Floodplain roughness for 50% of area	2.90	AC	30,000	87,000	-	8,700	957	4,090	100,747	113,327
42	-	Site 3 (23.1 acres)	Equipment & road access into site	2,000	LF	25	50,000	-	5,000	550	2,351	57,901	65,131
42	-	Site 3 (23.1 acres)	Grading and shaping of floodplain sediments (no export)	95,000	CY	8	760,000	-	76,000	8,360	35,733	880,093	989,985
42	-	Site 3 (23.1 acres)	Floodplain roughness for 75% of area	17.30	AC	30,000	519,000	-	51,900	5,709	24,402	601,011	676,055
42	-	Bank Stability and Channel Fringe Complexity	Develop process-based restoration and velocity variations along bar	1,000	LF	253	253,000	-	25,300	2,783	11,895	292,978	329,561
42	-	Large Wood Habitat Features	Ground-Based Placement	20.00	EA	27,990	559,800	-	55,980	6,158	26,320	648,258	729,202
42	-	Large Wood Habitat Features	Helicopter Placement (@ 50 members staged and placed per site)	4.00	EA	57,000	228,000	-	22,800	2,508	10,720	264,028	296,995
42	-	Habitat Restoration at dam footprint	Grading and shaping of floodplain sediments (no export)	8.00	EA	31,250	250,000	-	25,000	2,750	11,754	289,504	325,653
		JC Boyle											
42	-	Tributary Connectivity	Removal of sediment and similar obstructions to ensure volitional flow	2.00	EA	119,000	238,000	-	23,800	2,618	11,190	275,608	310,021
42	-	Site 1 (3.3 acres)	Equipment & road access into site	500	LF	25	12,500	-	1,250	138	588	14,475	16,283
42	-	Site 1 (3.3 acres)	Grading and shaping of floodplain sediments (no export)	37,000	CY	8	296,000	-	29,600	3,256	13,917	342,773	385,573
42	-	Site 1 (3.3 acres)	Floodplain roughness for 50% of area	1.65	AC	30,000	49,500	-	4,950	545	2,327	57,322	64,479
42	-	Site 2 (43.8 acres)	Equipment & road access into site	500	LF	25	12,500	-	1,250	138	588	14,475	16,283
42	-	Site 2 (43.8 acres)	Grading and shaping of floodplain sediments (no export)	35,000	CY	8	280,000	-	28,000	3,080	13,165	324,245	364,731
42	-	Site 2 (43.8 acres)	Floodplain roughness for 50% of area	21.90	AC	30,000	657,000	-	65,700	7,227	30,890	760,817	855,816

KRRC Cost Estimate - Full Removal

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Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
42	-	Site 3 (65.8 acres)	Equipment & road access into site	500	LF	25	12,500	-	1,250	138	588	14,475	16,283
42	-	Site 3 (65.8 acres)	Grading and shaping of floodplain sediments (no export)	53,000	CY	8	424,000	-	42,400	4,664	19,935	490,999	552,307
42	-	Site 3 (65.8 acres)	Floodplain roughness for 30% of area	20.00	AC	30,000	600,000	-	60,000	6,600	28,210	694,810	781,567
42	-	Site 4 (21.3 acres)	Equipment & road access into site	500	LF	25	12,500	-	1,250	138	588	14,475	16,283
42	-	Site 4 (21.3 acres)	Grading and shaping of floodplain sediments (no export)	17,000	CY	8	136,000	-	13,600	1,496	6,394	157,490	177,155
42	-	Site 4 (21.3 acres)	Floodplain roughness for 50% of area	10.65	AC	30,000	319,500	-	31,950	3,515	15,022	369,986	416,184
42	-	Bank Stability and Channel Fringe Complexity	Develop process-based restoration and velocity variations along bank	2,000	LF	253	506,000	-	50,600	5,566	23,790	585,956	659,121
42	-	Large Wood Habitat Features	Ground-Based Placement	30.00	EA	27,990	839,700	-	83,970	9,237	39,480	972,387	1,093,803
42	-	Large Wood Habitat Features	Helicopter Placement (50 members staged and placed per site)	2.00	EA	57,000	114,000	-	11,400	1,254	5,360	132,014	148,498
42	-	Habitat Restoration at dam footprint	Grading and shaping of floodplain sediments (no export)	8.00	EA	31,250	250,000	-	25,000	2,750	11,754	289,504	325,653
		Reservoir Area Restoration											
		Native Seed Collection											
43	-	Native Seed Collection	2019 Seed collection, preparation, storage	175	LB	1,233	215,783	32,367	24,815	2,730	10,145	285,840	297,274
43	-	Native Seed Collection	2020 Seed collection, preparation, storage	175	LB	1,233	215,783	32,367	24,815	2,730	10,145	285,840	309,165
43	-	Native Seed Collection	2021 Seed collection, preparation, storage	175	LB	1,233	215,783	32,367	24,815	2,730	10,145	285,840	321,531
		Seed Propagation											
43	-	Seed Propagation	PDB Scope 2019	434	LB	85	37,008	5,551	4,256	468	1,740	49,024	50,984
43	-	Seed Propagation	PDB Scope 2020	4,343	LB	85	370,082	55,512	42,559	4,682	17,400	490,235	530,239
43	-	Seed Propagation	PDB Scope 2021	38,651	LB	85	3,293,731	494,060	378,779	41,666	154,860	4,363,095	4,907,889
		Weed Eradication											
43	-	Weed Eradication	2019 Weed Eradication	85.00	AC	2,826	240,217	36,033	27,625	3,039	11,294	318,208	330,936
43	-	Weed Eradication	2020 Weed Eradication	68.00	AC	2,826	192,174	28,826	22,100	2,431	9,035	254,566	275,339
43	-	Weed Eradication	2021 Weed Eradication (Dam Mods)	54.40	AC	2,826	153,739	23,061	17,680	1,945	7,228	203,653	229,082
43	-	Weed Eradication	2022 Weed Eradication (Drawdown & Dam Removal)	300	AC	2,826	847,826	127,174	97,500	10,725	39,862	1,123,087	1,313,853
43	-	Weed Eradication	[LTC Cover] 2023 Weed Eradication	-	-	-	-	-	-	-	-	-	-
43	-	Weed Eradication	[LTC Cover] 2024 Weed Eradication	-	-	-	-	-	-	-	-	-	-
43	-	Weed Eradication	[LTC Cover] 2025 Weed Eradication	-	-	-	-	-	-	-	-	-	-
43	-	Weed Eradication	[LTC Cover] 2026 Weed Eradication	-	-	-	-	-	-	-	-	-	-
43	-	Weed Eradication	[LTC Cover] 2027 Weed Eradication	-	-	-	-	-	-	-	-	-	-
43	-	Weed Eradication	[LTC Cover] 2028 Weed Eradication	-	-	-	-	-	-	-	-	-	-
		Pioneer Seeding											
43	-	Pioneer Seeding	2022 Pioneer Seed	2,500	AC	52	130,435	19,565	15,000	1,650	6,133	172,783	202,131
43	-	Pioneer Seeding	2022 Pioneer Seed	250,000	LB	7	1,739,130	260,870	200,000	22,000	81,768	2,303,768	2,695,083
		Container Plant Growing											
43	-	Container Plant Growing	2022 and 2023 Pole Cuttings Collection and Short-Term Storage	335,463	EA	3	875,121	131,268	100,639	11,070	41,145	1,159,243	1,383,274
		Emergent Wetland Restoration											
43	-	Emergent Wetland	2022 Planting Layout	4.40	AC	261	1,148	172	132	15	54	1,520	1,779
43	-	Emergent Wetland	2022 Transplant/Salvage Ex. Wetland Plants backhoe bucket; Root	4,792	EA	10	49,999	7,500	5,750	632	2,351	66,232	77,483
43	-	Emergent Wetland	2023 Root Division Transplants from 1st Yr Transplants (1 plant/10	4,792	EA	13	62,499	9,375	7,187	791	2,939	82,791	100,727
43	-	Emergent Wetland	2022- 2023 Construction/Installation Period Maintenance (Assumed	4.40	AC	4,783	21,043	3,157	2,420	266	989	27,876	34,593
		Bank Wetland Restoration											
43	-	Bank Wetland	2022 Transplant/Salvage Ex. Plants with backhoe or frontloader buc	8,480	EA	10	88,408	13,261	10,167	1,118	4,157	117,111	137,003
43	-	Bank Wetland	2022 Fall Planting Layout	19.45	AC	261	5,074	761	584	64	239	6,721	7,863
43	-	Bank Wetland	2022 Soil Preparation (Rolling, Ripping, Tilling, Finish Grading, Am	19.45	AC	65	1,268	190	146	16	60	1,680	1,966
43	-	Bank Wetland	2022 Fall Broadcast Seeding of Riparian Native Seed (40 lbs PLS/a	19.45	AC	217	4,228	634	486	53	199	5,601	6,552
43	-	Bank Wetland	2023 Planting Layout	19.45	AC	261	5,074	761	584	64	239	6,721	8,177
43	-	Bank Wetland	2022 & 2023 Installation of Pole Cuttings (4/100SF Harvested by Co	42,362	EA	4	165,765	24,865	19,063	2,097	7,794	219,583	262,019
43	-	Bank Wetland	2022-2023 Construction/Installation Period Maintenance (Assumed	19.45	AC	4,783	93,022	13,953	10,698	1,177	4,374	123,223	147,036
		Bank Riparian Restoration											
43	-	Bank Riparian	2022 Transplant/Salvage Ex. Plants with backhoe bucket, with Root	45,693	EA	10	476,357	71,454	54,781	6,026	22,397	631,014	738,197
43	-	Bank Riparian	2022 Soil Amendments (Mycorrhiza)	105	AC	48	5,012	752	576	63	236	6,639	7,767
43	-	Bank Riparian	2023 Fall Planting Layout	105	AC	261	27,339	4,101	3,144	346	1,285	36,215	44,061
43	-	Bank Riparian	2022 Soil Preparation (Rolling, Ripping, Tilling, Finish Grading, Am	105	AC	65	6,835	1,025	786	86	321	9,054	10,592
43	-	Bank Riparian	2022 Fall Broadcast Seeding of Riparian Native Seed (40 lbs PLS/a	105	AC	217	22,783	3,417	2,620	288	1,071	30,179	35,306
43	-	Bank Riparian	2022 & 2023 Installation of Pole Cuttings (4/100SF in 2021 and	228,254	EA	4	893,169	133,975	102,714	11,299	41,994	1,183,152	1,411,803
43	-	Bank Riparian	2022 Deer fence 6' high chainlink with two strands at 7' and 8' in Se	10,480	LF	33	346,296	51,944	39,824	4,381	16,282	458,726	536,645
43	-	Bank Riparian	2028 Deer Fence Removal	10,480	LF	6	60,784	9,118	6,990	769	2,858	80,519	119,187
43	-	Bank Riparian	2023 Irrigation	105	AC	3,913	410,087	61,513	47,160	5,188	19,281	543,229	660,921
43	-	Bank Riparian	2022-2023 Construction/Installation Period Maintenance (Assumed	105	AC	4,783	501,217	75,183	57,640	6,340	23,566	663,946	792,257
		Floodplain Riparian Restoration											
43	-	Floodplain Riparian	2022 Soil Preparation (Rolling,Tilling, Finish Grading,)	149	AC	65	9,714	1,457	1,117	123	457	12,868	15,054
43	-	Floodplain Riparian	2022 Amendments (mycorrhizal inoculant to be mixed with seed)	149	AC	48	7,124	1,069	819	90	335	9,437	11,039
43	-	Floodplain Riparian	2023 Spring Planting Layout	149	AC	391	58,285	8,743	6,703	737	2,740	77,208	93,935
43	-	Floodplain Riparian	2022 Fall seeding with Mechanical Power/Sling Seeder and Rake/H	149	AC	217	32,380	4,857	3,724	410	1,522	42,893	50,179

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
43	-	Floodplain Riparian	2022 Installation of Pole Cuttings (1/100SF Harvested by Contract G	64,942	EA	4	253,889	38,083	29,197	3,212	11,937	336,318	393,444
43	-	Floodplain Riparian	2023 Seed Planting Installation	64,942	EA	4	253,889	38,083	29,197	3,212	11,937	336,318	409,182
43	-	Floodplain Riparian	2022 Deer fence 6' high chainlink with two strands at 7' and 8' in Sel	14,895	LF	33	492,183	73,827	56,601	6,226	23,141	651,978	762,722
43	-	Floodplain Riparian	2028 Deer Fence Removal	14,895	LF	6	86,391	12,959	9,935	1,093	4,062	114,439	169,398
43	-	Floodplain Riparian	2022-2023 Construction/Installation Period Maintenance (Assumed	149	AC	4,000	595,800	89,370	68,517	7,537	28,013	789,236	941,761
		Uplands below Rocky Wake Zone Restoration											
43	-	Uplands below Rocky Wake Zone	2022 Soil Preparation (Rolling, Ripping, Tilling, Finish Grading, Am	662	AC	61	40,314	6,047	4,636	510	1,895	53,402	62,473
43	-	Uplands below Rocky Wake Zone	20212Soil Amendments (mycorrhizal inoculant)	662	AC	48	31,675	4,751	3,643	401	1,489	41,959	49,086
43	-	Uplands below Rocky Wake Zone	2023 Spring Planting Layout 2nd Year	662	AC	174	115,183	17,277	13,246	1,457	5,416	152,579	185,635
43	-	Uplands below Rocky Wake Zone	2022 Seeding with Mechanical Power/Sling Seeder and Rake/Harro	662	AC	217	143,978	21,597	16,558	1,821	6,769	190,723	223,119
43	-	Uplands below Rocky Wake Zone	2023 Seeded Woody Plants with Cocoon Irrigation	2,649	AC	16	41,466	6,220	4,769	525	1,950	54,928	66,829
43	-	Uplands below Rocky Wake Zone	2022 Deer fence 6' high chainlink with two strands at 7' and 8' in Sel	66,230	LF	33	2,188,470	328,270	251,674	27,684	102,895	2,898,993	3,391,412
43	-	Uplands below Rocky Wake Zone	2028 Deer Fence Removal	66,230	LF	6	384,134	57,620	44,175	4,859	18,061	508,850	753,222
43	-	Uplands below Rocky Wake Zone	2022-2023 Construction/Installation Period Maintenance (Assumed	662	AC	4,000	2,649,200	397,380	304,658	33,512	124,557	3,509,307	4,187,501
		Rocky Wake Zone Restoration											
43	-	Rocky Wake Zone	2022 Amendments (mycorrhizal inoculant)	42.62	AC	48	2,038	306	234	26	96	2,700	3,159
43	-	Rocky Wake Zone	2023 Spring Planting Layout 2nd Year	42.62	AC	174	7,412	1,112	852	94	348	9,819	11,946
43	-	Rocky Wake Zone	2022 Soil Preparation (Rolling, Tilling, Finish Grading, Amending)	42.62	AC	65	2,780	417	320	35	131	3,682	4,307
43	-	Rocky Wake Zone	2022 Seeding with Mechanical Power/Sling Seeder and Rake/Harro	42.62	AC	217	9,265	1,390	1,066	117	436	12,273	14,358
43	-	Rocky Wake Zone	2023 Seeded Woody Plants with Cocoon Irrigation	170	AC	16	2,668	400	307	34	125	3,535	4,301
43	-	Rocky Wake Zone	2022 Deer fence 6' high chainlink with two strands at 7' and 8' in Sel	4,262	LF	33	140,831	21,125	16,196	1,782	6,621	186,555	218,242
43	-	Rocky Wake Zone	2028 Deer fence Removal	4,262	LF	6	24,720	3,708	2,843	313	1,162	32,745	48,471
43	-	Rocky Wake Zone	2022-2023 Construction/Installation Period Maintenance (Assumed	42.62	AC	4,000	170,480	25,572	19,605	2,157	8,015	225,829	269,472
		Disturbed Uplands above RWZ Restoration											
43	-	Disturbed Uplands above RWZ	2022 Cross-rip compacted areas to 24" depth with bulldozer (assume	122	AC	96	11,673	1,751	1,342	148	549	15,463	18,090
43	-	Disturbed Uplands above RWZ	2022 Soil Preparation (Rolling, Tilling, Finish Grading, Amending)	122	AC	65	7,959	1,194	915	101	374	10,543	12,334
43	-	Disturbed Uplands above RWZ	2022 Seeding with Mechanical Power/Sling Seeder and Rake/Harro	122	AC	217	26,530	3,980	3,051	336	1,247	35,144	41,113
43	-	Disturbed Uplands above RWZ	2022 Deer fence 6' high chainlink with two strands at 7' and 8' in Sel	12,204	LF	33	403,263	60,489	46,375	5,101	18,960	534,189	624,925
43	-	Disturbed Uplands above RWZ	2028 Deer fence removal	12,204	LF	6	70,783	10,617	8,140	895	3,328	93,764	138,794
43	-	Disturbed Uplands above RWZ	2022-2023 Construction/Installation Period Maintenance (Assumed	122	AC	4,000	488,160	73,224	56,138	6,175	22,952	646,649	771,618
		Upland Stockpiles Restoration											
43	-	Upland Stockpiles	2022 Cross-rip compacted areas to 24" depth with bulldozer (assume	48.83	AC	109	5,308	796	610	67	250	7,031	8,225
43	-	Upland Stockpiles	2022 Soil Preparation (Rolling, Tilling, Finish Grading, Amending)	48.83	AC	65	3,185	478	366	40	150	4,218	4,935
43	-	Upland Stockpiles	2022 Seeding with Mechanical Power/Sling Seeder and Rake/Harro	48.83	AC	217	10,615	1,592	1,221	134	499	14,062	16,450
43	-	Upland Stockpiles	2022 Deer fence 6' high chainlink with two strands at 7' and 8' in Sel	4,883	LF	33	161,351	24,203	18,555	2,041	7,586	213,737	250,042
43	-	Upland Stockpiles	2028 Deer fence removal	4,883	AC	0	283	42	33	4	13	375	555
43	-	Upland Stockpiles	2022-2023 Construction/Installation Period Maintenance (Assumed	48.83	AC	4,000	195,320	29,298	22,462	2,471	9,183	258,734	308,736
		Undisturbed Uplands Restoration											
43	-	Undisturbed Uplands	2022 Seeding of weed removal areas w/mech. power/sling seeder a	44.46	AC	217	9,665	1,450	1,112	122	454	12,803	14,978
43	-	Undisturbed Uplands	2022-2023 Construction/Installation Period Maintenance (Assumed	44.46	AC	4,000	177,840	26,676	20,452	2,250	8,361	235,579	281,106
		Yreka Water Line Replacement											
44	-	Yreka Water Line Replacement	Site work	1.00	LS	504,490	504,490	75,673	58,016	6,382	23,719	668,281	722,813
44	-	Yreka Water Line Replacement	Microtunnel	703	LF	4,176	2,935,920	440,388	337,631	37,139	138,037	3,889,116	4,206,468
44	-	Yreka Water Line Replacement	Steel Pipe Line	1,053	LF	749	789,064	118,360	90,742	9,982	37,099	1,045,247	1,130,539
		Transportation Improvements											
		Bridges - Lakeview											
45	-	Bridges - Lakeview	Sheet Pile Cofferdam For Center Footer	2,400	SF	35	84,187	-	8,419	926	3,958	97,490	105,445
45	-	Bridges - Lakeview	Earth Work Cofferdam Construction for side footers	1,186	LCY	14	16,810	-	1,681	185	790	19,467	21,055
45	-	Bridges - Lakeview	Backfill, structural, common earth, 105 H.P. dozer, 50' haul, from exi	89.00	LCY	37	3,288	-	329	36	155	3,808	4,118
45	-	Bridges - Lakeview	Structure Excavation (Rock) Drilling and blasting rock, boulders, und	107	BCY	170	18,239	-	1,824	201	858	21,120	22,844
45	-	Bridges - Lakeview	Structure Excavation (Type D)	1,122	BCY	19	20,933	-	2,093	230	984	24,241	26,219
45	-	Bridges - Lakeview	Structure Excavation (Bridge)	159	BCY	54	8,560	-	856	94	402	9,913	10,722
45	-	Bridges - Lakeview	Prestressed concrete piles, square, 40' long, 24" square, priced usi	480	VLFT	150	72,233	-	7,223	795	3,396	83,646	90,472
45	-	Bridges - Lakeview	18" Diameter 40' Long Tie Down Anchor Installation	480	VLFT	93	44,433	-	4,443	489	2,089	51,454	55,653
45	-	Bridges - Lakeview	Piling special costs, pre-augering for Pile and Tie Down Anchor	960	LF	289	277,047	-	27,705	3,048	13,026	320,825	347,005
45	-	Bridges - Lakeview	Mobilization, 150 ton, set up and remove crane, with pile leads and	2.00	EA	20,847	41,694	-	4,169	459	1,960	48,282	52,222
45	-	Bridges - Lakeview	A736 Barrier Wall	536	LF	360	193,165	-	19,317	2,125	9,082	223,689	241,942
45	-	Bridges - Lakeview	Expansion joint, neoprene, liquid, 1" x 2", cold applied	46.00	LF	41	1,907	-	191	21	90	2,208	2,388
45	-	Bridges - Lakeview	Columns Structural Concrete includes forms, Grade 60 rebar, concr	172	CY	1,802	309,970	-	30,997	3,410	14,574	358,951	388,241
45	-	Bridges - Lakeview	Deck Structural concrete, in place, includes forms, Grade 60 rebar, c	168	CY	1,068	179,469	-	17,947	1,974	8,438	207,828	224,787
45	-	Bridges - Lakeview	Footer Structural concrete, footing, reinforced, includes forms(4 uses	448	CY	388	173,996	-	17,400	1,914	8,181	201,491	217,932
45	-	Bridges - Lakeview	Approach Slab Structural concrete, in place, 6" thick, includes form	17.00	CY	268	4,562	-	456	50	215	5,283	5,715
45	-	Bridges - Lakeview	Precast 36" I-Girder 65'	8.00	EA	26,947	215,579	-	21,558	2,371	10,136	249,645	270,016
45	-	Bridges - Lakeview	Precast 36" I-Girder 48'	8.00	EA	33,484	267,873	-	26,787	2,947	12,595	310,201	335,514

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
45	-	Bridges - Lakeview	Bridge Demolition	3,917	SF	53	207,758	-	20,776	2,285	9,768	240,587	260,219
45	-	Bridges - Lakeview Paving	Roadway Excavation	510	CY	36	18,449	-	1,845	203	867	21,364	23,107
45	-	Bridges - Lakeview Paving	Imported Borrow	2,510	CY	41	102,146	-	10,215	1,124	4,803	118,287	127,939
45	-	Bridges - Lakeview Paving	Hot Mix Asphalt (Type A)	450	TON	118	52,904	-	5,290	582	2,487	61,264	66,263
45	-	Bridges - Lakeview Paving	Class 2 Aggregate Base	330	CY	59	19,398	-	1,940	213	912	22,464	24,297
45	-	Bridges - Lakeview Paving	Midwest Guardrail System	200	LF	37	7,345	-	735	81	345	8,506	9,200
45	-	Bridges - Lakeview Paving	Transition Railing (Type WB-31)	4.00	EA	3,617	14,470	-	1,447	159	680	16,756	18,123
45	-	Bridges - Lakeview Paving	Alternative Flared Terminal System	2.00	EA	1,809	3,617	-	362	40	170	4,189	4,531
45	-	Bridges - Lakeview Paving	Temporary Reinforced Silt Fence	600	LF	7	4,113	-	411	45	193	4,763	5,152
45	-	Bridges - Lakeview Paving	Temporary Fence (Type ESA)	300	LF	5	1,365	-	136	15	64	1,580	1,709
45	-	Bridges - Lakeview Paving	Temporary Construction Entrance	2.00	EA	3,892	7,783	-	778	86	366	9,013	9,749
45	-	Bridges - Lakeview Paving	Water Pollution Control	0.10	%	192,897	19,290	-	1,929	212	907	22,338	24,161
45	-	Bridges - Lakeview Paving	Roadside Sign - One Post	2.00	EA	244	488	-	49	5	23	566	612
45	-	Bridges - Lakeview Paving	Reset Roadside Sign	4.00	EA	271	1,085	-	109	12	51	1,257	1,359
45	-	Bridges - Lakeview Paving	Relocate Roadside Sign	2.00	EA	90	181	-	18	2	9	209	227
45	-	Bridges - Lakeview Paving	Thermoplastic Traffic Stripe	660	LF	1	513	-	51	6	24	594	643
45	-	Bridges - Lakeview Paving	Type III Barricade	4.00	EA	248	992	-	99	11	47	1,149	1,243
45	-	Bridges - Lakeview Paving	Traffic Control System	20.00	Days	904	18,087	-	1,809	199	850	20,945	22,654
45	-	Bridges - Lakeview Paving	Temporary Railing (Type K)	300	LF	43	12,751	-	1,275	140	600	14,766	15,971
45	-	Bridges - Fall Creek											
45	-	Bridges - Fall Creek	Structure Excavation (Bridge)	499	BCY	54	26,865	-	2,687	296	1,263	31,110	33,649
45	-	Bridges - Fall Creek	A736 Barrier Wall	100	LF	360	36,038	-	3,604	396	1,694	41,733	45,138
45	-	Bridges - Fall Creek	Columns/Walls Structural Concrete includes forms, Grade 60 rebar,	111	CY	1,802	200,039	-	20,004	2,200	9,405	231,649	250,551
45	-	Bridges - Fall Creek	Deck Structural concrete, in place, includes forms, Grade 60 rebar,	31.00	CY	1,068	33,116	-	3,312	364	1,557	38,349	41,479
45	-	Bridges - Fall Creek	Footer Structural concrete, footing, reinforced, includes forms(4 uses	86.00	CY	388	33,401	-	3,340	367	1,570	38,679	41,835
45	-	Bridges - Fall Creek	Approach Slab Structural concrete, in place, 6" thick, includes forms	22.00	CY	268	5,904	-	590	65	278	6,837	7,395
45	-	Bridges - Fall Creek	Bridge Demolition	720	SF	53	38,189	-	3,819	420	1,796	44,223	47,832
45	-	Bridges - Fall Creek Paving	Roadway Excavation	720	CY	36	26,045	-	2,605	286	1,225	30,161	32,622
45	-	Bridges - Fall Creek Paving	Imported Borrow	2,380	CY	41	96,856	-	9,686	1,065	4,554	112,160	121,313
45	-	Bridges - Fall Creek Paving	Hot Mix Asphalt (Type A)	230	TON	118	27,040	-	2,704	297	1,271	31,313	33,868
45	-	Bridges - Fall Creek Paving	Class 2 Aggregate Base	170	CY	59	9,993	-	999	110	470	11,572	12,516
45	-	Bridges - Fall Creek Paving	Midwest Guardrail System	100	LF	37	3,673	-	367	40	173	4,253	4,600
45	-	Bridges - Fall Creek Paving	Transition Railing (Type WB-31)	4.00	EA	3,617	14,470	-	1,447	159	680	16,756	18,123
45	-	Bridges - Fall Creek Paving	Alternative Flared Terminal System	2.00	EA	1,809	3,617	-	362	40	170	4,189	4,531
45	-	Bridges - Fall Creek Paving	Relocate Gate	1.00	EA	90	90	-	9	1	4	105	113
45	-	Bridges - Fall Creek Paving	Temporary Reinforced Silt Fence	400	LF	7	2,742	-	274	30	129	3,175	3,434
45	-	Bridges - Fall Creek Paving	Temporary Fence (Type ESA)	400	LF	5	1,820	-	182	20	86	2,107	2,279
45	-	Bridges - Fall Creek Paving	Temporary Hydroseed	280	SQYD	8	2,335	-	233	26	110	2,704	2,924
45	-	Bridges - Fall Creek Paving	Rollod Erosion Control / Jute Mesh	280	SQYD	15	4,208	-	421	46	198	4,873	5,271
45	-	Bridges - Fall Creek Paving	Temporary Fiber Roll	375	LF	7	2,747	-	275	30	129	3,181	3,441
45	-	Bridges - Fall Creek Paving	Temporary Construction Entrance	2.00	EA	3,892	7,783	-	778	86	366	9,013	9,749
45	-	Bridges - Fall Creek Paving	Water Pollution Control	0.10	%	159,934	15,993	-	1,599	176	752	18,521	20,032
45	-	Bridges - Fall Creek Paving	Temporary Traffic Stripe	500	LF	1	543	-	54	6	26	628	680
45	-	Bridges - Fall Creek Paving	Thermoplastic Traffic Stripe	275	LF	1	214	-	21	2	10	248	268
45	-	Bridges - Fall Creek Paving	Type III Barricade	2.00	EA	248	496	-	50	5	23	574	621
45	-	Bridges - Fall Creek Paving	Traffic Control System	50.00	Days	904	45,217	-	4,522	497	2,126	52,362	56,635
45	-	Bridges - Fall Creek Paving	Temporary Railing (Type K)	200	LF	43	8,501	-	850	94	400	9,844	10,647
45	-	Bridges - Daggett Road											
45	-	Bridges - Daggett Road	Sheet Pile Cofferdam For Footers	7,200	SF	35	252,561	-	25,256	2,778	11,875	292,470	316,336
45	-	Bridges - Daggett Road	Backfill, structural, common earth, 105 H.P. dozer, 50' haul, from exi	91.00	LCY	37	3,362	-	336	37	158	3,893	4,211
45	-	Bridges - Daggett Road	Structure Excavation (Rock) Drilling and blasting rock, boulders, und	107	BCY	170	18,239	-	1,824	201	858	21,120	22,844
45	-	Bridges - Daggett Road	Structure Excavation (Type D)	1,535	BCY	19	28,638	-	2,864	315	1,346	33,164	35,870
45	-	Bridges - Daggett Road	Structure Excavation (Bridge)	171	BCY	54	9,206	-	921	101	433	10,661	11,531
45	-	Bridges - Daggett Road	Prestressed concrete piles, square, 40' long, 24" square, priced usi	480	VLFT	150	72,233	-	7,223	795	3,396	83,646	90,472
45	-	Bridges - Daggett Road	18" Diameter 40' Long Tie Down Anchor Installation	480	VLFT	93	44,433	-	4,443	489	2,089	51,454	55,653
45	-	Bridges - Daggett Road	Piling special costs, pre-augering for Pile and Tie Down Anchor	960	LF	289	277,047	-	27,705	3,048	13,026	320,825	347,005
45	-	Bridges - Daggett Road	Mobilization, 150 ton, set up and remove crane, with pile leads and	2.00	EA	20,847	41,694	-	4,169	459	1,960	48,282	52,222
45	-	Bridges - Daggett Road	A736 Barrier Wall	530	LF	360	191,003	-	19,100	2,101	8,980	221,185	239,233
45	-	Bridges - Daggett Road	Expansion joint, neoprene, liquid, 1" x 2", cold applied	46.00	LF	41	1,907	-	191	21	90	2,208	2,388
45	-	Bridges - Daggett Road	Columns Structural Concrete includes forms, Grade 60 rebar, concre	157	CY	1,802	282,938	-	28,294	3,112	13,303	327,647	354,383
45	-	Bridges - Daggett Road	Deck Structural concrete, in place, includes forms, Grade 60 rebar,	167	CY	1,068	178,401	-	17,840	1,962	8,388	206,591	223,449
45	-	Bridges - Daggett Road	Footer Structural concrete, footing, reinforced, includes forms(4 uses	448	CY	388	173,996	-	17,400	1,914	8,181	201,491	217,932
45	-	Bridges - Daggett Road	Approach Slab Structural concrete, in place, 6" thick, includes forms	17.00	CY	268	4,562	-	456	50	215	5,283	5,715
45	-	Bridges - Daggett Road	Precast 36" I-Girder 65'	8.00	EA	26,947	215,579	-	21,558	2,371	10,136	249,645	270,016

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
45	-	Bridges - Daggett Road	Precast 36" I-Girder 48'	8.00	EA	33,484	267,873	-	26,787	2,947	12,595	310,201	335,514
45	-	Bridges - Daggett Road	Bridge Demolition	3,262	SF	53	173,016	-	17,302	1,903	8,135	200,356	216,705
45	-	Bridges - Daggett Road Paving	Roadway Excavation	1,500	CY	36	54,261	-	5,426	597	2,551	62,835	67,962
45	-	Bridges - Daggett Road Paving	Imported Borrow	5,500	CY	41	223,826	-	22,383	2,462	10,524	259,194	280,345
45	-	Bridges - Daggett Road Paving	Hot Mx Asphalt (Type A)	1,240	TON	118	145,781	-	14,578	1,604	6,854	168,817	182,592
45	-	Bridges - Daggett Road Paving	Class 2 Aggregate Base	920	CY	59	54,080	-	5,408	595	2,543	62,626	67,736
45	-	Bridges - Daggett Road Paving	Remove Base and Surfacing	9,485	SF	5	51,466	-	5,147	566	2,420	59,599	64,462
45	-	Bridges - Daggett Road Paving	Midwest Guardrail System	200	LF	37	7,345	-	735	81	345	8,506	9,200
45	-	Bridges - Daggett Road Paving	Transition Railing (Type WB-31)	4.00	EA	3,617	14,470	-	1,447	159	680	16,756	18,123
45	-	Bridges - Daggett Road Paving	Alternative Flared Terminal System	2.00	EA	1,809	3,617	-	362	40	170	4,189	4,531
45	-	Bridges - Daggett Road Paving	Temporary Reinforced Silt Fence	1,000	LF	7	6,855	-	685	75	322	7,938	8,586
45	-	Bridges - Daggett Road Paving	Temporary Fence (Type ESA)	1,000	LF	5	4,549	-	455	50	214	5,268	5,698
45	-	Bridges - Daggett Road Paving	Temporary Hydroseed	1,200	SQYD	8	10,006	-	1,001	110	470	11,587	12,532
45	-	Bridges - Daggett Road Paving	Rolled Erosion Control / Jute Mesh	1,200	SQYD	15	18,036	-	1,804	198	848	20,886	22,591
45	-	Bridges - Daggett Road Paving	Temporary Fiber Roll	1,100	LF	7	8,058	-	806	89	379	9,331	10,092
45	-	Bridges - Daggett Road Paving	Temporary Construction Entrance	1.00	EA	3,892	3,892	-	389	43	183	4,507	4,874
45	-	Bridges - Daggett Road Paving	Water Pollution Control	0.10	%	529,414	52,941	-	5,294	582	2,489	61,307	66,310
45	-	Bridges - Daggett Road Paving	Roadside Sign - One Post	1.00	EA	244	244	-	24	3	11	283	306
45	-	Bridges - Daggett Road Paving	Remove Roadside Sign	2.00	EA	90	181	-	18	2	9	209	227
45	-	Bridges - Daggett Road Paving	Reset Roadside Sign	2.00	EA	271	543	-	54	6	26	628	680
45	-	Bridges - Daggett Road Paving	Thermoplastic Traffic Stripe	2,020	LF	1	1,571	-	157	17	74	1,819	1,968
45	-	Bridges - Daggett Road Paving	Type III Barricade	2.00	EA	248	496	-	50	5	23	574	621
45	-	Bridges - Daggett Road Paving	Traffic Control System	15.00	Days	904	13,565	-	1,357	149	638	15,709	16,991
45	-	Bridges - Daggett Road Paving	Temporary Railing (Type K)	120	LF	43	5,101	-	510	56	240	5,906	6,388
		Bridges - Dry Creek											
45	-	Bridges - Dry Creek	Temporary Bridge	1,015	SF	186	188,425	-	18,842	2,073	8,859	218,199	236,004
45	-	Bridges - Dry Creek Paving	Roadway Excavation	700	CY	36	25,322	-	2,532	279	1,191	29,323	31,716
45	-	Bridges - Dry Creek Paving	Imported Borrow	1,000	CY	41	40,696	-	4,070	448	1,913	47,126	50,972
45	-	Bridges - Dry Creek Paving	Hot Mx Asphalt (Type A)	600	TON	118	70,539	-	7,054	776	3,317	81,685	88,351
45	-	Bridges - Dry Creek Paving	Class 2 Aggregate Base	380	CY	59	22,337	-	2,234	246	1,050	25,867	27,978
45	-	Bridges - Dry Creek Paving	Midwest Guardrail System	100	LF	37	3,673	-	367	40	173	4,253	4,600
45	-	Bridges - Dry Creek Paving	Transition Railing (Type WB-31)	4.00	EA	3,617	14,470	-	1,447	159	680	16,756	18,123
45	-	Bridges - Dry Creek Paving	Alternative Flared Terminal System	2.00	EA	1,809	3,617	-	362	40	170	4,189	4,531
45	-	Bridges - Dry Creek Paving	Temporary Reinforced Silt Fence	400	LF	7	2,742	-	274	30	129	3,175	3,434
45	-	Bridges - Dry Creek Paving	Temporary Fence (Type ESA)	400	LF	5	1,820	-	182	20	86	2,107	2,279
45	-	Bridges - Dry Creek Paving	Temporary Hydroseed	550	SQYD	8	4,586	-	459	50	216	5,311	5,744
45	-	Bridges - Dry Creek Paving	Rolled Erosion Control / Jute Mesh	550	SQYD	15	8,267	-	827	91	389	9,573	10,354
45	-	Bridges - Dry Creek Paving	Temporary Fiber Roll	1,000	LF	7	7,325	-	733	81	344	8,483	9,175
45	-	Bridges - Dry Creek Paving	Temporary Construction Entrance	2.00	EA	3,892	7,783	-	778	86	366	9,013	9,749
45	-	Bridges - Dry Creek Paving	Water Pollution Control	0.10	%	158,894	15,889	-	1,589	175	747	18,400	19,902
45	-	Bridges - Dry Creek Paving	Thermoplastic Traffic Stripe	650	LF	1	506	-	51	6	24	585	633
45	-	Bridges - Dry Creek Paving	Portable Changeable Message Signs	2.00	EA	2,713	5,426	-	543	60	255	6,283	6,796
45	-	Bridges - Dry Creek Paving	Type III Barricade	2.00	EA	248	496	-	50	5	23	574	621
45	-	Bridges - Dry Creek Paving	Traffic Control System	20.00	Days	904	18,087	-	1,809	199	850	20,945	22,654
45	-	Bridges - Dry Creek Paving	Temporary Railing (Type K)	200	LF	43	8,501	-	850	94	400	9,844	10,647
45	-	Bridges - Dry Creek Temp Detour	Roadway Excavation	1,200	CY	36	43,409	-	4,341	477	2,041	50,268	54,370
45	-	Bridges - Dry Creek Temp Detour	Ditch Excavation	40.00	CY	32	1,266	-	127	14	60	1,466	1,586
45	-	Bridges - Dry Creek Temp Detour	Imported Borrow	1,620	CY	41	65,927	-	6,593	725	3,100	76,345	82,574
45	-	Bridges - Dry Creek Temp Detour	Hot Mx Asphalt (Type A)	530	TON	118	62,310	-	6,231	685	2,930	72,156	78,043
45	-	Bridges - Dry Creek Temp Detour	Class 2 Aggregate Base	400	CY	59	23,513	-	2,351	259	1,106	27,228	29,450
45	-	Bridges - Dry Creek Temp Detour	Midwest Guardrail System	100	LF	37	3,673	-	367	40	173	4,253	4,600
45	-	Bridges - Dry Creek Temp Detour	Transition Railing (Type WB-31)	4.00	EA	3,617	14,470	-	1,447	159	680	16,756	18,123
45	-	Bridges - Dry Creek Temp Detour	Alternative Flared Terminal System	2.00	EA	1,809	3,617	-	362	40	170	4,189	4,531
45	-	Bridges - Dry Creek Temp Detour	Temporary Reinforced Silt Fence	400	LF	7	2,742	-	274	30	129	3,175	3,434
45	-	Bridges - Dry Creek Temp Detour	Temporary Fence (Type ESA)	400	LF	5	1,820	-	182	20	86	2,107	2,279
45	-	Bridges - Dry Creek Temp Detour	Temporary Hydroseed	320	SQYD	8	2,668	-	267	29	125	3,090	3,342
45	-	Bridges - Dry Creek Temp Detour	Rolled Erosion Control / Jute Mesh	320	SQYD	15	4,810	-	481	53	226	5,570	6,024
45	-	Bridges - Dry Creek Temp Detour	Temporary Fiber Roll	400	LF	7	2,930	-	293	32	138	3,393	3,670
45	-	Bridges - Dry Creek Temp Detour	Temporary Construction Entrance	2.00	EA	3,892	7,783	-	778	86	366	9,013	9,749
45	-	Bridges - Dry Creek Temp Detour	Water Pollution Control	0.10	%	196,424	19,642	-	1,964	216	924	22,746	24,602
45	-	Bridges - Dry Creek Temp Detour	Construction Area Signs	1.00	LS	1,739	1,739	-	174	19	82	2,014	2,178
45	-	Bridges - Dry Creek Temp Detour	Temporary Traffic Stripe	620	LF	1	673	-	67	7	32	779	843
45	-	Bridges - Dry Creek Temp Detour	Type III Barricade	2.00	EA	248	496	-	50	5	23	575	621
45	-	Bridges - Dry Creek Temp Detour	Traffic Control System	5.00	Days	904	4,522	-	452	50	213	5,236	5,664

KRRC Cost Estimate - Full Removal

July 2019

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45	-	Bridges - Dry Creek Temp Detour	Temporary Railing (Type K)	160	LF	43	6,801	-	680	75	320	7,875	8,518
		Bridges - Camp Creek											
45	-	Bridges - Camp Creek	Earth Work Cofferdam Construction for side footers	1,186	LCY	14	16,810	-	1,681	185	790	19,467	21,055
45	-	Bridges - Camp Creek	Backfill, structural, common earth, 105 H.P. dozer, 50' haul, from ex	420	LCY	37	15,517	-	1,552	171	730	17,969	19,435
45	-	Bridges - Camp Creek	Structure Excavation (Bridge)	585	BCY	54	31,495	-	3,150	346	1,481	36,472	39,448
45	-	Bridges - Camp Creek	Steel piles, "H" Sections, 50' long, HP14 X 89, excludes mobilization	1,400	VLFT	78	108,773	-	10,877	1,197	5,114	125,961	136,239
45	-	Bridges - Camp Creek	Piling special costs, pre-augering for Pile	1,400	LF	289	404,027	-	40,403	4,444	18,996	467,870	506,048
45	-	Bridges - Camp Creek	Mobilization, 150 ton, set up and remove crane, with pile leads and	2.00	EA	20,847	41,694	-	4,169	459	1,960	48,282	52,222
45	-	Bridges - Camp Creek	A736 Barrier Wall	444	LF	360	160,010	-	16,001	1,760	7,523	185,294	200,414
45	-	Bridges - Camp Creek	Expansion joint, neoprene, liquid, 1" x 2", cold applied	50.00	LF	41	2,072	-	207	23	97	2,400	2,596
45	-	Bridges - Camp Creek	Columns Structural Concrete includes forms, Grade 60 rebar, concrete	132	CY	1,802	237,884	-	23,788	2,617	11,185	275,474	297,953
45	-	Bridges - Camp Creek	Deck Structural concrete, in place, includes forms, Grade 60 rebar, 4	139	CY	1,068	148,489	-	14,849	1,633	6,981	171,953	185,985
45	-	Bridges - Camp Creek	Footer Structural concrete, footing, reinforced, includes forms(4 uses	162	CY	388	62,918	-	6,292	692	2,958	72,860	78,806
45	-	Bridges - Camp Creek	Approach Slab Structural concrete, in place, 6" thick, includes forms	19.00	CY	268	5,099	-	510	56	240	5,905	6,387
45	-	Bridges - Camp Creek	Precast 36" I-Girder 67'	4.00	EA	26,947	107,790	-	10,779	1,186	5,068	124,822	135,008
45	-	Bridges - Camp Creek	Precast 36" I-Girder 53'	8.00	EA	33,484	267,873	-	26,787	2,947	12,595	310,201	335,514
45	-	Bridges - Camp Creek Paving	Roadway Excavation	12,270	CY	36	443,854	-	44,385	4,882	20,869	513,990	555,932
45	-	Bridges - Camp Creek Paving	Ditch Excavation	200	CY	32	6,330	-	633	70	298	7,331	7,929
45	-	Bridges - Camp Creek Paving	Midwest Guardrail System	400	LF	37	14,690	-	1,469	162	691	17,012	18,400
45	-	Bridges - Camp Creek Paving	Transition Railing (Type WB-31)	4.00	EA	3,617	14,470	-	1,447	159	680	16,756	18,123
45	-	Bridges - Camp Creek Paving	Alternative Flared Terminal System	2.00	EA	1,809	3,617	-	362	40	170	4,189	4,531
45	-	Bridges - Camp Creek Paving	Temporary Reinforced Silt Fence	400	LF	7	2,742	-	274	30	129	3,175	3,434
45	-	Bridges - Camp Creek Paving	Temporary Fence (Type ESA)	400	LF	5	1,820	-	182	20	86	2,107	2,279
45	-	Bridges - Camp Creek Paving	Temporary Hydroseed	160	SQYD	8	1,334	-	133	15	63	1,545	1,671
45	-	Bridges - Camp Creek Paving	Roller Erosion Control / Jute Mesh	160	SQYD	15	2,405	-	240	26	113	2,785	3,012
45	-	Bridges - Camp Creek Paving	Temporary Fiber Roll	225	LF	7	1,648	-	165	18	77	1,909	2,064
45	-	Bridges - Camp Creek Paving	Temporary Construction Entrance	2.00	EA	3,892	7,783	-	778	86	366	9,013	9,749
45	-	Bridges - Camp Creek Paving	Water Pollution Control	0.10	%	450,184	45,018	-	4,502	495	2,117	52,132	56,386
45	-	Bridges - Camp Creek Paving	Roadside Sign - One Post	8.00	EA	244	1,953	-	195	21	92	2,262	2,447
45	-	Bridges - Camp Creek Paving	Thermoplastic Traffic Stripe	810	LF	1	630	-	63	7	30	730	789
45	-	Bridges - Camp Creek Paving	Type III Barricade	2.00	EA	248	496	-	50	5	23	574	621
45	-	Bridges - Camp Creek Paving	Traffic Control System	20.00	Days	904	18,087	-	1,809	199	850	20,945	22,654
45	-	Bridges - Camp Creek Paving	Temporary Railing (Type K)	300	LF	43	12,751	-	1,275	140	600	14,766	15,971
45	-	Bridges - Camp Creek Temp Culvert	Roadway Excavation	100	CY	36	3,617	-	362	40	170	4,189	4,531
45	-	Bridges - Camp Creek Temp Culvert	Ditch Excavation	150	CY	32	4,748	-	475	52	223	5,498	5,947
45	-	Bridges - Camp Creek Temp Culvert	Imported Borrow	3,500	CY	41	142,435	-	14,243	1,567	6,697	164,942	178,401
45	-	Bridges - Camp Creek Temp Culvert	Cleaning & Grubbing	5,000	LS	1	4,522	-	452	50	213	5,236	5,664
45	-	Bridges - Camp Creek Temp Culvert	Hot Mix Asphalt (Type A)	470	TON	118	55,256	-	5,526	608	2,598	63,987	69,208
45	-	Bridges - Camp Creek Temp Culvert	Class 2 Aggregate Base	235	CY	59	13,814	-	1,381	152	649	15,997	17,302
45	-	Bridges - Camp Creek Temp Culvert	Rock Slope Protection (Class?) Method B	15.00	CY	90	1,357	-	136	15	64	1,571	1,699
45	-	Bridges - Camp Creek Temp Culvert	Rock Slope Protection Fabric Class 8	45.00	SQYD	9	412	-	41	5	19	477	516
45	-	Bridges - Camp Creek Temp Culvert	36" Alternative Pipe Culvert	300	LF	236	70,924	-	7,092	780	3,335	82,132	88,834
45	-	Bridges - Camp Creek Temp Culvert	Temporary Reinforced Silt Fence	600	LF	7	4,113	-	411	45	193	4,763	5,152
45	-	Bridges - Camp Creek Temp Culvert	Temporary Fence (Type ESA)	600	LF	5	2,729	-	273	30	128	3,161	3,419
45	-	Bridges - Camp Creek Temp Culvert	Temporary Hydroseed	630	SQYD	8	5,253	-	525	58	247	6,083	6,579
45	-	Bridges - Camp Creek Temp Culvert	Roller Erosion Control / Jute Mesh	630	SQYD	15	9,469	-	947	104	445	10,965	11,860
45	-	Bridges - Camp Creek Temp Culvert	Temporary Fiber Roll	1,190	LF	7	8,717	-	872	96	410	10,094	10,918
45	-	Bridges - Camp Creek Temp Culvert	Temporary Concrete Washout	2,000	LS	1	1,809	-	181	20	85	2,094	2,265
45	-	Bridges - Camp Creek Temp Culvert	Temporary Construction Entrance	2.00	EA	3,892	7,783	-	778	86	366	9,013	9,749
45	-	Bridges - Camp Creek Temp Culvert	Water Pollution Control	0.10	%	297,084	29,708	-	2,971	327	1,397	34,403	37,210
45	-	Bridges - Camp Creek Temp Culvert	Construction Area Signs	1.00	LS	1,739	1,739	-	174	19	82	2,014	2,178
45	-	Bridges - Camp Creek Temp Culvert	Temporary Traffic Stripe	650	LF	1	705	-	71	8	33	817	884
45	-	Bridges - Camp Creek Temp Culvert	Type III Barricade	2.00	EA	248	496	-	50	5	23	575	621
45	-	Bridges - Camp Creek Temp Culvert	Traffic Control System	10.00	Days	904	9,043	-	904	99	425	10,472	11,327
45	-	Bridges - Camp Creek Temp Culvert	Temporary Railing (Type K)	600	LF	43	25,503	-	2,550	281	1,199	29,532	31,942
		Bridges - Jenny Creek											
45	-	Bridges - Jenny Creek	Sheet Pile Cofferdam For Center Footer	2,400	SF	35	84,187	-	8,419	926	3,958	97,490	105,445
45	-	Bridges - Jenny Creek	Earth Work Cofferdam Construction for side footers	1,186	LCY	14	16,810	-	1,681	185	790	19,467	21,055
45	-	Bridges - Jenny Creek	Backfill, structural, common earth, 105 H.P. dozer, 50' haul, from ex	142	LCY	37	5,246	-	525	58	247	6,075	6,571
45	-	Bridges - Jenny Creek	Structure Excavation (Type D)	320	BCY	19	5,970	-	597	66	281	6,914	7,478
45	-	Bridges - Jenny Creek	Structure Excavation (Bridge)	209	BCY	54	11,252	-	1,125	124	529	13,030	14,093
45	-	Bridges - Jenny Creek	Steel piles, "H" Sections, 50' long, HP14 X 89, excludes mobilization	2,640	VLFT	78	205,115	-	20,511	2,256	9,644	237,526	256,908
45	-	Bridges - Jenny Creek	Piling special costs, pre-augering for Pile and Tie Down Anchor	2,640	LF	289	761,880	-	76,188	8,381	35,821	882,269	954,262
45	-	Bridges - Jenny Creek	Mobilization, 150 ton, set up and remove crane, with pile leads and	2.00	EA	20,847	41,694	-	4,169	459	1,960	48,282	52,222

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
45	-	Bridges - Jenny Creek	A736 Barrier Wall	776	LF	360	279,657	-	27,966	3,076	13,149	323,848	350,274
45	-	Bridges - Jenny Creek	Expansion joint, neoprene, liquid, 1" x 2", cold applied	58.00	LF	41	2,404	-	240	26	113	2,784	3,011
45	-	Bridges - Jenny Creek	Columns Structural Concrete includes forms, Grade 60 rebar, concrete	174	CY	1,802	313,575	-	31,357	3,449	14,743	363,125	392,756
45	-	Bridges - Jenny Creek	Deck Structural concrete, in place, includes forms, Grade 60 rebar, 4	317	CY	1,068	338,641	-	33,864	3,725	15,922	392,152	424,152
45	-	Bridges - Jenny Creek	Footer Structural concrete, footing, reinforced, includes forms(4 uses	281	CY	388	109,136	-	10,914	1,200	5,131	126,381	136,694
45	-	Bridges - Jenny Creek	Approach Slab Structural concrete, in place, 6" thick, includes forms	22.00	CY	268	5,904	-	590	65	278	6,837	7,395
45	-	Bridges - Jenny Creek	Precast 61" Bulb Tee 73'	8.00	EA	44,308	354,467	-	35,447	3,899	16,666	410,478	443,973
45	-	Bridges - Jenny Creek	Precast 61" Bulb Tee 100'	8.00	EA	71,962	575,698	-	57,570	6,333	27,067	666,668	721,068
45	-	Bridges - Jenny Creek	Bridge Demolition	3,102	SF	53	164,530	-	16,453	1,810	7,736	190,529	206,076
45	-	Bridges - Jenny Creek Paving	Roadway Excavation	30,000	CY	36	1,085,217	-	108,522	11,937	51,023	1,256,700	1,359,247
45	-	Bridges - Jenny Creek Paving	Ditch Excavation	210	CY	32	6,647	-	665	73	313	7,697	8,325
45	-	Bridges - Jenny Creek Paving	Imported Borrow	35,000	CY	41	1,424,348	-	142,435	15,668	66,968	1,649,419	1,784,011
45	-	Bridges - Jenny Creek Paving	Hot Mx Asphalt (Type A)	600	TON	118	70,539	-	7,054	776	3,317	81,685	88,351
45	-	Bridges - Jenny Creek Paving	Class 2 Aggregate Base	370	CY	59	21,750	-	2,175	239	1,023	25,186	27,242
45	-	Bridges - Jenny Creek Paving	Midwest Guardrail System	200	LF	37	7,345	-	735	81	345	8,506	9,200
45	-	Bridges - Jenny Creek Paving	Transition Railing (Type WB-31)	4.00	EA	3,617	14,470	-	1,447	159	680	16,756	18,123
45	-	Bridges - Jenny Creek Paving	Alternative Flared Terminal System	2.00	EA	1,809	3,617	-	362	40	170	4,189	4,531
45	-	Bridges - Jenny Creek Paving	Temporary Reinforced Silt Fence	400	LF	7	2,742	-	274	30	129	3,175	3,434
45	-	Bridges - Jenny Creek Paving	Temporary Fence (Type ESA)	400	LF	5	1,820	-	182	20	86	2,107	2,279
45	-	Bridges - Jenny Creek Paving	Temporary Hydroseed	1,770	SQYD	8	14,758	-	1,476	162	694	17,090	18,485
45	-	Bridges - Jenny Creek Paving	Rolled Erosion Control / Jute Mesh	1,770	SQYD	15	26,604	-	2,660	293	1,251	30,807	33,321
45	-	Bridges - Jenny Creek Paving	Temporary Fiber Roll	2,490	LF	7	18,240	-	1,824	201	858	21,122	22,846
45	-	Bridges - Jenny Creek Paving	Temporary Concrete Washout	2,000	LS	1	1,809	-	181	20	85	2,094	2,265
45	-	Bridges - Jenny Creek Paving	Temporary Construction Entrance	2.00	EA	3,892	7,783	-	778	86	366	9,013	9,749
45	-	Bridges - Jenny Creek Paving	Water Pollution Control	0.10	%	2,608,501	260,850	-	26,085	2,869	12,264	302,069	326,718
45	-	Bridges - Jenny Creek Paving	Roadside Sign - One Post	8.00	EA	244	1,953	-	195	21	92	2,262	2,447
45	-	Bridges - Jenny Creek Paving	Construction Area Signs	2,000	LS	1	1,809	-	181	20	85	2,094	2,265
45	-	Bridges - Jenny Creek Paving	Thermoplastic Traffic Stripe	1,000	LF	1	778	-	78	9	37	901	974
45	-	Bridges - Jenny Creek Paving	Type III Barricade	2.00	EA	248	496	-	50	5	23	574	621
45	-	Bridges - Jenny Creek Paving	Traffic Control System	20.00	Days	904	18,087	-	1,809	199	850	20,945	22,654
45	-	Bridges - Jenny Creek Paving	Temporary Railing (Type K)	300	LF	43	12,751	-	1,275	140	600	14,766	15,971
		Bridges - Other											
45	-	Bridges - Pedestrian Bridge	Bridge Demolition Ped Bridge #1	800	SF	53	42,432	-	4,243	467	1,995	49,137	53,147
45	-	Bridges - Camp Ground	Bridge Demolition Ped Bridge Campground	800	SF	53	42,432	-	4,243	467	1,995	49,137	53,147
45	-	Bridges - JC Boyle	Bridge Demolition Timber JC Boyle	1,800	SF	53	95,472	-	9,547	1,050	4,489	110,558	119,580
		Culverts - Beaver Creek (Copco Rd)											
45	-	Culverts - Beaver Creek (Copco Rd)	Roadway Excavation	3,000	CY	36	108,522	-	10,852	1,194	5,102	125,670	135,925
45	-	Culverts - Beaver Creek (Copco Rd)	Imported Borrow	2,500	CY	41	101,739	-	10,174	1,119	4,783	117,816	127,429
45	-	Culverts - Beaver Creek (Copco Rd)	Rock Slope Protection Class III, Method B	250	CY	90	22,609	-	2,261	249	1,063	26,181	28,318
45	-	Culverts - Beaver Creek (Copco Rd)	Rock Slope Protection Fabric Class 8	700	SQYD	2	1,746	-	175	19	82	2,021	2,186
45	-	Culverts - Beaver Creek (Copco Rd)	60" CORRUGATED STEEL PIPE (.138" THICK)	80.00	LF	244	19,534	-	1,953	215	918	22,621	24,466
45	-	Culverts - Beaver Creek (Copco Rd)	Temporary Reinforced Silt Fence	600	LF	7	4,113	-	411	45	193	4,763	5,152
45	-	Culverts - Beaver Creek (Copco Rd)	Temporary Fence (Type ESA)	600	LF	5	2,729	-	273	30	128	3,161	3,419
45	-	Culverts - Beaver Creek (Copco Rd)	Water Pollution Control	0.10	%	188,953	18,895	-	1,890	208	888	21,881	23,667
45	-	Culverts - Beaver Creek (Copco Rd)	Construction Area Signs	1.00	LS	522	522	-	52	6	25	604	653
45	-	Culverts - Beaver Creek (Copco Rd)	Traffic Control System	1.00	LS	8,696	8,696	-	870	96	409	10,070	10,891
45	-	Culverts - Beaver Creek (Copco Rd)	Temporary Railing (Type K)	80.00	LF	33	2,642	-	264	29	124	3,059	3,309
45	-	Culverts - Beaver Creek (Copco Rd)	Replace and Reconstruct 60-inch Culvert No.1 at Beaver Creek	1.00	LS	13,043	13,043	-	1,304	143	613	15,105	16,337
45	-	Culverts - Beaver Creek (Copco Rd)	Replace and Reconstruct 60-inch Culvert No.2 at Beaver Creek	1.00	LS	13,043	13,043	-	1,304	143	613	15,105	16,337
		Culverts - Raymond Gulch (Copco Rd)											
45	-	Culverts - Raymond Gulch (Copco Rd)	Rock Slope Protection Class III, Method B	150	CY	90	13,565	-	1,357	149	638	15,709	16,991
45	-	Culverts - Raymond Gulch (Copco Rd)	Rock Slope Protection Fabric Class 8	400	SQYD	2	997	-	100	11	47	1,155	1,249
45	-	Culverts - Raymond Gulch (Copco Rd)	Temporary Reinforced Silt Fence	600	LF	7	4,113	-	411	45	193	4,763	5,152
45	-	Culverts - Raymond Gulch (Copco Rd)	Temporary Fence (Type ESA)	600	LF	5	2,729	-	273	30	128	3,161	3,419
45	-	Culverts - Raymond Gulch (Copco Rd)	Water Pollution Control	0.10	%	14,563	1,456	-	146	16	68	1,686	1,824
45	-	Culverts - Raymond Gulch (Copco Rd)	Traffic Control System	1.00	LS	870	870	-	87	10	41	1,007	1,089
45	-	Culverts - Raymond Gulch (Copco Rd)	60-inch Culvert at Raymond Gulch	1.00	LS	8,696	8,696	-	870	96	409	10,070	10,891
		Culverts - Patricia Avenue											
45	-	Culverts - Patricia Avenue	Rock Slope Protection Class III, Method B	150	CY	90	13,565	-	1,357	149	638	15,709	16,991
45	-	Culverts - Patricia Avenue	Rock Slope Protection Fabric Class 8	400	SQYD	2	997	-	100	11	47	1,155	1,249
45	-	Culverts - Patricia Avenue	Water Pollution Control	0.10	%	14,563	1,456	-	146	16	68	1,686	1,824
45	-	Culverts - Patricia Avenue	Traffic Control System	1.00	LS	870	870	-	87	10	41	1,007	1,089
		Culverts - Topsy Grade											
45	-	Culverts - Topsy Grade	Trench Excavation	275	CY	10	2,858	-	286	31	134	3,309	3,579

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
45	-	Culverts - Topsy Grade	Clearing & Grubbing	1.00	LS	1,739	1,739	-	174	19	82	2,014	2,178
45	-	Culverts - Topsy Grade	Rock Slope Protection Class III, Method B	800	CY	90	72,348	-	7,235	796	3,402	83,780	90,616
45	-	Culverts - Topsy Grade	Rock Slope Protection Fabric Class 8	2,350	SQYD	2	5,860	-	586	64	276	6,786	7,340
45	-	Culverts - Topsy Grade	24" CORRUGATED STEEL PIPE (.138" THICK)	200	LF	19	3,740	-	374	41	176	4,331	4,684
45	-	Culverts - Topsy Grade	Temporary Reinforced Silt Fence	1,000	LF	7	6,855	-	685	75	322	7,938	8,586
45	-	Culverts - Topsy Grade	Temporary Fence (Type ESA)	1,000	LF	5	4,549	-	455	50	214	5,268	5,698
45	-	Culverts - Topsy Grade	Water Pollution Control	0.10	%	86,544	8,654	-	865	95	407	10,022	10,840
45	-	Culverts - Topsy Grade	Traffic Control System	1.00	LS	4,348	4,348	-	435	48	204	5,035	5,446
		Culverts - JC Boyle Unnamed											
45	-	Culverts - JC Boyle Unnamed	Rock Slope Protection Class III, Method B	115	CY	90	10,400	-	1,040	114	489	12,043	13,026
45	-	Culverts - JC Boyle Unnamed	Rock Slope Protection Fabric Class 8	350	SQYD	2	873	-	87	10	41	1,011	1,093
45	-	Culverts - JC Boyle Unnamed	Water Pollution Control	0.10	%	11,273	1,127	-	113	12	53	1,305	1,412
45	-	Culverts - JC Boyle Unnamed	Traffic Control System	1.00	LS	870	870	-	87	10	41	1,007	1,089
45	-	Culverts - JC Boyle Unnamed	Copco Road at Unnamed Creek Culvert No. 1	1.00	LS	13,043	13,043	-	1,304	143	613	15,105	16,337
45	-	Culverts - JC Boyle Unnamed	Copco Road at Unnamed Creek Culvert No. 2	1.00	LS	13,043	13,043	-	1,304	143	613	15,105	16,337
45	-	Culverts - JC Boyle Unnamed	6'x6'x34' Box Culvert installation	1.00	LS	13,043	13,043	-	1,304	143	613	15,105	16,337
		Culverts - Scotch Creek (Copco Rd)											
45	-	Culverts - Scotch Creek (Copco Rd)	Roadway Excavation	3,000	CY	36	108,522	-	10,852	1,194	5,102	125,670	135,925
45	-	Culverts - Scotch Creek (Copco Rd)	Ditch Excavation	10.00	CY	32	317	-	32	3	15	367	396
45	-	Culverts - Scotch Creek (Copco Rd)	Imported Borrow	3,000	CY	41	122,087	-	12,209	1,343	5,740	141,379	152,915
45	-	Culverts - Scotch Creek (Copco Rd)	Hot Mx Asphalt (Type A)	170	TON	118	19,986	-	1,999	220	940	23,144	25,033
45	-	Culverts - Scotch Creek (Copco Rd)	Class 2 Aggregate Base	120	CY	59	7,054	-	705	78	332	8,169	8,835
45	-	Culverts - Scotch Creek (Copco Rd)	Rock Slope Protection Class III, Method B	5.00	CY	90	452	-	45	5	21	524	566
45	-	Culverts - Scotch Creek (Copco Rd)	Rock Slope Protection Fabric Class 8	12.00	SQYD	2	30	-	3	0	1	35	37
45	-	Culverts - Scotch Creek (Copco Rd)	Structural Concrete, Box Culvert	10.00	CY	4,373	43,725	-	4,373	481	2,056	50,635	54,766
45	-	Culverts - Scotch Creek (Copco Rd)	Midwest Guardrail System	400	LF	37	14,690	-	1,469	162	691	17,012	18,400
45	-	Culverts - Scotch Creek (Copco Rd)	Alternative Flared Terminal System	2.00	EA	1,809	3,617	-	362	40	170	4,189	4,531
45	-	Culverts - Scotch Creek (Copco Rd)	Temporary Reinforced Silt Fence	400	LF	7	2,742	-	274	30	129	3,175	3,434
45	-	Culverts - Scotch Creek (Copco Rd)	Temporary Fence (Type ESA)	400	LF	5	1,820	-	182	20	86	2,107	2,279
45	-	Culverts - Scotch Creek (Copco Rd)	Temporary Hydroseed	220	SQYD	8	1,834	-	183	20	86	2,124	2,298
45	-	Culverts - Scotch Creek (Copco Rd)	Rolled Erosion Control / Jute Mesh	220	SQYD	15	3,307	-	331	36	155	3,829	4,142
45	-	Culverts - Scotch Creek (Copco Rd)	Temporary Fiber Roll	450	LF	7	3,296	-	330	36	155	3,817	4,129
45	-	Culverts - Scotch Creek (Copco Rd)	Temporary Construction Entrance	2.00	EA	3,892	7,783	-	778	86	366	9,013	9,749
45	-	Culverts - Scotch Creek (Copco Rd)	Water Pollution Control	0.10	%	302,173	30,217	-	3,022	332	1,421	34,992	37,847
45	-	Culverts - Scotch Creek (Copco Rd)	Construction Area Signs	1.00	LS	2,174	2,174	-	217	24	102	2,517	2,723
45	-	Culverts - Scotch Creek (Copco Rd)	Thermoplastic Traffic Stripe	200	LF	1	156	-	16	2	7	180	195
45	-	Culverts - Scotch Creek (Copco Rd)	Traffic Control System	1.00	LS	8,696	8,696	-	870	96	409	10,070	10,891
45	-	Culverts - Scotch Creek (Copco Rd)	Temporary Railing (Type K)	200	LF	33	6,604	-	660	73	311	7,648	8,272
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Roadway Excavation	550	CY	36	19,896	-	1,990	219	935	23,039	24,920
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Ditch Excavation	10.00	CY	32	317	-	32	3	15	367	396
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Imported Borrow	2,300	CY	41	93,600	-	9,360	1,030	4,401	108,390	117,235
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Hot Mx Asphalt (Type A)	510	TON	118	59,958	-	5,996	660	2,819	69,433	75,098
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Class 2 Aggregate Base	380	CY	59	22,337	-	2,234	246	1,050	25,867	27,978
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Rock Slope Protection (Class?) Method B	10.00	CY	90	904	-	90	10	43	1,047	1,133
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Rock Slope Protection Fabric Class 8	30.00	SQYD	9	275	-	27	3	13	318	344
45	-	Culverts - Scotch Creek Temp (Copco Rd)	36" Alternative Pipe Culvert	250	LF	236	59,104	-	5,910	650	2,779	68,443	74,028
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Temporary Reinforced Silt Fence	300	LF	7	2,056	-	206	23	97	2,381	2,576
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Temporary Fence (Type ESA)	300	LF	5	1,365	-	136	15	64	1,580	1,709
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Temporary Hydroseed	590	SQYD	8	4,919	-	492	54	231	5,697	6,162
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Rolled Erosion Control / Jute Mesh	590	SQYD	15	8,868	-	887	98	417	10,269	11,107
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Temporary Fiber Roll	450	LF	7	3,296	-	330	36	155	3,817	4,129
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Temporary Concrete Washout	2,000	LS	1	1,809	-	181	20	85	2,094	2,265
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Temporary Construction Entrance	2.00	EA	3,892	7,783	-	778	86	366	9,013	9,749
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Water Pollution Control	0.10	%	256,392	25,639	-	2,564	282	1,205	29,691	32,113
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Construction Area Signs	1.00	LS	1,739	1,739	-	174	19	82	2,014	2,178
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Temporary Traffic Stripe	520	LF	1	564	-	56	6	27	653	707
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Type III Barricade	2.00	EA	248	496	-	50	5	23	575	621
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Traffic Control System	10.00	Days	904	9,043	-	904	99	425	10,472	11,327
45	-	Culverts - Scotch Creek Temp (Copco Rd)	Temporary Railing (Type K)	55.06	LF	386	21,252	-	2,125	234	999	24,610	26,619
		Paving											
45	-	Paving - Lakeview Disposal Access Road	Pre: none; Post: 0.7 miles 6" AB overlay (no drainage improvements)	1.00	EA	147,826	147,826	22,174	17,000	1,870	6,950	195,820	229,082
45	-	Paving - Copco 1 Dam Access	Pre: 2500CY roadway excavation, 0.9 miles 9" AB overlay (no drainage)	1.00	EA	217,391	217,391	32,609	25,000	2,750	10,221	287,971	323,928
45	-	Paving - Copco Rd from Copco 1 access to Copco Bridge	Pre: 1 mile 9" AB repair; Post: 1 mile 9" AB repair, 0.2 mile HMA overlay	1.00	EA	276,522	276,522	41,478	31,800	3,498	13,001	366,299	421,926
45	-	Paving - Copco 1 Ager Beswick Rd Barge Access	Pre: minor excavation and 9" AB section; Post: none	1.00	EA	52,174	52,174	7,826	6,000	660	2,453	69,113	77,743

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
45	-	Paving - US 97 Dalles CA Hwy	Pre: none; Post: none (high only)	1.00	EA	-	-	-	-	-	-	-	-
45	-	Paving - OR 66 Green Springs hwy	Pre: none; Post: none (high only)	1.00	EA	-	-	-	-	-	-	-	-
45	-	Paving - JC Boyle Keno Worden	Pre: none; Post: none (high only)	1.00	EA	-	-	-	-	-	-	-	-
45	-	Paving - Topsy Grade Rd	Pre: 0.9 mile 9" AB repair; Post: 0.9 mile 9" AB repair	1.00	EA	765,217	765,217	114,783	88,000	9,680	35,978	1,013,658	1,163,032
45	-	Paving - JC Boyle Dam Access Rd (2,940 ft to dam toe)	Pre: minor excavation; 0.25 mile new 9" AB, 0.7 mile 9" AB repair; post: 1.5 mile 9" AB repair; no guardrail	1.00	EA	291,304	291,304	43,696	33,500	3,685	13,696	385,881	441,009
45	-	Paving - JC Boyle Power Canal Access Rd	Pre: 1.5 mile 9" AB repair; post: 1.5 mile 9" AB repair; no guardrail	1.00	EA	375,652	375,652	56,348	43,200	4,752	17,662	497,614	570,943
45	-	Paving - JC Boyle Powerhouse Access Rd	Pre: none; Post: none (high only)	1.00	EA	-	-	-	-	-	-	-	-
45	-	Paving - Copco Rd I5 to Ager Rd	Pre: none; Post: 1 mile new asphalt overlay	1.00	EA	947,826	947,826	142,174	109,000	11,990	44,564	1,255,554	1,468,820
45	-	Paving - Copco Rd Ager Rd to Lakeview Rd	Pre: 0.5 miles crack sealer, 0.75 miles new asphalt; Post: 1 miles new asphalt	1.00	EA	1,413,043	1,413,043	211,957	162,500	17,875	66,437	1,871,812	2,156,066
45	-	Paving - Copco Rd to Lakeview Rd to Dagget Rd	Pre: 1 mile crack sealer, 1.5 miles new asphalt; Post: 2 miles new asphalt	1.00	EA	2,591,304	2,591,304	388,696	298,000	32,780	121,835	3,432,615	3,953,894
45	-	Paving - Copco Rd Daggett Rd to Copco 1 Access Rd	Pre: 1.5 mile 9" AB repair; Post: 1.5 mile 9" AB repair, no guardrail	1.00	EA	375,652	375,652	56,348	43,200	4,752	17,662	497,614	570,943
		Recreation Improvements											
		KENO Alt A											
46	-	KENO Alt A	Natural Launch Road - Gravel fill, 4" gravel depth & Finish Grading	210	SY	26	5,534	830	636	70	260	7,331	7,929
46	-	KENO Alt A	Improved Commercial Access Road - gravel fill, 8" gravel depth, exc	1,069	SY	42	44,579	6,687	5,127	564	2,096	59,052	63,871
46	-	KENO Alt A	Clearing & grubbing, cut & chip light trees, to 6" diameter	210	SY	2	517	78	59	7	24	685	741
46	-	KENO Alt A	Boulder Retaining Wall - Grading and Finish Grading Slopes	45.00	SY	36	1,598	240	184	20	75	2,117	2,290
46	-	KENO Alt A	Boulder Retaining Wall 2'X2'X2' 8CF or 1200lbs per boulder	60.00	ton	680	40,786	6,118	4,690	516	1,918	54,028	58,437
46	-	KENO Alt A	Access Gate - Fence, chain link industrial, double swing gates, 8' h	3.00	Opng	2,586	7,759	1,164	892	98	365	10,278	11,117
46	-	KENO Alt A	Boulder Retaining Wall geo-grid soil reinforcement for segmental bl	397	SF	3	1,102	165	127	14	52	1,460	1,579
46	-	KENO Alt A	Stone Retaining Wall geo-grid soil reinforcement for segmental blo	919	SF	2	1,790	269	206	23	84	2,371	2,565
46	-	KENO Alt A	Timber Retaining wall - timber, 6" x 8"	100	LF	52	5,234	785	602	66	246	6,933	7,499
46	-	KENO Alt A	Stone Retaining Wall - retaining wall, cut stone, 6' to 10' high, 2' thi	919	SF	148	135,724	20,359	15,608	1,717	6,381	179,789	194,460
46	-	KENO Alt A	Bulletin board/ Kiosk - prefabricated, wood frame, 1/4" cork, 4' x 8"	2.00	EA	963	1,926	289	221	24	91	2,551	2,759
		HWY 66 Bridge											
46	-	HWY 66 Bridge	Boat Ramp - Fine grading, finish grading, small area, to be paved w	1,025	SY	11	11,513	1,727	1,324	146	541	15,251	16,495
46	-	HWY 66 Bridge	Boat Ramp - Fill, gravel fill, compacted, under floor slabs, 4" deep	9,317	SF	2	22,830	3,425	2,625	289	1,073	30,242	32,710
46	-	HWY 66 Bridge	Boat Ramp - C.I.P. concrete forms, slab on grade, edge, wood, 7" to	280	sfca	116	32,423	4,863	3,729	410	1,524	42,950	46,454
46	-	HWY 66 Bridge	Boat Ramp - Expansion joint, premolded, bituminous fiber, 1/2" x 6"	2,050	LF	2	3,236	485	372	41	152	4,287	4,636
46	-	HWY 66 Bridge	Boat Ramp - Reinforcing steel, in place, columns, #3 to #7, A615, c	34,950	lb	2	62,545	9,382	7,193	791	2,941	82,851	89,612
46	-	HWY 66 Bridge	Boat Ramp - Structural concrete, ready mix, heavyweight, 4500 psi, s	233	CY	246	57,300	8,595	6,590	725	2,694	75,903	82,097
46	-	HWY 66 Bridge	Boat Ramp - Structural concrete, placing, slab on grade, pumped, o	233	CY	79	18,342	2,751	2,109	232	862	24,297	26,280
46	-	HWY 66 Bridge	Boat Ramp - Concrete finishing, fresh concrete flatwork, floors, basi	9,317	SF	1	9,778	1,467	1,124	124	460	12,953	14,010
46	-	HWY 66 Bridge	Boat Ramp - Concrete surface treatment, curing, sprayed membrane	93.20	Csf	33	3,120	468	359	39	147	4,133	4,470
46	-	HWY 66 Bridge	Boat Ramp - Vapor retarders, building paper, polyethylene vapor bar	93.20	sq	27	2,518	378	290	32	118	3,336	3,608
46	-	HWY 66 Bridge	Gravel Trail - Gravel fill, 4" gravel depth & Finish Grading	1,543	SY	26	40,659	6,099	4,676	514	1,912	53,860	58,255
46	-	HWY 66 Bridge	Gravel Beach - Gravel fill, 4" gravel depth & Finish Grading	837	SY	26	22,056	3,308	2,536	279	1,037	29,217	31,601
46	-	HWY 66 Bridge	Planting beds preparation, backfill planting pit, on site topsoil, skid	100	CY	71	7,140	1,071	821	90	336	9,458	10,230
46	-	HWY 66 Bridge	Clearing & grubbing, cut & chip light trees, to 6" diameter	18,611	SY	2	45,783	6,867	5,265	579	2,153	60,647	65,596
46	-	HWY 66 Bridge	Boat Ramp Cofferd Dam - Dewatering, pumping 8 hours, attended 2 h	60.00	days	1,283	76,955	11,543	8,850	973	3,618	101,940	110,258
46	-	HWY 66 Bridge	Boulder Retaining Wall - Grading and Finish Grading Slopes	109	SY	36	3,871	581	445	49	182	5,128	5,546
46	-	HWY 66 Bridge	Gravel Trail - Backfill, in 8" layers, spreading, small dozer, includes	390	L.C.Y.	3	1,007	151	116	13	47	1,334	1,443
46	-	HWY 66 Bridge	Paved Access Road - Backfill, in 8" layers, spreading, small dozer, s	1,595	L.C.Y.	3	4,118	618	474	52	194	5,455	5,900
46	-	HWY 66 Bridge	Gravel Trail - Excavating with Dozer fill to be used onsite	300	B.C.Y.	4	1,090	164	125	14	51	1,444	1,562
46	-	HWY 66 Bridge	Paved Access Road - Excavating with Dozer fill to be used onsite	1,227	B.C.Y.	4	4,457	669	513	56	210	5,904	6,386
46	-	HWY 66 Bridge	Gabion Wall - Structural excavation for minor structures, bank meas	106	B.C.Y.	25	2,637	396	303	33	124	3,493	3,778
46	-	HWY 66 Bridge	Boat Ramp Cofferd Dam - Rip-rap and rock lining, random, broken stor	60.00	ton	143	8,555	1,283	984	108	402	11,333	12,257
46	-	HWY 66 Bridge	Boat Ramp Cofferd Dam - Placing 1 ton supersack for coffer dam 3 rd	60.00	ton	311	18,658	2,799	2,146	236	877	24,716	26,732
46	-	HWY 66 Bridge	Boulder Retaining Wall 2'X2'X2' 8CF or 1200lbs per boulder	215	ton	680	146,151	21,923	16,807	1,849	6,872	193,601	209,399
46	-	HWY 66 Bridge	Boat Ramp Cofferd Dam - Synthetic erosion control, jute mesh, 100 S	647	SY	3	1,638	246	188	21	77	2,170	2,347
46	-	HWY 66 Bridge	Docks, floating, recreational, prefabricated galvanized steel with pol	796	SF	75	59,463	8,919	6,838	752	2,796	78,769	85,196
46	-	HWY 66 Bridge	Gravel Trail - Base course drainage layers, aggregate base course fd	1,543	SY	6	9,918	1,488	1,141	125	466	13,138	14,210
46	-	HWY 66 Bridge	Gravel Trail - Base course drainage layers, prepare and roll sub-bas	1,543	SY	2	3,634	545	418	46	171	4,814	5,207
46	-	HWY 66 Bridge	Paved Access Road - Base course drainage layers, prepare and rol	4,416	SY	2	10,399	1,560	1,196	132	489	13,775	14,899
46	-	HWY 66 Bridge	Gravel Beach - Base course drainage layers, prepare and roll sub-ba	837	SY	2	1,971	296	227	25	93	2,611	2,824
46	-	HWY 66 Bridge	Paved Access Road - Asphaltic concrete paving, parking lots & driv	39,747	SF	4	174,748	26,212	20,096	2,211	8,216	231,483	250,372
46	-	HWY 66 Bridge	Parking Lot - Pavement markings, parking stall, thermoplastic, white	16.00	Stall	432	6,912	1,037	795	87	325	9,156	9,903
46	-	HWY 66 Bridge	Parking Lot - Pavement markings, street letters and numbers	20.00	SF	9	173	26	20	2	8	229	248
46	-	HWY 66 Bridge	Boulder Retaining Wall geo-grid soil reinforcement for segmental bl	980	SF	3	2,720	408	313	34	128	3,603	3,897
46	-	HWY 66 Bridge	Timber Retaining wall - timber, 6" x 8"	273	LF	52	14,289	2,143	1,643	181	672	18,928	20,473
46	-	HWY 66 Bridge	Gabion retaining walls, stone filled gabions, stone delivered, galvan	106	LF	369	39,092	5,864	4,496	495	1,838	51,784	56,009
46	-	HWY 66 Bridge	Parking Lot - Precast concrete parking bumpers, wheel stops, preca	16.00	EA	289	4,624	694	532	58	217	6,125	6,625
46	-	HWY 66 Bridge	Site seating, park benches, precast concrete, with backs, wood rails	1.00	EA	1,936	1,936	290	223	24	91	2,565	2,774
46	-	HWY 66 Bridge	Parking Lot - Handicap Sign - Signs, stock signs, reflectorized, 18"x	2.00	EA	107	214	32	25	3	10	283	307

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
46	-	HWY 66 Bridge	Parking Lot - Handicap Sign - Signs, 10'-0", add to above for steel post	2.00	EA	57	114	17	13	1	5	151	163
46	-	HWY 66 Bridge	Soil preparation, mulching, redwood nuggets, 3" deep, hand spread	667	SY	7	4,895	734	563	62	230	6,484	7,013
46	-	HWY 66 Bridge	Planting beds preparation, excavate planting pit, heavy soil or clay,	100	CY	15	1,513	227	174	19	71	2,004	2,168
46	-	HWY 66 Bridge	Trees Planted in prepared Beds	60.00	EA	588	35,305	5,296	4,060	447	1,660	46,767	50,584
46	-	HWY 66 Bridge	Shrubs Planted in prepared Beds	133	EA	129	17,133	2,570	1,970	217	806	22,696	24,547
46	-	HWY 66 Bridge	Entry Sign	1.00	EA	963	963	144	111	12	45	1,276	1,380
46	-	HWY 66 Bridge	Vaulted Toilet and Pay Station - Comfort stations, prefab, stock, with	335	SF	226	75,628	11,344	8,697	957	3,556	100,182	108,357
		Below JC Boyle											
46	-	Below JC Boyle	Gravel Trail - Gravel fill, 4" gravel depth & Finish Grading	357	SY	26	9,407	1,411	1,082	119	442	12,461	13,478
46	-	Below JC Boyle	Gravel Trail Boat Launch Area - Gravel fill, 4" gravel depth & Finish	193	SY	26	5,086	763	585	64	239	6,737	7,287
46	-	Below JC Boyle	Parking Lot - gravel fill, 8" gravel depth, excl surfacing	1,198	SY	43	51,339	7,701	5,904	649	2,414	68,007	73,556
46	-	Below JC Boyle	Improved Commercial Access Road - gravel fill, 8" gravel depth, excl	3,245	SY	42	135,322	20,298	15,562	1,712	6,362	179,257	193,884
46	-	Below JC Boyle	Boat Launch Area Wooden Boat Slide	418	SF	6	2,653	398	305	34	125	3,514	3,801
46	-	Below JC Boyle	Planting beds preparation, backfill planting pit, on site topsoil, skid	50.00	CY	71	3,570	536	411	45	168	4,729	5,115
46	-	Below JC Boyle	Clearing & grubbing, cut & chip light trees, to 6" diameter	4,628	SY	2	11,385	1,708	1,309	144	535	15,081	16,312
46	-	Below JC Boyle	Gravel Trail - Backfill, in 8" layers, spreading, small dozer, includes	91.00	L.C.Y.	3	235	35	27	3	11	311	337
46	-	Below JC Boyle	Gravel Trail - Excavating with Dozer fill to be used onsite	70.00	B.C.Y.	4	254	38	29	3	12	336	364
46	-	Below JC Boyle	Parking Lot - Excavating with Dozer fill to be used onsite	366	B.C.Y.	4	1,329	199	153	17	62	1,760	1,904
46	-	Below JC Boyle	Boat Launch Area Gabion Wall - Structural excavation for minor stru	179	B.C.Y.	25	4,453	668	512	56	209	5,899	6,380
46	-	Below JC Boyle	Boulder Retaining Wall 2'X2'X2' 8CF or 1200lbs per boulder	71.00	ton	680	48,264	7,240	5,550	611	2,269	63,934	69,151
46	-	Below JC Boyle	Gravel Trail - Base course drainage layers, aggregate base course f	357	SY	6	2,295	344	264	29	108	3,040	3,288
46	-	Below JC Boyle	Parking Lot - Base course drainage layers, aggregate base course f	1,198	SY	6	7,701	1,155	886	97	362	10,201	11,034
46	-	Below JC Boyle	Gravel Trail Boat Launch Area - Base course drainage layers, aggreg	193	SY	6	1,241	186	143	16	58	1,644	1,778
46	-	Below JC Boyle	Gravel Trail - Base course drainage layers, prepare and roll sub-bas	357	SY	2	841	126	97	11	40	1,114	1,205
46	-	Below JC Boyle	Parking Lot - Base course drainage layers, prepare and roll sub-bas	1,198	SY	2	2,821	423	324	36	133	3,737	4,042
46	-	Below JC Boyle	Gravel Trail Boat Launch Area - Base course drainage layers, prepa	193	SY	2	455	68	52	6	21	603	652
46	-	Below JC Boyle	Parking Lot - Pavement markings, parking stall, thermoplastic, white	15.00	Stall	432	6,480	972	745	82	305	8,584	9,284
46	-	Below JC Boyle	Parking Lot - Pavement markings, street letters and numbers	50.00	SF	9	433	65	50	5	20	574	620
46	-	Below JC Boyle	Boat Launch Area - Gabion retaining walls, stone filled gabions, sto	268	LF	172	46,100	6,915	5,302	583	2,167	61,067	66,050
46	-	Below JC Boyle	Parking Lot - Precast concrete parking bumpers, wheel stops, preca	15.00	EA	289	4,335	650	499	55	204	5,742	6,211
46	-	Below JC Boyle	Site seating, park benches, precast concrete, with backs, wood rails	3.00	EA	1,936	5,807	871	668	73	273	7,692	8,320
46	-	Below JC Boyle	Parking Lot - Handicap Sign - Signs, stock signs, reflectorized, 18" x	2.00	EA	107	214	32	25	3	10	283	307
46	-	Below JC Boyle	Parking Lot - Handicap Sign - Signs, 10'-0", add to above for steel po	2.00	EA	57	114	17	13	1	5	151	163
46	-	Below JC Boyle	Soil preparation, mulching, redwood nuggets, 3" deep, hand spread	89.00	SY	7	653	98	75	8	31	865	936
46	-	Below JC Boyle	Planting beds preparation, excavate planting pit, heavy soil or clay,	50.00	CY	15	757	114	87	10	36	1,003	1,085
46	-	Below JC Boyle	Trees Planted in prepared Beds	8.00	EA	588	4,707	706	541	60	221	6,235	6,744
46	-	Below JC Boyle	Shrubs Planted in prepared Beds	41.00	EA	129	5,281	792	607	67	248	6,996	7,566
46	-	Below JC Boyle	Stairs - Stair tread nosing insert, cast aluminum, abrasive surface, 3	12.00	EA	121	1,450	218	167	18	68	1,921	2,078
46	-	Below JC Boyle	Stairs - Structural concrete, in place, stairs (3500 psi), 3'-6" wide, fre	48.00	LF	53	2,551	383	293	32	120	3,379	3,655
46	-	Below JC Boyle	Stairs - Railing, commercial, wall rail, steel pipe, painted, 1-1/2" dia	17.00	LF	30	518	78	60	7	24	686	742
46	-	Below JC Boyle	Stairs - Railing, industrial, welded, steel pipe, 2 rails, 3'-6" high, pos	18.00	LF	60	1,082	162	124	14	51	1,433	1,550
46	-	Below JC Boyle	Entry Sign	1.00	EA	963	963	144	111	12	45	1,276	1,380
46	-	Below JC Boyle	Vaulted Toilet and Pay Station - Comfort stations, prefab, stock, with	335	SF	226	75,628	11,344	8,697	957	3,556	100,182	108,357
		Turtle Camp											
46	-	Turtle Camp	Gravel Trail - Gravel fill, 4" gravel depth & Finish Grading	148	SY	26	3,900	585	449	49	183	5,166	5,588
46	-	Turtle Camp	Parking Lot - gravel fill, 8" gravel depth, excl surfacing	580	SY	43	24,855	3,728	2,858	314	1,169	32,925	35,611
46	-	Turtle Camp	Access Road - gravel fill, 8" gravel depth, excl surfacing	710	SY	43	30,426	4,564	3,499	385	1,431	40,304	43,593
46	-	Turtle Camp	Improved Commercial Access Road - gravel fill, 8" gravel depth, excl	2,641	SY	42	110,135	16,520	12,666	1,393	5,178	145,892	157,797
46	-	Turtle Camp	Planting beds preparation, backfill planting pit, on site topsoil, skid	30.00	CY	71	2,142	321	246	27	101	2,837	3,069
46	-	Turtle Camp	Clearing & grubbing, cut & chip light trees, to 6" diameter	1,692	SY	2	4,162	624	479	53	196	5,513	5,963
46	-	Turtle Camp	Gravel Trail - Backfill, in 8" layers, spreading, small dozer, includes	39.00	L.C.Y.	3	101	15	12	1	5	134	145
46	-	Turtle Camp	Gravel Trail - Excavating with Dozer fill to be used onsite	30.00	B.C.Y.	4	109	16	13	1	5	144	156
46	-	Turtle Camp	Parking Lot - Excavating with Dozer fill to be used onsite	177	B.C.Y.	4	643	96	74	8	30	852	921
46	-	Turtle Camp	Access Road - Excavating with Dozer fill to be used onsite	217	B.C.Y.	4	788	118	91	10	37	1,044	1,129
46	-	Turtle Camp	Gravel Trail - Base course drainage layers, aggregate base course f	148	SY	6	951	143	109	12	45	1,260	1,363
46	-	Turtle Camp	Parking Lot - Base course drainage layers, aggregate base course f	580	SY	6	3,728	559	429	47	175	4,938	5,341
46	-	Turtle Camp	Access Road - Base course drainage layers, aggregate base course f	710	SY	6	4,564	685	525	58	215	6,046	6,539
46	-	Turtle Camp	Gravel Trail - Base course drainage layers, prepare and roll sub-bas	148	SY	2	349	52	40	4	16	462	500
46	-	Turtle Camp	Parking Lot - Base course drainage layers, prepare and roll sub-bas	580	SY	2	1,366	205	157	17	64	1,809	1,957
46	-	Turtle Camp	Access Road - Base course drainage layers, prepare and roll sub-ba	710	SY	2	1,672	251	192	21	79	2,215	2,396
46	-	Turtle Camp	Parking Lot - Pavement markings, parking stall, thermoplastic, white	10.00	Stall	432	4,320	648	497	55	203	5,723	6,190
46	-	Turtle Camp	Parking Lot - Pavement markings, street letters and numbers	25.00	SF	9	217	33	25	3	10	287	311
46	-	Turtle Camp	Timber Retaining wall - timber, 6" x 8"	130	LF	52	6,804	1,021	782	86	320	9,013	9,748
46	-	Turtle Camp	Parking Lot - Precast concrete parking bumpers, wheel stops, preca	10.00	EA	289	2,890	434	332	37	136	3,828	4,141

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
46	-	Turtle Camp	Site seating, park benches, precast concrete, with backs, wood rails	1.00	EA	1,936	1,936	290	223	24	91	2,565	2,774
46	-	Turtle Camp	Parking Lot - Handicap Sign - Signs, stock signs, reflectorized, 18" x 24"	2.00	EA	107	214	32	25	3	10	283	307
46	-	Turtle Camp	Parking Lot - Handicap Sign - Signs, 10'-0", add to above for steel post	2.00	EA	57	114	17	13	1	5	151	163
46	-	Turtle Camp	Soil preparation, mulching, redwood nuggets, 3" deep, hand spread	133	SY	7	976	146	112	12	46	1,293	1,398
46	-	Turtle Camp	Planting beds preparation, excavate planting pit, heavy soil or clay, 1' deep	89.00	CY	15	1,347	202	155	17	63	1,784	1,930
46	-	Turtle Camp	Trees Planted in prepared Beds	12.00	EA	588	7,061	1,059	812	89	332	9,353	10,117
46	-	Turtle Camp	Bulletin Board	2.00	EA	963	1,926	289	221	24	91	2,551	2,759
46	-	Turtle Camp	Vaulted Toilet and Pay Station - Comfort stations, prefab, stock, with	335	SF	226	75,628	11,344	8,697	957	3,556	100,182	108,357
46	-	Camp Creek											
46	-	Camp Creek	Gravel Trail - Gravel fill, 4" gravel depth & Finish Grading	1,440	SY	26	37,945	5,692	4,364	480	1,784	50,264	54,366
46	-	Camp Creek	Parking Lot - gravel fill, 8" gravel depth, excl surfacing	867	SY	43	37,154	5,573	4,273	470	1,747	49,217	53,233
46	-	Camp Creek	Clearing & grubbing, cut & chip light trees, to 6" diameter	2,820	SY	2	6,937	1,041	798	88	326	9,189	9,939
46	-	Camp Creek	Gravel Trail - Backfill, structural, common earth, 55 H.P. wheeled loader	806	L.C.Y.	20	16,028	2,404	1,843	203	754	21,232	22,964
46	-	Camp Creek	Compaction, riding, vibrating roller, 4 passes, 6" lifts	620	E.C.Y.	8	4,962	744	571	63	233	6,573	7,109
46	-	Camp Creek	Gravel Trail - Excavating with Dozer fill to be used onsite	352	B.C.Y.	8	2,910	437	335	37	137	3,855	4,169
46	-	Camp Creek	Gravel Trail - Slope for Trail Excavating with Dozer fill to be used onsite	268	B.C.Y.	22	5,820	873	669	74	274	7,710	8,339
46	-	Camp Creek	Parking Lot - Excavating with Dozer fill to be used onsite	265	B.C.Y.	4	963	144	111	12	45	1,276	1,380
46	-	Camp Creek	Gravel Trail- Base course drainage layers, aggregate base course for	1,440	SY	6	9,256	1,388	1,064	117	435	12,261	13,262
46	-	Camp Creek	Parking Lot - Base course drainage layers, aggregate base course for	345	SY	6	2,218	333	255	28	104	2,938	3,178
46	-	Camp Creek	Gravel Trail - Base course drainage layers, prepare and roll sub-base	1,440	SY	2	3,391	509	390	43	159	4,492	4,858
46	-	Camp Creek	Parking Lot - Base course drainage layers, prepare and roll sub-base	867	SY	2	2,042	306	235	26	96	2,705	2,926
46	-	Camp Creek	Parking Lot - Pavement markings, parking stall, thermoplastic, white	8.00	Stall	432	3,456	518	397	44	162	4,578	4,952
46	-	Camp Creek	Parking Lot - Pavement markings, street letters and numbers	25.00	SF	9	217	33	25	3	10	287	311
46	-	Camp Creek	Timber Retaining wall - timber, 6" x 8"	209	LF	52	10,939	1,641	1,258	138	514	14,491	15,673
46	-	Camp Creek	Parking Lot - Precast concrete parking bumpers, wheel stops, precast	8.00	EA	289	2,312	347	266	29	109	3,063	3,313
46	-	Camp Creek	Site seating, park benches, precast concrete, with backs, wood rails	5.00	EA	1,936	9,678	1,452	1,113	122	455	12,820	13,866
46	-	Camp Creek	Parking Lot - Handicap Sign - Signs, stock signs, reflectorized, 18" x 24"	2.00	EA	107	214	32	25	3	10	283	307
46	-	Camp Creek	Parking Lot - Handicap Sign - Signs, 10'-0", add to above for steel post	2.00	EA	57	114	17	13	1	5	151	163
46	-	Camp Creek	Bulletin Board	2.00	EA	963	1,926	289	221	24	91	2,551	2,759
46	-	Camp Creek	Vaulted Toilet and Pay Station - Comfort stations, prefab, stock, with	335	SF	226	75,628	11,344	8,697	957	3,556	100,182	108,357
46	-	Copco Valley Day Use											
46	-	Copco Valley Day Use	Gravel Trail - Gravel fill, 4" gravel depth & Finish Grading	2,771	SY	26	73,018	10,953	8,397	924	3,433	96,725	104,617
46	-	Copco Valley Day Use	Parking Lot - gravel fill, 8" gravel depth, excl surfacing	8,222	SY	43	352,346	52,852	40,520	4,457	16,566	466,741	504,827
46	-	Copco Valley Day Use	Planting beds preparation, backfill planting pit, on site topsoil, skid	517	CY	71	36,912	5,537	4,245	467	1,735	48,896	52,886
46	-	Copco Valley Day Use	Clearing & grubbing, cut & chip light trees, to 6" diameter	30,890	SY	2	75,989	11,398	8,739	961	3,573	100,660	108,874
46	-	Copco Valley Day Use	Access Road/ Trail - Backfill, structural, common earth, 55 H.P. wheeled loader	2,741	L.C.Y.	81	223,079	33,462	25,654	2,822	10,488	295,505	319,619
46	-	Copco Valley Day Use	Access Road/ Trail - Compaction, riding, vibrating roller, 4 passes, 6" lifts	2,109	E.C.Y.	8	16,879	2,532	1,941	214	794	22,359	24,184
46	-	Copco Valley Day Use	Gravel Trail- Base course drainage layers, aggregate base course for	2,771	SY	6	17,811	2,672	2,048	225	837	23,594	25,519
46	-	Copco Valley Day Use	Parking Lot - Base course drainage layers, aggregate base course for	8,222	SY	6	52,850	7,928	6,078	669	2,485	70,009	75,721
46	-	Copco Valley Day Use	Parking Lot - Base course drainage layers, prepare and roll sub-base	867	SY	2	2,042	306	235	26	96	2,705	2,926
46	-	Copco Valley Day Use	Gravel Trail - Base course drainage layers, prepare and roll sub-base	2,771	SY	2	6,526	979	750	83	307	8,645	9,350
46	-	Copco Valley Day Use	Parking Lot - Base course drainage layers, prepare and roll sub-base	8,222	SY	2	19,362	2,904	2,227	245	910	25,648	27,741
46	-	Copco Valley Day Use	Parking Lot - Pavement markings, parking stall, thermoplastic, white	10.00	Stall	432	4,320	648	497	55	203	5,723	6,190
46	-	Copco Valley Day Use	Parking Lot - Pavement markings, street letters and numbers	25.00	SF	9	217	33	25	3	10	287	311
46	-	Copco Valley Day Use	Gabion retaining walls, stone filled gabions, stone delivered, galvanized	30.00	LF	273	8,196	1,229	943	104	385	10,857	11,743
46	-	Copco Valley Day Use	Parking Lot - Precast concrete parking bumpers, wheel stops, precast	10.00	EA	289	2,890	434	332	37	136	3,828	4,141
46	-	Copco Valley Day Use	Site seating, park benches, precast concrete, with backs, wood rails	6.00	EA	1,936	11,614	1,742	1,336	147	546	15,385	16,640
46	-	Copco Valley Day Use	Parking Lot - Handicap Sign - Signs, stock signs, reflectorized, 18" x 24"	2.00	EA	107	214	32	25	3	10	283	307
46	-	Copco Valley Day Use	Parking Lot - Handicap Sign - Signs, 10'-0", add to above for steel post	2.00	EA	57	114	17	13	1	5	151	163
46	-	Copco Valley Day Use	Soil preparation, mulching, redwood nuggets, 3" deep, hand spread	2,435	SY	7	17,870	2,681	2,055	226	840	23,672	25,603
46	-	Copco Valley Day Use	Planting beds preparation, excavate planting pit, heavy soil or clay, 1' deep	150	CY	15	2,270	341	261	29	107	3,007	3,252
46	-	Copco Valley Day Use	Trees Planted in prepared Beds	279	EA	588	164,167	24,625	18,879	2,077	7,719	217,467	235,212
46	-	Copco Valley Day Use	Bulletin Board	2.00	EA	963	1,926	289	221	24	91	2,551	2,759
46	-	Copco Valley Day Use	Vaulted Toilet and Pay Station - Comfort stations, prefab, stock, with	335	SF	226	75,628	11,344	8,697	957	3,556	100,182	108,357
46	-	Copco 2 PH Alt 1											
46	-	Copco 2 PH Alt 1	Gravel Trail - Gravel fill, 4" gravel depth & Finish Grading	722	SY	26	19,025	2,854	2,188	241	894	25,202	27,258
46	-	Copco 2 PH Alt 1	Planting beds preparation, backfill planting pit, on site topsoil, skid	164	CY	71	11,709	1,756	1,347	148	551	15,511	16,776
46	-	Copco 2 PH Alt 1	Gravel Trail - Backfill, in 8" layers, spreading, small dozer, includes	195	L.C.Y.	3	503	75	58	6	24	666	721
46	-	Copco 2 PH Alt 1	Paved Access Road - Backfill, in 8" layers, spreading, small dozer, includes	1,441	L.C.Y.	3	3,720	558	428	47	175	4,928	5,330
46	-	Copco 2 PH Alt 1	Gravel Trail - Excavating with Dozer fill to be used onsite	150	B.C.Y.	4	545	82	63	7	26	722	781
46	-	Copco 2 PH Alt 1	Paved Access Road - Excavating with Dozer fill to be used onsite	1,108	B.C.Y.	4	4,025	604	463	51	189	5,332	5,767
46	-	Copco 2 PH Alt 1	Docks, floating, recreational, prefabricated galvanized steel with pol	796	SF	75	59,463	8,919	6,838	752	2,796	78,769	85,196
46	-	Copco 2 PH Alt 1	Gravel Trail- Base course drainage layers, aggregate base course for	722	SY	6	4,641	696	534	59	218	6,148	6,649
46	-	Copco 2 PH Alt 1	Gravel Trail - Base course drainage layers, prepare and roll sub-base	722	SY	2	1,700	255	196	22	80	2,252	2,436

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
46	-	Copco 2 PH Alt 1	Paved Access Road - Base course drainage layers, prepare and roll	3,990	SY	2	9,396	1,409	1,081	119	442	12,447	13,462
46	-	Copco 2 PH Alt 1	Paved Access Road - Asphaltic concrete paving, parking lots & driv	35,914	SF	4	157,896	23,684	18,158	1,997	7,424	209,160	226,227
46	-	Copco 2 PH Alt 1	Parking Lot - Pavement markings, parking stall, thermoplastic, white	10.00	Stall	432	4,320	648	497	55	203	5,723	6,190
46	-	Copco 2 PH Alt 1	Parking Lot - Pavement markings, street letters and numbers	25.00	SF	9	217	33	25	3	10	287	311
46	-	Copco 2 PH Alt 1	Parking Lot - Precast concrete parking bumpers, wheel stops, precast	10.00	EA	289	2,890	434	332	37	136	3,828	4,141
46	-	Copco 2 PH Alt 1	Site seating, park benches, precast concrete, with backs, wood rails	3.00	EA	1,936	5,807	871	668	73	273	7,692	8,320
46	-	Copco 2 PH Alt 1	Parking Lot - Handicap Sign - Signs, stock signs, reflectorized, 18"x	2.00	EA	107	214	32	25	3	10	283	307
46	-	Copco 2 PH Alt 1	Parking Lot - Handicap Sign - Signs, 10'-0", add to above for steel po	2.00	EA	57	114	17	13	1	5	151	163
46	-	Copco 2 PH Alt 1	Soil preparation, mulching, redwood nuggets, 3" deep, hand spread	986	SY	7	7,236	1,085	832	92	340	9,585	10,367
46	-	Copco 2 PH Alt 1	Planting beds preparation, excavate planting pit, heavy soil or clay,	60.00	CY	15	908	136	104	11	43	1,203	1,301
46	-	Copco 2 PH Alt 1	Trees Planted in prepared Beds	113	EA	588	66,491	9,974	7,646	841	3,126	88,078	95,266
46	-	Copco 2 PH Alt 1	Vaulted Toilet and Pay Station - Comfort stations, prefab, stock, wit	335	SF	226	75,628	11,344	8,697	957	3,556	100,182	108,357
		Iron Gate Hatchery Rec Area											
46	-	Iron Gate Hatchery Rec Area	Gravel Trail - Gravel fill, 4" gravel depth & Finish Grading	773	SY	26	20,369	3,055	2,342	258	958	26,982	29,184
46	-	Iron Gate Hatchery Rec Area	Planting beds preparation, backfill planting pit, on site topsoil, skid	572	CY	71	40,838	6,126	4,696	517	1,920	54,097	58,511
46	-	Iron Gate Hatchery Rec Area	Gravel Trail - Backfill, in 8" layers, spreading, small dozer, includes	195	L.C.Y.	3	503	75	58	6	24	666	721
46	-	Iron Gate Hatchery Rec Area	Paved Access Road - Backfill, in 8" layers, spreading, small dozer, i	1,434	L.C.Y.	3	3,702	555	426	47	174	4,904	5,304
46	-	Iron Gate Hatchery Rec Area	Gravel Trail - Excavating with Dozer fill to be used onsite	150	B.C.Y.	4	545	82	63	7	26	722	781
46	-	Iron Gate Hatchery Rec Area	Paved Access Road - Excavating with Dozer fill to be used onsite	1,103	B.C.Y.	4	4,006	601	461	51	188	5,307	5,740
46	-	Iron Gate Hatchery Rec Area	Docks, floating, recreational, prefabricated galvanized steel with pol	796	SF	75	59,463	8,919	6,838	752	2,796	78,769	85,196
46	-	Iron Gate Hatchery Rec Area	Gravel Trail - Base course drainage layers, aggregate base course fo	773	SY	6	4,969	745	571	63	234	6,582	7,119
46	-	Iron Gate Hatchery Rec Area	Gravel Trail - Base course drainage layers, prepare and roll sub-bas	773	SY	2	1,820	273	209	23	86	2,411	2,608
46	-	Iron Gate Hatchery Rec Area	Paved Access Road - Base course drainage layers, prepare and roll	3,970	SY	2	9,349	1,402	1,075	118	440	12,384	13,395
46	-	Iron Gate Hatchery Rec Area	Paved Access Road - Asphaltic concrete paving, parking lots & driv	35,734	SF	4	157,105	23,566	18,067	1,987	7,387	208,112	225,094
46	-	Iron Gate Hatchery Rec Area	Parking Lot - Pavement markings, parking stall, thermoplastic, white	32.00	Stall	432	13,824	2,074	1,590	175	650	18,312	19,806
46	-	Iron Gate Hatchery Rec Area	Parking Lot - Pavement markings, street letters and numbers	25.00	SF	9	217	33	25	3	10	287	311
46	-	Iron Gate Hatchery Rec Area	Timber Retaining wall - timber, 6" x 8"	183	LF	52	9,578	1,437	1,101	121	450	12,688	13,723
46	-	Iron Gate Hatchery Rec Area	Parking Lot - Precast concrete parking bumpers, wheel stops, precast	32.00	EA	289	9,248	1,387	1,064	117	435	12,251	13,250
46	-	Iron Gate Hatchery Rec Area	Site seating, park benches, precast concrete, with backs, wood rails	2.00	EA	1,936	3,871	581	445	49	182	5,128	5,546
46	-	Iron Gate Hatchery Rec Area	Parking Lot - Handicap Sign - Signs, stock signs, reflectorized, 18"x	2.00	EA	107	214	32	25	3	10	283	307
46	-	Iron Gate Hatchery Rec Area	Parking Lot - Handicap Sign - Signs, 10'-0", add to above for steel po	2.00	EA	57	114	17	13	1	5	151	163
46	-	Iron Gate Hatchery Rec Area	Soil preparation, mulching, redwood nuggets, 3" deep, hand spread	3,433	SY	7	25,194	3,779	2,897	319	1,185	33,374	36,097
46	-	Iron Gate Hatchery Rec Area	Planting beds preparation, excavate planting pit, heavy soil or clay,	165	CY	15	2,497	375	287	32	117	3,308	3,578
46	-	Iron Gate Hatchery Rec Area	Trees Planted in prepared Beds	309	EA	588	181,819	27,273	20,909	2,300	8,549	240,850	260,503
46	-	Iron Gate Hatchery Rec Area	Bulletin Board	2.00	EA	963	1,926	289	221	24	91	2,551	2,759
46	-	Iron Gate Hatchery Rec Area	Vaulted Toilet and Pay Station - Comfort stations, prefab, stock, wit	335	SF	226	75,628	11,344	8,697	957	3,556	100,182	108,357
		Downstream Flood Control Improvements											
47	-	Downstream Flood Control Improvements	[Stakeholder Cover] Downstream Flood Control Improvements				-	-	-	-	-	-	-
		Public Health and Safety Fencing											
48	-	Public Health and Safety Fencing	Cattle exclusion fencing	182,160	LF	10	1,870,885	280,633	215,152	23,667	87,963	2,478,299	2,665,476
		Fire Management Planning											
49	-	Fire Management Planning	Current estimate for Fire Management	3.00	EA	800,000	2,400,000	-	240,000	26,400	112,840	2,779,240	3,006,026
		Spawning Gravel Augmentation											
		Vegetation Maintenance & Monitoring											
49A	-	Establishment Maintenance & Monitoring	[LTC Cover] 2024 Monitoring monthly from November 1 through April	-	-	-	-	-	-	-	-	-	-
49A	-	Establishment Maintenance & Monitoring	[LTC Cover] 2024 Maintenance	-	-	-	-	-	-	-	-	-	-
49A	-	Long Term Maintenance & Monitoring	[LTC Cover] 2025 Monitoring bi-monthly from Nov. 1 through April 1 a	-	-	-	-	-	-	-	-	-	-
49A	-	Long Term Maintenance & Monitoring	[LTC Cover] 2025 Maintenance (assuming 80% of the restored areas	-	-	-	-	-	-	-	-	-	-
49A	-	Long Term Maintenance & Monitoring	[LTC Cover] 2026 Monitoring once from November 1 through April 1 a	-	-	-	-	-	-	-	-	-	-
49A	-	Long Term Maintenance & Monitoring	[LTC Cover] 2026 Maintenance (assuming 60% of the restored areas	-	-	-	-	-	-	-	-	-	-
49A	-	Long Term Maintenance & Monitoring	[LTC Cover] 2027 Monitoring bi-monthly from April 1 through Novemb	-	-	-	-	-	-	-	-	-	-
49A	-	Long Term Maintenance & Monitoring	[LTC Cover] 2027 Maintenance (assuming 40% of the restored areas	-	-	-	-	-	-	-	-	-	-
49A	-	Long Term Maintenance & Monitoring	[LTC Cover] 2028 Monitoring spring and fall (2 visits per year)	-	-	-	-	-	-	-	-	-	-
49A	-	Long Term Maintenance & Monitoring	[LTC Cover] 2028 Maintenance (assuming 20% of the restored areas	-	-	-	-	-	-	-	-	-	-
		Mainstem spawning (AR-1)											
49A	-	Mainstem spawning (AR-1)	Confluence Area Maintenance (downstream tribs)	1,350	HR	55	74,250	11,138	8,539	939	3,491	98,357	112,850
49A	-	Mainstem spawning (AR-1)	Confluence Area Maintenance (upstream tribs)	600	HR	55	33,000	4,950	3,795	417	1,552	43,714	50,156
49A	-	Mainstem spawning (AR-1)	Spawning Gravel Augmentation	16,132	CY	217	3,506,957	526,043	403,300	44,363	164,886	4,645,549	5,225,610
49A	-	Mainstem spawning (AR-1)	Laborer (30 days)	200	HR	70	14,000	2,100	1,610	177	658	18,545	20,861
49A	-	Mainstem spawning (AR-1)	200 Class Excavator (30 days)	360	HR	250	90,000	13,500	10,350	1,139	4,232	119,220	134,106
		Wetland Mitigation (TER-5)											
49A	-	Wetland Mitigation (TER-5)	[LTC Cover] Compensatory migration in Oregon	-	-	-	-	-	-	-	-	-	-
49A	-	Wetland Mitigation (TER-5)	[LTC Cover] Wetland migration monitoring	-	-	-	-	-	-	-	-	-	-
49A	-	Wetland Mitigation (TER-5)	[LTC Cover] Reporting and regulatory compliance	-	-	-	-	-	-	-	-	-	-

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
MITIGATION MEASURES													
Groundwater Analysis													
51	-	Groundwater Analysis	AECOM FY17/18 Planning	1.00	YR	43,222	43,222	-	-	-	-	43,222	43,222
51	-	Groundwater Analysis	AECOM FY18/19 Planning	1.00	YR	204,120	204,120	-	-	-	-	204,120	204,120
51	-	Groundwater Analysis	AECOM FY19/20 Preliminary Services - Coordination & Outreach	1.00	YR	16,000	16,000	-	-	-	-	16,000	16,320
51	-	Groundwater Analysis	Outreach to well owners - meetings	10.00	EA	8,700	87,000	-	-	-	-	87,000	92,361
51	-	Groundwater Analysis	Outreach to well owners - followup calls	1.00	LS	33,000	33,000	-	-	-	-	33,000	35,033
51	-	Groundwater Analysis	[Stakeholder Cover] Drill and install new monitoring wells	-	-	-	-	-	-	-	-	-	-
51	-	Groundwater Analysis	[Stakeholder Cover] Water level monitoring of new wells - modification	-	-	-	-	-	-	-	-	-	-
51	-	Groundwater Analysis	[Stakeholder Cover] Water level monitoring of new wells - monitoring	-	-	-	-	-	-	-	-	-	-
51	-	Groundwater Analysis	[Stakeholder Cover] WQ laboratory analytical testing (per well)	-	-	-	-	-	-	-	-	-	-
51	-	Groundwater Analysis	[Stakeholder Cover] Well replacements	-	-	-	-	-	-	-	-	-	-
51	-	Groundwater Analysis	[Stakeholder Cover] Well abandonment	-	-	-	-	-	-	-	-	-	-
51	-	Groundwater Analysis	[Stakeholder Cover] Temporary water supply	-	-	-	-	-	-	-	-	-	-
51	-	Groundwater Analysis	[Stakeholder Cover] Permitting and Reporting	-	-	-	-	-	-	-	-	-	-
Downstream Water Supply/Rights													
52	-	Downstream Water Supply/Rights	Hay production	3,379	T	175	591,357	-	-	-	-	591,357	678,500
52	-	Downstream Water Supply/Rights	Water supply for domestic use for water rights	1.00	LS	8,666	8,666	-	-	-	-	8,666	9,943
52	-	Downstream Water Supply/Rights	Sediment removal at intakes	254	CY	500	126,999	-	-	-	-	126,999	145,714
52	-	Downstream Water Supply/Rights	Groundwater wells - domestic	9.00	EA	10,000	90,000	-	-	-	-	90,000	103,263
52	-	Downstream Water Supply/Rights	Groundwater wells - municipal	1.00	EA	100,000	100,000	-	-	-	-	100,000	114,736
52	-	Downstream Water Supply/Rights	Sediment basin	39.00	EA	1,852	72,222	-	-	-	-	72,222	82,865
Cultural Resources													
Actuals													
53	-	Cultural Resources	AECOM FY17/18 Cultural Resources, AECOM	1.00	YR	1,080,880	1,080,880	-	-	-	-	1,080,880	1,080,880
53	-	Cultural Resources	AECOM FY18/19 Cultural Resources, AECOM	1.00	YR	1,453,410	1,453,410	-	-	-	-	1,453,410	1,453,410
2019 H1 Support													
53	-	Cultural Resources Tasks	Generally	6.00	MO	168,958	1,013,750	-	-	-	-	1,013,750	1,013,750
2019 H2 Support													
53	-	Task management	Principal Scientist/Planner	208	HR	900	187,200	-	-	-	-	187,200	194,688
53	-	Task 1.2A Agency consultation	Principal Scientist/Planner	83.20	HR	180	14,976	-	-	-	-	14,976	15,575
53	-	Task 1.2A Agency consultation	Senior Scientist/Planner	41.60	HR	160	6,656	-	-	-	-	6,656	6,922
53	-	Task 1.2B Tribal consultation and work plans	Principal Scientist/Planner	256	HR	180	46,080	-	-	-	-	46,080	47,923
53	-	Task 1.2B Tribal consultation and work plans	Senior Scientist/Planner	128	HR	160	20,480	-	-	-	-	20,480	21,299
53	-	Task 1.2B Tribal consultation and work plans	Technical Editor	16.00	HR	105	1,680	-	-	-	-	1,680	1,747
53	-	Task 1.2B Tribal consultation and work plans	GIS/CADD/Graphics	24.00	HR	90	2,160	-	-	-	-	2,160	2,246
53	-	Submerged Resources Report	Preparation costs	1.00	EA	2,160	2,160	-	-	-	-	2,160	2,160
2020 H2 Support													
53	-	Task 1.2B Tribal consultation and work plans	Monthly working group meetings	10.00	MO	29,800	298,000	-	-	-	-	298,000	309,920
53	-	Task 1.2B Tribal consultation and work plans	Monthly tribal meetings	10.00	MO	15,200	152,000	-	-	-	-	152,000	158,080
2021-2024 Support													
53	-	Task management	Principal Scientist/Planner	1,040	HR	180	187,200	-	-	-	-	187,200	219,227
53	-	Task 1.2A Agency consultation	Principal Scientist/Planner	416	HR	180	74,880	-	-	-	-	74,880	87,691
53	-	Task 1.2A Agency consultation	Senior Scientist/Planner	208	HR	160	33,280	-	-	-	-	33,280	38,974
53	-	Task 1.2B Tribal consultation and work plans	Principal Scientist/Planner	1,280	HR	180	230,400	-	-	-	-	230,400	269,817
53	-	Task 1.2B Tribal consultation and work plans	Senior Scientist/Planner	640	HR	160	102,400	-	-	-	-	102,400	119,919
53	-	Task 1.2B Tribal consultation and work plans	Technical Editor	80.00	HR	105	8,400	-	-	-	-	8,400	9,837
53	-	Task 1.2B Tribal consultation and work plans	GIS/CADD/Graphics	120	HR	90	10,800	-	-	-	-	10,800	12,648
53	-	Task 2.6L Curation	Principal Scientist/Planner	80.00	HR	180	14,400	-	-	-	-	14,400	16,754
53	-	Task 2.6L Curation	Scientist/Planner	1,640	HR	120	196,800	-	-	-	-	196,800	228,971
53	-	Task 2.6L Curation	Curation	410	EA	500	205,000	-	-	-	-	205,000	238,512
53	-	Task 2.6L Curation	Other direct costs	1.00	SUM	5,000	5,000	-	-	-	-	5,000	5,817
53	-	Task 2.6M Arch fieldwork - Drawdown shoreline survey	Principal Scientist/Planner	200	HR	180	36,000	-	-	-	-	36,000	40,495
53	-	Task 2.6M Arch fieldwork - Drawdown shoreline survey	Senior Scientist/Planner	290	HR	160	46,400	-	-	-	-	46,400	52,194
53	-	Task 2.6M Arch fieldwork - Drawdown shoreline survey	Scientist/Planner	1,180	HR	120	141,600	-	-	-	-	141,600	159,281
53	-	Task 2.6M Arch fieldwork - Drawdown shoreline survey	Technical Editor	40.00	HR	105	4,200	-	-	-	-	4,200	4,724
53	-	Task 2.6M Arch fieldwork - Drawdown shoreline survey	Junior Scientist/Planner	10.00	HR	95	950	-	-	-	-	950	1,069
53	-	Task 2.6M Arch fieldwork - Drawdown shoreline survey	GIS/CADD/Graphics	100	HR	90	9,000	-	-	-	-	9,000	10,124
53	-	Task 2.6M Arch fieldwork - Drawdown shoreline survey	Tribal monitor subcontract	149	DA	617	91,933	-	-	-	-	91,933	103,412
53	-	Task 2.6M Arch fieldwork - Drawdown shoreline survey	Travel and per diem	1.00	SUM	35,858	35,858	-	-	-	-	35,858	40,335
53	-	Task 2.6M Arch fieldwork - Post drawdown survey	Principal Scientist/Planner	200	HR	180	36,000	-	-	-	-	36,000	42,115
53	-	Task 2.6M Arch fieldwork - Post drawdown survey	Senior Scientist/Planner	98.00	HR	160	15,680	-	-	-	-	15,680	18,343
53	-	Task 2.6M Arch fieldwork - Post drawdown survey	Scientist/Planner	972	HR	120	116,640	-	-	-	-	116,640	136,452
53	-	Task 2.6M Arch fieldwork - Post drawdown survey	Technical Editor	40.00	HR	105	4,200	-	-	-	-	4,200	4,913

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MU by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
53	-	Task 2.6M Arch fieldwork - Post drawdown survey	Junior Scientist/Planner	20.00	HR	95	1,900	-	-	-	-	1,900	2,223
53	-	Task 2.6M Arch fieldwork - Post drawdown survey	GIS/CADD/Graphics	120	HR	90	10,800	-	-	-	-	10,800	12,634
53	-	Task 2.6M Arch fieldwork - Post drawdown survey	Field Technician	768	HR	75	57,600	-	-	-	-	57,600	67,384
53	-	Task 2.6M Arch fieldwork - Post drawdown survey	Tribal monitor subcontract	77.00	DA	648	49,884	-	-	-	-	49,884	58,358
53	-	Task 2.6M Arch fieldwork - Post drawdown survey	Travel and per diem	1.00	SUM	30,900	30,900	-	-	-	-	30,900	36,149
53	-	Task 2.6N Discoveries - Burial recovery	Human remains	100	EA	15,000	1,500,000	-	-	-	-	1,500,000	1,756,624
53	-	Task 2.6N Discoveries - Burial recovery	Other direct costs	1.00	SUM	500	500	-	-	-	-	500	586
53	-	Task 2.6N Discoveries - Arch resources	Archaeological unit cost	60.00	EA	30,000	1,800,000	-	-	-	-	1,800,000	2,107,949
53	-	Task 2.6N Discoveries - Arch resources	Other direct costs	1.00	SUM	500	500	-	-	-	-	500	586
53	-	Task 2.6O Short-term monitoring FY 2021-2022	Principal Scientist/Planner	240	HR	180	43,200	-	-	-	-	43,200	49,566
53	-	Task 2.6O Short-term monitoring FY 2021-2022	Senior Scientist/Planner	1,808	HR	160	289,280	-	-	-	-	289,280	331,909
53	-	Task 2.6O Short-term monitoring FY 2021-2022	Scientist/Planner	1,928	HR	120	231,360	-	-	-	-	231,360	265,454
53	-	Task 2.6O Short-term monitoring FY 2021-2022	Technical Editor	40.00	HR	105	4,200	-	-	-	-	4,200	4,819
53	-	Task 2.6O Short-term monitoring FY 2021-2022	Junior Scientist/Planner	40.00	HR	95	3,800	-	-	-	-	3,800	4,360
53	-	Task 2.6O Short-term monitoring FY 2021-2022	GIS/CADD/Graphics	120	HR	90	10,800	-	-	-	-	10,800	12,392
53	-	Task 2.6O Short-term monitoring FY 2021-2022	Field Technician	7,680	HR	75	576,000	-	-	-	-	576,000	660,880
53	-	Task 2.6O Short-term monitoring FY 2021-2022	Tribal monitor subcontract	452	EA	617	278,884	-	-	-	-	278,884	319,981
53	-	Task 2.6O Short-term monitoring FY 2021-2022	Other direct costs	1.00	SUM	127,984	127,984	-	-	-	-	127,984	146,844
53	-	Task 2.6O Short-term monitoring FY 2023-2025	Principal Scientist/Planner	240	HR	180	43,200	-	-	-	-	43,200	54,690
53	-	Task 2.6O Short-term monitoring FY 2023-2025	Senior Scientist/Planner	1,176	HR	160	188,160	-	-	-	-	188,160	238,205
53	-	Task 2.6O Short-term monitoring FY 2023-2025	Scientist/Planner	1,536	HR	120	184,320	-	-	-	-	184,320	233,343
53	-	Task 2.6O Short-term monitoring FY 2023-2025	Technical Editor	40.00	HR	105	4,200	-	-	-	-	4,200	5,317
53	-	Task 2.6O Short-term monitoring FY 2023-2025	Junior Scientist/Planner	40.00	HR	95	3,800	-	-	-	-	3,800	4,811
53	-	Task 2.6O Short-term monitoring FY 2023-2025	GIS/CADD/Graphics	230	HR	90	20,700	-	-	-	-	20,700	26,206
53	-	Task 2.6O Short-term monitoring FY 2023-2025	Field Technician	7,680	HR	75	576,000	-	-	-	-	576,000	729,198
53	-	Task 2.6O Short-term monitoring FY 2023-2025	Tribal monitor subcontract	294	EA	648	190,468	-	-	-	-	190,468	241,126
53	-	Task 2.6O Short-term monitoring FY 2023-2025	Other direct costs	1.00	SUM	57,448	57,448	-	-	-	-	57,448	72,727
53	-	TCP Project allowance	TCP Project allowance	1.00	SUM	1,000,000	1,000,000	-	-	-	-	1,000,000	1,000,000
53	-	Cultural resources allowance	Allowance for additional discoveries (reconciled with risk log)	1.00	SUM	1,000,000	1,000,000	-	-	-	-	1,000,000	1,000,000
		MONITORING & REPORTING (KRRC)											
		Aquatic Resource Measures											
		Mainstem spawning (AR-1)											
61	-	Mainstem spawning (AR-1)	Tributary confluence monitoring (passage)	1,080	HR	86	93,000	-	-	-	-	93,000	106,705
61	-	Mainstem spawning (AR-1)	[inc in PDB] Confluence Area Maintenance (downstream tribs)	1,350	HR	-	-	-	-	-	-	-	-
61	-	Mainstem spawning (AR-1)	[inc in PDB] Confluence Area Maintenance (upstream tribs)	600	HR	-	-	-	-	-	-	-	-
61	-	Mainstem spawning (AR-1)	[LTC Cover] Mainstem Spawning Gravel Survey	-	-	-	-	-	-	-	-	-	-
61	-	Mainstem spawning (AR-1)	[LTC Cover] Tributary Spawning Gravel Survey	-	-	-	-	-	-	-	-	-	-
61	-	Mainstem spawning (AR-1)	[LTC Cover] Reporting and Coordination	-	-	-	-	-	-	-	-	-	-
61	-	Mainstem spawning (AR-1)	[inc in PDB] Spawning Gravel Augmentation	16,132	CY	-	-	-	-	-	-	-	-
61	-	Mainstem spawning (AR-1)	[inc in PDB] Laborer (30 days)	200	HR	-	-	-	-	-	-	-	-
61	-	Mainstem spawning (AR-1)	[inc in PDB] 200 Class Excavator (30 days)	360	HR	-	-	-	-	-	-	-	-
		Juvenile outmigration (AR-2)											
61	-	Juvenile outmigration (AR-2)	[LTC Cover] Tributary Confluence Monitoring (Passage)	-	-	-	-	-	-	-	-	-	-
61	-	Juvenile outmigration (AR-2)	[LTC Cover] Tributary Confluence Monitoring (WQ)	-	-	-	-	-	-	-	-	-	-
61	-	Juvenile outmigration (AR-2)	[LTC Cover] 2019 Mainstem Winter Seining Recon	-	-	-	-	-	-	-	-	-	-
61	-	Juvenile outmigration (AR-2)	[LTC Cover] 2020 Mainstem Winter Seining (Coho) (3.3)	-	-	-	-	-	-	-	-	-	-
61	-	Juvenile outmigration (AR-2)	[LTC Cover] Fish Transport (1 Truck)	-	-	-	-	-	-	-	-	-	-
61	-	Juvenile outmigration (AR-2)	[LTC Cover] Fish Rescue and relo Crew	-	-	-	-	-	-	-	-	-	-
61	-	Juvenile outmigration (AR-2)	[LTC Cover] Fish Transport (2 Trucks)	-	-	-	-	-	-	-	-	-	-
61	-	Juvenile outmigration (AR-2)	[LTC Cover] Reporting and Coordination	-	-	-	-	-	-	-	-	-	-
61	-	Juvenile outmigration (AR-2)	[LTC Cover] Miscellaneous Equipment	-	-	-	-	-	-	-	-	-	-
61	-	Juvenile outmigration (AR-2)	[LTC Cover] H2O Monitoring Equipment	-	-	-	-	-	-	-	-	-	-
61	-	Juvenile outmigration (AR-2)	[LTC Cover] H2O Monitoring Equipment	-	-	-	-	-	-	-	-	-	-
61	-	Juvenile outmigration (AR-2)	[LTC Cover] Technician Equipment	-	-	-	-	-	-	-	-	-	-
61	-	Juvenile outmigration (AR-2)	[LTC Cover] Transport Vehicle Rental (\$300/day for 21 days)	-	-	-	-	-	-	-	-	-	-
61	-	Juvenile outmigration (AR-2)	[LTC Cover] Transport Vehicle Operational Cost (\$.75/mi)	-	-	-	-	-	-	-	-	-	-
		Sucker rescue and relo plan (AR-6)											
61	-	Sucker rescue and relo plan (AR-6)	Sucker Recapture Study (Spring and Fall) (3.3)	1,680	HR	83	140,000	-	-	-	-	140,000	145,675
61	-	Sucker rescue and relo plan (AR-6)	[LTC Cover] Sucker Salvage	-	-	-	-	-	-	-	-	-	-
61	-	Sucker rescue and relo plan (AR-6)	[LTC Cover] Sucker Transport (1 Truck)	-	-	-	-	-	-	-	-	-	-
61	-	Sucker rescue and relo plan (AR-6)	[LTC Cover] Reporting and Coordination	-	-	-	-	-	-	-	-	-	-
61	-	Sucker rescue and relo plan (AR-6)	[LTC Cover] Boat Electrofisher	-	-	-	-	-	-	-	-	-	-
61	-	Sucker rescue and relo plan (AR-6)	[LTC Cover] Boats (2 boats)	-	-	-	-	-	-	-	-	-	-
61	-	Sucker rescue and relo plan (AR-6)	[LTC Cover] Technician Equipment	-	-	-	-	-	-	-	-	-	-

KRRC Cost Estimate - Full Removal

July 2019

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61	-	Sucker rescue and relo plan (AR-6)	[LTC Cover] Tagging Equipment	-	-	-	-	-	-	-	-	-	-
61	-	Sucker rescue and relo plan (AR-6)	[LTC Cover] Transport Vehicle Rental (\$300/day)	-	-	-	-	-	-	-	-	-	-
61	-	Sucker rescue and relo plan (AR-6)	[LTC Cover] Transport Vehicle Operational Cost (\$0.75/mi)	-	-	-	-	-	-	-	-	-	-
	-	Freshwater mussel relo (AR-7)											
61	-	Freshwater mussel relo (AR-7)	Freshwater Mussel Reconnaissance	400	HR	89	35,600	-	-	-	-	35,600	35,600
61	-	Freshwater mussel relo (AR-7)	[LTC Cover] Mussel Salvage and relo	-	-	-	-	-	-	-	-	-	-
61	-	Freshwater mussel relo (AR-7)	[LTC Cover] Mussel Transport (1 Truck)	-	-	-	-	-	-	-	-	-	-
61	-	Freshwater mussel relo (AR-7)	[LTC Cover] Reporting and Coordination	-	-	-	-	-	-	-	-	-	-
61	-	Freshwater mussel relo (AR-7)	[LTC Cover] Miscellaneous Equipment	-	-	-	-	-	-	-	-	-	-
61	-	Freshwater mussel relo (AR-7)	[LTC Cover] Diving Gear	-	-	-	-	-	-	-	-	-	-
61	-	Freshwater mussel relo (AR-7)	[LTC Cover] Technician Equipment	-	-	-	-	-	-	-	-	-	-
61	-	Freshwater mussel relo (AR-7)	[LTC Cover] Transport Vehicle Rental (\$300/day)	-	-	-	-	-	-	-	-	-	-
61	-	Freshwater mussel relo (AR-7)	[LTC Cover] Transport Vehicle Operational Cost (\$0.75/mi)	-	-	-	-	-	-	-	-	-	-
		Terrestrial Resource Measures											
		Biological Monitoring - Generally											
62	-	Biological Monitoring (2.5, 4.2)	AECOM FY17/18 Planning (AQ & TER)	1.00	YR	656,078	656,078	-	-	-	-	656,078	656,078
62	-	Biological Monitoring (2.5, 4.2)	AECOM FY18/19 Planning (AW & TER)	1.00	YR	954,937	954,937	-	-	-	-	954,937	954,937
62	-	Biological Monitoring (4.2)	AECOM FY19/20 Prelim Services - Coordination	1.00	YR	64,000	64,000	-	-	-	-	64,000	64,000
62	-	Biological Monitoring (4.2)	AECOM FY20/21 Prelim Services / Dam Mods	1.00	YR	66,000	66,000	-	-	-	-	66,000	66,000
62	-	Biological Monitoring (4.2)	[LTC Cover] AECOM FY21/22 Dam Mods / Dam Removal - Coordination	-	-	-	-	-	-	-	-	-	-
62	-	Biological Monitoring (4.2)	[LTC Cover] AECOM FY22/23 Dam Removal & Restoration - Coordination	-	-	-	-	-	-	-	-	-	-
62	-	Biological Monitoring (4.2)	[LTC Cover] AECOM FY23/24+ Post Construction - Coordination	-	-	-	-	-	-	-	-	-	-
		Habitat restoration plan (TER-1)											
62	-	Habitat restoration plan (TER-1)	Included in vegetation restoration	-	-	-	-	-	-	-	-	-	-
		Nesting Bird Surveys (TER-2)											
62	-	Nesting Bird Surveys (TER-2)	[LTC Cover] Osprey nest platform management - Contractor	-	-	-	-	-	-	-	-	-	-
62	-	Nesting Bird Surveys (TER-2)	[LTC Cover] Osprey nest platform management	-	-	-	-	-	-	-	-	-	-
62	-	Nesting Bird Surveys (TER-2)	[LTC Cover] Osprey nest exclusion monitoring	-	-	-	-	-	-	-	-	-	-
62	-	Nesting Bird Surveys (TER-2)	[LTC Cover] Osprey nest regulatory compliance and reporting	-	-	-	-	-	-	-	-	-	-
		Nesting Bird Surveys (TER-2)											
62	-	Nesting Bird Surveys (TER-2)	AECOM Bio Monitoring (2.5, 4.2) FY19/20 Prelim Services - NSO	1.00	YR	37,080	37,080	-	-	-	-	37,080	37,822
62	-	Nesting Bird Surveys (TER-2)	AECOM Bio Monitoring (2.5, 4.2) FY19/20 Prelim Services - Nesting	1.00	YR	266,208	266,208	-	-	-	-	266,208	271,532
62	-	Nesting Bird Surveys (TER-2)	[LTC Cover] Cliff swallow nest management - Contractor	-	-	-	-	-	-	-	-	-	-
62	-	Nesting Bird Surveys (TER-2)	[LTC Cover] Cliff swallow nest management	-	-	-	-	-	-	-	-	-	-
62	-	Nesting Bird Surveys (TER-2)	[LTC Cover] Cliff swallow nest exclusion monitoring	-	-	-	-	-	-	-	-	-	-
62	-	Nesting Bird Surveys (TER-2)	[LTC Cover] Biological monitoring, nest site monitoring	-	-	-	-	-	-	-	-	-	-
62	-	Nesting Bird Surveys (TER-2)	[LTC Cover] Biological monitoring, construction site monitoring & w	-	-	-	-	-	-	-	-	-	-
62	-	Nesting Bird Surveys (TER-2)	[LTC Cover] Compliance reporting	-	-	-	-	-	-	-	-	-	-
62	-	Nesting Bird Surveys (TER-2)	[LTC Cover] Post construction special status species monitoring	-	-	-	-	-	-	-	-	-	-
62	-	Nesting Bird Surveys (TER-2)	[LTC Cover] Post construction special status regulatory compliance	-	-	-	-	-	-	-	-	-	-
		Bald and Golden Eagle (TER-3)											
62	-	Bald and Golden Eagle (TER-3)	AECOM Bio Monitoring (2.5, 4.2) FY19/20 Prelim Services	1.00	YR	Included	Included	-	-	-	-	-	-
62	-	Bald and Golden Eagle (TER-3)	Project Management/Task Oversight	1.00	EA	38,800	38,800	-	-	-	-	38,800	44,552
62	-	Bald and Golden Eagle (TER-3)	1 pre-construction survey in the early breeding season the year before	1.00	EA	49,819	49,819	-	-	-	-	49,819	53,884
62	-	Bald and Golden Eagle (TER-3)	1 pre-construction survey within 2 weeks prior to construction	1.00	EA	71,819	71,819	-	-	-	-	71,819	77,679
62	-	Bald and Golden Eagle (TER-3)	Pre-construction surveys (3x/year) if construction start is delayed from	1.00	HR	191,457	191,457	-	-	-	-	191,457	191,457
62	-	Bald and Golden Eagle (TER-3)	Eagle Avoidance and Minimization Plan	1.00	EA	28,560	28,560	-	-	-	-	28,560	29,131
62	-	Bald and Golden Eagle (TER-3)	[LTC Cover] Biological monitoring during construction	-	-	-	-	-	-	-	-	-	-
62	-	Bald and Golden Eagle (TER-3)	[LTC Cover] Reporting (1x/year for 5 years)	-	-	-	-	-	-	-	-	-	-
62	-	Bald and Golden Eagle (TER-3)	[LTC Cover] Meetings (agency, internal team, etc.)	-	-	-	-	-	-	-	-	-	-
62	-	Bald and Golden Eagle (TER-3)	USFWS take permit/Eagle Conservation Plan	1.00	HR	-	Risk Log	-	-	-	-	-	-
62	-	Bald and Golden Eagle (TER-3)	Post-Construction Eagle Surveys (3x/year for 5 years, only req'd if the	1.00	HR	-	Risk Log	-	-	-	-	-	-
		Special Status Plants (TER-4)											
62	-	Special Status Plants (TER-4)	AECOM Bio Monitoring (2.5, 4.2) FY19/20 Prelim Services	1.00	YR	56,208	56,208	-	-	-	-	56,208	57,332
62	-	Special Status Plants (TER-4)	[LTC Cover] Relo and monitoring - additional 2019 work (extended s	-	-	-	-	-	-	-	-	-	-
62	-	Special Status Plants (TER-4)	[LTC Cover] Relo and monitoring	-	-	-	-	-	-	-	-	-	-
		Wetland Mitigation (TER-5)											
62	-	Wetland Mitigation (TER-5)	[inc in PDB] Compensatory migration in Oregon	1.00	EA	-	-	-	-	-	-	-	-
62	-	Wetland Mitigation (TER-5)	[inc in PDB] Wetland migration monitoring	1.00	EA	-	-	-	-	-	-	-	-
62	-	Wetland Mitigation (TER-5)	[inc in PDB] Reporting and regulatory compliance	1.00	EA	-	-	-	-	-	-	-	-
		Western Pond Turtle (TER-7)											
62	-	Western Pond Turtle (TER-7)	AECOM Bio Monitoring (2.5, 4.2) FY19/20 Prelim Services	1.00	YR	-	Included	-	-	-	-	-	-
62	-	Western Pond Turtle (TER-7)	Wetland creation in Oregon - approximately 0.5 acres	1.00	EA	21,000	21,000	-	-	-	-	21,000	21,937
62	-	Western Pond Turtle (TER-7)	Investigation of turtle population - 1 additional year	1.00	EA	52,500	52,500	-	-	-	-	52,500	54,844

KRRC Cost Estimate - Full Removal

July 2019

Est ID	Cost Sheet	Heading	Description	Qty	Unit	(\$) Rate	(\$) Direct Cost	15% MJ by Sub	10% PDB OH&P	1% Bonds	Field Overhead	(\$) Estimate	Escalated YOC Estimate
62	-	Western Pond Turtle (TER-7)	Capture and relo of turtles	1.00	EA	36,750	36,750	-	-	-	-	36,750	39,749
62	-	Western Pond Turtle (TER-7)	Relo of turtles to Klamath	1.00	EA	21,000	21,000	-	-	-	-	21,000	23,622
62	-	Western Pond Turtle (TER-7)	Monitoring	1.00	EA	42,000	42,000	-	-	-	-	42,000	48,126
62	-	Western Pond Turtle (TER-7)	Reporting and Regulatory Compliance	1.00	EA	26,250	26,250	-	-	-	-	26,250	28,436
		Special Status Bats (TER-6)											
62	-	Special Status Bats (TER-6)	AECOM Bio Monitoring (2.5, 4.2) FY19/20 Prelim Services	1.00	YR	-	Included	-	-	-	-	-	-
62	-	Special Status Bats (TER-6)	Pre-Demolition Exclusion Oversight	1.00	EA	112,790	112,790	-	-	-	-	112,790	122,056
62	-	Special Status Bats (TER-6)	Bat Management Plan (Final)	1.00	EA	22,300	22,300	-	-	-	-	22,300	23,147
62	-	Special Status Bats (TER-6)	Re-assess Structures within One Year Prior to Drawdown	1.00	EA	22,500	22,500	-	-	-	-	22,500	24,336
62	-	Special Status Bats (TER-6)	Biological Monitoring	1.00	EA	119,080	119,080	-	-	-	-	119,080	139,378
62	-	Special Status Bats (TER-6)	Agency Coordination/Meetings	1.00	EA	50,770	50,770	-	-	-	-	50,770	54,919
62	-	Special Status Bats (TER-6)	Design Replacement Roosts	1.00	EA	38,800	38,800	-	-	-	-	38,800	39,731
62	-	Special Status Bats (TER-6)	[inc in PDB] Construction of Replacement Roosts	1.00	EA	-	-	-	-	-	-	-	-
62	-	Special Status Bats (TER-6)	Construction of Replacement Roosts	1.00	EA	128,000	128,000	19,200	14,720	1,619	6,018	169,557	179,866
62	-	Special Status Bats (TER-6)	[LTC Cover] Monitor Installation of Replacement Roosts	-	-	-	-	-	-	-	-	-	-
62	-	Special Status Bats (TER-6)	[LTC Cover] Post-Construction Monitoring of Replacement Roosts	-	-	-	-	-	-	-	-	-	-
		Baseline Water Quality Monitoring											
		Field installation & equipment											
63	-	Field installation & equipment	AECOM Water Monitoring (3.3) FY19/20 Prelim Services	1.00	YR	50,956	50,956	-	-	-	-	50,956	51,975
63	-	Field installation & equipment	Keno	1.00	EA	58,000	58,000	-	-	-	-	58,000	58,000
63	-	Field installation & equipment	JC Boyle	1.00	EA	151,000	151,000	-	-	-	-	151,000	151,000
63	-	Field installation & equipment	Copco	1.00	EA	86,000	86,000	-	-	-	-	86,000	86,000
63	-	Field installation & equipment	Iron Gate	1.00	EA	74,000	74,000	-	-	-	-	74,000	74,000
63	-	Field installation & equipment	Walker Bridge	1.00	EA	77,000	77,000	-	-	-	-	77,000	77,000
63	-	Field installation & equipment	Seiad Valley	1.00	EA	62,000	62,000	-	-	-	-	62,000	62,000
63	-	Field installation & equipment	Orleans	1.00	EA	64,000	64,000	-	-	-	-	64,000	64,000
63	-	Field installation & equipment	Klamath	1.00	EA	59,000	59,000	-	-	-	-	59,000	59,000
63	-	Field installation & equipment	Shasta	1.00	EA	65,000	65,000	-	-	-	-	65,000	65,000
63	-	Field installation & equipment	Scott	1.00	EA	65,000	65,000	-	-	-	-	65,000	65,000
END								-	-	-		-	-

PARTIAL REMOVAL ADJUSTMENTS

KRRC Cost Estimate - Line Item Adjustments for Partial Removal

July 2019

Cost Sh.	Line Item/Category	Esc YOC Estimate Ddt (Excl. FO)	Esc YOC Remediation Estimate	Est 2019 Annual Maint Rate	Esc from 2022 10 Year Maint Estimate	Esc YOC Actionable Savings	Comments
	Copco No. 1 Facility Removal	\$ (6,640,263)	\$ 182,790	\$ 12,500	\$ 168,815	\$ (6,242,241)	
	Penstocks	\$ (1,650,377)	\$ 70,304	\$ 6,500	\$ 87,784	\$ (1,486,093)	
2.019	Remove & Dispose of 3 sections of 23' of 72" Dia. steel lining (embedded)	\$ (274,991)	\$ 21,632	\$ 2,000	\$ 27,010	\$ (226,349)	Repair; 10-yr repair
2.020	Remove & Dispose of 3 - 72" butterfly valves (embedded)	\$ (249,063)	\$ 5,408	\$ 500	\$ 6,753	\$ (236,903)	Repair; 10-yr repair
2.065	Remove Concrete Items associated with 10 ft. diam. Penstocks. reinf. Concrete	\$ (119,145)	-	-	-	-	No remediation; minimal annual maint.
2.066	Plug 14-foot diameter penstock with concrete	\$ (158,208)	-	-	-	-	No remediation; minimal annual maint.
2.067	Remove & Dispose of 8 screens	\$ (24,861)	-	-	-	-	No remediation; minimal annual maint.
2.068	Remove & Dispose of 8 Water Gates	\$ (23,118)	-	-	-	-	No remediation; minimal annual maint.
2.070	Remove & Dispose of 14" Dia. penstock pipe	\$ (441,401)	\$ 21,632	\$ 2,000	\$ 27,010	\$ (392,759)	Repair; 10-yr repair
2.071	Remove & Dispose of 10" Dia. penstock pipe	\$ (353,383)	\$ 21,632	\$ 2,000	\$ 27,010	\$ (304,740)	Repair; 10-yr repair
	Powerhouse Intake Structure	\$ (2,950,840)	\$ 12,979	\$ 2,000	\$ 27,010	\$ (2,910,851)	
2.011	Remove Concrete Intake Structure on Right Abutment	\$ (2,950,840)	\$ 12,979	\$ 2,000	\$ 27,010	\$ (2,910,851)	Remove lead paint and fence; standard annual building maint.
	Diversion Control Structure	\$ (418,287)	\$ 12,979	\$ 2,000	\$ 27,010	\$ (378,287)	
2.014	Remove Diversion Tunnel Control Structure Concrete	\$ (418,287)	\$ 12,979	\$ 2,000	\$ 27,010	\$ (378,287)	Remove lead paint and fence; standard annual building maint.
	Powerhouse (ind. mech & elect. equipment)	\$ (1,620,759)	\$ 86,528	\$ 2,000	\$ 27,010	\$ (1,467,011)	
2.024	Remove Powerhouse Concrete down to top of rock under the Powerhouse	\$ (659,581)	\$ 86,528	\$ 2,000	\$ 27,010	\$ (546,042)	Remove lead paint and asbesthos. fence bulding and new roof. annual building maint.
2.025	Remove Powerhouse Structural Steel	\$ (77,708)	-	-	-	-	No remediation; no maint.
2.028	Remove & Dispose of 4 - Horizontal Tandem Francis Turbines	\$ (282,604)	-	-	-	-	Remediation and maint. covered in building costs
2.029	Remove & Dispose of 2 - 40 Ton indoor cranes	\$ (75,536)	-	-	-	-	Remediation and maint. covered in building costs
2.034	Remove & Dispose of Unwatering Piping	\$ (11,240)	-	-	-	-	Remediation and maint. covered in building costs
2.036	Remove & Dispose of Horizontal AC Generator, Indoor Open Frame	\$ (168,135)	-	-	-	-	Remediation and maint. covered in building costs
2.037	Remove & Dispose of Excitation equipment for 12.5 MVA Generator	\$ (30,065)	-	-	-	-	Remediation and maint. covered in building costs
2.040	Remove & Dispose of Generator Switchgear, 5kV-includes unit breakers	\$ (20,065)	-	-	-	-	Remediation and maint. covered in building costs
2.041	Remove & Dispose of Station Service Switchgear, 600 volt - (5 sections)	\$ (11,250)	-	-	-	-	Remediation and maint. covered in building costs
2.044	Remove & Dispose of Raceways, Conduit and Cable	\$ (15,741)	-	-	-	-	Remediation and maint. covered in building costs
2.046	Remove & Dispose of Step-up Transformers, indoor, oil-filled, 1-phase, 5000kVA	\$ (122,529)	-	-	-	-	Remediation and maint. covered in building costs
2.047	Remove & Dispose of Step-up Transformers, indoor, oil-filled, 1-phase, 4165kVA	\$ (122,529)	-	-	-	-	Remediation and maint. covered in building costs
	Copco No. 2 Facility Removal	\$ (3,824,448)	\$ 118,976	\$ 9,000	\$ 121,547	\$ (3,550,548)	
	Power Penstock Intake Structure and Gate	\$ (642,108)	\$ 10,816	\$ 2,000	\$ 27,010	\$ (604,282)	
3.061	Remove Intake Structure Concrete	\$ (402,964)	\$ 10,816	\$ 2,000	\$ 27,010	\$ (365,138)	Fence; annual maint. added
3.065	Remove & Dispose of Caterpillar Gate (steel)	\$ (41,334)	-	-	-	-	Remediation and maint. covered in structure costs
3.066	Remove & Dispose of Trash rack and trash rake (steel)	\$ (47,206)	-	-	-	-	Remediation and maint. covered in structure costs
3.067	Remove & Dispose of Stop Logs and slots for intake (steel)	\$ (150,604)	-	-	-	-	Remediation and maint. covered in structure costs
	Tunnel Portals	\$ (164,444)	-	\$ 1,000	\$ 13,505	\$ (150,938)	
3.062	Remove Concrete Items associated with 16-foot I.D. Wood Stave Pipe	\$ (164,444)	-	\$ 1,000	\$ 13,505	\$ (150,938)	No remediation; minimal maint.
	Concrete Pipe Cradles	\$ (164,444)	-	\$ 1,000	\$ 13,505	\$ (150,938)	
3.062	Remove Concrete Items associated with 16-foot I.D. Wood Stave Pipe	\$ (164,444)	-	\$ 1,000	\$ 13,505	\$ (150,938)	No remediation; minimal maint.
	Steel Penstock, Supports, Anchors	\$ (1,622,524)	\$ 21,632	\$ 3,000	\$ 40,516	\$ (1,560,376)	
3.064	Remove Concrete Items associated with Penstocks D/S from Tunnel No. 2	\$ (575,713)	\$ 21,632	\$ 1,000	\$ 13,505	\$ (562,207)	No remediation; minimal maint.
3.071	Remove & Dispose of Penstock after bifurcation to butterfly valves	\$ (894,815)	\$ 21,632	\$ 2,000	\$ 27,010	\$ (866,173)	Repair; annual maint. added
3.072	Remove & Dispose of Bifurcated vent pipes and support structure	\$ (10,561)	-	-	-	-	Included in line item above
3.073	Remove & Dispose of 2 - 138" Butterfly valves	\$ (181,435)	-	-	-	-	No remediation; no maint.
	Powerhouse	\$ (1,230,929)	\$ 86,528	\$ 2,000	\$ 27,010	\$ (1,084,011)	
3.027	Remove Copper Shingles from Roof of Powerhouse	\$ (15,984)	-	-	-	-	Included in line item below
3.028	Remove Powerhouse Concrete down to spring-line of turbine	\$ (202,371)	\$ 86,528	\$ 2,000	\$ 27,010	\$ (88,832)	Remove lead paint and asbesthos. fence bulding and new roof. annual building maint.
3.029	Remove Structural Steel items associated with Powerhouse	\$ (177,215)	-	-	-	-	Remediation and maint. covered in building costs
3.036	Remove & Dispose - 12 - Cast Iron Columns	\$ (21,835)	-	-	-	-	Remediation and maint. covered in building costs
3.037	Remove & Dispose - 2 - Francis Turbines	\$ (416,674)	-	-	-	-	Remediation and maint. covered in building costs
3.038	Remove & Dispose - 2 - 40 Ton indoor cranes	\$ (107,943)	-	-	-	-	Remediation and maint. covered in building costs
3.043	Remove & Dispose - Unwatering Piping	\$ (19,204)	-	-	-	-	Remediation and maint. covered in building costs
3.044	Remove & Dispose - Drainage Piping	\$ (10,286)	-	-	-	-	Remediation and maint. covered in building costs
3.045	Remove & Dispose - AC Generator, Indoor Vertical	\$ (164,356)	-	-	-	-	Remediation and maint. covered in building costs
3.046	Remove & Dispose - Excitation equipment for 15 MVA Generator	\$ (17,513)	-	-	-	-	Remediation and maint. covered in building costs
3.049	Remove & Dispose - Generator Switchgear, 7.2kV-includes unit breakers	\$ (14,016)	-	-	-	-	Remediation and maint. covered in building costs
3.050	Remove & Dispose - Station Service Switchgear, 600-volt (5 sections)	\$ (12,561)	-	-	-	-	Remediation and maint. covered in building costs
3.053	Remove & Dispose - Raceways, Conduit and Cable	\$ (17,592)	-	-	-	-	Remediation and maint. covered in building costs
	Iron Gate Facility Removal	\$ (1,472,669)	\$ 86,528	\$ 2,000	\$ 27,010	\$ (1,306,084)	
	Powerhouse	\$ (1,472,669)	\$ 86,528	\$ 2,000	\$ 27,010	\$ (1,306,084)	
4.039	Remove Powerhouse Concrete down to spring-line of turbine	\$ (1,015,479)	\$ 86,528	\$ 2,000	\$ 27,010	\$ (901,941)	Remove lead paint and asbesthos. fence bulding and new roof. annual building maint.
4.04	Remove and Dispose of Turbine Unit	-	-	-	-	-	Remediation and maint. covered in building costs
4.042	Remove and Dispose of Crane	\$ (203,725)	-	-	-	-	Remediation and maint. covered in building costs
4.043	Remove and Dispose of Governor	\$ (15,821)	-	-	-	-	Remediation and maint. covered in building costs
4.048	Remove and Dispose of Pumps	\$ (10,177)	-	-	-	-	Remediation and maint. covered in building costs
4.049	Remove and Dispose of Exposed Piping Around the Plant	\$ (18,731)	-	-	-	-	Remediation and maint. covered in building costs
4.05	Remove and Dispose of Unwatering Piping	\$ (16,594)	-	-	-	-	Remediation and maint. covered in building costs
4.054	Remove and Dispose of AC Generator, Outdoor Horizontal	\$ (16,289)	-	-	-	-	Remediation and maint. covered in building costs
4.059	Remove and Dispose of Unit and plant control switchboard	\$ (64,202)	-	-	-	-	Remediation and maint. covered in building costs
4.061	Remove and Dispose of Raceways, Bus, Conduit and Cable	\$ (27,008)	-	-	-	-	Remediation and maint. covered in building costs
	J. C. Boyle Facility Removal	\$ (7,835,051)	\$ 163,322	\$ 30,000	\$ 378,147	\$ (7,363,376)	
	Steel Pipeline and Support	\$ (962,587)	\$ 12,979	\$ 2,000	\$ 27,010	\$ (922,598)	
1.083.1	Remove & Dispose Penstocks and bifurcation (steel)	\$ (962,587)	\$ 12,979	\$ 2,000	\$ 27,010	\$ (922,598)	

KRRC Cost Estimate - Line Item Adjustments for Partial Removal

July 2019

Cost Sh.	Line Item/Category	Esc YOC Estimate Ddt (Excl. FO)	Esc YOC Remediation Estimate	Est 2019 Annual Maint Rate	Esc from 2022 10 Year Maint Estimate	Esc YOC Actionable Savings	Comments
	Canal Intake (Screen) Structure	\$ (834,506)	\$ 12,979	\$ 4,000	\$ 54,021	\$ (767,506)	
1.061	Remove Intake Structure Concrete	\$ (340,890)	\$ -	\$ 2,000	\$ 27,010	\$ (313,880)	No remediation; annual maint. for entire structure
1.062	Remove Fish Screen Building	\$ (55,841)	\$ 12,979	\$ 2,000	\$ 27,010	\$ (15,852)	Remove lead paint and fence; standard annual building maint.
	Left Concrete Gravity Section	\$ (136,319)	\$ -	\$ 2,000	\$ 27,010	\$ (109,308)	
1.008	Remove Gravity Dam Section Concrete	\$ (71,304)	\$ -	\$ 2,000	\$ 27,010	\$ (44,293)	No remediation. Annual maint. added.
	Canal Headgate Structure	\$ (153,392)	\$ -	\$ 1,000	\$ 13,505	\$ (139,886)	
1.064	Remove Concrete Items associated with the 14-ft-diameter Steel Pipe	\$ (153,392)	\$ -	\$ 1,000	\$ 13,505	\$ (139,886)	Covers all the conc associated with the penstock from the dam at the canal, inc head gate
	Power Canal (Flume)	\$ (4,255,793)	\$ -	\$ 5,000	\$ 67,526	\$ (4,188,267)	
1.065	Remove Open Concrete Flume	\$ (3,492,506)	\$ -	\$ 5,000	\$ 67,526	\$ (3,424,980)	No remediation. Annual maint. added
	Powerhouse (Incl. mech & elect. equipment)	\$ (1,117,198)	\$ 54,080	\$ 2,000	\$ 27,010	\$ (1,009,009)	
1.029	Remove Powerhouse Concrete down to Elevation 3324.0	\$ (438,884)	\$ 54,080	\$ 2,000	\$ 27,010	\$ (357,794)	Remove lead paint and asbestos, and fence buidng; annual building maint.
	Buildings	\$ (375,257)	\$ 83,283	\$ 14,000	\$ 189,073	\$ (226,802)	
1.011	Remove Storage Shed located on access road	\$ (77,038)	\$ 11,898	\$ 2,000	\$ 27,010	\$ (38,130)	Remove lead paint and fence; standard annual building maint.
1.012	Remove Warehouse, North & South Residence (Red Barn) Near Dam Access Road	\$ (172,758)	\$ 11,898	\$ 2,000	\$ 27,010	\$ (133,850)	Remove lead paint and fence; standard annual building maint.
1.031	Remove Warehouse near Powerhouse	\$ (93,731)	\$ 11,898	\$ 2,000	\$ 27,010	\$ (54,823)	Remove lead paint and fence; standard annual building maint.
	TOTAL PARTIAL REMOVAL SAVINGS	\$ (19,772,431)	\$ 551,616	\$ 53,500	\$ 695,520	\$ (18,467,247)	



Attachment B Pay Item Cost Detail Worksheets

COPCO 1 DAM REMOVAL

PAY ITEM COST DETAIL WORKSHEET 2.001 Furnish, Install, and Remove Barge-Mounted Crane in Reservoir for Dam Removal

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.001	Project	:	KRRP - Copco 1				
Description	:	Furnish, Install, and Remove Barge-Mounted Crane in Reservoir for Dam Removal	Group	:	D07				
Quantity	:	1.00	Is	:		Project #	:	2	
Daily Production	:	0.05	Is per	:	10	Estimator	:	Eric Jones	
Work Days	:	20.0	Days	:		Is per	:	0.055	Total Cost
Unit Price	:	\$358,914.90	per Is	:		Probable Low Cost Parameter	:		\$323,023
Total Cost	:	\$358,915		:		Probable High Cost Parameter	:	0.0375	\$448,644
									Unit Price Per Is
									\$323,023.41
									\$448,643.63

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	20.0	10	200.00	L	\$58.87	incl. in rate	incl. in rate	\$11,774.40
Laborer	Active	2.00	20.0	10	400.00	L	\$51.07	incl. in rate	incl. in rate	\$20,429.20
Equipment Operator (crane)	Active	1.00	20.0	10	200.00	L	\$81.60	incl. in rate	incl. in rate	\$16,319.60
Equipment Operator (oiler)	Active	1.00	20.0	10	200.00	L	\$73.43	incl. in rate	incl. in rate	\$14,685.00
Tugboat Captain	Active	1.00	20.0	10	200.00	L	\$77.37	incl. in rate	incl. in rate	\$15,474.80
Tugboat Hand	Active	1.00	20.0	10	200.00	L	\$67.06	incl. in rate	incl. in rate	\$13,411.20
Barge Operator	Active	1.00	20.0	10	200.00	L	\$79.13	incl. in rate	incl. in rate	\$15,826.80
Barge, Deck Engineer, Winch Operator	Active	1.00	20.0	10	200.00	L	\$79.13	incl. in rate	incl. in rate	\$15,826.80
Crawler Crane (270tn)	Active	2.00	20.0	10	400.00	E	\$454.10	incl. in rate	incl. in rate	\$181,640.00
					Labor Hours	1800	TOTAL LABOR			\$123,747.80
					Equipment Hours	400	TOTAL EQUIPMENT			\$181,640.00

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
						TOTAL MATERIAL
						\$0.00

SUBCONTRACT COSTS						
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount	
Barge Rental 3 Months	3.00	month	1.000	3.00	\$9,600.00	\$28,800.00
Tug Boat Rental 3 Months	3.00	month	1.000	3.00	\$3,550.00	\$10,650.00
						\$0.00
						\$0.00
						TOTAL SUBCONTRACTS
						\$39,450.00

SUMMARY OF COSTS						
Labor Cost	\$123,747.80	Labor Burden @	0.0%	\$0.00		\$123,747.80
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00		\$0.00
Equipment Cost	\$181,640.00	Equipment Tax @	7.75%	\$14,077.10		\$195,717.10
Subcontractors	\$39,450.00					\$39,450.00
DIRECT COST SUBTOTALS	\$344,838			\$14,077	DIRECT COST SUBTOTALS	\$358,915
Additional Pay Item Notes :						

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PAY ITEM COST DETAIL WORKSHEET

2.007 Remove Current Diversion Tunnel Plug

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.007	Project	:	KRRP - Copco 1				
Description	:	Remove Current Diversion Tunnel Plug	Group	:	D02				
Quantity	:	195.00	cy						
Daily Production	:	15.00	cy per	10	hour shift	Project #	:	2	
Work Days	:	13.0	Days			Estimator	:	Eric Jones	
Unit Price	:	\$650.44	per cy			Probable Low Cost Parameter		16.5	Total Cost
Total Cost	:	\$126,836				Probable High Cost Parameter		12	Unit Price Per cy
								\$152,203	\$585.40
									\$780.53

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	13.0	10	130.00	L	\$58.87	incl. in rate	incl. in rate	\$7,653.36
Laborer	Active	5.00	13.0	10	650.00	L	\$51.07	incl. in rate	incl. in rate	\$33,197.45
Equipment Operator (medium)	Active	2.00	13.0	10	260.00	L	\$72.34	incl. in rate	incl. in rate	\$18,807.36
Truck Driver (heavy)	Active	1.00	13.0	10	130.00	L	\$75.72	incl. in rate	incl. in rate	\$9,844.12
Barge Operator	Active	1.00	13.0	10	130.00	L	\$79.13	incl. in rate	incl. in rate	\$10,287.42
Barge, Deck Engineer, Winch Operator	Active	1.00	13.0	10	130.00	L	\$79.13	incl. in rate	incl. in rate	\$10,287.42
Barge, Sectional, 20'x10'	Active	2.00	13.0	10	260.00	E	\$6.89	incl. in rate	incl. in rate	\$1,791.40
Loader, FE Rubber Tire (3.5cy)	Active	1.00	13.0	10	130.00	E	\$63.11	incl. in rate	incl. in rate	\$8,204.30
Truck, On-Highway Dump (6x4, 12cy)	Active	1.00	13.0	10	130.00	E	\$57.41	incl. in rate	incl. in rate	\$7,463.30
Air Compressor 600 CFM	Active	2.00	13.0	10	260.00	E	\$60.25	incl. in rate	incl. in rate	\$15,665.00
Pavement Breakers 60lbs	Active	6.00	13.0	10	780.00	E	\$1.27	incl. in rate	incl. in rate	\$990.60
Labor Hours					1430	TOTAL LABOR				\$90,077.13
Equipment Hours					1560	TOTAL EQUIPMENT				\$34,114.60

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
TOTAL MATERIAL						\$0.00

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					\$0.00
					\$0.00
					\$0.00
					\$0.00
TOTAL SUBCONTRACTS					\$0.00

SUMMARY OF COSTS						
Labor Cost	\$90,077.13	Labor Burden @	0.0%	\$0.00		\$90,077.13
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00		\$0.00
Equipment Cost	\$34,114.60	Equipment Tax @	7.75%	\$2,643.88		\$36,758.48
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$124,192			\$2,644	DIRECT COST SUBTOTALS	\$126,836
Additional Pay Item Notes :						

There will be two barges used to support the demolition of the concrete plug. One barge will manage the equipment and one will be used for material hauling. It is expected that the concrete plug will demolished with pavement breaks with the support from a skid steer. Blasting was not used to demolish this item to avoid damaging the tunnel.

2.008 Tailrace Cofferdam- Furnish & Unload Material

PAY ITEM NUMBER	:	2.008	Project	:	KRRP - Copco 1
Description	:	Tailrace Coffor Dam- Furnish & Unload Material	Group	:	D02
Quantity	:	25.00 LD			
Daily Production	:	5.00 LD per	10	hour shift	
Work Days	:	5.0	Days		
Unit Price	:	\$8,613.85	per LD		
Total Cost	:	\$215,346			
			Project #	:	2
			Estimator	:	Michael Barba
			Probable Low Cost Parameter	:	5.75
			Probable High Cost Parameter	:	4
					Total Cost
					Unit Price Per LD
					\$183,044
					\$7,321.77
					\$258,416
					\$10,336.62

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	5.0	10	50.00	L	\$58.87	incl. in rate	incl. in rate	\$2,943.60
Laborer	Active	1.00	5.0	10	50.00	L	\$51.07	incl. in rate	incl. in rate	\$2,553.65
Equipment Operator (medium)	Active	1.00	5.0	10	50.00	L	\$72.34	incl. in rate	incl. in rate	\$3,616.80
Equipment Operator (crane)	Active	1.00	5.0	10	50.00	L	\$81.60	incl. in rate	incl. in rate	\$4,079.90
Crawler Crane (130tn)	Active	1.00	5.0	10	50.00	E	\$262.91	incl. in rate	incl. in rate	\$13,145.50
Loader, FE Rubber Tire (5.25cy)	Active	1.00	5.0	10	50.00	E	\$76.00	incl. in rate	incl. in rate	\$3,800.00
Pile Driver	Active	2.00	5.0	10	100.00	L	\$78.56	incl. in rate	incl. in rate	\$7,856.00
Labor Hours					300	TOTAL LABOR				\$21,049.95
Equipment Hours					100	TOTAL EQUIPMENT				\$16,945.50

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
						\$0.00
24" Combi Pipe Pile (.5" thick wall X 40' long 31 each c	1,240.00	VLF	1.060	1,314.40	\$25.00	\$32,860.00
Sheet Pile AZ-13 12080 SF	114,760.00	Lbs	1.060	121,645.60	\$0.50	\$60,822.80
Rigging Allowance (10% of Material Cost)	1.00	AL	1.000	1.00	\$9,368.28	\$9,368.28
TOTAL MATERIAL						\$103,051.08

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Load Allowance	25	LD		\$1,000.00	\$25,000.00
Crane Mobilization	1	LS		\$40,000.00	\$40,000.00
					\$0.00
					\$0.00
			TOTAL SUBCONTRACTS		\$65,000.00

Labor Cost	\$21,049.95	Labor Burden @	0.0%	\$0.00		\$21,049.95
Material Cost	\$103,051.08	Material Tax @	7.75%	\$7,986.46		\$111,037.54
Equipment Cost	\$16,945.50	Equipment Tax @	7.75%	\$1,313.28		\$18,258.78
Subcontractors	\$65,000.00					\$65,000.00
DIRECT COST SUBTOTALS	\$206,047			\$9,300	DIRECT COST SUBTOTALS	\$215,346
Additional Pay Item Notes :						
Figuring that the crane mobilization will cost more due to restricted access.						

PAY ITEM COST DETAIL WORKSHEET

2.008 Tailrace Coffe Dam- Drive Pile

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.008			Project	:	KRRP - Copco 1		
Description	:	Tailrace Coffe Dam- Drive Pile			Group	:	D02		
Quantity	:	12,080.00	SF						
Daily Production	:	700.00	SF per	10	hour shift	Project #	:	2	
Work Days	:	17.3	Days		Estimator	:	Michael Barba	SF per	Total Cost
Unit Price	:	\$29.96	per SF		Probable Low Cost Parameter		805	\$307,676	Unit Price Per SF
Total Cost	:	\$361,972			Probable High Cost Parameter		525	\$452,464	\$37.46

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	17.3	10	173.00	L	\$58.87	incl. in rate	incl. in rate	\$10,184.86
Laborer	Active	3.00	17.3	10	519.00	L	\$51.07	incl. in rate	incl. in rate	\$26,506.89
Equipment Operator (crane)	Active	1.00	17.3	10	173.00	L	\$81.60	incl. in rate	incl. in rate	\$14,116.45
Equipment Operator (oiler)	Active	1.00	17.3	10	173.00	L	\$73.43	incl. in rate	incl. in rate	\$12,702.53
Vibratory Hammer & Extractor	Active	1.00	17.3	10	173.00	E	\$94.14	incl. in rate	incl. in rate	\$16,286.22
Welder	Active	1.00	17.3	10	173.00	E	\$7.84	incl. in rate	incl. in rate	\$1,356.32
Crawler Crane (130tn)	Active	1.00	17.3	10	173.00	E	\$262.91	incl. in rate	incl. in rate	\$45,483.43
Pile Driver	Active	4.00	17.3	10	692.00	L	\$78.56	incl. in rate	incl. in rate	\$54,363.52
D36 Hammer 36X100' Leads	Active	1.00	17.3	10	173.00	E	\$102.44	incl. in rate	incl. in rate	\$17,722.12
Labor Hours					1730	TOTAL LABOR				\$117,874.24
Equipment Hours					692	TOTAL EQUIPMENT				\$80,848.09

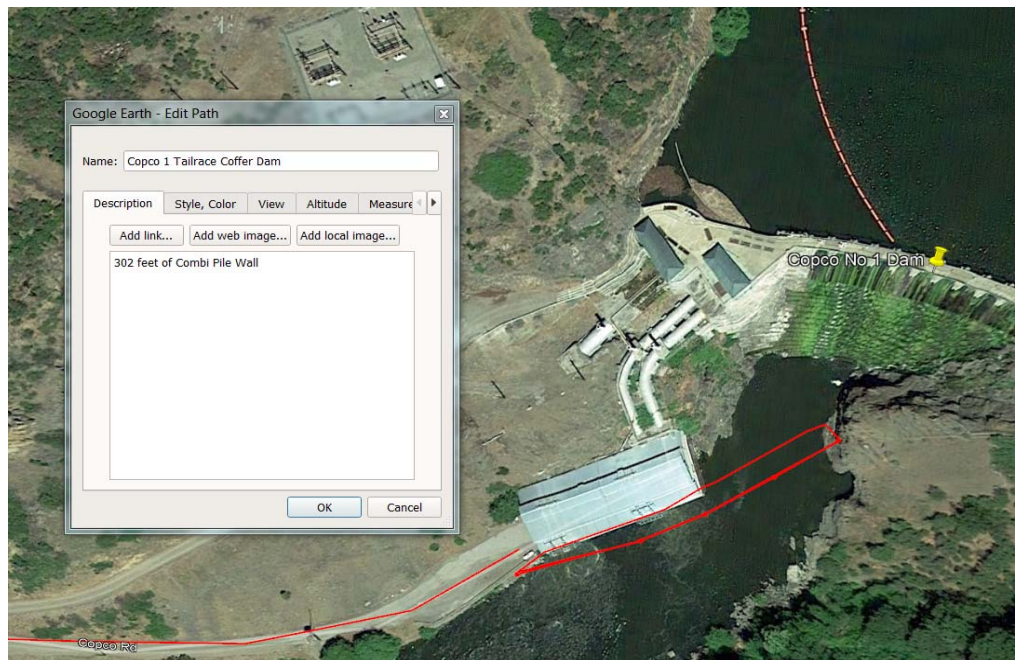
MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
PDA Allowance	1.00	AL	1.000	1.00	\$15,000.00	\$15,000.00
Welding materials Allowance (10% of Labor)	1.00	AL	1.000	1.00	\$11,787.42	\$11,787.42
						TOTAL MATERIAL
						\$26,787.42

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Predrilling for Pipe Pile (20' deep at 31 locations)	620	VLFT		\$126.00	\$78,120.00
Predrilling Equipment Mob and Demob	1	LS		\$50,000.00	\$50,000.00
					TOTAL SUBCONTRACTS
					\$128,120.00

SUMMARY OF COSTS						
Labor Cost	\$117,874.24	Labor Burden @	0.0%	\$0.00		\$117,874.24
Material Cost	\$26,787.42	Material Tax @	7.75%	\$2,076.03		\$28,863.45
Equipment Cost	\$80,848.09	Equipment Tax @	7.75%	\$6,265.73		\$87,113.82
Subcontractors	\$128,120.00					\$128,120.00
DIRECT COST SUBTOTALS	\$353,630			\$8,342	DIRECT COST SUBTOTALS	\$361,972
Additional Pay Item Notes :						

2.008 Tailrace Cofferd Dam- Drive Pile				
Details				
High Cost Factors			Low Cost Factors	
Bad Weather	0%		No Bad Weather	0%
Gas Price Increase	10%		Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	15%		No Unforeseen Contaminated Mats/ Access Issues	5%
	25%			15%

Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)	Overall Production	
	1500	8	70%	8400
	100	10	70%	700



2.008 Tailrace Cofferdam-Extract Pile

PAY ITEM NUMBER	:	2.008	Project	:	KRRP - Copco 1
Description	:	Tailrace Cofferdam-Extract Pile	Group	:	D02
Quantity	:	12,080.00 SF			
Daily Production	:	1,050.00 SF per	10	hour shift	
Work Days	:	11.5	Days		
Unit Price	:	\$15.61	per SF		
Total Cost	:	\$188,570			
			Project #	:	2
			Estimator	:	Michael Barba
			Probable Low Cost Parameter	:	1207.5
			Probable High Cost Parameter	:	840
					Total Cost
					Unit Price Per SF
					\$160,285
					\$13.27
					\$226,284
					\$18.73

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	11.5	10	115.00	L	\$58.87	incl. in rate	incl. in rate	\$6,770.28
Laborer	Active	3.00	11.5	10	345.00	L	\$51.07	incl. in rate	incl. in rate	\$17,620.19
Equipment Operator (crane)	Active	1.00	11.5	10	115.00	L	\$81.60	incl. in rate	incl. in rate	\$9,383.77
Equipment Operator (oiler)	Active	1.00	11.5	10	115.00	L	\$73.43	incl. in rate	incl. in rate	\$8,443.88
Vibratory Hammer & Extractor	Active	1.00	11.5	10	115.00	E	\$94.14	incl. in rate	incl. in rate	\$10,826.10
Welder	Active	1.00	11.5	10	115.00	E	\$7.84	incl. in rate	incl. in rate	\$901.60
Crawler Crane (130tn)	Active	1.00	11.5	10	115.00	E	\$262.91	incl. in rate	incl. in rate	\$30,234.65
Pile Driver	Active	4.00	11.5	10	460.00	L	\$78.56			\$36,137.60
Labor Hours					1150	TOTAL LABOR				\$78,355.71
Equipment Hours					345	TOTAL EQUIPMENT				\$41,962.35

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
TOTAL MATERIAL						\$0.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Load Allowance	25	LD		\$1,000.00	\$25,000.00
Crane Demobilization	1	LS		\$40,000.00	\$40,000.00
					\$0.00
					\$0.00
			TOTAL SUBCONTRACTS		\$65,000.00

Labor Cost		\$78,355.71	Labor Burden @	0.0%	\$0.00		\$78,355.71
Material Cost		\$0.00	Material Tax @	7.75%	\$0.00		\$0.00
Equipment Cost		\$41,962.35	Equipment Tax @	7.75%	\$3,252.08		\$45,214.43
Subcontractors		\$65,000.00					\$65,000.00
DIRECT COST SUBTOTALS		\$185,318			\$3,252	DIRECT COST SUBTOTALS	\$188,570
Additional Pay Item Notes :							
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PAY ITEM COST DETAIL WORKSHEET

2.009 Installation of 3 each 72" Blind Flanges

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.009	Project	:	KRRP - Copco 1				
Description	:	Installation of 3 each 72" Blind Flanges	Group	:	D02				
Quantity	:	38,000.00 LBS							
Daily Production	:	5,000.00 LBS per	20	hour shift	Project #	:	2		
Work Days	:	7.6 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$33.03 per LBS			Probable Low Cost Parameter			5750	\$1,066,884
Total Cost	:	\$1,255,158			Probable High Cost Parameter			3500	\$1,631,706
									Unit Price Per LBS
									\$28.08
									\$42.94

CREW COSTS										
Description	Active	# in	Days	Hours	Total	L/E	Hourly	Hrly oper.	Burden	Labor / Equipment
	Idle	crew	Worked	/day	Hours		Rate	Cost	Rate	Cost
Labor Foreman	Active	1.00	7.6	20	152.00	L	\$58.87	incl. in rate	incl. in rate	\$8,948.54
Laborer	Active	3.00	7.6	20	456.00	L	\$51.07	incl. in rate	incl. in rate	\$23,289.29
Equipment Operator (crane)	Active	1.00	7.6	20	152.00	L	\$81.60	incl. in rate	incl. in rate	\$12,402.90
Diver, Wet	Active	6.00	7.6	20	912.00	L	\$142.66	incl. in rate	incl. in rate	\$130,105.01
Diver, Tender	Active	3.00	7.6	20	456.00	L	\$92.77	incl. in rate	incl. in rate	\$42,304.94
Barge Operator	Active	1.00	7.6	20	152.00	L	\$79.13	incl. in rate	incl. in rate	\$12,028.37
Barge, Deck Engineer, Winch Operator	Active	1.00	7.6	20	152.00	L	\$79.13	incl. in rate	incl. in rate	\$12,028.37
Barge, Sectional, 40'x10', includes ramp	Active	2.00	7.6	20	304.00	E	\$17.71	incl. in rate	incl. in rate	\$5,383.84
Gas Welding Machine	Active	2.00	7.6	20	304.00	E	\$2.88	incl. in rate	incl. in rate	\$874.60
Crawler Crane (270tn)	Active	1.00	7.6	20	152.00	E	\$454.10	incl. in rate	incl. in rate	\$69,023.20
					Labor Hours	2432			TOTAL LABOR	\$241,107.42
					Equipment Hours	760			TOTAL EQUIPMENT	\$75,281.64

MATERIAL COSTS						
Description	Item	Order	Conversion	Order	Order	Material
	Quantity	Unit	Factor / Waste	Quantity	Price	Cost
Furnish 3 each 72" Blind Flanges	38,000.00	LBS	1.000	38,000.00	\$22.00	\$836,000.00
Welding structural steel in field, cost per welder, 8# per ton, 1/8" dia, type 6011, incl 1 operating engineer	19.00	ton	1.000	19.00	\$18.85	\$358.15
Cutting, steel, to 1/4" thick, by hand, incl prep, torch cutting & grinding, excl staging (assumed qty)	1,000.00	lf	1.000	1,000.00	\$20.00	\$20,000.00
Exothermic weld, 4/0 wire to 1" ground rod (assumed qty)	100.00	ea	1.000	100.00	\$10.25	\$1,025.00
Exothermic weld, to building steel, 4/0 wire (assumed qty)	100.00	ea	1.000	100.00	\$10.25	\$1,025.00
TOTAL MATERIAL						\$858,408.15

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
	8.00	EA	1.000	8.00	\$1,000.00
TOTAL SUBCONTRACTS					\$8,000.00

SUMMARY OF COSTS						
Labor Cost	\$241,107.42	Labor Burden @	0.0%	\$0.00		\$241,107.42
Material Cost	\$858,408.15	Material Tax @	7.75%	\$66,526.63		\$924,934.78
Equipment Cost	\$75,281.64	Equipment Tax @	7.75%	\$5,834.33		\$81,115.97
Subcontractors	\$8,000.00					\$8,000.00
DIRECT COST SUBTOTALS	\$1,182,797			\$72,361	DIRECT COST SUBTOTALS	\$1,255,158

Additional Pay Item Notes :

This pay item is to account for the installation of the 3 blind flanges in the place of the 3 flapper gates on the diversion tunnel. Due to the depth of the structure there will need to be a total of 6 divers so 2 each can alternate every 20 mins to install the blind flanges. Production has been reduced to account for the inefficiency due to the allowed underwater duration. Due to this being considered in channel work restricted by the California in water work permits it will be double shifted in the schedule.

PAY ITEM COST DETAIL WORKSHEET

2.009.2 Installation of 16.5 X 18.5 Roller Gate and Gate Structure

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.009.2	Project	:	KRRP - Copco 1				
Description	:	Installation of 16.5 X 18.5 Roller Gate and Gate Structure	Group	:	D02				
Quantity	:	1.00 LS							
Daily Production	:	0.03 LS per	20	hour shift	Project #	:	2		
Work Days	:	40.0 Days			Estimator	:	Mihaela Tomulescu	LS per	Total Cost
Unit Price	:	\$4,481,793.76 per LS			Probable Low Cost Parameter		0.02875	\$3,809,525	Unit Price Per LS
Total Cost	:	\$4,481,794			Probable High Cost Parameter		0.0175	\$5,826,332	\$5,826,331.89

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	40.0	20	800.00	L	\$58.87	incl. in rate	incl. in rate	\$47,097.60
Laborer	Active	3.00	40.0	20	2,400.00	L	\$51.07	incl. in rate	incl. in rate	\$122,575.20
Carpenter Foreman (out)	Active	1.00	40.0	20	800.00	L	\$85.49	incl. in rate	incl. in rate	\$68,393.60
Carpenters	Active	4.00	40.0	20	3,200.00	L	\$85.49	incl. in rate	incl. in rate	\$273,574.40
Equipment Operator (crane)	Active	1.00	40.0	20	800.00	L	\$81.60	incl. in rate	incl. in rate	\$65,278.40
Steelworker	Active	2.00	40.0	20	1,600.00	L	\$78.10	incl. in rate	incl. in rate	\$124,960.00
Barge Operator	Active	1.00	40.0	20	800.00	L	\$79.13	incl. in rate	incl. in rate	\$63,307.20
Barge, Deck Engineer, Winch Operator	Active	1.00	40.0	20	800.00	L	\$79.13	incl. in rate	incl. in rate	\$63,307.20
Electrician	Active	2.00	40.0	20	1,600.00	L	\$55.80	incl. in rate	incl. in rate	\$89,284.80
Crawler Crane (270tn)	Active	1.00	40.0	20	800.00	E	\$454.10	incl. in rate	incl. in rate	\$363,280.00
Barge, Sectional, 40'x10', includes ramp	Active	1.00	40.0	20	800.00	E	\$17.71	incl. in rate	incl. in rate	\$14,168.00
Conc Pump (small)	Active	1.00	3.0	20	60.00	E	\$121.58	incl. in rate	incl. in rate	\$7,294.80
Equipment Operator (light)	Active	1.00	3.0	20	60.00	L	\$71.39	incl. in rate	incl. in rate	\$4,283.40
Labor Hours					12860	TOTAL LABOR				\$922,061.80
Equipment Hours					1660	TOTAL EQUIPMENT				\$384,742.80

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
quote from JM Works)	1.00	LS	1.000	1.00	\$2,331,511.00	\$2,331,511.00
1/8" dia, type 6011, incl 1 operating engineer	55.00	ton	1.000	55.00	\$250.00	\$13,750.00
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$92,206.18	\$92,206.18
Material	10%	%	1.000	0.10	\$2,331,511.00	\$233,151.10
Concrete Material Forms and Reinforcement Allowance	25%	%	1.000	0.25	\$922,061.80	\$230,515.45
Rock Anchor Dowel Allowance for Tunnel and Bulkhead	10%	%	1.000	0.10	\$922,061.80	\$92,206.18
TOTAL MATERIAL						\$2,901,133.73

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
	40.00	EA	1.000	40.00	\$480.00
					\$19,200.00
					\$0.00
TOTAL SUBCONTRACTS					\$19,200.00

SUMMARY OF COSTS					
Labor Cost	\$922,061.80	Labor Burden @	0.0%	\$0.00	\$922,061.80
Material Cost	\$2,901,133.73	Material Tax @	7.75%	\$224,837.86	\$3,125,971.59
Equipment Cost	\$384,742.80	Equipment Tax @	7.75%	\$29,817.57	\$414,560.37
Subcontractors	\$19,200.00				\$19,200.00
DIRECT COST SUBTOTALS	\$4,227,138			\$254,655	DIRECT COST SUBTOTALS \$4,481,794
Additional Pay Item Notes :					

It is expected that small sectional barges will need to be mobilized into area to allow equipment to access diversion tunnel. Expecting barges to be small sectionals similar to a flexi float system due to the hauling restrictions due to the size of the haul road. Concrete pump is expected to be used 3 days to accommodate pouring concrete. This activity has been double shifted with two 10 hours shifts due to the restrictions from the California in water work permit.

High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	10%	Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues	0%
	20%		10%

Drilling and Blasting Production per shift	19
Drilling and Blasting CY per Hour	1.00
# of Drills	19
CY per Hour	19
CY per Hour Back Check	38
38CY per HR per 8hr shift (Ideal prod)	50%
Efficient Compared to Ideal Production	50%
Inefficiencies Compared to Ideal Production	50%

Demolition of the concrete dam will be a combination of blasting and hydraulic breakers. The material is expected to fall to the down stream side near the power house coffer dam. Equipment will be staged at bottom to process and prepare material for hauling. Hauling is expected to be 80% efficient after accounting the narrow and steep haul routes, staff breaks, haulage at night, etc. A concrete sawing subcontractor is expected to periodically be used during the demo process and an allowance has been used to account for the cost. It is expected that the demolition activity will have reduced production due to the strength of concrete and the amount of oversize reinforcement embedded with in the concrete. A 270ton crane will be used to support the demolition operation for half of the duration. A larger crane has been used due to the expectation of needing to lift equipment or materials at a larger radius. It is expected that a combination of torches and excavator shears will be used to cut through steel items as necessary. This item is to be double shifted with two 10 hour shifts to account for the California in water work restrictions

2.011 Remove Concrete Intake Structure on Right Abutment

SUMMARY OF COSTS						
Labor Cost	\$812,461.62	Labor Burden @	0.0%	\$0.00	Included in hourly labor rate.	\$812,461.62
Material Cost	\$150,309.39	Material Tax @	7.75%	\$11,648.98		\$161,958.37
Equipment Cost	\$1,273,293.64	Equipment Tax @	7.75%	\$98,680.26		\$1,371,973.89
Subcontractors	\$14,800.00					\$14,800.00
DIRECT COST SUBTOTALS		\$2,250,865	\$110,329		DIRECT COST SUBTOTALS	\$2,361,194
Additional Pay Item Notes :						

2.011 Remove Concrete Intake Structure on Right Abutment				
Details				
High Cost Factors		Low Cost Factors		
Bad Weather	0%	No Bad Weather		0%
Gas Price Increase	10%	Gas Price Decrease		10%
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues		5%
	20%			15%
Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Etc)		Overall Production
	38	8	50%	152.00
		20	50%	380.00
Haul Notes		Excavator Loading Production per shift		
CY	16,400.00	CY per Hour		21
Swell Factor	60%	CY Bucket Size		2.50
Bulk CY	26240	Buckets Per Hour		8
Haul Vehicle 60% Capacity (2 tons per CY)	7.2	# of Excavators		1.00
# of Haul Vehicles	2	CY per Hour (5 CY Bucket)		21
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)		5 CY Per Hour Ideal Production Per 8 Hour Shift		95
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) Minutes)		Efficient Compared to Ideal Production		22%
Haul Speed (Loaded MPH)	5.00	Inefficiencies Compared to Ideal Production		78%
Return Speed (Unloaded MPH)	10.00			
Haul Distance (Miles)	0.50			
Shift Length (Hours)	20			
Cycle Time		Breaker Production		
Load Time (Load Time Minutes / 60mins)	0.08	Hydraulic Hammer CY per Hour		19.00
Haul Time (Haul Distance / Haul Speed)	0.10	# of Hammers		2
Dump Time (Dump Time Minutes / 60 Mins)	0.05	CY per Hour		9.5
Return Time (Haul Distance / Return Speed)	0.05	CY per Hour Back Check		9.5
Hours Per Cycle	0.28	32CY per HR per 8hr shift (Ideal prod)		3200%
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	80%	Efficient Compared to Ideal Production		30%
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.35	Inefficiencies Compared to Ideal Production		0.703125
Number of Cycles(Bulk CY/(Haul Vehicle Cap X # of Haul Vehicles)	1822			
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	637.7			
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	2.86			
Number of Haul Days	32			
		Drilling and Blasting Production per shift		
		Drilling and Blasting CY per Hour		19
		# of Drills		1.00
		CY per Hour		19
		38CY per HR per 8hr shift (Ideal prod)		19
		Efficient Compared to Ideal Production		38
		Inefficiencies Compared to Ideal Production		50%
				50%
Other Notes				

2.013 Install Diversion Tunnel Plugs
Details

High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	5%	Gas Price Decrease	5%
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues	5%
			10%

Production Per Hour	Hours	Overall Production
	0.3	8
		2.4
		6

Production & Sequence Notes

The Plug is expected to be formed in two sections. The inner section will be formed and braced off of the tunnel walls. After the inner form (set form) is installed the face form will be built similar to the set form by bracing off of the tunnel walls. To ensure consolidation a high slump small aggregate mix will be used and concrete vibrators will have access through the Bat opening block out at the top. One 5 man crew will be used to construct the formwork, place the concrete, and strip the form work. One crew of 3 rodbusters will be used to tie and brace reinforcement. Expected duration is 5 days to form the plug , 2 days to reinforce the plug, 1 days to pour the plug, and 2 days to strip the plug. Crane will be used 1/2 of time to support crew by flying material close to plug location. A small pump will be used to install concrete. Please note the production is adjusted to account for the duration as listed above. This item will be double shifted with 2 10 hour shifts due to the California in water work restriction.

Other Notes

2.014 Remove Diversion Tunnel Control Structure Concrete			
Details			
High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	10%	Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues	0%
	20%		10%

Production Per Hour	Hours	Overall Production	
	3	8	24
		20	60

Crew Notes

350.00 CY

7.2 CY per Truck

49 # of loads

5.80 # of days

8 Loads per Day

2.00 # of trucks

4.19 # of loads per Shift Per truck

48.61 Back Check CY

350.00 Back Check CY

60.00 CY per Day

12 Excavator Buckets 5CY

Other Notes

This activity is to remove the existing diversion control structure.This will need to be removed before the drawdown period begins due to the existing valves restricting the required flow rates for the draw down. Due to the depth of the valves and similar to payitem 2.002, divers performing the demolition activity will only be able to spend 20 mins at a time to demolish the structure. The demolished material will be loaded out with a clamshell bucket.This item will be double shifted with two 10 hours shifts due to the California in water work restrictions.

Production and Sequence notes

Barge will be used to support entire operation

Crane will be used to bucket demolished material out of the reservoir

Chipping hammers will break up the structure

Divers will be operating the chipping hammers during the demolition process

Tenders are required for each diver

Trucks are anticipated to be used half of the time once there is enough material to load out

Expect to use wire saw on some of the structure

PAY ITEM COST DETAIL WORKSHEET

2.015 Remove & Dispose of Hand Rails at dam

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.015	Project	:	KRRP - Copco 1				
Description	:	Remove & Dispose of Hand Rails at dam	Group	:	D10				
Quantity	:	11,000.00 LBS							
Daily Production	:	13,750.00 LBS per	10	hour shift	Project #	:	2		
Work Days	:	0.8 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.45 per LBS			Probable Low Cost Parameter			15812.5	\$4,238
Total Cost	:	\$4,986			Probable High Cost Parameter			11000	\$5,983
									Unit Price Per LBS
									\$0.39
									\$0.54

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.8	10	8.00	L	\$58.87	incl. in rate	incl. in rate	\$470.98
Laborer	Active	3.00	0.8	10	24.00	L	\$51.07	incl. in rate	incl. in rate	\$1,225.75
Steelworker	Active	2.00	0.8	10	16.00	L	\$78.10	incl. in rate	incl. in rate	\$1,249.60
Equipment Operator (medium)	Active	1.00	0.8	10	8.00	L	\$72.34	incl. in rate	incl. in rate	\$578.69
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.8	10	8.00	E	\$63.11	incl. in rate	incl. in rate	\$504.88
Labor Hours					56	TOTAL LABOR				\$3,525.02
Equipment Hours					8	TOTAL EQUIPMENT				\$504.88

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$176.25	\$176.25
						TOTAL MATERIAL
						\$176.25

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (10%)					
	0.55	ton	1.000	0.55	\$595.00
Hauling cost to Yreka Transfer 40 Miles	1.00	Loads	20 tons a load	\$400.00	\$400.00
					TOTAL SUBCONTRACTS
					\$727.25

SUMMARY OF COSTS					
Labor Cost	\$3,525.02	Labor Burden @	0.0%	\$0.00	\$3,525.02
Material Cost	\$176.25	Material Tax @	7.75%	\$13.66	\$189.91
Equipment Cost	\$504.88	Equipment Tax @	7.75%	\$39.13	\$544.01
Subcontractors	\$727.25				\$727.25
DIRECT COST SUBTOTALS	\$4,933			\$53	DIRECT COST SUBTOTALS
					\$4,986
Additional Pay Item Notes :					
During the removal of the structural steel of the spillway the handrails will be removed. This estimate accounts for the labor and the hauling of material but equipment is accounted for in pay item 2.012.					

PAY ITEM COST DETAIL WORKSHEET

2.018 Remove & Dispose Stop log hoist, track and supports

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.018	Project	:	KRRP - Copco 1				
Description	:	Remove & Dispose Stop log hoist, track and supports	Group	:	D03				
Quantity	:	26,000.00 LBS							
Daily Production	:	13,000.00 LBS per	10	hour shift	Project #	:	2		
Work Days	:	2.0 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.38 per LBS			Probable Low Cost Parameter			14300	\$8,828
Total Cost	:	\$9,809			Probable High Cost Parameter			9750	\$12,261
									Unit Price Per LBS
									\$0.34
									\$0.47

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	2.0	10	20.00	L	\$58.87	incl. in rate	incl. in rate	\$1,177.44
Laborer	Active	3.00	2.0	10	60.00	L	\$51.07	incl. in rate	incl. in rate	\$3,064.38
Steelworker	Active	3.00	2.0	10	60.00	L	\$78.10	incl. in rate	incl. in rate	\$4,686.00

PAY ITEM COST DETAIL WORKSHEET

2.019 Remove & Dispose of 3 sections of 23' of 72" Dia. steel lining (embedded)

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.019	Project	:	KRRP - Copco 1				
Description	:	Remove & Dispose of 3 sections of 23' of 72" Dia. steel lining (embedded)	Group	:	D03				
Quantity	:	54,000.00 LBS							
Daily Production	:	10,850.00 LBS per	10	hour shift	Project #	:	2		
Work Days	:	5.0 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$4.24 per LBS			Probable Low Cost Parameter			12477.5	\$194,517
Total Cost	:	\$228,843			Probable High Cost Parameter			8680	\$274,612
									Unit Price Per LBS
									\$3.60
									\$5.09

CREW COSTS										
Description	Active Idle	# In crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	5.0	10	50.00	L	\$58.87	incl. in rate	incl. in rate	\$2,943.60
Laborer	Active	3.00	5.0	10	150.00	L	\$51.07	incl. in rate	incl. in rate	\$7,660.95
Equipment Operator (crane)	Active	2.00	5.0	10	100.00	L	\$81.60	incl. in rate	incl. in rate	\$8,159.80
Diver, Wet	Active	8.00	5.0	10	400.00	L	\$142.66	incl. in rate	incl. in rate	\$57,063.60
Diver, Tender	Active	8.00	5.0	10	400.00	L	\$92.77	incl. in rate	incl. in rate	\$37,109.60
Barge Operator	Active	2.00	5.0	10	100.00	L	\$79.13	incl. in rate	incl. in rate	\$7,913.40
Barge, Deck Engineer, Winch Operator	Active	2.00	5.0	10	100.00	L	\$79.13	incl. in rate	incl. in rate	\$7,913.40
Barge, Sectional, 40'x10', includes ramp	Active	2.00	5.0	10	100.00	E	\$17.71	incl. in rate	incl. in rate	\$1,771.00
Crawler Crane (270tn)	Active	2.00	5.0	10	100.00	E	\$454.10	incl. in rate	incl. in rate	\$45,410.00
Hydraulic Crane (80tn)	Active	1.00	5.0	10	50.00	E	\$197.66	incl. in rate	incl. in rate	\$9,883.00
					Labor Hours	1300	TOTAL LABOR			\$128,764.35
					Equipment Hours	250	TOTAL EQUIPMENT			\$57,064.00

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 15% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$19,314.65	\$19,314.65
Selective demolition, torch cutting, steel, 1" thick plate (assumed qty)	1,000.00	LF	1.000	1,000.00	\$0.85	\$850.00
						TOTAL MATERIAL
						\$20,164.65

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (100%)					
	27.00	ton	1.000	27.00	\$16,065.00
Hauling cost to Yreka Transfer 40 Miles	2.00	Loads	20 tons a load	\$400.00	\$800.00
					TOTAL SUBCONTRACTS
					\$16,865.00

SUMMARY OF COSTS						
Labor Cost	\$128,764.35	Labor Burden @	0.0%	\$0.00		\$128,764.35
Material Cost	\$20,164.65	Material Tax @	7.75%	\$1,562.76		\$21,727.41
Equipment Cost	\$57,064.00	Equipment Tax @	7.75%	\$4,422.46		\$61,486.46
Subcontractors	\$16,865.00					\$16,865.00
DIRECT COST SUBTOTALS	\$228,858			\$5,985	DIRECT COST SUBTOTALS	\$228,843
Additional Pay Item Notes :						
This is to remove sections of 72" line in the diversion tunnel on the reservoir side. This operation has to occur before the draw down due to the existing openings of the diversion tunnel being to small to allow for the require flow rates during the drawdown period. Detail on crews and productions are listed on the next page.						

2.019 Remove & Dispose of 3 sections of 23' of 72" Dia. steel lining (embedded)

Details

High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	10%	Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues	5%
	20%		15%

Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)	Overall Production
	1550	8	8680
	1550	10	10850

Pay Items Notes
Crew is expected to remove the steel lining just after demolishing the existing intake structure. The operation will have to be done underwater and due to the depth of the lining divers will only be able to spend 20 mins at the location of the lining. To account for the restricted working time, extra divers have been added to rotate during the demolition process. It is expected the equipment used will be the same as the demolition operation from pay item 2.012. There will be a barge for the crane and there will be a barge to place the demolished steel lining. The lining will be off loaded at shore with a 80 ton crane which is expected to be used only half of the duration. This operations is restricted by the in water work permits from California. This operation could be double shifted if necessary to work in the permit window. The estimate currently shows a single shift 5 days a week 10 hours a day.

PAY ITEM COST DETAIL WORKSHEET

2.02 Remove & Dispose of 3 - 72" butterfly valves (embedded)

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.02			Project	:	KRRP - Copco 1		
Description	:	Remove & Dispose of 3 - 72" butterfly valves (embedded)			Group	:	D03		
Quantity	:	55,000.00 LBS							
Daily Production	:	10,850.00 LBS per			10	hour shift	Project #	:	2
Work Days	:	5.1 Days					Estimator	:	Mihaela Tomulescu
Unit Price	:	\$3.77 per LBS					Probable Low Cost Parameter		11935
Total Cost	:	\$207,267					Probable High Cost Parameter		9222.5
									\$186,540
									\$238,357
									\$3.39
									\$4.33

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	5.1	10	51.00	L	\$58.87	incl. in rate	incl. in rate	\$3,002.47
Laborer	Active	3.00	5.1	10	153.00	L	\$51.07	incl. in rate	incl. in rate	\$7,814.17
Equipment Operator (crane)	Active	2.00	5.1	10	102.00	L	\$81.60	incl. in rate	incl. in rate	\$8,323.00
Diver, Wet	Active	8.00	5.1	10	408.00	L	\$142.66	incl. in rate	incl. in rate	\$58,204.87
Diver, Tender	Active	8.00	5.1	10	408.00	L	\$92.77	incl. in rate	incl. in rate	\$37,851.79
Barge Operator	Active	2.00	5.1	10	102.00	L	\$79.13	incl. in rate	incl. in rate	\$8,071.67
Barge, Deck Engineer, Winch Operator	Active	2.00	5.1	10	102.00	L	\$79.13	incl. in rate	incl. in rate	\$8,071.67
Barge, Sectional, 40'x10', includes ramp	Active	2.00	5.1	10	102.00	E	\$17.71	incl. in rate	incl. in rate	\$1,806.42
Crawler Crane (270tn)	Active	2.00	5.1	10	102.00	E	\$454.10	incl. in rate	incl. in rate	\$46,318.20
Hydraulic Crane (50tn)	Active	1.00	5.1	10	51.00	E	\$136.20	incl. in rate	incl. in rate	\$6,946.20
Labor Hours					1326	TOTAL LABOR				\$131,339.64
Equipment Hours					255	TOTAL EQUIPMENT				\$55,070.82

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$13,133.96	\$13,133.96
						TOTAL MATERIAL
						\$13,133.96

SUBCONTRACT COSTS				
Description	Quantity	Units	Notes / Company	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (10%)	2.75	ton	1.000	\$1,636.25
Hauling cost to Yreka Transfer 40 Miles	2.00	Loads	20 tons a load	\$800.00
				TOTAL SUBCONTRACTS
				\$2,436.25

SUMMARY OF COSTS					
Labor Cost	\$131,339.64	Labor Burden @	0.0%	\$0.00	\$131,339.64
Material Cost	\$13,133.96	Material Tax @	7.75%	\$1,017.88	\$14,151.85
Equipment Cost	\$55,070.82	Equipment Tax @	7.75%	\$4,267.99	\$59,338.81
Subcontractors	\$2,436.25				\$2,436.25
DIRECT COST SUBTOTALS	\$201,981			\$5,286	DIRECT COST SUBTOTALS \$207,267

Additional Pay Item Notes :

This pay items accounts for removing the 72" valves that are shown to be in the existing diversion structure. These will be removed with the same crew that is removing the steel lining (pay item 2.019).

PAY ITEM COST DETAIL WORKSHEET

2.021 Remove & Dispose of 3 - 72" flapper valves with remote mechanical

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.021	Project	:	KRRP - Copco 1				
Description	:	Remove & Dispose of 3 - 72" flapper valves with remote mechanical	Group	:	D03				
Quantity	:	78,000.00 LBS	Project #	:	2	LBS per	Total Cost	Unit Price Per LBS	
Daily Production	:	21,000.00 LBS per	Estimator	:	Mihaela Tomulescu	23100	\$136,551	\$1.75	
Work Days	:	3.7 Days	Probable Low Cost Parameter	:					
Unit Price	:	\$1.95 per LBS	Probable High Cost Parameter	:		17850	\$174,481	\$2.24	
Total Cost	:	\$151,723		:					

CREW COSTS										
Description	Active	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	3.7	10	37.00	L	\$58.87	incl. in rate	incl. in rate	\$2,178.26
Laborer	Active	3.00	3.7	10	111.00	L	\$51.07	incl. in rate	incl. in rate	\$5,669.10
Equipment Operator (crane)	Active	2.00	3.7	10	74.00	L	\$81.60	incl. in rate	incl. in rate	\$6,038.25
Diver, Wet	Active	8.00	3.7	10	296.00	L	\$142.66	incl. in rate	incl. in rate	\$42,227.06
Diver, Tender	Active	8.00	3.7	10	296.00	L	\$92.77	incl. in rate	incl. in rate	\$27,461.10
Barge Operator	Active	2.00	3.7	10	74.00	L	\$79.13	incl. in rate	incl. in rate	\$5,855.92
Barge, Deck Engineer, Winch Operator	Active	2.00	3.7	10	74.00	L	\$79.13	incl. in rate	incl. in rate	\$5,855.92
Barge, Sectional, 40'x10', includes ramp	Active	2.00	3.7	10	74.00	E	\$17.71	incl. in rate	incl. in rate	\$1,310.54
Crawler Crane (270tn)	Active	2.00	3.7	10	74.00	E	\$454.10	incl. in rate	incl. in rate	\$33,603.40
Hydraulic Crane (50tn)	Active	1.00	3.7	10	37.00	E	\$136.20	incl. in rate	incl. in rate	\$5,039.40
					Labor Hours	962	TOTAL LABOR			\$95,285.62
					Equipment Hours	185	TOTAL EQUIPMENT			\$39,953.34

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$9,528.56	\$9,528.56
TOTAL MATERIAL						\$9,528.56

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (10%)					
	3.90	ton	1.000	3.90	\$595.00
Hauling cost to Yreka Transfer 40 Miles	2.00	Loads	20 tons a load	\$400.00	\$800.00
TOTAL SUBCONTRACTS					\$3,120.50

SUMMARY OF COSTS							
Labor Cost	\$95,285.62	Labor Burden @	0.0%	\$0.00			\$95,285.62
Material Cost	\$9,528.56	Material Tax @	7.75%	\$738.46			\$10,267.03
Equipment Cost	\$39,953.34	Equipment Tax @	7.75%	\$3,096.38			\$43,049.72
Subcontractors	\$3,120.50						\$3,120.50
DIRECT COST SUBTOTALS	\$147,888			\$3,835	DIRECT COST SUBTOTALS		\$151,723
Additional Pay Item Notes :							

This payitem is to remove the 72" flapper gates on the existing diversion structure. It is expected that the same crew demolishing the rest of the structure, lining, and valves will remove these gates. As for the other related pays to the existing diversion structure , this work item is also time restricted due to the depth of the structure and the working in the California in water work permit limitations. Removing the gates is expected to have a better production than the other related demolition items.

PAY ITEM COST DETAIL WORKSHEET

2.024 Remove Powerhouse Concrete down to top of rock under the Powerhouse


PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.024	Project		: KRRP - Copco 1				
Description	:	Remove Powerhouse Concrete down to top of rock under the Powerhouse	Group		: D07				
Quantity	:	3,100.00	cy						
Daily Production	:	133.00	cy per	10	hour shift	Project #	:	2	
Work Days	:	23.3	Days			Estimator	:	Eric Jones	
Unit Price	:	\$170.25	per cy			Probable Low Cost Parameter		146.3	Total Cost \$475,003
Total Cost	:	\$527,781				Probable High Cost Parameter		106.4	Unit Price Per cy \$204.30

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	23.3	10	233.00	L	\$58.87	incl. in rate	incl. in rate	\$13,717.18
Laborer	Active	3.00	23.3	10	699.00	L	\$51.07	incl. in rate	incl. in rate	\$35,700.03
Equipment Operator (medium)	Active	2.00	23.3	10	466.00	L	\$72.34	incl. in rate	incl. in rate	\$33,708.58
Truck Driver (heavy)	Active	1.00	24.1	10	241.20	L	\$66.92	incl. in rate	incl. in rate	\$16,142.07
Air Compressor 900 cfm	Active	1.00	23.3	10	233.00	E	\$38.87	incl. in rate	incl. in rate	\$9,056.46
Air Tool, Chipping Hammer	Active	2.00	23.3	10	466.00	E	\$2.23	incl. in rate	incl. in rate	\$1,039.18
Generator, Small Generator, 10 - 15 kW	Active	1.00	23.3	10	233.00	E	\$7.04	incl. in rate	incl. in rate	\$1,640.32
Hydraulic Excavator (5.0cy)	Active	1.00	23.3	10	233.00	E	\$276.50	incl. in rate	incl. in rate	\$64,424.50
Hydraulic Excavator (2.5cy)	Active	1.00	23.3	10	233.00	E	\$205.40	incl. in rate	incl. in rate	\$47,858.20
Hydraulic Impact Breaker Attachment (5k+ ft-lb)	Active	1.00	23.3	10	233.00	E	\$63.28	incl. in rate	incl. in rate	\$14,744.24
Hydraulic Thumbs/Shear Attachment	Active	1.00	23.3	10	233.00	E	\$24.92	incl. in rate	incl. in rate	\$5,806.36
Truck, On-Highway Dump (6x4, 12cy)	Active	1.00	24.1	10	241.20	E	\$57.41	incl. in rate	incl. in rate	\$13,847.29
Kobelco SK260LC-10 Ex W/ith CP100 Magnet	Active	1.00	23.3	10	233.00	E	\$89.29	incl. in rate	incl. in rate	\$20,804.57
Drilling and Blasting Operator	Active	3.00	23.3	10	699.00	L	\$48.70	incl. in rate	incl. in rate	\$34,038.97
Air Track Drill 4"	Active	1.00	23.3	10	233.00	E	\$160.98	incl. in rate	incl. in rate	\$37,508.34
Hydraulic Crane (50tn)	Active	1.00	5.8	10	58.25	E	\$134.32	incl. in rate	incl. in rate	\$7,824.14
Labor Hours					2,338	TOTAL LABOR		\$133,306.82		
Equipment Hours					2,629	TOTAL EQUIPMENT		\$224,553.60		

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables (5% labor)	1.00	LS	1.000	1.00	\$6,665.34	\$6,665.34
Blasting Material	16,400.00	CY	1.050	17,220.00	\$5.56	\$95,777.64
Drill Bit Wear Allowance (20% of Drilling Eq)	1.00	LS	1.000	1.00	\$6,807.79	\$6,807.79
TOTAL MATERIAL						\$109,250.77

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Concrete Saw Cutting	1	AL	Allowance	\$20,000.00	\$20,000.00
Hauling cost to Yreka Transfer 40 Miles	12.00	Loads	150lbs per CY	\$400.00	\$4,800.00
Selective demolition, torch cutting, steel, 1" thick plate	1.00	AL	Allowance	10,000.00	\$10,000.00
TOTAL SUBCONTRACTS					\$34,800.00

SUMMARY OF COSTS						
Labor Cost	\$133,306.82	Labor Burden @	0.0%	\$0.00	Included in hourly labor rate.	\$133,306.82
Material Cost	\$109,250.77	Material Tax @	7.75%	\$8,466.94		\$117,717.71
Equipment Cost	\$224,553.60	Equipment Tax @	7.75%	\$17,402.90		\$241,956.50
Subcontractors	\$34,800.00					\$34,800.00
DIRECT COST SUBTOTALS	\$501,911			\$25,870	DIRECT COST SUBTOTALS	\$527,781
Additional Pay Item Notes :						
See detail sheet for crew and production notes						

2.024 Remove Powerhouse Concrete down to top of rock under the Powerhouse				
Details				
High Cost Factors			Low Cost Factors	
Bad Weather	0%		No Bad Weather	0%
Gas Price Increase	10%		Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	10%		No Unforeseen Contaminated Mats/ Access Issues	0%
	20%			10%
Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)	Overall Production	
	38	8	35%	106.40
	10		35%	133.00
Haul Notes		Excavator Loading Production per shift		
CY	3,100.00	CY per Hour		21
Swell Factor	60%	CY Bucket Size		2.50
Bulk CY	4960	Buckets Per Hour		8
Haul Vehicle 60%Capacity (2 tons per CY)	7.2	# of Excavators		1.00
# of Haul Vehicles	1	CY per Hour (5 CY Bucket)		21
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	5	CY Per Hour Ideal Production Per 8 Hour Shift		95
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)	3	Efficient Compared to Ideal Production		22%
Haul Speed (Loaded MPH)	5.00	Inefficiencies Compared to Ideal Production		78%
Return Speed (Unloaded MPH)	10.00			
Haul Distance (Miles)	0.50			
Shift Length (Hours)	10			
Cyce Time		Breaker Production		
Load Time (Load Time Minutes / 60mins)	0.08			
Haul Time (Haul Distance / Haul Speed)	0.10	Hydraulic Hammer CY per Hour		1.00
Dump Time (Dump Time Minutes / 60 Mins)	0.05	# of Hammers		13.3
Return Time (Haul Distance / Return Speed)	0.05	CY per Hour		13.3
Hours Per Cycle	0.28	CY per Hour Back Check		32
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	80%	32CY per HR per 8hr shift (Ideal prod)		42%
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.35	Efficient Compared to Ideal Production		58%
Number of Cycles/ Bulk CY/ (Haul Vehicle Cap X # of Haul Vehicles)	689	Inefficiencies Compared to Ideal Production		
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	241.15			
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	2.86			
Number of Haul Days	24			
		Drilling and Blasting Production per shift		
		Drilling and Blasting CY per Hour		13.3
		# of Drills		1.00
		CY per Hour		13.3
		CY per Hour Back Check		13.3
		38CY per HR per 8hr shift (Ideal prod)		38
		Efficient Compared to Ideal Production		35%
		Inefficiencies Compared to Ideal Production		65%

Other Notes
This estimate presents that the power house concrete will be demolished by using a combination of blasting and concrete breakers/ Crushers. A CPM 100 crusher attachment with a magnet option will be used to help sort reinforcement for the demolished concrete. Smaller haul trucks will have to be used due to the small haul route to power house area. It is expected that the power house concrete will have dense reinforcement and other embedded items and the efficiency has been reduced to account for the time it will take for extra processing time. Steel cutting and a crane have been added for 25 of the time to account for removing the draft tube as the concrete demolition progresses.

PAY ITEM COST DETAIL WORKSHEET

2.025 Remove Powerhouse Structural Steel

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.025	Project	:	KRRP - Copco 1				
Description	:	Remove Powerhouse Structural Steel	Group	:	D10				
Quantity	:	110,000.00 LBS							
Daily Production	:	19,000.00 LBS per	10	hour shift	Project #	:	2		
Work Days	:	5.8 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.57 per LBS			Probable Low Cost Parameter			21850	\$52,853
Total Cost	:	\$62,180			Probable High Cost Parameter			15200	\$74,616
									Unit Price Per LBS
									\$0.48
									\$0.68

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	5.8	10	58.00	L	\$58.87	incl. in rate	incl. in rate	\$3,414.58
Laborer	Active	3.00	5.8	10	174.00	L	\$51.07	incl. in rate	incl. in rate	\$8,886.70
Steelworker	Active	2.00	5.8	10	116.00	L	\$78.10	incl. in rate	incl. in rate	\$9,059.60
Equipment Operator (crane)	Active	1.00	5.8	10	58.00	L	\$81.60	incl. in rate	incl. in rate	\$4,732.68
Equipment Operator (medium)	Active	1.00	5.8	10	58.00	L	\$72.34	incl. in rate	incl. in rate	\$4,195.49
Crawler Crane (130tn)	Active	1.00	5.8	10	58.00	E	\$262.91	incl. in rate	incl. in rate	\$15,248.78
Loader, FE Rubber Tire (5.25cy)	Active	1.00	5.8	10	58.00	E	\$76.00	incl. in rate	incl. in rate	\$4,408.00
					Labor Hours	464			TOTAL LABOR	\$30,289.05
					Equipment Hours	116			TOTAL EQUIPMENT	\$19,656.78

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$3,028.91	\$3,028.91
						TOTAL MATERIAL
						\$3,028.91

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (10%)	5.50	ton	1.000	5.50	\$595.00
Hauling cost to Yreka Transfer 40 Miles (assumption)	3.00	Loads	20 tons a load		\$400.00
	3,500.00	LF	1.000	3,500.00	\$0.85
					TOTAL SUBCONTRACTS
					\$7,447.50

SUMMARY OF COSTS					
Labor Cost	\$30,289.05	Labor Burden @	0.0%	\$0.00	\$30,289.05
Material Cost	\$3,028.91	Material Tax @	7.75%	\$234.74	\$3,263.65
Equipment Cost	\$19,656.78	Equipment Tax @	7.75%	\$1,523.40	\$21,180.18
Subcontractors	\$7,447.50				\$7,447.50
DIRECT COST SUBTOTALS	\$60,422			\$1,758	DIRECT COST SUBTOTALS
					\$62,180
Additional Pay Item Notes :					

2.027 Remove & Dispose of Cooling water and bearing oil systems

Used RS Means : Pipe, metal pipe, to 1-1/2" diam., selective demolition, 4040 LF of 1 1/2" oil pipes at 2.72 Lbs. Used 1 Forman, 2 Steelworkers to cut the pipes and 3 Laborers to load the pipes in the truck. The cooling and lubrication systems for the Hydroelectric Barge turbine, speed increaser and generator will be a combination of water and oil. These systems will be isolated from the water passages so that no contamination of passing water will occur. The following is a list of hazardous materials, substances, chemicals, and wastes normally found at a hydropower facility that may require disposal actions if not recycled or reused for their intended purpose:

1. Polychlorinated Biphenyls (PCBs)
2. Asbestos
3. Paint/abrasive blast grit (red lead paint)
4. Oil
5. Mercury
6. Antifreeze
7. Halogenated and non-halogenated solvents
8. Greases
9. Pesticides (includes herbicides, insecticides, and wood preservatives)
10. Petroleum contaminated
11. Chlorinated fluorocarbons (CFCs) Freon/Halon
12. Gasoline/diesel (includes product and sludge in tanks)
13. Batteries (includes acid)
14. Water treatment sludge (septic tanks/wastewater treatment).
15. Based on the hazardous materials above assumed hazardous waste 100% of the total lbs.

PAY ITEM COST DETAIL WORKSHEET

2.028 Remove & Dispose of 4 - Horizontal Tandem Francis Turbines

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.028			Project	:	KRRP - Copco 1		
Description	:	Remove & Dispose of 4 - Horizontal Tandem Francis Turbines			Group	:	D03		
Quantity	:	452,000.00	LBS						
Daily Production	:	28,000.00	LBS per	10	hour shift	Project #	:	2	
Work Days	:	16.1	Days				Estimator	:	Mihaela Tomulescu
Unit Price	:	\$0.50	per LBS				Probable Low Cost Parameter		LBS per 30800
Total Cost	:	\$226,133				Probable High Cost Parameter		Total Cost 22400	\$203,520
								\$271,359	Unit Price Per LBS \$0.45
								\$0.60	

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	16.1	10	161.00	L	\$58.87	incl. in rate	incl. in rate	\$9,478.39
Laborer	Active	3.00	16.1	10	483.00	L	\$51.07	incl. in rate	incl. in rate	\$24,668.26
Electrician Foreman	Active	1.00	16.1	10	161.00	L	\$55.80	incl. in rate	incl. in rate	\$8,984.28
Electrician	Active	2.00	16.1	10	322.00	L	\$55.80	incl. in rate	incl. in rate	\$17,968.57
Steelworker	Active	2.00	16.1	10	322.00	L	\$78.10	incl. in rate	incl. in rate	\$25,148.20
Millwright	Active	2.00	16.1	10	322.00	L	\$82.04	incl. in rate	incl. in rate	\$26,416.24
Equipment Operator (medium)	Active	1.00	16.1	10	161.00	L	\$72.34	incl. in rate	incl. in rate	\$11,646.10
Equipment Operator (crane)	Active	2.00	16.1	10	322.00	L	\$81.60	incl. in rate	incl. in rate	\$26,274.56
Hydraulic Crane (50tn)	Active	1.00	16.1	10	161.00	E	\$136.20	incl. in rate	incl. in rate	\$21,928.20
Loader, FE Rubber Tire (3.5cy)	Active	1.00	16.1	10	161.00	E	\$63.11	incl. in rate	incl. in rate	\$10,160.71
					Labor Hours	2,254	TOTAL LABOR		\$150,584.59	
					Equipment Hours	322	TOTAL EQUIPMENT		\$32,088.91	

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$15,058.46	\$15,058.46
TOTAL MATERIAL						\$15,058.46

SUBCONTRACT COSTS						
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount	
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	22.60	ton	1.000	22.60	\$595.00	\$13,447.00
Hauling cost to Yreka Transfer 40 Miles (assumption)	12.00	Loads	20 tons a load	\$800.00		\$9,600.00
	2,000.00	LF	1.000	2,000.00	\$0.85	\$1,700.00
TOTAL SUBCONTRACTS						\$24,747.00

SUMMARY OF COSTS						
Labor Cost	\$150,584.59	Labor Burden @	0.0%	\$0.00		\$150,584.59
Material Cost	\$15,058.46	Material Tax @	7.75%	\$1,167.03		\$16,225.49
Equipment Cost	\$32,088.91	Equipment Tax @	7.75%	\$2,486.89		\$34,575.80
Subcontractors	\$24,747.00					\$24,747.00
DIRECT COST SUBTOTALS	\$222,479			\$3,654	DIRECT COST SUBTOTALS	\$226,133

Additional Pay Item Notes :

Working crew will disconnect power and take care of the temporary electrical power they need at the site. Then the crew will open the engine side panels, and remove the nacelle access panels. Disconnect the engine thermocouple leads at the terminal board. Before disconnecting any lines all fuel, oil, and hydraulic fluid valves are closed. Plug all lines as they are disconnected to prevent entrance of foreign material. Remove the clamps securing the bleed-air ducts at the firewall. Then, disconnect the electrical connector plugs, engine breather and vent lines, and fuel, oil, and hydraulic lines. Disconnect the engine power lever and propeller control rods or cables. Remove the covers from the lift points, attach the sling, and remove slack from the cables using a suitable hoist. The sling must be adjusted to position. Remove the engine mount bolts. The engine is ready to be removed. Move the engine forward, out of the nacelle structure, until it clears the and then lower into position on the stand, and secure it prior to removing the engine sling. The crew will then cut it into pieces the big parts for disposal. Per load price is more expensive due to potential permits or more smaller loads due to haul route restrictions.

PAY ITEM COST DETAIL WORKSHEET

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.029	Project	:	KRRP - Copco 1				
Description	:	Remove & Dispose of 2 - 40 Ton indoor cranes	Group	:	D10				
Quantity	:	140,000.00 LBS							
Daily Production	:	30,000.00 LBS per	10	hour shift	Project #	:	2		
Work Days	:	4.7 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.43 per LBS			Probable Low Cost Parameter			34500	\$51,376
Total Cost	:	\$60,442			Probable High Cost Parameter			24000	\$72,531
									Unit Price Per LBS
									\$0.37
									\$0.52

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	4.7	10	47.00	L	\$58.87	incl. in rate	incl. in rate	\$2,766.98
Laborer	Active	3.00	4.7	10	141.00	L	\$51.07	incl. in rate	incl. in rate	\$7,201.29
Ironworkers	Active	3.00	4.7	10	141.00	L	\$78.16	incl. in rate	incl. in rate	\$11,019.86
Equipment Operator (medium)	Active	1.00	4.7	10	47.00	L	\$72.34	incl. in rate	incl. in rate	\$3,399.79
Equipment Operator (crane)	Active	1.00	4.7	10	47.00	L	\$81.60	incl. in rate	incl. in rate	\$3,835.11
Crawler Crane (130tn)	Active	1.00	4.7	10	47.00	E	\$262.91	incl. in rate	incl. in rate	\$12,356.77
Hydraulic Excavator (2.5cy)	Active	1.00	4.7	10	47.00	E	\$205.40	incl. in rate	incl. in rate	\$9,653.80
					Labor Hours	423	TOTAL LABOR		\$28,223.03	
					Equipment Hours	94	TOTAL EQUIPMENT		\$22,010.57	

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$1,411.15	\$1,411.15
TOTAL MATERIAL						\$1,411.15

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (5% of total weight)					
	3.50	ton	1.000	3.50	\$595.00
Hauling cost to Yreka Transfer 40 Miles	4.00	Loads	20 tons a load		\$800.00
plate (assumption)	2,000.00	LF	1.000	2,000.00	\$0.85
TOTAL SUBCONTRACTS					\$6,982.50

SUMMARY OF COSTS						
Labor Cost	\$28,223.03	Labor Burden @	0.0%	\$0.00		\$28,223.03
Material Cost	\$1,411.15	Material Tax @	7.75%	\$109.36		\$1,520.52
Equipment Cost	\$22,010.57	Equipment Tax @	7.75%	\$1,705.82		\$23,716.39
Subcontractors	\$6,982.50					\$6,982.50
DIRECT COST SUBTOTALS	\$58,627			\$1,815	DIRECT COST SUBTOTALS	\$60,442
Additional Pay Item Notes :						

PAY ITEM COST DETAIL WORKSHEET

2.031 Remove & Dispose of 2 - CO2 Systems

PAY ITEM INFORMATION										
PAY ITEM NUMBER	:	2.031			Project	:	KRRP - Copco 1			
Description	:	Remove & Dispose of 2 - CO2 Systems			Group	:	D03			
Quantity	:	3,100.00 LBS								
Daily Production	:	7,500.00 LBS per			10	hour shift	Project #	:	2	
Work Days	:	0.4 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost	Unit Price Per LBS
Unit Price	:	\$0.90 per LBS			Probable Low Cost Parameter	:	8250		\$2,515	\$0.81
Total Cost	:	\$2,795			Probable High Cost Parameter	:	6375		\$3,214	\$1.04

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.4	10	4.00	L	\$58.87	incl. in rate	incl. in rate	\$235.49
Laborer	Active	2.00	0.4	10	8.00	L	\$51.07	incl. in rate	incl. in rate	\$408.58
Steelworker	Active	2.00	0.4	10	8.00	L	\$78.10	incl. in rate	incl. in rate	\$624.80
Equipment Operator (medium)	Active	1.00	0.4	10	4.00	L	\$72.34	incl. in rate	incl. in rate	\$289.34
Loader, FE Rubber Tire (5.25cy)	Active	1.00	0.4	10	4.00	E	\$76.00	incl. in rate	incl. in rate	\$304.00
Labor Hours					24	TOTAL LABOR				\$1,558.22
Equipment Hours					4	TOTAL EQUIPMENT				\$304.00

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$77.91	\$77.91
						TOTAL MATERIAL
						\$77.91

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling cost to Yreka Transfer 40 Miles	1.00	Loads	20 tons a load	\$400.00	\$400.00
Selective demolition, torch cutting, steel, 1" thick plate (assumption)	500.00	LF	1.000	500.00	\$0.85
					\$425.00
					TOTAL SUBCONTRACTS
					\$825.00

SUMMARY OF COSTS									
Labor Cost	\$1,558.22	Labor Burden @	0.0%	\$0.00					\$1,558.22
Material Cost	\$77.91	Material Tax @	7.75%	\$6.04					\$83.95
Equipment Cost	\$304.00	Equipment Tax @	7.75%	\$23.56					\$327.56
Subcontractors	\$825.00								\$825.00
DIRECT COST SUBTOTALS		\$2,765			\$30	DIRECT COST SUBTOTALS			\$2,795
Additional Pay Item Notes :									

PAY ITEM COST DETAIL WORKSHEET

2.033 Remove & Dispose of Transformer Oil Fire Protection

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.033	Project	:	KRRP - Copco 1				
Description	:	Remove & Dispose of Transformer Oil Fire Protection	Group	:	D05				
Quantity	:	5,400.00 LBS	Project #	:	2				
Daily Production	:	7,500.00 LBS per 10 hour shift	Estimator	:	Mihaela Tomulescu				
Work Days	:	0.7 Days	Probable Low Cost Parameter	:	8250	LBS per	\$5,291	Total Cost	Unit Price Per LBS
Unit Price	:	\$1.09 per LBS	Probable High Cost Parameter	:	6000		\$7,054		\$1.31
Total Cost	:	\$5,879							

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.7	10	7.00	L	\$58.87	incl. in rate	incl. in rate	\$412.10
Laborer	Active	2.00	0.7	10	14.00	L	\$51.07	incl. in rate	incl. in rate	\$715.02
Steelworker	Active	2.00	0.7	10	14.00	L	\$78.10	incl. in rate	incl. in rate	\$1,093.40
Equipment Operator (medium)	Active	1.00	0.7	10	7.00	L	\$72.34	incl. in rate	incl. in rate	\$506.35
Loader, FE Rubber Tire (5.25cy)	Active	1.00	0.7	10	7.00	E	\$76.00	incl. in rate	incl. in rate	\$532.00
Labor Hours					42	TOTAL LABOR				\$2,726.88
Equipment Hours					7	TOTAL EQUIPMENT				\$532.00

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$136.34	\$136.34
						TOTAL MATERIAL
						\$136.34

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	2.70	ton	1.000	2.70	\$595.00
Hauling cost to Yreka Transfer 40 Miles plate (assumption)	1.00	Loads	20 tons a load		\$400.00
	500.00	LF	1.000	500.00	\$0.85
					TOTAL SUBCONTRACTS
					\$2,431.50

SUMMARY OF COSTS									
Labor Cost	\$2,726.88	Labor Burden @	0.0%	\$0.00					\$2,726.88
Material Cost	\$136.34	Material Tax @	7.75%	\$10.57					\$146.91
Equipment Cost	\$532.00	Equipment Tax @	7.75%	\$41.23					\$573.23
Subcontractors	\$2,431.50								\$2,431.50
DIRECT COST SUBTOTALS	\$5,827			\$52				DIRECT COST SUBTOTALS	\$5,879
Additional Pay Item Notes :									

PAY ITEM COST DETAIL WORKSHEET

2.034 Remove & Dispose of Unwatering Piping

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.034	Project	:	KRRP - Copco 1				
Description	:	Remove & Dispose of Unwatering Piping	Group	:	D05				
Quantity	:	27,000.00 LBS							
Daily Production	:	22,500.00 LBS per	10	hour shift	Project #	:	2		
Work Days	:	1.2 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.33 per LBS			Probable Low Cost Parameter			25875	\$7,645
Total Cost	:	\$8,994			Probable High Cost Parameter			16875	\$11,243
									Unit Price Per LBS
									\$0.28
									\$0.42

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.2	10	12.00	L	\$58.87	incl. in rate	incl. in rate	\$706.46
Laborer	Active	2.00	1.2	10	24.00	L	\$51.07	incl. in rate	incl. in rate	\$1,225.75
Steelworker	Active	2.00	1.2	10	24.00	L	\$78.10	incl. in rate	incl. in rate	\$1,874.40
Equipment Operator (medium)	Active	1.00	1.2	10	12.00	L	\$72.34	incl. in rate	incl. in rate	\$868.03
Loader, FE Rubber Tire (5.25cy)	Active	1.00	1.2	10	12.00	E	\$76.00	incl. in rate	incl. in rate	\$912.00
Labor Hours					72	TOTAL LABOR				\$4,674.65
Equipment Hours					12	TOTAL EQUIPMENT				\$912.00

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$467.46	\$467.46
TOTAL MATERIAL						\$467.46

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (25% from total weight)					
	3.38	ton	1.000	3.38	\$595.00
Hauling cost to Yreka Transfer 40 Miles (assumption)	1.00	Loads	20 tons a load		\$400.00
	500.00	LF	1.000	500.00	\$0.85
TOTAL SUBCONTRACTS					\$2,833.13

SUMMARY OF COSTS									
Labor Cost	\$4,674.65	Labor Burden @	0.0%	\$0.00					\$4,674.65
Material Cost	\$467.46	Material Tax @	7.75%	\$36.23					\$503.69
Equipment Cost	\$912.00	Equipment Tax @	7.75%	\$70.68					\$982.68
Subcontractors	\$2,833.13								\$2,833.13
DIRECT COST SUBTOTALS	\$8,887			\$107				DIRECT COST SUBTOTALS	\$8,994
Additional Pay Item Notes :									

PAY ITEM COST DETAIL WORKSHEET

2.036 Remove & Dispose of Horizontal AC Generator, Indoor Open Frame

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.036	Project	:	KRRP - Copco 1				
Description	:	Remove & Dispose of Horizontal AC Generator, Indoor Open Frame	Group	:	D04				
Quantity	:	2.00 EA	Project #	:	2	Estimator	:	Mihaela Tomulescu	EA per
Daily Production	:	0.40 EA per	Probable Low Cost Parameter	:	0.46	Total Cost	:	\$114,357	Unit Price Per EA
Work Days	:	5.0 Days	Probable High Cost Parameter	:	0.32	\$161,446	:	\$80,722.82	
Unit Price	:	\$67,269.02 per EA							
Total Cost	:	\$134,538							

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Crawler Crane (270tn)	Active	1.00	5.0	10	50.00	E	\$454.10	incl. in rate	incl. in rate	\$22,705.00
Electrician	Active	4.00	5.0	10	200.00	L	\$55.80	incl. in rate	incl. in rate	\$11,160.60
Equipment Operator (oiler)	Active	1.00	5.0	10	50.00	L	\$73.43	incl. in rate	incl. in rate	\$3,671.25
Equipment Operator (crane)	Active	1.00	5.0	10	50.00	L	\$81.60	incl. in rate	incl. in rate	\$4,079.90
Steelworker	Active	5.00	5.0	10	250.00	L	\$78.10	incl. in rate	incl. in rate	\$19,525.00
Loader, FE Rubber Tire (8.6cy)	Active	2.00	5.0	10	100.00	E	\$225.40	incl. in rate	incl. in rate	\$22,540.00
Labor Foreman	Active	1.00	5.0	10	50.00	L	\$58.87	incl. in rate	incl. in rate	\$2,943.60
Welder	Active	3.00	5.0	10	150.00	E	\$7.84	incl. in rate	incl. in rate	\$1,176.00
Gas Welding Machine	Active	3.00	5.0	10	150.00	E	\$2.88	incl. in rate	incl. in rate	\$431.55
Truck Driver (heavy)	Active	4.00	5.0	10	200.00	L	\$75.72	incl. in rate	incl. in rate	\$15,144.80
Truck, Flatbed (4x4, 10,000 gvw)	Active	4.00	5.0	10	200.00	E	\$27.09	incl. in rate	incl. in rate	\$5,418.00
Electrician Foreman	Active	1.00	5.0	10	50.00	L	\$55.80	incl. in rate	incl. in rate	\$2,790.15
					Labor Hours	850				\$59,315.30
					Equipment Hours	650				\$52,270.55

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$5,931.53	\$5,931.53
TOTAL MATERIAL						\$5,931.53

SUBCONTRACT COSTS						
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount	
Disposal fee (for 115 tons)	115	tons	1.000	115.00	\$74.00	\$8,510.00
Hauling cost to Yreka Transfer 40 Miles	10.00	Loads	20 tons a load	\$400.00		\$4,000.00
TOTAL SUBCONTRACTS						\$12,510.00

SUMMARY OF COSTS						
Labor Cost	\$59,315.30	Labor Burden @	0.0%	\$0.00		\$59,315.30
Material Cost	\$5,931.53	Material Tax @	7.75%	\$459.69		\$6,391.22
Equipment Cost	\$52,270.55	Equipment Tax @	7.75%	\$4,050.97		\$56,321.52
Subcontractors	\$12,510.00					\$12,510.00
DIRECT COST SUBTOTALS	\$130,027			\$4,511	DIRECT COST SUBTOTALS	\$134,538
Additional Pay Item Notes :						

PAY ITEM COST DETAIL WORKSHEET

2.037 Remove & Dispose of Excitation equipment for 12.5 MVA Generator

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.037			Project	:	KRRP - Copco 1		
Description	:	Remove & Dispose of Excitation equipment for 12.5 MVA Generator			Group	:	D04		
Quantity	:	1.50 EA							
Daily Production	:	1.88 EA per		10	hour shift	Project #	:	2	
Work Days	:	0.8		Days		Estimator	:	Mihaela Tomulescu	EA per
Unit Price	:	\$7,271.14 per EA			Probable Low Cost Parameter	:	2.15625	Total Cost	Unit Price Per EA
Total Cost	:	\$10,907			Probable High Cost Parameter	:	1.40625	\$9,271	\$6,180.47
								\$13,633	\$9,088.92

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	0.8	10	8.00	L	\$55.80	incl. in rate	incl. in rate	\$446.42
Electrician	Active	1.00	0.8	10	8.00	L	\$55.80	incl. in rate	incl. in rate	\$446.42
Laborer	Active	2.00	0.8	10	16.00	L	\$51.07	incl. in rate	incl. in rate	\$817.17
Loader, FE Rubber Tire (8.6cy)	Active	1.00	0.8	10	8.00	E	\$225.40	incl. in rate	incl. in rate	\$1,803.20
Hydraulic Crane (120tn)	Active	1.00	0.8	10	8.00	E	\$242.08	incl. in rate	incl. in rate	\$1,936.64
Welder	Active	1.00	0.8	10	8.00	E	\$7.84	incl. in rate	incl. in rate	\$62.72
Gas Welding Machine	Active	1.00	0.8	10	8.00	E	\$2.88	incl. in rate	incl. in rate	\$23.02
Equipment Operator (medium)	Active	1.00	0.8	10	8.00	L	\$72.34	incl. in rate	incl. in rate	\$578.69
Equipment Operator (crane)	Active	1.00	0.8	10	8.00	L	\$81.60	incl. in rate	incl. in rate	\$652.78
Labor Hours					48	TOTAL LABOR				\$2,941.49
Equipment Hours					32	TOTAL EQUIPMENT				\$3,825.58

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$147.07	\$147.07
Selective demolition, torch cutting, steel, 1" thick plate (assumed qty)	2,500.00	LF	1.000	2,500.00	\$0.85	\$2,125.00
TOTAL MATERIAL						\$2,272.07

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	1.00	ton	1.000	1.00	\$595.00
Hauling cost to Yreka Transfer 40 Miles	2.00	Loads		\$400.00	\$800.00
TOTAL SUBCONTRACTS					\$1,395.00

SUMMARY OF COSTS						
Labor Cost	\$2,941.49	Labor Burden @	0.0%	\$0.00		\$2,941.49
Material Cost	\$2,272.07	Material Tax @	7.75%	\$176.09		\$2,448.16
Equipment Cost	\$3,825.58	Equipment Tax @	7.75%	\$296.48		\$4,122.06
Subcontractors	\$1,395.00					\$1,395.00
DIRECT COST SUBTOTALS	\$10,434			\$473	DIRECT COST SUBTOTALS	\$10,907
Additional Pay Item Notes :						
Production based on 1 Forman, 1 Electrician, 1 Welder to cut to remove the electrical equipment and 1 laborer to haul. Equipment used 1 Loader and 1 Crane for disposal. Assumed 2 sections, weight 1000LBS.						

PAY ITEM COST DETAIL WORKSHEET

2.039 Remove & Dispose of Neutral grounding equip. for 12.5 MVA Generator

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.039	Project	:	KRRP - Copco 1				
Description	:	Remove & Dispose of Neutral grounding equip. for 12.5 MVA Generator	Group	:	D04				
Quantity	:	2.00 EA							
Daily Production	:	2.50 EA per	10	hour shift	Project #	:	2		
Work Days	:	0.8	Days		Estimator	:	Mihaela Tomulescu	EA per	Total Cost
Unit Price	:	\$1,936.75	per EA		Probable Low Cost Parameter		2.75	\$3,486	Unit Price Per EA
Total Cost	:	\$3,874			Probable High Cost Parameter		2.125	\$4,455	\$2,227.26

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	0.8	10	8.00	L	\$55.80	incl. in rate	incl. in rate	\$446.42
Electrician	Active	1.00	0.8	10	8.00	L	\$55.80	incl. in rate	incl. in rate	\$446.42
Laborer	Active	2.00	0.8	10	16.00	L	\$51.07	incl. in rate	incl. in rate	\$817.17
Loader, FE Rubber Tire (3.5cy)	Active	2.00	0.8	10	16.00	E	\$63.11	incl. in rate	incl. in rate	\$1,009.76
Equipment Operator (light)	Active	1.00	0.8	10	8.00	L	\$69.19	incl. in rate	incl. in rate	\$553.52
					Labor Hours	40	TOTAL LABOR			\$2,263.54
					Equipment Hours	16	TOTAL EQUIPMENT			\$1,009.76

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$113.18	\$113.18
						TOTAL MATERIAL
						\$113.18

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling cost to Yreka Transfer 40 Miles	1.00	Loads		\$400.00	\$400.00
					TOTAL SUBCONTRACTS
					\$400.00

SUMMARY OF COSTS									
Labor Cost	\$2,263.54	Labor Burden @	0.0%	\$0.00					\$2,263.54
Material Cost	\$113.18	Material Tax @	7.75%	\$8.77					\$121.95
Equipment Cost	\$1,009.76	Equipment Tax @	7.75%	\$78.26					\$1,088.02
Subcontractors	\$400.00								\$400.00
DIRECT COST SUBTOTALS	\$3,786					\$87	DIRECT COST SUBTOTALS		\$3,874
Additional Pay Item Notes :									
Assumption for Crew R3: 1 Forman, 1 Electrician, 1 Ironworker and 1 welder to cut rods, to remove the electrical equipment and 1 laborer to haul in the truck.									

2.04 Remove & Dispose of Generator Switchgear, 5kV-includes unit breakers

Used 3 Crews (2 sections each weight around 800 LBS per crew) formed of 1 Forman, 3 Electrician, 2 laborer to haul with the crane in the truck. Assumed contamination hazardous waste that will be disposed at 34 miles away from the construction site to Yreka Transfer Recycling. In normal circumstances, decontaminated residual components could be accepted at landfill sites but Polychlorinated biphenyl, otherwise known as PCB, is a synthetic chemical that is widely used for industrial and commercial use as dielectric fluid in transformers and capacitors because of its high resistance to decomposition, low electrical conductivity, low flammability and high heat capacity. Transformer repair, reconditioning and retro-filling facilities are the major industry sectors that contributes to the spread of PCB contamination. Types of PCB Wastes:

PCB wastes are discarded materials that contain PCB or have been contaminated with PCBs and that are without any commercial, industrial, or economic use. For the purpose of this Code of Practice, PCBs wastes are classified as follows: Liquid PCB wastes

- o PCB-based dielectric fluids removed from transformers and other equipment
- o PCB-based heat transfer and hydraulic fluids
- o Metallic solid wastes
- o PCB equipment such as capacitors, transformers, **switchgears**, circuit breakers, heat transfer systems, etc.
- o Contaminated components removed from electrical equipment such as windings;
- o PCB-contaminated containers and equipment such as metal drums, tanks, pumps, metal filters, etc.

PAY ITEM COST DETAIL WORKSHEET

2.043 Remove & Dispose of Battery System

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.043			Project	:	KRRP - Copco 1		
Description	:	Remove & Dispose of Battery System			Group	:	D05		
Quantity	:	1.00 EA							
Daily Production	:	0.41 EA per	10	hour shift	Project #	:	2		
Work Days	:	2.4	Days		Estimator	:	Mihaela Tomulescu	EA per	Total Cost
Unit Price	:	\$14,109.87 per EA			Probable Low Cost Parameter		0.45375	\$12,699	\$12,698.89
Total Cost	:	\$14,110			Probable High Cost Parameter		0.350625	\$16,226	\$16,226.35

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	2.4	10	24.00	L	\$58.87	incl. in rate	incl. in rate	\$1,412.93
Electrician	Active	1.00	2.4	10	24.00	L	\$55.80	incl. in rate	incl. in rate	\$1,339.27
Equipment Operator (light)	Active	1.00	2.4	10	24.00	L	\$69.19	incl. in rate	incl. in rate	\$1,660.56
Loader, FE Rubber Tire (8.6cy)	Active	1.00	2.4	10	24.00	E	\$225.40	incl. in rate	incl. in rate	\$5,409.60
Laborer	Active	2.00	2.4	10	48.00	L	\$51.07	incl. in rate	incl. in rate	\$2,451.50
Welder	Active	1.00	2.4	10	24.00	E	\$7.84	incl. in rate	incl. in rate	\$188.16
Gas Welding Machine	Active	1.00	2.4	10	24.00	E	\$2.88	incl. in rate	incl. in rate	\$69.05
					Labor Hours	120	TOTAL LABOR			\$6,864.26
					Equipment Hours	72	TOTAL EQUIPMENT			\$5,666.81

MATERIAL COSTS						
Description	Item Quantity	Order Unit	onversion ctor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$686.43	\$686.43
						TOTAL MATERIAL
						\$686.43

SUBCONTRACT COSTS				
Description	Quantity	Units	Notes / Company	Contract or Quote Amount
Hauling cost to Yreka Transfer 40 Miles	1.00	Loads		\$400.00
				TOTAL SUBCONTRACTS
				\$400.00

SUMMARY OF COSTS						
Labor Cost	\$6,864.26	Labor Burden @	0.0%	\$0.00		\$6,864.26
Material Cost	\$686.43	Material Tax @	7.75%	\$53.20		\$739.62
Equipment Cost	\$5,666.81	Equipment Tax @	7.75%	\$439.18		\$6,105.99
Subcontractors	\$400.00					\$400.00
DIRECT COST SUBTOTALS	\$13,617			\$492	DIRECT COST SUBTOTALS	\$14,110
Additional Pay Item Notes :						
Assuming 3 days of work disposing around 60 batteries, racks and supports. Using Crews E-19 for metals demolition, E-12 and E-25 for cutting steel and A-3H for equipment disposal, B-34A for hauling.						

PAY ITEM COST DETAIL WORKSHEET

2.044 Remove & Dispose of Raceways, Conduit and Cable

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.044			Project	:	KRRP - Copco 1		
Description	:	Remove & Dispose of Raceways, Conduit and Cable			Group	:	D05		
Quantity	:	1.00 EA							
Daily Production	:	0.63 EA per			10	hour shift	Project #	:	2
Work Days	:	1.6 Days					Estimator	:	Mihaela Tomulescu
Unit Price	:	\$12,595.81 per EA					EA per	Total Cost	Unit Price Per EA
Total Cost	:	\$12,596					Probable Low Cost Parameter	0.6875	\$11,336
							Probable High Cost Parameter	0.53125	\$14,485
									\$14,485.18

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.6	10	16.00	L	\$58.87	incl. in rate	incl. in rate	\$941.95
Electrician	Active	2.00	1.6	10	32.00	L	\$55.80	incl. in rate	incl. in rate	\$1,785.70
Laborer	Active	4.00	1.6	10	64.00	L	\$51.07	incl. in rate	incl. in rate	\$3,268.67
Loader, FE Rubber Tire (8.6cy)	Active	1.00	1.6	10	16.00	E	\$225.40	incl. in rate	incl. in rate	\$3,606.40
Equipment Operator (medium)	Active	1.00	1.6	10	16.00	L	\$72.34	incl. in rate	incl. in rate	\$1,157.38
Labor Hours					128	TOTAL LABOR				\$7,153.70
Equipment Hours					16	TOTAL EQUIPMENT				\$3,606.40

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 15% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$1,073.05	\$1,073.05
						TOTAL MATERIAL
						\$1,073.05

SUBCONTRACT COSTS				
Description	Quantity	Units	Notes / Company	Contract or Quote Amount
Hauling cost to Yreka Transfer 40 Miles	1.00	Loads		\$400.00
				TOTAL SUBCONTRACTS
				\$400.00

SUMMARY OF COSTS									
Labor Cost	\$7,153.70	Labor Burden @	0.0%	\$0.00					\$7,153.70
Material Cost	\$1,073.05	Material Tax @	7.75%	\$83.16					\$1,156.22
Equipment Cost	\$3,606.40	Equipment Tax @	7.75%	\$279.50					\$3,885.90
Subcontractors	\$400.00								\$400.00
DIRECT COST SUBTOTALS	\$12,233			\$363				DIRECT COST SUBTOTALS	\$12,596
Additional Pay Item Notes :									
Assumption for removal of control power cable, conduit (2000 LF) and cable tray (300 LF) - using R3 electrical crew and laborers for hauling with the loader.									

PAY ITEM COST DETAIL WORKSHEET

2.045 Remove & Dispose of Misc. power & control boards

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.045			Project	:	KRRP - Copco 1		
Description	:	Remove & Dispose of Misc. power & control boards			Group	:	D05		
Quantity	:	1.00 EA							
Daily Production	:	1.25 EA per 10 hour shift							
Work Days	:	0.8 Days			Project #	:	2		
Unit Price	:	\$5,030.08 per EA			Estimator	:	Mihaela Tomulescu	EA per	Total Cost
Total Cost	:	\$5,030			Probable Low Cost Parameter		1.375	\$4,527	\$4,527.08
					Probable High Cost Parameter		1.0625	\$5,785	\$5,784.60

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.8	10	8.00	L	\$58.87	incl. in rate	incl. in rate	\$470.98
Electrician	Active	1.00	0.8	10	8.00	L	\$55.80	incl. in rate	incl. in rate	\$446.42
Laborer	Active	2.00	0.8	10	16.00	L	\$51.07	incl. in rate	incl. in rate	\$817.17
Loader, FE Rubber Tire (8.6cy)	Active	1.00	0.8	10	8.00	E	\$225.40	incl. in rate	incl. in rate	\$1,803.20
Equipment Operator (medium)	Active	1.00	0.8	10	8.00	L	\$72.34	incl. in rate	incl. in rate	\$578.69
					Labor Hours	40	TOTAL LABOR			\$2,313.26
					Equipment Hours	8	TOTAL EQUIPMENT			\$1,803.20

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 15% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$346.99	\$346.99
						TOTAL MATERIAL
						\$346.99

SUBCONTRACT COSTS				
Description	Quantity	Units	Notes / Company	Contract or Quote Amount
Hauling cost to Yreka Transfer 40 Miles	1.00	Loads		\$400.00
				TOTAL SUBCONTRACTS
				\$400.00

SUMMARY OF COSTS						
Labor Cost	\$2,313.26	Labor Burden @	0.0%	\$0.00		\$2,313.26
Material Cost	\$346.99	Material Tax @	7.75%	\$26.89		\$373.88
Equipment Cost	\$1,803.20	Equipment Tax @	7.75%	\$139.75		\$1,942.95
Subcontractors	\$400.00					\$400.00
DIRECT COST SUBTOTALS	\$4,863			\$167	DIRECT COST SUBTOTALS	\$5,030
Additional Pay Item Notes :						
Assumption for removal of 3' x 2' x 9" boards - 10 each using R3 electrical crew and laborers for hauling with the loader.						

2.046 Remove & Dispose of Step-up Transformers, indoor, oil-filled, 1-phase, 5000kVA

PAY ITEM COST DETAIL WORKSHEET

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.046			Project	:	KRRP - Copco 1		
Description	:	Remove & Dispose of Step-up Transformers, indoor, oil-filled, 1-phase, 5000kVA			Group	:	D05		
Quantity	:	3.00	EA						
Daily Production	:	0.60	EA per	10	hour shift	Project #	:	2	
Work Days	:	5.0	Days			Estimator	:	Mihaela Tomulescu	
Unit Price	:	\$32,681.62	per EA			Probable Low Cost Parameter	:	0.66	
Total Cost	:	\$98,045				Probable High Cost Parameter	:	0.51	
								Total Cost	\$88,240
									\$29,413.46
									\$37,583.86

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	3.00	5.0	10	150.00	L	\$55.80	incl. in rate	incl. in rate	\$8,370.45
Electrician	Active	3.00	5.0	10	150.00	L	\$55.80	incl. in rate	incl. in rate	\$8,370.45
Laborer	Active	6.00	5.0	10	300.00	L	\$51.07	incl. in rate	incl. in rate	\$15,321.90
Hydraulic Excavator (6.0cy)	Active	1.00	5.0	10	50.00	E	\$324.12	incl. in rate	incl. in rate	\$16,206.00
Crawler Crane (130tn)	Active	1.00	5.0	10	50.00	E	\$262.91	incl. in rate	incl. in rate	\$13,145.50
Equipment Operator (medium)	Active	1.00	5.0	10	50.00	L	\$72.34	incl. in rate	incl. in rate	\$3,616.80
Equipment Operator (crane)	Active	1.00	5.0	10	50.00	L	\$81.60	incl. in rate	incl. in rate	\$4,079.90
Truck, Utility, with Man-Basket	Active	3.00	5.0	10	150.00	E	\$31.90	incl. in rate	incl. in rate	\$4,785.00
					Labor Hours	700	TOTAL LABOR			\$39,759.50
					Equipment Hours	250	TOTAL EQUIPMENT			\$34,136.50

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor	1.00	LS	1.000	1.00	\$1,987.98	\$1,987.98
TOTAL MATERIAL						\$1,987.98

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling cost to Yreka Transfer 40 Miles	1.00	Loads		\$400.00	\$400.00
Remove oil from oil-filled step-up transformer (allowance for oil containers, filters, etc)	1 EA		1.000	\$13,000.00	\$13,000.00
Forklift crew, all-terrain forklift, 45' lift, 35' reach, 9000 lb. capacity, weekly use	1 week		1.000	\$5,961.23	\$5,961.23
TOTAL SUBCONTRACTS					\$19,361.23

SUMMARY OF COSTS					
Labor Cost	\$39,759.50	Labor Burden @	0.0%	\$0.00	\$39,759.50
Material Cost	\$1,987.98	Material Tax @	7.75%	\$154.07	\$2,142.04
Equipment Cost	\$34,136.50	Equipment Tax @	7.75%	\$2,645.58	\$36,782.08
Subcontractors	\$19,361.23				\$19,361.23
DIRECT COST SUBTOTALS	\$95,245			\$2,800	DIRECT COST SUBTOTALS \$98,045
Additional Pay Item Notes :					

Weight and dimensions of the transformers have particular importance so transport vehicles must be adequate. A considerable proportion of the weight is due to the oil, so the direct consequence is that the big transformers have to be transported empty. During transport the transformers are filled either by dry air or nitrogen. Because of transportation, the auxiliaries have to be removed. For this reason the collaboration with all the people involved in the project is essential. AECOM best assumption for a 5000 kVA, 2300/72000 volt transformer removal- - 3 crew R3 formed of 1 Foreman, 1 Electricians, 1 Utility man-bracket truck, 1 crane for disposal of each transformer in the truck and 2 laborer's to remove the auxiliaries and the pad (1 excavator).

PAY ITEM COST DETAIL WORKSHEET

2.047 Remove & Dispose of Step-up Transformers, indoor, oil-filled, 1-phase, 4165kVA

PAY ITEM INFORMATION									
PAY ITEM NUMBER	2.047				Project	KRRP - Copco 1			
Description	Remove & Dispose of Step-up Transformers, indoor, oil-filled, 1-phase, 4165kVA				Group	D05			
Quantity	3.00	EA			Project #	2			
Daily Production	0.60	EA per	10	hour shift	Estimator	Mihaela Tomulescu			
Work Days	5.0	Days			Probable Low Cost Parameter	0.66	EA per	Total Cost	Unit Price Per EA
Unit Price	\$32,681.62 per EA				Probable High Cost Parameter	0.51	\$112,752	\$37,583.86	
Total Cost	\$98,045								

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	3.00	5.0	10	150.00	L	\$55.80	incl. in rate	incl. in rate	\$8,370.45
Electrician	Active	3.00	5.0	10	150.00	L	\$55.80	incl. in rate	incl. in rate	\$8,370.45
Laborer	Active	6.00	5.0	10	300.00	L	\$51.07	incl. in rate	incl. in rate	\$15,321.90
Hydraulic Excavator (6.0cy)	Active	1.00	5.0	10	50.00	E	\$324.12	incl. in rate	incl. in rate	\$16,206.00
Crawler Crane (130tn)	Active	1.00	5.0	10	50.00	E	\$262.91	incl. in rate	incl. in rate	\$13,145.50
Equipment Operator (medium)	Active	1.00	5.0	10	50.00	L	\$72.34	incl. in rate	incl. in rate	\$3,616.80
Equipment Operator (crane)	Active	1.00	5.0	10	50.00	L	\$81.60	incl. in rate	incl. in rate	\$4,079.90
Truck, Utility, with Man-Basket	Active	3.00	5.0	10	150.00	E	\$31.90	incl. in rate	incl. in rate	\$4,785.00
Labor Hours					700	TOTAL LABOR				\$39,759.50
Equipment Hours					250	TOTAL EQUIPMENT				\$34,136.50

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor	1.00	LS	1.000	1.00	\$1,987.98	\$1,987.98
TOTAL MATERIAL						\$1,987.98

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling cost to Yreka Transfer 40 Miles	1.00	Loads		\$400.00	\$400.00
Remove oil from oil-filled step-up transformer (allowance for oil containers, filters, etc)	1	EA	1.000	\$13,000.00	\$13,000.00
Forklift crew, all-terrain forklift, 45' lift, 35' reach, 9000 lb. capacity, weekly use	1	week	1.000	\$5,961.23	\$5,961.23
TOTAL SUBCONTRACTS					\$19,361.23

SUMMARY OF COSTS									
Labor Cost	\$39,759.50	Labor Burden @	0.0%	\$0.00					\$39,759.50
Material Cost	\$1,987.98	Material Tax @	7.75%	\$154.07					\$2,142.04
Equipment Cost	\$34,136.50	Equipment Tax @	7.75%	\$2,645.58					\$36,782.08
Subcontractors	\$19,361.23								\$19,361.23
DIRECT COST SUBTOTALS		\$95,245		\$2,800			DIRECT COST SUBTOTALS		\$98,045
Additional Pay Item Notes :									
Weight and dimensions of the transformers have particular importance so transport vehicles must be adequate. A considerable proportion of the weight is due to the oil, so the direct consequence is that the big transformers have to be transported empty. During transport the transformers are filled either by dry air or nitrogen. Because of transportation, the auxiliaries have to be removed . For this reason the collaboration with all the people involved in the project is essential. AECOM best assumption for a 4165 kVA, 2300/72000 volt transformer removal- 3 crew R3 formed of 1 Foreman, 1 Electricians, 1 Utility man-bracket truck, 1 crane for disposal of each transformer in the truck and 2 laborer's to remove the auxiliaries and the pad (1 excavator).									

PAY ITEM COST DETAIL WORKSHEET

2.048 Remove & Dispose of Seven 40-Ton Travelling Crane motors - hoist

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.048			Project	:	KRRP - Copco 1		
Description	:	Remove & Dispose of Seven 40-Ton Travelling Crane motors - hoist			Group	:	D11		
Quantity	:	1.00 EA							
Daily Production	:	2.50 EA per			10	hour shift	Project #	:	2
Work Days	:	0.4			Days		Estimator	:	Mihaela Tomulescu
Unit Price	:	\$2,965.11			per EA		Probable Low Cost Parameter	:	2.75
Total Cost	:	\$2,965					Probable High Cost Parameter	:	2.125
							Total Cost	:	\$2,669
							Unit Price Per EA	:	\$2,668.60
								:	\$3,409.88

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Truck, Off-Road, Articulated Rear, 20cy	Active	1.00	0.4	10	4.00	E	\$117.28	incl. in rate	incl. in rate	\$469.12
Hydraulic Crane (80tn)	Active	1.00	0.4	10	4.00	E	\$197.66	incl. in rate	incl. in rate	\$790.64
Laborer	Active	1.00	0.4	10	4.00	L	\$51.07	incl. in rate	incl. in rate	\$204.29
Equipment Operator (crane)	Active	1.00	0.4	10	4.00	L	\$81.60	incl. in rate	incl. in rate	\$326.39
Truck Driver (heavy)	Active	1.00	0.4	10	4.00	L	\$75.72	incl. in rate	incl. in rate	\$302.90
Steelworker	Active	1.00	0.4	10	4.00	L	\$78.10	incl. in rate	incl. in rate	\$312.40
Labor Hours					16	TOTAL LABOR				\$1,145.98
Equipment Hours					8	TOTAL EQUIPMENT				\$1,259.76

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$57.30	\$57.30
						TOTAL MATERIAL
						\$57.30

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling cost to Yreka Transfer 40 Miles	1.00	Loads		\$400.00	\$400.00
					\$0.00
					\$0.00
					TOTAL SUBCONTRACTS
					\$400.00

SUMMARY OF COSTS									
Labor Cost	\$1,145.98	Labor Burden @	0.0%	\$0.00					\$1,145.98
Material Cost	\$57.30	Material Tax @	7.75%	\$4.44					\$61.74
Equipment Cost	\$1,259.76	Equipment Tax @	7.75%	\$97.63					\$1,357.39
Subcontractors	\$400.00								\$400.00
DIRECT COST SUBTOTALS		\$2,863		\$102			DIRECT COST SUBTOTALS		\$2,965
Additional Pay Item Notes :									
Assumed removal of hoist, hoist trolley, gantry: 1 Steelworker and 1 Laborers to load the overhead crane motors in the truck using the crane.									

PAY ITEM COST DETAIL WORKSHEET

2.054 Remove & Dispose of 69kV circuit breakers, oil filled, PCB

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.054	Project	:	KRRP - Copco 1				
Description	:	Remove & Dispose of 69kV circuit breakers, oil filled, PCB	Group	:	D05				
Quantity	:	2.00 EA	Project #	:	2				
Daily Production	:	2.50 EA per	Estimator	:	Mihaela Tomulescu				
Work Days	:	0.8 Days	EA per	:	2.75	Total Cost	:	\$3,538	Unit Price Per EA
Unit Price	:	\$1,965.57 per EA	Probable Low Cost Parameter	:	2.25	\$4,324	:	\$2,162.13	
Total Cost	:	\$3,931	Probable High Cost Parameter	:			:		

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.8	10	8.00	L	\$58.87	incl. in rate	incl. in rate	\$470.98
Electrician	Active	1.00	0.8	10	8.00	L	\$55.80	incl. in rate	incl. in rate	\$446.42
Hydraulic Crane (35tn)	Active	1.00	0.8	10	8.00	E	\$117.77	incl. in rate	incl. in rate	\$942.16
Equipment Operator (crane)	Active	1.00	0.8	10	8.00	L	\$81.60	incl. in rate	incl. in rate	\$652.78
Laborer	Active	2.00	0.8	10	16.00	L	\$51.07	incl. in rate	incl. in rate	\$817.17
					Labor Hours	40	TOTAL LABOR			\$2,387.35
					Equipment Hours	8	TOTAL EQUIPMENT			\$942.16

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$119.37	\$119.37
						TOTAL MATERIAL
						\$119.37

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling cost to Yreka Transfer 40 Miles	1.00	Loads		\$400.00	\$400.00
					TOTAL SUBCONTRACTS
					\$400.00

SUMMARY OF COSTS						
Labor Cost	\$2,387.35	Labor Burden @	0.0%	\$0.00		\$2,387.35
Material Cost	\$119.37	Material Tax @	7.75%	\$9.25		\$128.62
Equipment Cost	\$942.16	Equipment Tax @	7.75%	\$73.02		\$1,015.18
Subcontractors	\$400.00					\$400.00
DIRECT COST SUBTOTALS	\$3,849			\$82	DIRECT COST SUBTOTALS	\$3,931
Additional Pay Item Notes :						
Production is based off of RSMs using Crew formed of 1 Forman, 1 Electrician,1Crane. Considered 1 laborer to help loading circuit breakers from the switchyard in the truck for saving it in the designated place.						

PAY ITEM COST DETAIL WORKSHEET

2.055 Remove & Dispose of 69kV disconnect switches, group-operated

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.055			Project	:	KRRP - Copco 1		
Description	:	Remove & Dispose of 69kV disconnect switches, group-operated			Group	:	D05		
Quantity	:	2.00 EA							
Daily Production	:	2.50 EA per		10	hour shift	Project #	:	2	
Work Days	:	0.8		Days		Estimator	:	Mihaela Tomulescu	
Unit Price	:	\$1,965.57 per EA				EA per		Total Cost	Unit Price Per EA
Total Cost	:	\$3,931				Probable Low Cost Parameter	2.75	\$3,538	\$1,769.02
						Probable High Cost Parameter	2.25	\$4,324	\$2,162.13

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman (out)	Active	1.00	0.8	10	8.00	L	\$58.87	incl. in rate	incl. in rate	\$470.98
Electrician	Active	1.00	0.8	10	8.00	L	\$55.80	incl. in rate	incl. in rate	\$446.42
Hydraulic Crane (35tn)	Active	1.00	0.8	10	8.00	E	\$117.77	incl. in rate	incl. in rate	\$942.16
Equipment Operator (crane)	Active	1.00	0.8	10	8.00	L	\$81.60	incl. in rate	incl. in rate	\$652.78
Laborer	Active	2.00	0.8	10	16.00	L	\$51.07	incl. in rate	incl. in rate	\$817.17
Labor Hours					40	TOTAL LABOR				\$2,387.35
Equipment Hours					8	TOTAL EQUIPMENT				\$942.16

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$119.37	\$119.37
						TOTAL MATERIAL
						\$119.37

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling cost to Yreka Transfer 40 Miles	1.00	Loads		\$400.00	\$400.00
					TOTAL SUBCONTRACTS
					\$400.00

SUMMARY OF COSTS									
Labor Cost	\$2,387.35	Labor Burden @	0.0%	\$0.00					\$2,387.35
Material Cost	\$119.37	Material Tax @	7.75%	\$9.25					\$128.62
Equipment Cost	\$942.16	Equipment Tax @	7.75%	\$73.02					\$1,015.18
Subcontractors	\$400.00								\$400.00
DIRECT COST SUBTOTALS		\$3,849		\$82		DIRECT COST SUBTOTALS		\$3,931	
Additional Pay Item Notes :									
Production is based off of RSMs using Crew formed of 1 Foreman, 1 Electrician,1Crane. Considered 1 laborer to help loading circuit breakers from the switchyard in the truck for saving it in the designated place.									

2.056 Remove & Dispose of 60-foot wood poles

PAY ITEM NUMBER	:	2.056	Project	:	KRRP - Copco 1		
Description	:	Remove & Dispose of 60-foot wood poles	Group	:	D05		
Quantity	:	12.00 EA					
Daily Production	:	6.25 EA per	10	hour shift			
Work Days	:	1.9	Days				
Unit Price	:	\$1,009.93 per EA					
Total Cost	:	\$12,119					
			Project #	:	2		
			Estimator	:	Mihaela Tomulescu	EA per	Total Cost
						7.1875	Unit Price Per EA
			Probable Low Cost Parameter			\$10,301	\$858.44
			Probable High Cost Parameter			5	\$14,543
							\$1,211.92

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.9	10	19.00	L	\$58.87	incl. in rate	incl. in rate	\$1,118.57
Electrician	Active	1.00	1.9	10	19.00	L	\$55.80	incl. in rate	incl. in rate	\$1,060.26
Hydraulic Crane (17tn)	Active	1.00	1.9	10	19.00	E	\$82.43	incl. in rate	incl. in rate	\$1,566.17
Equipment Operator (medium)	Active	1.00	1.9	10	19.00	L	\$72.34	incl. in rate	incl. in rate	\$1,374.38
Laborer	Active	2.00	1.9	10	38.00	L	\$51.07	incl. in rate	incl. in rate	\$1,940.77
Vibratory Hammer & Extractor	Active	1.00	1.9	10	19.00	E	\$94.14	incl. in rate	incl. in rate	\$1,788.66
Truck, Utility, with Man-Basket	Active	1.00	1.9	10	19.00	E	\$31.90	incl. in rate	incl. in rate	\$606.10
Labor Hours					95	TOTAL LABOR				\$5,493.98
Equipment Hours					57	TOTAL EQUIPMENT				\$3,960.93

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$274.70	\$274.70
Topsoil placement and grading, loam or topsoil, F.E. loader, 1-1/2 C.Y., remove and stockpile on site, spread from pile to rough finish grade	12.00	CY	1.000	12.00	\$4.74	\$56.88
TOTAL MATERIAL						\$331.58

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling cost to Yreka Transfer 40 Miles	5.00	Loads		\$400.00	\$2,000.00
TOTAL SUBCONTRACTS					\$2,000.00

Labor Cost	\$5,493.98	Labor Burden @	0.0%	\$0.00	\$5,493.98
Material Cost	\$331.58	Material Tax @	7.75%	\$25.70	\$357.28
Equipment Cost	\$3,960.93	Equipment Tax @	7.75%	\$306.97	\$4,267.90
Subcontractors	\$2,000.00				\$2,000.00
DIRECT COST SUBTOTALS	\$11,786			\$333	\$12,119

Production is based off of RSMs using Crew R3 (1 Foreman and 1 Electrician, 1 Crane and 1 man-basket truck to help untie the line. Considered 2 laborer and 1 Vibratory Hammer for demolish the pole foundation, helping placing poles in a designated place and loading them in the truck for disposal. This process includes filling in pole locations with gravel, clean fill and topsoil.

PAY ITEM COST DETAIL WORKSHEET

2.057 Remove & Dispose of 30-foot wood cross arms

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.057			Project	:	KRRP - Copco 1		
Description	:	Remove & Dispose of 30-foot wood cross arms			Group	:	D05		
Quantity	:	24.00 EA							
Daily Production	:	20.00 EA per		10	hour shift	Project #	:	2	
Work Days	:	1.2		Days		Estimator	:	Mihaela Tomulescu	EA per
Unit Price	:	\$250.71		per EA		Probable Low Cost Parameter		23	\$5,114
Total Cost	:	\$6,017				Probable High Cost Parameter		16	\$7,220
									Unit Price Per EA
									\$213.10
									\$300.85

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.2	10	12.00	L	\$58.87	incl. in rate	incl. in rate	\$706.46
Laborer	Active	2.00	1.2	10	24.00	L	\$51.07	incl. in rate	incl. in rate	\$1,225.75
Hydraulic Crane (17tn)	Active	1.00	1.2	10	12.00	E	\$82.43	incl. in rate	incl. in rate	\$989.16
Equipment Operator (medium)	Active	1.00	1.2	10	12.00	L	\$72.34	incl. in rate	incl. in rate	\$868.03

PAY ITEM COST DETAIL WORKSHEET

2.058 Remove & Dispose of 69-kV insulator strings

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.058	Project	:	KRRP - Copco 1				
Description	:	Remove & Dispose of 69-kV insulator strings	Group	:	D05				
Quantity	:	12.00 EA							
Daily Production	:	7.50 EA per	10	hour shift	Project #	:	2		
Work Days	:	1.6 Days			Estimator	:	Mihaela Tomulescu	EA per	Total Cost
Unit Price	:	\$226.26 per EA			Probable Low Cost Parameter			8.625	\$2,308
Total Cost	:	\$2,715			Probable High Cost Parameter			6	\$3,258
									Unit Price Per EA
									\$192.32
									\$271.51

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.6	10	16.00	L	\$58.87	incl. in rate	incl. in rate	\$941.95
Laborer	Active	2.00	1.6	10	32.00	L	\$51.07	incl. in rate	incl. in rate	\$1,634.34
Labor Hours					48	TOTAL LABOR				\$2,576.29
Equipment Hours					0	TOTAL EQUIPMENT				\$0.00

PAY ITEM COST DETAIL WORKSHEET

2.059 Remove & Dispose of Transmission Line No. 3

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.059	Project	:	KRRP - Copco 1				
Description	:	Remove & Dispose of Transmission Line No. 3	Group	:	D05				
Quantity	:	1.66 MILE							
Daily Production	:	0.63 MILE per	10	hour shift	Project #	:	2		
Work Days	:	2.7	Days		Estimator	:	Mihaela Tomulescu	MILE per	Total Cost
Unit Price	:	\$21,636.41	per MILE		Probable Low Cost Parameter		0.71875	\$30,529	Unit Price Per MILE
Total Cost	:	\$35,916			Probable High Cost Parameter		0.46875	\$44,896	\$27,045.51

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	2.7	10	26.60	L	\$55.80	incl. in rate	incl. in rate	\$1,484.36
Electrician	Active	2.00	2.7	10	53.20	L	\$55.80	incl. in rate	incl. in rate	\$2,968.72
Truck, Utility, with Man-Basket	Active	2.00	2.7	10	53.20	E	\$31.90	incl. in rate	incl. in rate	\$1,697.08
Laborer	Active	2.00	2.7	10	53.20	L	\$51.07	incl. in rate	incl. in rate	\$2,717.08
Hydraulic Excavator (2.5cy)	Active	1.00	2.7	10	26.60	E	\$205.40	incl. in rate	incl. in rate	\$5,463.64
Hydraulic Crane (80tn)	Active	1.00	2.7	10	26.60	E	\$197.66	incl. in rate	incl. in rate	\$5,257.76
Equipment Operator (crane)	Active	1.00	2.7	10	26.60	L	\$81.60	incl. in rate	incl. in rate	\$2,170.51
Equipment Operator (light)	Active	1.00	2.7	10	26.60	L	\$69.19	incl. in rate	incl. in rate	\$1,840.45
Hydraulic Impact Breaker Attachment (5k+ ft-lb)	Active	1.00	2.7	10	26.60	E	\$63.28	incl. in rate	incl. in rate	\$1,683.25
					Labor Hours	186.2	TOTAL LABOR			\$11,181.12
					Equipment Hours	133	TOTAL EQUIPMENT			\$14,101.72

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$559.06	\$559.06
Topsoil placement and grading, loam or topsoil, F.E. loader, 1-1/2 C.Y., remove and stockpile on site, spread from pile to rough finish grade	31.00	CY	1.000	31.00	\$4.74	\$146.94
TOTAL MATERIAL						\$706.00

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Rent trailer with cable pulling rig, for high voltage line work - Rent per day	2.66	days		\$3,000.00	\$7,980.00
Hauling cost to Yreka Transfer 40 Miles	2.00	Loads	1 mile per load	\$400.00	\$800.00
TOTAL SUBCONTRACTS					\$8,780.00

SUMMARY OF COSTS						
Labor Cost	\$11,181.12	Labor Burden @	0.0%	\$0.00		\$11,181.12
Material Cost	\$706.00	Material Tax @	7.75%	\$54.71		\$760.71
Equipment Cost	\$14,101.72	Equipment Tax @	7.75%	\$1,092.88		\$15,194.61
Subcontractors	\$8,780.00					\$8,780.00
DIRECT COST SUBTOTALS	\$34,769			\$1,148	DIRECT COST SUBTOTALS	\$35,916
Additional Pay Item Notes :						

When a transmission line is decommissioned and is not converted to another use, the decommissioning typically includes the removal of all infrastructure if it is no longer required, or has reached end-of-life conditions. Removed parts will be re-used, recycled or disposed. Production is based off of RSMs using Crew B-1C and B-3 (1 Foreman, 2 laborer, 1 Excavator & 1 crane for lift, position and load in the truck, 1 Hydraulic rock-splitting/rock-drilling equipment to break equipment foundations and concrete for demo :2 Electrician,, 1 utility truck to access poles, string conductor, modify structure arms, provide guard structures, etc. Crews may be working simultaneously along the project alignment and substations, hydro plant and switchyard. Transmission line poles or structures are 60 feet tall. There are several different kinds of transmission structures. Transmission structures are constructed of wood. They can be single-poled or multi-poled. They can be single-circuited, carrying one set of transmission lines or double-circuited with two sets of lines. Pole height and load capacity limitations determine the distance between poles (span length) either on the basis of ground clearance or ability to support heavy wind and ice loads. Assumed average span between structures to be 275 feet so for 1.66 miles of overhead transmission we will have approximately 31 structures. In areas where single-pole structures are preferred, weak or wet soils may require concrete foundations for support. Where a transmission line must cross a street or slightly change direction, larger angle structures or guy wires may be required. Poles with guy wires impact a much larger area. Angle structures are usually more than double the diameter of other steel poles. They are made of steel, usually five to six feet in diameter, and have a large concrete base. The base may be buried ten or more feet below the ground surface. The diameter of the pole and the depth the base is buried depends on the condition of the soils and the voltage of the line. Assumed the structures are disposed to Yreka recycling, 36 miles away. This estimate is made as the best AECOM assumption, as actual pricing would occur during the detailed engineering and construction bid process.

PAY ITEM COST DETAIL WORKSHEET

2.060 Remove & Dispose of Transmission Line No. 15

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.060	Project	:	KRRP - Copco 1				
Description	:	Remove & Dispose of Transmission Line No. 15	Group	:	D05				
Quantity	:	1.33 MILE	Project #	:	2	Estimator	:	Mihaela Tomulescu	
Daily Production	:	0.63 MILE per 10 hour shift	MILE per	:	0.71875	Total Cost	:	\$24,587	Unit Price Per MILE
Work Days	:	2.1 Days	Probable Low Cost Parameter	:	0.46875	\$36,157	:	\$18,486.26	
Unit Price	:	\$21,748.55 per MILE	Probable High Cost Parameter	:			:	\$27,185.68	
Total Cost	:	\$28,926		:			:		

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	2.1	10	21.30	L	\$55.80	incl. in rate	incl. in rate	\$1,188.60
Electrician	Active	2.00	2.1	10	42.60	L	\$55.80	incl. in rate	incl. in rate	\$2,377.21
Truck, Utility, with Man-Basket	Active	2.00	2.1	10	42.60	E	\$31.90	incl. in rate	incl. in rate	\$1,358.94
Laborer	Active	2.00	2.1	10	42.60	L	\$51.07	incl. in rate	incl. in rate	\$2,175.71
Hydraulic Excavator (2.5cy)	Active	1.00	2.1	10	21.30	E	\$205.40	incl. in rate	incl. in rate	\$4,375.02
Hydraulic Crane (80tn)	Active	1.00	2.1	10	21.30	E	\$197.66	incl. in rate	incl. in rate	\$4,210.16
Equipment Operator (crane)	Active	1.00	2.1	10	21.30	L	\$81.60	incl. in rate	incl. in rate	\$1,738.04
Equipment Operator (light)	Active	1.00	2.1	10	21.30	L	\$69.19	incl. in rate	incl. in rate	\$1,473.75
Hydraulic Impact Breaker Attachment (5k+ ft-lb)	Active	1.00	2.1	10	21.30	E	\$63.28	incl. in rate	incl. in rate	\$1,347.86
					Labor Hours	149.1	TOTAL LABOR			\$8,953.31
					Equipment Hours	106.5	TOTAL EQUIPMENT			\$11,291.98

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$447.67	\$447.67
Topsoil placement and grading, loam or topsoil, F.E. loader, 1-1/2 C.Y., remove and stockpile on site, spread from pile to rough finish grade	26.00	CY	1.000	26.00	\$4.74	\$123.24
						TOTAL MATERIAL
						\$570.91

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Rent trailer with cable pulling rig, for high voltage line work - Rent per day	2.13	days		\$3,000.00	\$6,390.00
Hauling cost to Yreka Transfer 40 Miles	2.00	Loads	1 mile per load	\$400.00	\$800.00
					TOTAL SUBCONTRACTS
					\$7,190.00

SUMMARY OF COSTS						
Labor Cost	\$8,953.31	Labor Burden @	0.0%	\$0.00		\$8,953.31
Material Cost	\$570.91	Material Tax @	7.75%	\$44.25		\$615.15
Equipment Cost	\$11,291.98	Equipment Tax @	7.75%	\$875.13		\$12,167.11
Subcontractors	\$7,190.00					\$7,190.00
DIRECT COST SUBTOTALS	\$28,006			\$919	DIRECT COST SUBTOTALS	\$28,926

Additional Pay Item Notes :						
When a transmission line is decommissioned and is not converted to another use, the decommissioning typically includes the removal of all infrastructure if it is no longer required, or has reached end-of-life conditions. Removed parts will be re-used, recycled or disposed. Production is based off of RSMs using Crew B-1C and B-3 (1 Foreman, 2 laborer, 1 Excavator & 1 crane for lift, position and load in the truck, 1 Hydraulic rock-splitting/rock-drilling equipment to break equipment foundations and concrete for demo .2 Electrician, 1 utility truck to access poles, string conductor, modify structure arms, provide guard structures, etc. Crews may be working simultaneously along the project alignment and substations, hydro plant and switchyard. Transmission line poles or structures are 60 feet tall. There are several different kinds of transmission structures. Transmission structures are constructed of wood. They can be single-poled or multi-poled. They can be single-circuit, carrying one set of transmission lines or double-circuited with two sets of lines. Pole height and load capacity limitations determine the distance between poles (span length) either on the basis of ground clearance or ability to support heavy wind and ice loads. Assumed average span between structures to be 275 feet so for 1.33 miles of overhead transmission we will have approximately 26 structures. In areas where single-pole structures are preferred, weak or wet soils may require concrete foundations for support. Where a transmission line must cross a street or slightly change direction, larger angle structures or guy wires may be required. Poles with guy wires impact a much larger area. Angle structures are usually more than double the diameter of other steel poles. They are made of steel, usually five to six feet in diameter, and have a large concrete base. The base may be buried ten or more feet below the ground surface. The diameter of the pole and the depth the base is buried depends on the condition of the soils and the voltage of the line. Assumed the structures are disposed to Yreka recycling, 36 miles away. This estimate is made as the best AECOM assumption, as actual pricing would occur during the detailed engineering and construction bid process.						

PAY ITEM COST DETAIL WORKSHEET

2.061 Remove & Dispose of Transmission Line No. 26-1

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.061	Project	:	KRRP - Copco 1				
Description	:	Remove & Dispose of Transmission Line No. 26-1	Group	:	D05				
Quantity	:	0.07 MILE							
Daily Production	:	0.63 MILE per	10	hour shift	Project #	:	2		
Work Days	:	0.1 Days			Estimator	:	Mihaela Tomulescu	MILE per	Total Cost
Unit Price	:	\$28,438.33 per MILE			Probable Low Cost Parameter		0.71875	\$1,692	Unit Price Per MILE
Total Cost	:	\$1,991			Probable High Cost Parameter		0.46875	\$2,488	\$35,547.91

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	0.1	10	1.10	L	\$55.80	incl. in rate	incl. in rate	\$61.38
Electrician	Active	2.00	0.1	10	2.20	L	\$55.80	incl. in rate	incl. in rate	\$122.77
Truck, Utility, with Man-Basket	Active	2.00	0.1	10	2.20	E	\$31.90	incl. in rate	incl. in rate	\$70.18
Laborer	Active	2.00	0.1	10	2.20	L	\$51.07	incl. in rate	incl. in rate	\$112.36
Hydraulic Excavator (2.5cy)	Active	1.00	0.1	10	1.10	E	\$205.40	incl. in rate	incl. in rate	\$225.94
Hydraulic Crane (80tn)	Active	1.00	0.1	10	1.10	E	\$197.66	incl. in rate	incl. in rate	\$217.43
Equipment Operator (crane)	Active	1.00	0.1	10	1.10	L	\$81.60	incl. in rate	incl. in rate	\$89.76
Equipment Operator (light)	Active	1.00	0.1	10	1.10	L	\$69.19	incl. in rate	incl. in rate	\$76.11
Hydraulic Impact Breaker Attachment (3k-4k ft-lb)	Active	2.00	0.1	10	2.20	E	\$36.81	incl. in rate	incl. in rate	\$80.98
					Labor Hours	7.7	TOTAL LABOR			\$462.38
					Equipment Hours	6.6	TOTAL EQUIPMENT			\$594.53

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$23.12	\$23.12
Topsoil placement and grading, loam or topsoil, F.E. loader, 1-1/2 C.Y., remove and stockpile on site, spread from pile to rough finish grade	26.00	CY	1.000	26.00	\$4.74	\$123.24
TOTAL MATERIAL						\$146.36

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Rent trailer with cable pulling rig, for high voltage line work - Rent per day	0.11	days		\$3,000.00	\$330.00
Hauling cost to Yreka Transfer 40 Miles	1.00	Loads	1 mile per load	\$400.00	\$400.00
TOTAL SUBCONTRACTS					\$730.00

SUMMARY OF COSTS						
Labor Cost	\$462.38	Labor Burden @	0.0%	\$0.00		\$462.38
Material Cost	\$146.36	Material Tax @	7.75%	\$11.34		\$157.70
Equipment Cost	\$594.53	Equipment Tax @	7.75%	\$46.08		\$640.60
Subcontractors	\$730.00					\$730.00
DIRECT COST SUBTOTALS	\$1,933			\$57	DIRECT COST SUBTOTALS	\$1,991

Additional Pay Item Notes :

When a transmission line is decommissioned and is not converted to another use, the decommissioning typically includes the removal of all infrastructure if it is no longer required, or has reached end-of-life conditions. Removed parts will be re-used, recycled or disposed. Production is based off of RSMs using Crew B-1C and B-3 (1 Foreman, 2 laborer, 1 Excavator & 1 crane for lift, position and load in the truck, 1 Hydraulic rock-splitting/rock-drilling equipment to break equipment foundations and concrete for demo 2 Electrician,, 1 utility truck to access poles, string conductor, modify structure arms, provide guard structures, etc. Crews may be working simultaneously along the project alignment and substations, hydro plant and switchyard. Transmission line poles or structures are 60 feet tall. There are several different kinds of transmission structures. Transmission structures are constructed of wood. They can be single-poled or multi-poled. They can be single-circuted, carrying one set of transmission lines or double-circuted with two sets of lines. Pole height and load capacity limitations determine the distance between poles (span length) either on the basis of ground clearance or ability to support heavy wind and ice loads. Assumed average span between structures to be 275 feet so for 0.07 miles of overhead transmission we will have approximately 2 structures. In areas where single-pole structures are preferred, weak or wet soils may require concrete foundations for support. Where a transmission line must cross a street or slightly change direction, larger angle structures or guy wires may be required. Poles with guy wires impact a much larger area. Angle structures are usually more than double the diameter of other steel poles. They are made of steel, usually five to six feet in diameter, and have a large concrete base. The base may be buried ten or more feet below the ground surface. The diameter of the pole and the depth the base is buried depends on the condition of the soils and the voltage of the line. Assumed the structures are disposed to Yreka recycling, 36 miles away. This estimate is made as the best AECOM assumption, as actual pricing would occur during the detailed engineering and construction bid process.

PAY ITEM COST DETAIL WORKSHEET

2.062 Remove & Dispose of Transmission Line No. 26-2

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.062	Project	:	KRRP - Copco 1				
Description	:	Remove & Dispose of Transmission Line No. 26-2	Group	:	D05				
Quantity	:	0.07 MILE							
Daily Production	:	0.63 MILE per	10	hour shift	Project #	:	2		
Work Days	:	0.1	Days		Estimator	:	Mihaela Tomulescu	MILE per	Total Cost
Unit Price	:	\$28,438.33	per MILE		Probable Low Cost Parameter		0.71875	\$1,692	\$24,172.58
Total Cost	:	\$1,991			Probable High Cost Parameter		0.46875	\$2,488	\$35,547.91

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	0.1	10	1.10	L	\$55.80	incl. in rate	incl. in rate	\$61.38
Electrician	Active	2.00	0.1	10	2.20	L	\$55.80	incl. in rate	incl. in rate	\$122.77
Truck, Utility, with Man-Basket	Active	2.00	0.1	10	2.20	E	\$31.90	incl. in rate	incl. in rate	\$70.18
Laborer	Active	2.00	0.1	10	2.20	L	\$51.07	incl. in rate	incl. in rate	\$112.36
Hydraulic Excavator (2.5cy)	Active	1.00	0.1	10	1.10	E	\$205.40	incl. in rate	incl. in rate	\$225.94
Hydraulic Crane (80tn)	Active	1.00	0.1	10	1.10	E	\$197.66	incl. in rate	incl. in rate	\$217.43
Equipment Operator (crane)	Active	1.00	0.1	10	1.10	L	\$81.60	incl. in rate	incl. in rate	\$89.76
Equipment Operator (light)	Active	1.00	0.1	10	1.10	L	\$69.19	incl. in rate	incl. in rate	\$76.11
Hydraulic Impact Breaker Attachment (3k-4k ft-lb)	Active	2.00	0.1	10	2.20	E	\$36.81	incl. in rate	incl. in rate	\$80.98
Labor Hours					7.7	TOTAL LABOR			\$462.38	
Equipment Hours					6.6	TOTAL EQUIPMENT			\$594.53	

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$23.12	\$23.12
F.E. loader, 1-1/2 C.Y., remove and stockpile on	26.00	CY	1.000	26.00	\$4.74	\$123.24
TOTAL MATERIAL						\$146.36

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Rent trailer with cable pulling rig, for high voltage					
line work - Rent per day	0.11	days		\$3,000.00	\$330.00
Hauling cost to Yreka Transfer 40 Miles	1.00	Loads	1 mile per load	\$400.00	\$400.00
TOTAL SUBCONTRACTS					\$730.00

SUMMARY OF COSTS						
Labor Cost	\$462.38	Labor Burden @	0.0%	\$0.00		\$462.38
Material Cost	\$146.36	Material Tax @	7.75%	\$11.34		\$157.70
Equipment Cost	\$594.53	Equipment Tax @	7.75%	\$46.08		\$640.60
Subcontractors	\$730.00					\$730.00
DIRECT COST SUBTOTALS	\$1,933			\$57	DIRECT COST SUBTOTALS	\$1,991
Additional Pay Item Notes :						

When a transmission line is decommissioned and is not converted to another use, the decommissioning typically includes the removal of all infrastructure if it is no longer required, or has reached end-of-life conditions. Removed parts will be re-used, recycled or disposed. Production is based off of RSMs using Crew B-1C and B-3 (1 Foreman, 2 laborer, 1 Excavator & 1 crane for lift, position and load in the truck, 1 Hydraulic rock-splitting/rock-drilling equipment to break equipment foundations and concrete for demo 2 Electrician,, 1 utility truck to access poles, string conductor, modify structure arms, provide guard structures, etc. Crews may be working simultaneously along the project alignment and substations, hydro plant and switchyard. Transmission line poles or structures are 60 feet tall. There are several different kinds of transmission structures. Transmission structures are constructed of wood. They can be single-poled or multi-poled. They can be single-circuited, carrying one set of transmission lines or double-circuited with two sets of lines. Pole height and load capacity limitations determine the distance between poles (span length) either on the basis of ground clearance or ability to support heavy wind and ice loads. Assumed average span between structures to be 275 feet so for 0.07 miles of overhead transmission we will have approximately 2 structures. In areas where single-pole structures are preferred, weak or wet soils may require concrete foundations for support. Where a transmission line must cross a street or slightly change direction, larger angle structures or guy wires may be required. Poles with guy wires impact a much larger area. Angle structures are usually more than double the diameter of other steel poles. They are made of steel, usually five to six feet in diameter, and have a large concrete base. The base may be buried ten or more feet below the ground surface. The diameter of the pole and the depth the base is buried depends on the condition of the soils and the voltage of the line. Assumed the structures are disposed to Yreka recycling, 36 miles away. This estimate is made as the best AECOM assumption, as actual pricing would occur during the detailed engineering and construction bid process.

2.065 Remove Concrete Items associated with 10 ft. diam. Penstocks, reinf. Concrete

SUMMARY OF COSTS						
Labor Cost	\$34,712.22	Labor Burden @	0.0%	\$0.00	Included in hourly labor rate.	\$34,712.22
Material Cost	\$5,206.83	Material Tax @	7.75%	\$403.53		\$5,610.36
Equipment Cost	\$36,022.92	Equipment Tax @	7.75%	\$2,791.78		\$38,814.69
Subcontractors	\$16,200.00					\$16,200.00
DIRECT COST SUBTOTALS		\$92,142		\$3,195	DIRECT COST SUBTOTALS	\$95,337
Additional Pay Item Notes :						

8 man crew will construct plug in the dry rough 5 days of construction to plug each side for a total of 10 days. Expect 6" pump will be needed day and night entire duration to control water during construction of plugs.

2.066 Plug 14-foot diameter penstock with concrete			
Details			
High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	5%	Gas Price Decrease	5%
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues	5%
	15%		10%

Production Per Hour	Hours	Overall Production	
	0.3	8	2.4
		10	3

Production & Sequence Notes

The Plug is expected to be formed in two sections. The inner section will be formed and braced off of the tunnel walls. After the inner form (set form) is installed the face form will be built similar to the set form by bracing off of the tunnel walls. To ensure consolidation a high slump small aggregate mix will be used and concrete vibrators will have access through the Bat opening block out at the top. One 5 man crew will be used to construct the formwork, place the concrete, and strip the form work. One crew of 3 rodbusters will be used to tie and brace reinforcement. Expected duration is 5 days to form the plug , 2 days to reinforce the plug, 1 days to pour the plug, and 2 days to strip the plug. Crane will be used 1/2 of time to support crew by flying material close to plug location. A small pump will be used to install concrete. Please note the production is adjusted to account for the duration as listed above.

Other Notes

PAY ITEM COST DETAIL WORKSHEET

2.067 Remove & Dispose of 8 screens

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.067			Project	:	KRRP - Copco 1		
Description	:	Remove & Dispose of 8 screens			Group	:	D03		
Quantity	:	18,000.00 LBS							
Daily Production	:	22,500.00	LBS per	10	hour shift	Project #	:	2	
Work Days	:	0.8 Days			Estimator	:	Mihaela Tomulescu		
Unit Price	:	\$1.11 per LBS			Probable Low Cost Parameter		LBS per	Total Cost	Unit Price Per LBS
Total Cost	:	\$19,893			Probable High Cost Parameter		24750	\$17,904	\$0.99
							18000	\$23,872	\$1.33

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.8	10	8.00	L	\$58.87	incl. in rate	incl. in rate	\$470.98
Laborer	Active	4.00	0.8	10	32.00	L	\$51.07	incl. in rate	incl. in rate	\$1,634.34
Crawler Crane (270tn)	Active	2.00	0.8	10	16.00	E	\$454.10	incl. in rate	incl. in rate	\$7,265.60
Equipment Operator (medium)	Active	2.00	0.8	10	16.00	L	\$72.34	incl. in rate	incl. in rate	\$1,157.38
Welder	Active	2.00	0.8	10	16.00	E	\$7.84	incl. in rate	incl. in rate	\$125.44
Gas Welding Machine	Active	2.00	0.8	10	16.00	E	\$2.88	incl. in rate	incl. in rate	\$46.03
Electrician	Active	1.00	0.8	10	8.00	L	\$55.80	incl. in rate	incl. in rate	\$446.42
Steelworker	Active	6.00	0.8	10	48.00	L	\$78.10	incl. in rate	incl. in rate	\$3,748.80
Truck, Flatbed (4x4, 10,000 gvw)	Active	4.00	0.8	10	32.00	E	\$27.09	incl. in rate	incl. in rate	\$866.88
Truck Driver (heavy)	Active	4.00	0.8	10	32.00	L	\$75.72	incl. in rate	incl. in rate	\$2,423.17
					Labor Hours	144	TOTAL LABOR		\$9,881.08	
					Equipment Hours	80	TOTAL EQUIPMENT		\$8,303.95	

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$988.11	\$988.11
TOTAL MATERIAL						\$988.11

SUBCONTRACT COSTS				
Description	Quantity	Units	Notes / Company	Contract or Quote Amount
TOTAL SUBCONTRACTS				\$0.00

SUMMARY OF COSTS					
Labor Cost	\$9,881.08	Labor Burden @	0.0%	\$0.00	\$9,881.08
Material Cost	\$988.11	Material Tax @	7.75%	\$76.58	\$1,064.69
Equipment Cost	\$8,303.95	Equipment Tax @	7.75%	\$643.56	\$8,947.51
Subcontractors	\$0.00				\$0.00
DIRECT COST SUBTOTALS	\$19,173			\$720	DIRECT COST SUBTOTALS \$19,893
Additional Pay Item Notes :					
Production based on crew 1 Foreman, 2 Steelworkers and 1 Welder to cut and attach hooks to the gate for disposal, 4 Laborers to rigging wire rope slings, 1 Electrician to provide power for tools, 1 Truck for 2 screens. Assuming 1 day of work.					

2.068 Remove & Dispose of 8 Water Gates

PAY ITEM NUMBER	:	2.068	Project	:	KRRP - Copco 1
Description	:	Remove & Dispose of 8 Water Gates	Group	:	D03
Quantity	:	18,000.00 LBS			
Daily Production	:	22,500.00 LBS per	10	hour shift	
Work Days	:	0.8 Days	Project #	:	2
Unit Price	:	\$1.03 per LBS	Estimator	:	Mihaela Tomulescu
Total Cost	:	\$18,499	LBS per	:	24750
			Total Cost	:	\$16,649
			Unit Price Per LBS	:	\$0.92
			Probable Low Cost Parameter	:	18000
			Probable High Cost Parameter	:	\$22,198
				:	\$1.23

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman (out)	Active	1.00	0.8	10	8.00	L	\$58.87	incl. in rate	incl. in rate	\$470.98
Laborer	Active	4.00	0.8	10	32.00	L	\$51.07	incl. in rate	incl. in rate	\$1,634.34
Crawler Crane (270tn)	Active	2.00	0.8	10	16.00	E	\$454.10	incl. in rate	incl. in rate	\$7,265.60
Equipment Operator (medium)	Active	2.00	0.8	10	16.00	L	\$72.34	incl. in rate	incl. in rate	\$1,157.38
Welder	Active	2.00	0.8	10	16.00	E	\$7.84	incl. in rate	incl. in rate	\$125.44
Gas Welding Machine	Active	2.00	0.8	10	16.00	E	\$2.88	incl. in rate	incl. in rate	\$46.03
Electrician	Active	1.00	0.8	10	8.00	L	\$55.80	incl. in rate	incl. in rate	\$446.42
Steelworker	Active	2.00	0.8	10	16.00	L	\$78.10	incl. in rate	incl. in rate	\$1,249.60
Truck, Flatbed (4x4, 10,000 gvw)	Active	4.00	0.8	10	32.00	E	\$27.09	incl. in rate	incl. in rate	\$866.88
Truck Driver (heavy)	Active	4.00	0.8	10	32.00	L	\$75.72	incl. in rate	incl. in rate	\$2,423.17
Labor Hours					112	TOTAL LABOR				\$7,381.88
Equipment Hours					80	TOTAL EQUIPMENT				\$8,303.95

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$738.19	\$738.19
Selective demolition, torch cutting, steel, 1" thick plate (assumption)	1,500.00	LF	1.000	1,500.00	\$0.85	\$1,275.00
TOTAL MATERIAL						\$2,013.19

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
TOTAL SUBCONTRACTS					\$0.00

Labor Cost	\$7,381.88	Labor Burden @	0.0%	\$0.00		\$7,381.88
Material Cost	\$2,013.19	Material Tax @	7.75%	\$156.02		\$2,169.21
Equipment Cost	\$8,303.95	Equipment Tax @	7.75%	\$643.56		\$8,947.51
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$17,699			\$800	DIRECT COST SUBTOTALS	\$18,499

Production based on crew 1 Forman, 2 Steelworkers and 1 Welder to cut and attach hooks to the gate for disposal, 4 Laborers to rigging wire rope slings, 1 Electrician to provide power for tools, 1 Truck for 2 gates. Assuming 1 day of work.

PAY ITEM COST DETAIL WORKSHEET

2.069 Remove & Dispose of 3 - 30" Dia. x 25' stand pipes

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.069	Project	:	KRRP - Copco 1				
Description	:	Remove & Dispose of 3 - 30" Dia. x 25' stand pipes	Group	:	D03				
Quantity	:	6,000.00 LBS							
Daily Production	:	7,500.00 LBS per	10	hour shift	Project #	:	2		
Work Days	:	0.8 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.83 per LBS			Probable Low Cost Parameter			8250	\$4,469
Total Cost	:	\$4,966			Probable High Cost Parameter			6000	\$5,959
									Unit Price Per LBS
									\$0.74
									\$0.99

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Hydraulic Crane (35tn)	Active	1.00	0.8	10	8.00	E	\$117.77	incl. in rate	incl. in rate	\$942.16
Laborer	Active	2.00	0.8	10	16.00	L	\$51.07	incl. in rate	incl. in rate	\$817.17
Truck Driver (light)	Active	1.00	0.8	10	8.00	L	\$65.82	incl. in rate	incl. in rate	\$526.59
Truck, Flatbed (4x4, 10,000 gvw)	Active	1.00	0.8	10	8.00	E	\$27.09	incl. in rate	incl. in rate	\$216.72
Labor Foreman	Active	1.00	0.8	10	8.00	L	\$58.87	incl. in rate	incl. in rate	\$470.98
Equipment Operator (crane)	Active	1.00	0.8	10	8.00	L	\$81.60	incl. in rate	incl. in rate	\$652.78
Steelworker	Active	2.00	0.8	10	16.00	L	\$78.10	incl. in rate	incl. in rate	\$1,249.60
					Labor Hours	56	TOTAL LABOR		\$3,717.12	
					Equipment Hours	16	TOTAL EQUIPMENT		\$1,158.88	

MATERIAL COSTS						
Description	Item	Order	Conversion	Order	Order	Material
						TOTAL MATERIAL
						\$0.00

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					TOTAL SUBCONTRACTS
					\$0.00

SUMMARY OF COSTS						
Labor Cost	\$3,717.12	Labor Burden @	0.0%	\$0.00		\$3,717.12
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00		\$0.00
Equipment Cost	\$1,158.88	Equipment Tax @	7.75%	\$89.81		\$1,248.69
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$4,876			\$90	DIRECT COST SUBTOTALS	\$4,966
Additional Pay Item Notes :						
Crew formed of 2 Steelworker to cut the pipes and 2 Laborers that will use the crane to load the pipe in the truck.						

PAY ITEM COST DETAIL WORKSHEET

2.071 Remove & Dispose of 10' Dia. penstock pipe

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.071	Project	:	KRRP - Copco 1				
Description	:	Remove & Dispose of 10' Dia. penstock pipe	Group	:	D03				
Quantity	:	270,000.00 LBS	Project #	:	2	Estimator	:	Mihaela Tomulescu	
Daily Production	:	30,300.00 LBS per				LBS per		Total Cost	Unit Price Per LBS
Work Days	:	8.9 Days				34845		\$240,353	\$0.89
Unit Price	:	\$1.05 per LBS	Probable Low Cost Parameter			22725		\$353,461	\$1.31
Total Cost	:	\$282,769	Probable High Cost Parameter						

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	8.9	10	89.00	L	\$58.87	incl. in rate	incl. in rate	\$5,239.61
Laborer	Active	4.00	8.9	10	356.00	L	\$51.07	incl. in rate	incl. in rate	\$18,181.99
Steelworker	Active	2.00	8.9	10	178.00	L	\$78.10	incl. in rate	incl. in rate	\$13,901.80
Equipment Operator (crane)	Active	2.00	8.9	10	178.00	L	\$81.60	incl. in rate	incl. in rate	\$14,524.44
Equipment Operator (medium)	Active	2.00	8.9	10	178.00	L	\$72.34	incl. in rate	incl. in rate	\$12,875.81
Crawler Crane (90tn)	Active	1.00	8.9	10	89.00	E	\$211.22	incl. in rate	incl. in rate	\$18,798.58
Crawler Crane (270tn)	Active	1.00	8.9	10	89.00	E	\$454.10	incl. in rate	incl. in rate	\$40,414.90
Loader, FE Rubber Tire (5.25cy)	Active	1.00	8.9	10	89.00	E	\$76.00	incl. in rate	incl. in rate	\$6,764.00
Hydraulic Excavator (5.0cy)	Active	1.00	8.9	10	89.00	E	\$276.50	incl. in rate	incl. in rate	\$24,608.50
Boomlift (JLG 60')	Active	2.00	8.9	10	178.00	E	\$52.87	incl. in rate	incl. in rate	\$9,410.86
Acetylene Torches	Active	4.00	8.9	10	356.00	E	\$0.47	incl. in rate	incl. in rate	\$167.32
Air Compressor 600 cfm	Active	2.00	8.9	10	178.00	E	\$21.74	incl. in rate	incl. in rate	\$3,869.72
Generator, Small Generator, 10 - 15 kW	Active	2.00	8.9	10	178.00	E	\$7.04	incl. in rate	incl. in rate	\$1,253.12
Hepa Vac System	Active	4.00	8.9	10	356.00	E	\$0.47	incl. in rate	incl. in rate	\$167.32
					Labor Hours	979	TOTAL LABOR			\$64,723.65
					Equipment Hours	1602	TOTAL EQUIPMENT			\$105,454.32

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 20% labor (saw blades, drill bits, torch gas, etc)	1.00	LS	1.000	1.00	\$12,944.73	\$12,944.73
HEPA Vac Systems For Grinders	4.00	EA	1.000	4.00	\$1,000.00	\$4,000.00
Handheld Grinders	4.00	EA	1.000	4.00	\$250.00	\$1,000.00
TOTAL MATERIAL						\$17,944.73

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Access Allowance at Klamath River	1	AL		\$50.00	\$50.00
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (10% of total)	13.50	ton		\$595.00	\$8,032.50
Hauling Disposal Cost	45.00	Loads	20 tons a load	\$600.00	\$27,000.00
Shoring Allowance	1	AL		\$50,000.00	\$50,000.00
TOTAL SUBCONTRACTS					\$85,082.50

SUMMARY OF COSTS					
Labor Cost	\$64,723.65	Labor Burden @	0.0%	\$0.00	\$64,723.65
Material Cost	\$17,944.73	Material Tax @	7.75%	\$1,390.72	\$19,335.45
Equipment Cost	\$105,454.32	Equipment Tax @	7.75%	\$8,172.71	\$113,627.03
Subcontractors	\$85,082.50				\$85,082.50
DIRECT COST SUBTOTALS	\$273,205			\$9,563	DIRECT COST SUBTOTALS
					\$282,769

Additional Pay Item Notes :	
This pay item is to demolish penstock and haul off site. This activity is expected to be 60% efficient to account for prepping sections of the pipe for cutting due to coating, staff breaks, equipment maintenance, temp shoring, equipment repositioning, haul road adjustment, and ect. Currently we are expecting to have 14 each 20K lb loads of penstock. Each pipe length is expected to be roughly 21' long. A 90 ton crawler crane will be rigged to the 21' long cut pipe and once cut it will track near loading location. 130 ton crawler crane will be used as a support crane / hold crane for the adjacent pipe section. A shoring allowance has been added for potential sag areas depending where the penstock is cut. Hauling is expected to cost more than typical disposal hauling due to the access restrictions and potential hauling permits.	

2.071 Remove & Dispose of 10' Dia. penstock pipe			
Details			
High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	10%	Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	15%	No Unforeseen Contaminated Mats/ Access Issues	5%
	25%		15%

Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)	Overall Production
	5,000.00	8	24000
	5,050.00	10	30300

Total Lbs	270,000.00		
Assumed Pipe Thickness is 3/4" thick	0.75		
10' diameter pipe			
Lbs per ft	957	20000	20.89864159
Total LF	282.13		
Each Piece at 20k length	21		
Number of pieces	14.00		

PAY ITEM COST DETAIL WORKSHEET

2.070 Remove & Dispose of 14' Dia. penstock pipe

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.070			Project	:	KRRP - Copco 1		
Description	:	Remove & Dispose of 14' Dia. penstock pipe			Group	:	D03		
Quantity	:	256,000.00 LBS							
Daily Production	:	30,300.00 LBS per			10	hour shift	Project #	:	2
Work Days	:	8.4 Days					Estimator	:	Mihaela Tomulescu
Unit Price	:	\$1.38 per LBS					Probable Low Cost Parameter		LBS per
Total Cost	:	\$353,199					Probable High Cost Parameter		Total Cost
									Unit Price Per LBS

CREW COSTS										
Description	Active	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	8.4	10	84.00	L	\$58.87	incl. in rate	incl. in rate	\$4,945.25
Laborer	Active	4.00	8.4	10	336.00	L	\$51.07	incl. in rate	incl. in rate	\$17,160.53
Steelworker	Active	2.00	8.4	10	168.00	L	\$78.10	incl. in rate	incl. in rate	\$13,120.80
Equipment Operator (crane)	Active	2.00	8.4	10	168.00	L	\$81.60	incl. in rate	incl. in rate	\$13,708.46
Equipment Operator (medium)	Active	2.00	8.4	10	168.00	L	\$72.34	incl. in rate	incl. in rate	\$12,152.45
Crawler Crane (90tn)	Active	1.00	8.4	10	84.00	E	\$211.22	incl. in rate	incl. in rate	\$17,742.48
Crawler Crane (270tn)	Active	1.00	8.4	10	84.00	E	\$454.10	incl. in rate	incl. in rate	\$38,144.40
Loader, FE Rubber Tire (5.25cy)	Active	1.00	8.4	10	84.00	E	\$76.00	incl. in rate	incl. in rate	\$6,384.00
Hydraulic Excavator (5.0cy)	Active	1.00	8.4	10	84.00	E	\$276.50	incl. in rate	incl. in rate	\$23,226.00
Boomlift (JLG 60')	Active	2.00	8.4	10	168.00	E	\$52.87	incl. in rate	incl. in rate	\$9,410.86
Acetylene Torches	Active	4.00	8.4	10	336.00	E	\$0.47	incl. in rate	incl. in rate	\$167.32
Air Compressor 600 cfm	Active	2.00	8.4	10	168.00	E	\$21.74	incl. in rate	incl. in rate	\$3,869.72
Generator, Small Generator, 10 - 15 kW	Active	2.00	8.4	10	168.00	E	\$7.04	incl. in rate	incl. in rate	\$1,253.12
Hepa Vac System	Active	4.00	8.4	10	336.00	E	\$0.47	incl. in rate	incl. in rate	\$167.32
					Labor Hours	924			TOTAL LABOR	\$61,087.49
					Equipment Hours	1512			TOTAL EQUIPMENT	\$100,365.22

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 20% labor (saw blades, drill bits, torch gas, etc)	1.00	LS	1.000	1.00	\$12,217.50	\$12,217.50
HEPA Vac Systems For Grinders	4.00	EA	1.000	4.00	\$1,000.00	\$4,000.00
Handheld Grinders	4.00	EA	1.000	4.00	\$250.00	\$1,000.00
						TOTAL MATERIAL
						\$17,217.50

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Access Allowance at Klamath River	1	AL		\$100,000.00	\$100,000.00
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (10% of total)					
	12.80	ton		\$595.00	\$7,616.00
Hauling Disposal Cost	13.00	Loads	20 tons a load	\$600.00	\$7,800.00
Shoring Allowance	1	AL		\$50,000.00	\$50,000.00
					TOTAL SUBCONTRACTS
					\$165,416.00

SUMMARY OF COSTS					
Labor Cost	\$61,087.49	Labor Burden @	0.0%	\$0.00	\$61,087.49
Material Cost	\$17,217.50	Material Tax @	7.75%	\$1,334.36	\$18,551.85
Equipment Cost	\$100,365.22	Equipment Tax @	7.75%	\$7,778.30	\$108,143.52
Subcontractors	\$165,416.00				\$165,416.00
DIRECT COST SUBTOTALS	\$344,086			\$9,113	DIRECT COST SUBTOTALS
					\$353,199
Additional Pay Item Notes :					

This pay item is to demolish penstock and haul off site. This activity is expected to be 60% efficient to account for prepping sections of the pipe for cutting due to coating, staff breaks, equipment maintenance, temp shoring, equipment repositioning, haul road adjustment, and ect. Currently we are expecting to have 13 each 20K lb loads of penstock. Each pipe length is expected to be roughly 21' long. A 90 ton crawler crane will be rigged to the 21' long cut pipe and once cut it will track near loading location. 130 ton crawler crane will be used as a support crane / hold crane for the adjacent pipe section. A shoring allowance has been added for potential sag areas depending where the penstock is cut. Hauling is expected to cost more than typical disposal hauling due to the access restrictions and potential hauling permits.

2.070 Remove & Dispose of 14' Dia. penstock pipe
Details

High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	10%	Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues	5%
20%		15%	

Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)	Overall Production
5,000.00	8	60%	24000
5,050.00	10	60%	30300

Total Lbs	256,000.00		
Assumed Pipe Thickness is 3/4" thick	0.75		
14" diameter pipe			
Lbs per ft	1350	20000	15
Total LF	190.00		
Each Piece at 36k length	15		
Number of pieces	13.00		

PAY ITEM COST DETAIL WORKSHEET

2.082 Sitework - Concrete Processing and Soil Cover for Disposal Area

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.082	Project	:	KRRP - Copco 1				
Description	:	Sitework - Concrete Processing and Soil Cover for Disposal Area	Group	:	D12				
Quantity	:	12,000.00 cy	Project #	:	2	Estimator	:	Michael Barba	
Daily Production	:	700.00 cy per 10 hour shift	Probable Low Cost Parameter	:	770	cy per	:	770	Total Cost
Work Days	:	17.1 Days	Probable High Cost Parameter	:	630		:		Unit Price Per cy
Unit Price	:	\$17.19 per cy							\$15.47
Total Cost	:	\$206,327							\$18.91

CREW COSTS										
Description	Active Idle	# In crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Hydraulic Excavator (2.5cy)	Active	1.00	17.1	10	171.00	E	\$205.40	incl. in rate	incl. in rate	\$35,123.40
Labor Foreman	Active	1.00	17.1	10	171.00	L	\$58.87	incl. in rate	incl. in rate	\$10,067.11
Laborer	Active	3.00	17.1	10	513.00	L	\$51.07	incl. in rate	incl. in rate	\$26,200.45
Equipment Operator (medium)	Active	4.00	17.1	10	684.00	L	\$72.34	incl. in rate	incl. in rate	\$49,477.82
Dozer (235hp)(CATD7)	Active	1.00	17.1	10	171.00	E	\$171.07	incl. in rate	incl. in rate	\$29,252.97
Grader, 180hp, 13' blade	Active	1.00	17.1	10	171.00	E	\$84.69	incl. in rate	incl. in rate	\$14,481.99
Terex Track Crusher	Active	1.00	17.1	10	171.00	E	\$103.99	incl. in rate	incl. in rate	\$17,781.72
Kobelco SK260LC-10 Ex With CP100 Magnet	Active	1.00	17.1	10	171.00	E	\$89.29	incl. in rate	incl. in rate	\$15,268.59
					Labor Hours	1368	TOTAL LABOR			\$85,745.39
					Equipment Hours	855	TOTAL EQUIPMENT			\$111,908.67

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
						TOTAL MATERIAL
						\$0.00

SUBCONTRACT COSTS				
Description	Quantity	Units	Notes / Company	Unit Price
				TOTAL SUBCONTRACTS
				\$0.00

SUMMARY OF COSTS						
Labor Cost	\$85,745.39	Labor Burden @	0.0%	\$0.00		\$85,745.39
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00		\$0.00
Equipment Cost	\$111,908.67	Equipment Tax @	7.75%	\$8,672.92		\$120,581.59
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$197,654			\$8,673	DIRECT COST SUBTOTALS	\$206,327
Additional Pay Item Notes :						
Please see details sheet						

2.082 Sitework - Concrete Processing and Soil Cover for Disposal Area
Details

High Cost Factors			Low Cost Factors		
Bad Weather	0%		No Bad Weather		0%
Gas Price Increase	10%		Gas Price Decrease		10%
Unforeseen Contaminated Mats/ Access Issues	0%		No Unforeseen Contaminated Mats/ Access Issues		0%
	10%				10%
Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Etc.)	Overall Production		
	100	8	70%		560
		10	70%		700
Track Crusher Production		Excavator Loading Production per shift			
CY per Hour	70.00	CY per Hour			70.00
Lbs per Hour (4050lbs per CF)	283,500.00	CY Bucket Size			2.50
Tons per Hour	142	Buckets Per Hour			28
# of Crushers	1.00	# of Excavators			1.00
Tons per hour	142	CY per Hour			70
Tons Per Hour Ideal Production Per 8 Hour Shift	300	Ideal Production			95
Efficient Compared to Ideal Production	47%	Efficient Compared to Ideal Production			74%
Inefficiencies Compared to Ideal Production	53%	Inefficiencies Compared to Ideal Production			26%
		Excavator Crusher Production			
		Hydraulic Hammer CY per Hour			70
		# of Hammers			1.00
		CY per Hour			70
		CY per Hour Back Check			70
		Ideal Production			150
		Efficient Compared to Ideal Production			47%
		Inefficiencies Compared to Ideal Production			53%

Other Notes
This estimate is to account for extra processing of the demolished concrete related to Copco 1and spreading soil over disposal area. The estimate Estimate currently reflects using three pieces of equipment to support operation; a Kobelco excavator with a CP100 crusher/ Magnet attachment, a Terex Track Crusher with a magnetic over belt, rebar deflector, and a rip stop belt, and a 2.5CY excavator. The Kobelco with the CP100 crusher will break concrete into manageable pieces for the 5CY excavator to load into the Crusher. The CP100 crusher will have a magnet attachment to remove any lose reinforcement. The crusher production is expected to drive the operations duration and the overall operation is expected to be 70% efficient to account for equipment maintenance, staff breaks, equipment repositioning, etc.. Reinforcement haul off has been accounted for in the other concrete demolition items. The soil cover material is expected to come from stripping the topsoil at the disposal area. The soil cover operation will be completed using a dozer and a grader.

PAY ITEM COST DETAIL WORKSHEET

2.085 Access/Haul Road Improvements - Soil Excavation

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.085	Project	:	KRRP - Copco 1				
Description	:	Access/Haul Road Improvements - Soil Excavation	Group	:	D16				
Quantity	:	1,600.00	cy						
Daily Production	:	1,250.00	cy per	10	hour shift	Project #	:	2	
Work Days	:	1.3	Days			Estimator	:	Michael Barba	
Unit Price	:	\$15.51	per cy			cy per		1437.5	Total Cost
Total Cost	:	\$24,822				Probable Low Cost Parameter			\$21,099
						Probable High Cost Parameter		1000	\$29,786
									Unit Price Per cy
									\$13.19
									\$18.62

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Dozer (310hp)(CATD8)	Active	2.00	1.3	10	26.00	E	\$195.72	incl. in rate	incl. in rate	\$5,088.72
Hydraulic Excavator (5.0cy)	Active	1.00	1.3	10	13.00	E	\$276.50	incl. in rate	incl. in rate	\$3,594.50
Loader, FE Rubber Tire (5.25cy)	Active	2.00	1.3	10	26.00	E	\$76.00	incl. in rate	incl. in rate	\$1,976.00
Truck, Off-Road, Articulated Rear, 20cy	Active	2.00	1.3	10	26.00	E	\$117.28	incl. in rate	incl. in rate	\$3,049.28
Equipment Operator (medium)	Active	4.00	1.3	10	52.00	L	\$72.34	incl. in rate	incl. in rate	\$3,761.47
Equipment Operator (light)	Active	1.00	1.3	10	13.00	L	\$69.19	incl. in rate	incl. in rate	\$899.47
Truck Driver (heavy)	Active	2.00	1.3	10	26.00	L	\$75.72	incl. in rate	incl. in rate	\$1,968.82
Laborer	Active	4.00	1.3	10	52.00	L	\$51.07	incl. in rate	incl. in rate	\$2,655.80
Labor Foreman	Active	1.00	1.3	10	13.00	L	\$58.87	incl. in rate	incl. in rate	\$765.34
					Labor Hours	156			TOTAL LABOR	\$10,050.90
					Equipment Hours	91			TOTAL EQUIPMENT	\$13,708.50

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
						TOTAL MATERIAL
						\$0.00

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					TOTAL SUBCONTRACTS
					\$0.00

SUMMARY OF COSTS						
Labor Cost	\$10,050.90	Labor Burden @	0.0%	\$0.00		\$10,050.90
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00		\$0.00
Equipment Cost	\$13,708.50	Equipment Tax @	7.75%	\$1,062.41		\$14,770.91
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$23,759			\$1,062	DIRECT COST SUBTOTALS	\$24,822
Additional Pay Item Notes :						

This estimate is to improve existing and new haul roads to provide access to Copco1. This is mainly for grading/ creating dirt haul roads.

PAY ITEM COST DETAIL WORKSHEET

2.091 Mallard Cove - 20'x5' Gangway w/ aluminum grate and railings

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.091			Project	:	KRRP - Copco 1		
Description	:	Mallard Cove - 20'x5' Gangway w/ aluminum grate and railings			Group	:	D16		
Quantity	:	1.00	EA						
Daily Production	:	2.50	EA per	10					
Work Days	:	0.4	Days		Project #	:	2		
Unit Price	:	\$1,986.96	per EA		Estimator	:	Eric Jones	EA per	Total Cost
Total Cost	:	\$1,987			Probable Low Cost Parameter		2.875	\$1,689	Unit Price Per EA
					Probable High Cost Parameter		2.125	\$2,285	\$2,285.00

PAY ITEM NUMBER	:	2.093	Project	:	KRRP - Copco 1
Description	:	Mallard Cove - Wood plank tables to be removed and hauled away	Group	:	D16
Quantity	:	8.00 EA			
Daily Production	:	40.00 EA per	10	hour shift	
Work Days	:	0.2 Days	Project #	:	2
Unit Price	:	\$83.39 per EA	Estimator	:	Eric Jones
Total Cost	:	\$667	EA per	:	44
			Probable Low Cost Parameter	:	\$600
			Probable High Cost Parameter	:	\$75.05
				:	\$91.73

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Loader, FE Rubber Tire (5.25cy)	Active	1.00	0.2	10	2.00	E	\$76.00	incl. in rate	incl. in rate	\$152.00
Truck, Pickup (4x4, 3/4tn)	Active	1.00	0.2	10	2.00	E	\$16.99	incl. in rate	incl. in rate	\$33.98
Equipment Operator (medium)	Active	1.00	0.2	10	2.00	L	\$72.34	incl. in rate	incl. in rate	\$144.67
Labor Foreman	Active	1.00	0.2	10	2.00	L	\$58.87	incl. in rate	incl. in rate	\$117.74
Laborer	Active	2.00	0.2	10	4.00	L	\$51.07	incl. in rate	incl. in rate	\$204.29
Labor Hours					8	TOTAL LABOR				\$466.71
Equipment Hours					4	TOTAL EQUIPMENT				\$185.98

[illegible]

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
TOTAL SUBCONTRACTS					\$0.00

Labor Cost	\$466.71	Labor Burden @	0.0%			\$466.71
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00		\$0.00
Equipment Cost	\$185.98	Equipment Tax @	7.75%	\$14.41		\$200.39
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$653			\$14	DIRECT COST SUBTOTALS	\$667

Additional Pay Item Notes :

4 man crew will remove tables and load them on to either truck hauling dock or gangway. This activity will occur with pay item 92.

2.096 Copco Cove - Dock abutment railing made of 2.5" dia. steel pipe

PAY ITEM COST DETAIL WORKSHEET

2.097 Copco Cove - Signs to be removed and hauled away

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	2.097			Project	:	KRRP - Copco 1		
Description	:	Copco Cove - Signs to be removed and hauled away			Group	:	D16		
Quantity	:	6.00 EA							
Daily Production	:	15.00 EA per		10	hour shift	Project #	:	2	
Work Days	:	0.4 Days			Estimator	:	Eric Jones	EA per	Total Cost
Unit Price	:	\$290.01 per EA			Probable Low Cost Parameter	:	16.5	\$1,566	Unit Price Per EA
Total Cost	:	\$1,740			Probable High Cost Parameter	:	13.5	\$1,914	\$319.01

PAY ITEM NUMBER	:	2.098	Project	:	KRRP - Copco 1
Description	:	Copco Cove - Wood plank tables to be removed and hauled away	Group	:	D16
Quantity	:	2.00 EA			
Daily Production	:	30.00 EA per	10	hour shift	
Work Days	:	0.1 Days	Estimator	:	Eric Jones
Unit Price	:	\$166.78 per EA	EA per		Total Cost
Total Cost	:	\$334	Probable Low Cost Parameter	33	\$300
			Probable High Cost Parameter	27	\$367
					Unit Price Per EA
					\$150.10
					\$183.45

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Loader, FE Rubber Tire (5.25cy)	Active	1.00	0.1	10	1.00	E	\$76.00	incl. in rate	incl. in rate	\$76.00
Truck, Pickup (4x4, 3/4tn)	Active	1.00	0.1	10	1.00	E	\$16.99	incl. in rate	incl. in rate	\$16.99
Equipment Operator (medium)	Active	1.00	0.1	10	1.00	L	\$72.34	incl. in rate	incl. in rate	\$72.34
Labor Foreman	Active	1.00	0.1	10	1.00	L	\$58.87	incl. in rate	incl. in rate	\$58.87
Laborer	Active	2.00	0.1	10	2.00	L	\$51.07	incl. in rate	incl. in rate	\$102.15
Labor Hours					4	TOTAL LABOR				\$233.35
Equipment Hours					2	TOTAL EQUIPMENT				\$92.99

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
TOTAL MATERIAL						\$0.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
		EA			
		EA			
TOTAL SUBCONTRACTS					\$0.00

Labor Cost	\$233.35	Labor Burden @	0.0%			\$233.35
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00		\$0.00
Equipment Cost	\$92.99	Equipment Tax @	7.75%	\$7.21		\$100.20
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$326			\$7	DIRECT COST SUBTOTALS	\$334

Additional Pay Item Notes :

Base don four man crew taking 2 hours to remove and load tables. Tables to be loaded on same flatbed truck from pay item 97.

PAY ITEM INFORMATION

PAY ITEM NUMBER	:	2.099	Project	:	KRRP - Copco 1
Description	:	Copco Cove - Regrade	Group	:	D16
Quantity	:	2.30 AC			
Daily Production	:	1.25 AC per	10	hour shift	
Work Days	:	1.8 Days	Project #	:	2
Unit Price	:	\$5,368.26 per AC	Estimator	:	Eric Jones
Total Cost	:	\$12,347	AC per	:	
			Total Cost	:	\$11,112
			Unit Price Per AC	:	\$4,831.44
			Probable Low Cost Parameter	:	1.375
			Probable High Cost Parameter	:	1.0625
				:	\$14,199
				:	\$6,173.50

CREW COSTS

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Dozer (125hp)(CATD6)	Active	1.00	1.8	10	18.00	E	\$82.58	incl. in rate	incl. in rate	\$1,486.44
Truck, On-Highway Dump (6x4, 12cy)	Active	1.00	1.8	10	18.00	E	\$57.41	incl. in rate	incl. in rate	\$1,033.38
Grader, 180hp, 13' blade	Active	1.00	1.8	10	18.00	E	\$84.69	incl. in rate	incl. in rate	\$1,524.42
Roller, Single Drum (steel wheel, 12.0 - 14.9 MTn)	Active	1.00	1.8	10	18.00	E	\$76.79	incl. in rate	incl. in rate	\$1,382.22
Truck, Pickup (4x4, 3/4tn)	Active	1.00	1.8	10	18.00	E	\$16.99	incl. in rate	incl. in rate	\$305.82
Truck Driver (heavy)	Active	1.00	1.8	10	18.00	L	\$66.92	incl. in rate	incl. in rate	\$1,204.63
Labor Foreman (out)	Active	1.00	1.8	10	18.00	L	\$58.87	incl. in rate	incl. in rate	\$1,059.70
Equipment Operator (medium)	Active	3.00	1.8	10	54.00	L	\$72.34	incl. in rate	incl. in rate	\$3,906.14

Labor Hours	90	TOTAL LABOR	\$6,170.47
Equipment Hours	90	TOTAL EQUIPMENT	\$5,732.28

MATERIAL COSTS

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
TOTAL MATERIAL						\$0.00

SUBCONTRACT COSTS

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
TOTAL SUBCONTRACTS					\$0.00

SUMMARY OF COSTS

Labor Cost	\$6,170.47	Labor Burden @	0.0%			\$6,170.47
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00		\$0.00
Equipment Cost	\$5,732.28	Equipment Tax @	7.75%	\$444.25		\$6,176.53
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$11,903			\$444	DIRECT COST SUBTOTALS	\$12,347

Additional Pay Item Notes :

Production is based off of 12 man crew finishing .5 acres a shift, dozers will be regrading area, grader will be used to fine grade, tractors will be used to rip material for seeding, seed sprayers will use Idaho Fescue seed, water truck will continuously water area for 2 weeks.

PAY ITEM COST DETAIL WORKSHEET

5.006 Remove Frame dead end structures 60-80 ft high @Switchyard

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	5.006			Project	:	KRRP - Copco 1		
Description	:	Remove Frame dead end structures 60-80 ft high @Switchyard			Group	:	D05		
Quantity	:	4.00	EA						
Daily Production	:	1.00	EA per	10	hour shift	Project #	:	2	
Work Days	:	4.0	Days			Estimator	:	Mihaela Tomulescu	
Unit Price	:	\$11,850.45	per EA			Probable Low Cost Parameter	:	1.15	
Total Cost	:	\$47,402				Probable High Cost Parameter	:	0.7	
						EA per	:	Total Cost	Unit Price Per EA
							:	\$40,292	\$10,072.88
							:	\$61,622	\$15,405.58

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	4.0	10	40.00	L	\$58.87	incl. in rate	incl. in rate	\$2,354.88
Laborer	Active	1.00	4.0	10	40.00	L	\$51.07	incl. in rate	incl. in rate	\$2,042.92
Equipment Operator (crane)	Active	2.00	4.0	10	80.00	L	\$81.60	incl. in rate	incl. in rate	\$6,527.84
Equipment Operator (medium)	Active	1.00	4.0	10	40.00	L	\$72.34	incl. in rate	incl. in rate	\$2,893.44
Electrician	Active	3.00	4.0	10	120.00	L	\$55.80	incl. in rate	incl. in rate	\$6,696.36
Steelworker	Active	1.00	4.0	10	40.00	L	\$78.10	incl. in rate	incl. in rate	\$3,124.00
Hydraulic Crane (80tn)	Active	2.00	4.0	10	80.00	E	\$197.66	incl. in rate	incl. in rate	\$15,812.80
Loader, FE Rubber Tire (5.25cy)	Active	1.00	4.0	10	40.00	E	\$76.00	incl. in rate	incl. in rate	\$3,040.00
Truck, Utility, with Man-Basket	Active	1.00	4.0	10	40.00	E	\$31.90	incl. in rate	incl. in rate	\$1,276.00
					Labor Hours	360			TOTAL LABOR	\$23,639.44
					Equipment Hours	160			TOTAL EQUIPMENT	\$20,128.80

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$1,181.97	\$1,181.97
						TOTAL MATERIAL
						\$1,181.97

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling cost to landfill	4.00	Loads	18 CY per load	\$200.00	\$800.00
					TOTAL SUBCONTRACTS
					\$800.00

SUMMARY OF COSTS						
Labor Cost	\$23,639.44	Labor Burden @	0.0%	\$0.00		\$23,639.44
Material Cost	\$1,181.97	Material Tax @	7.75%	\$91.60		\$1,273.57
Equipment Cost	\$20,128.80	Equipment Tax @	7.75%	\$1,559.98		\$21,688.78
Subcontractors	\$800.00					\$800.00
DIRECT COST SUBTOTALS	\$45,750			\$1,652	DIRECT COST SUBTOTALS	\$47,402
Additional Pay Item Notes :						
Figuring it will take one day for each structure to be removed. Assuming that the structure will need to be cut into pieces for hauling. Hauling has being accounted for by an allowance line item.						

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	5.007	Project	:	KRRP - Copco 1				
Description	:	Remove Power Circuit Breakers 69KV @Switchyard	Group	:	D05				
Quantity	:	2.00 EA							
Daily Production	:	1.25 EA per	10	hour shift	Project #	:	2		
Work Days	:	1.6	Days		Estimator	:	Mihaela Tomulescu	EA per	Total Cost
Unit Price	:	\$6,116.39	per EA		Probable Low Cost Parameter			1.375	\$11,010
Total Cost	:	\$12,233			Probable High Cost Parameter			0.9375	\$15,291
									Unit Price Per EA
									\$5,504.75
									\$7,645.49

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	2.00	1.6	10	32.00	L	\$58.87	incl. in rate	incl. in rate	\$1,883.90
Electrician	Active	2.00	1.6	10	32.00	L	\$55.80	incl. in rate	incl. in rate	\$1,785.70
Hydraulic Crane (35tn)	Active	1.00	1.6	10	16.00	E	\$117.77	incl. in rate	incl. in rate	\$1,884.32
Equipment Operator (crane)	Active	1.00	1.6	10	16.00	L	\$81.60	incl. in rate	incl. in rate	\$1,305.57
Laborer	Active	2.00	1.6	10	32.00	L	\$51.07	incl. in rate	incl. in rate	\$1,634.34
Truck, Flatbed (4x4, 10,000 gvw)	Active	1.00	1.6	10	16.00	E	\$27.09	incl. in rate	incl. in rate	\$433.44
Truck, Utility, with Man-Basket	Active	1.00	1.6	10	16.00	E	\$31.90	incl. in rate	incl. in rate	\$510.40
Truck Driver (light)	Active	2.00	1.6	10	32.00	L	\$65.82	incl. in rate	incl. in rate	\$2,106.37
Labor Hours					144	TOTAL LABOR				\$8,715.87
Equipment Hours					48	TOTAL EQUIPMENT				\$2,828.16

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$435.79	\$435.79
						TOTAL MATERIAL
						\$435.79

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					TOTAL SUBCONTRACTS
					\$0.00

SUMMARY OF COSTS						
Labor Cost	\$8,715.87	Labor Burden @	0.0%	\$0.00		\$8,715.87
Material Cost	\$435.79	Material Tax @	7.75%	\$33.77		\$469.57
Equipment Cost	\$2,828.16	Equipment Tax @	7.75%	\$219.18		\$3,047.34
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$11,980			\$253	DIRECT COST SUBTOTALS	\$12,233
Additional Pay Item Notes :						

Production is based off of RSMs using Crew formed of 1 Forman, 1 Electrician,1Crane. Considered 1 laborer to help loading circuit breakers in the truck for saving it in the designated place. 1 utility truck access poles, string conductor, modify structure arms, provide guard structures, etc. Crews may be working simultaneously along the project alignment and substations, power plant and switchyard.

PAY ITEM COST DETAIL WORKSHEET

5.008 Remove Disconnect Switches @Switchyard

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	5.008	Project	:	KRRP - Copco 1				
Description	:	Remove Disconnect Switches @Switchyard	Group	:	D05				
Quantity	:	4.00 EA							
Daily Production	:	1.25 EA per	10	hour shift	Project #	:	2		
Work Days	:	3.2	Days		Estimator	:	Mihaela Tomulescu	EA per	Total Cost
Unit Price	:	\$8,710.21	per EA		Probable Low Cost Parameter			1.375	\$31,357
Total Cost	:	\$34,841			Probable High Cost Parameter			0.9375	\$43,551
									Unit Price Per EA
									\$7,839.19
									\$10,887.76

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	3.2	10	32.00	L	\$58.87	incl. in rate	incl. in rate	\$1,883.90
Electrician	Active	2.00	3.2	10	64.00	L	\$55.80	incl. in rate	incl. in rate	\$3,571.39
Hydraulic Excavator (6.0cy)	Active	1.00	3.2	10	32.00	E	\$324.12	incl. in rate	incl. in rate	\$10,371.84
Equipment Operator (medium)	Active	1.00	3.2	10	32.00	L	\$72.34	incl. in rate	incl. in rate	\$2,314.75
Laborer	Active	2.00	3.2	10	64.00	L	\$51.07	incl. in rate	incl. in rate	\$3,268.67
Truck, Flatbed (4x4, 10,000 gvw)	Active	1.00	3.2	10	32.00	E	\$27.09	incl. in rate	incl. in rate	\$866.88
Truck, Utility, with Man-Basket	Active	2.00	3.2	10	64.00	E	\$31.90	incl. in rate	incl. in rate	\$2,041.60
Truck Driver (light)	Active	2.00	3.2	10	64.00	L	\$65.82	incl. in rate	incl. in rate	\$4,212.74
Truck Driver (heavy)	Active	1.00	3.2	10	32.00	L	\$75.72	incl. in rate	incl. in rate	\$2,423.17
					Labor Hours	288	TOTAL LABOR			\$17,674.62
					Equipment Hours	128	TOTAL EQUIPMENT			\$13,280.32

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 15% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$2,651.19	\$2,651.19
						TOTAL MATERIAL
						\$2,651.19

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					TOTAL SUBCONTRACTS
					\$0.00

SUMMARY OF COSTS						
Labor Cost	\$17,674.62	Labor Burden @	0.0%	\$0.00		\$17,674.62
Material Cost	\$2,651.19	Material Tax @	7.75%	\$205.47		\$2,856.66
Equipment Cost	\$13,280.32	Equipment Tax @	7.75%	\$1,029.22		\$14,309.54
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$33,606			\$1,235	DIRECT COST SUBTOTALS	\$34,841
Additional Pay Item Notes :						

PAY ITEM COST DETAIL WORKSHEET

5.009 Remove all associated auxiliary equipment @Switchyard (Allowance)

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	5.009	Project	:	KRRP - Copco 1				
Description	:	Remove all associated auxiliary equipment @Switchyard (Allowance)	Group	:	D05				
Quantity	:	1.00 LS							
Daily Production	:	1.25 LS per	10	hour shift	Project #	:	2		
Work Days	:	3.0	Days		Estimator	:	Mihaela Tomulescu	LS per	Total Cost
Unit Price	:	\$53,473.36	per LS		Probable Low Cost Parameter			1.375	\$48,126
Total Cost	:	\$53,473			Probable High Cost Parameter			0.9375	\$66,842
									Unit Price Per LS
									\$48,126.02
									\$66,841.70

CREW COSTS											
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost	
Labor Foreman	Active	1.00	3.0	10	30.00	L	\$58.87	incl. in rate	incl. in rate	\$1,766.16	
Electrician	Active	4.00	3.0	10	120.00	L	\$55.80	incl. in rate	incl. in rate	\$6,696.36	
Hydraulic Excavator (2.5cy)	Active	1.00	3.0	10	30.00	E	\$205.40	incl. in rate	incl. in rate	\$6,162.00	
Equipment Operator (medium)	Active	1.00	3.0	10	30.00	L	\$72.34	incl. in rate	incl. in rate	\$2,170.08	
Truck, Utility, with Man-Basket	Active	1.00	3.0	10	30.00	E	\$31.90	incl. in rate	incl. in rate	\$957.00	
Hydraulic Crane (17tn)	Active	1.00	3.0	10	30.00	E	\$82.43	incl. in rate	incl. in rate	\$2,472.90	
Laborer	Active	4.00	3.0	10	120.00	L	\$51.07	incl. in rate	incl. in rate	\$6,128.76	
Truck Driver (heavy)	Active	3.00	3.0	10	90.00	L	\$75.72	incl. in rate	incl. in rate	\$6,815.16	
Truck, On-Highway Dump (6x4, 12cy)	Active	2.00	3.0	10	60.00	E	\$57.41	incl. in rate	incl. in rate	\$3,444.60	
Equipment Operator (crane)	Active	1.00	3.0	10	30.00	L	\$81.60	incl. in rate	incl. in rate	\$2,447.94	
					Labor Hours	420	TOTAL LABOR			\$26,024.46	
					Equipment Hours	150	TOTAL EQUIPMENT			\$13,036.50	

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$1,301.22	\$1,301.22
						TOTAL MATERIAL
						\$1,301.22

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Rent trailer with cable pulling rig, for high voltage line work - Rent per day	1.00	days		4.00	\$3,000.00
					TOTAL SUBCONTRACTS
					\$12,000.00

SUMMARY OF COSTS						
Labor Cost	\$26,024.46	Labor Burden @	0.0%	\$0.00		\$26,024.46
Material Cost	\$1,301.22	Material Tax @	7.75%	\$100.84		\$1,402.07
Equipment Cost	\$13,036.50	Equipment Tax @	7.75%	\$1,010.33		\$14,046.83
Subcontractors	\$12,000.00					\$12,000.00
DIRECT COST SUBTOTALS	\$52,362			\$1,111	DIRECT COST SUBTOTALS	\$53,473
Additional Pay Item Notes :						

Production is based off of RSMs using Crew formed of 1 Forman, 4 Electrician, 2 laborer, 1 Excavator & 1 crane for lift, position and load in the truck,, 1 Hydraulic rock-splitting/rock-drilling equipment to break equipment foundations, 1 utility truck access poles, string conductor, modify structure arms, provide guard structures, etc. Crews may be working simultaneously along the project alignment and substations, hydro plant and switchyard.

PAY ITEM COST DETAIL WORKSHEET

5.010 Remove Distribution lines 69 Kv between Copco 1 Switchyard and HE Plant (6 Poles)

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	5.010	Project	:	KRRP - Copco 1				
Description	:	(6 Poles)	Group	:	D05				
Quantity	:	6.00 EA							
Daily Production	:	3.75 EA per	10	hour shift	Project #	:	2		
Work Days	:	1.6 Days			Estimator	:	Mihaela Tomulescu	EA per	Total Cost
Unit Price	:	\$3,306.79 per EA			Probable Low Cost Parameter			4.125	\$17,857
Total Cost	:	\$19,841			Probable High Cost Parameter			2.8125	\$24,801
									Unit Price Per EA
									\$2,976.11
									\$4,133.48

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.6	10	16.00	L	\$58.87	incl. in rate	incl. in rate	\$941.95
Laborer	Active	1.00	1.6	10	16.00	L	\$51.07	incl. in rate	incl. in rate	\$817.17
Equipment Operator (crane)	Active	2.00	1.6	10	32.00	L	\$81.60	incl. in rate	incl. in rate	\$2,611.14
Equipment Operator (medium)	Active	1.00	1.6	10	16.00	L	\$72.34	incl. in rate	incl. in rate	\$1,157.38
Electrician	Active	3.00	1.6	10	48.00	L	\$55.80	incl. in rate	incl. in rate	\$2,678.54
Steelworker	Active	1.00	1.6	10	16.00	L	\$78.10	incl. in rate	incl. in rate	\$1,249.60
Hydraulic Crane (80tn)	Active	2.00	1.6	10	32.00	E	\$197.66	incl. in rate	incl. in rate	\$6,325.12
Loader, FE Rubber Tire (5.25cy)	Active	1.00	1.6	10	16.00	E	\$76.00	incl. in rate	incl. in rate	\$1,216.00
Truck, Utility, with Man-Basket	Active	1.00	1.6	10	16.00	E	\$31.90	incl. in rate	incl. in rate	\$510.40
Labor Hours					144	TOTAL LABOR				\$9,455.78
Equipment Hours					64	TOTAL EQUIPMENT				\$8,051.52

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$472.79	\$472.79
						TOTAL MATERIAL
						\$472.79

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling cost to landfill	6.00	Loads	18 CY per load	\$200.00	\$1,200.00
					TOTAL SUBCONTRACTS
					\$1,200.00

SUMMARY OF COSTS						
Labor Cost	\$9,455.78	Labor Burden @	0.0%	\$0.00		\$9,455.78
Material Cost	\$472.79	Material Tax @	7.75%	\$36.64		\$509.43
Equipment Cost	\$8,051.52	Equipment Tax @	7.75%	\$623.99		\$8,675.51
Subcontractors	\$1,200.00					\$1,200.00
DIRECT COST SUBTOTALS	\$19,180			\$661	DIRECT COST SUBTOTALS	\$19,841
Additional Pay Item Notes :						

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	5.011	Project	:	KRRP - Copco 1				
Description	:	Diversion Dam	Group	:	D05				
Quantity	:	8.00 EA							
Daily Production	:	2.50 EA per	10	hour shift	Project #	:	2		
Work Days	:	3.2	Days		Estimator	:	Mihaela Tomulescu	EA per	Total Cost
Unit Price	:	\$1,794.89	per EA		Probable Low Cost Parameter		2.75	\$12,923	Unit Price Per EA
Total Cost	:	\$14,359			Probable High Cost Parameter		1.875	\$17,949	\$2,243.61

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	3.2	10	32.00	L	\$58.87	incl. in rate	incl. in rate	\$1,883.90
Electrician	Active	1.00	3.2	10	32.00	L	\$55.80	incl. in rate	incl. in rate	\$1,785.70
Hydraulic Crane (17tn)	Active	1.00	3.2	10	32.00	E	\$82.43	incl. in rate	incl. in rate	\$2,637.76
Equipment Operator (medium)	Active	1.00	3.2	10	32.00	L	\$72.34	incl. in rate	incl. in rate	\$2,314.75
Truck Driver (heavy)	Active	1.00	3.2	10	32.00	L	\$75.72	incl. in rate	incl. in rate	\$2,423.17
Truck, Flatbed (4x4, 10,000 gvw)	Active	1.00	3.2	10	32.00	E	\$27.09	incl. in rate	incl. in rate	\$866.88
Laborer	Active	1.00	3.2	10	32.00	L	\$51.07	incl. in rate	incl. in rate	\$1,634.34
Labor Hours					160	TOTAL LABOR				\$10,041.86
Equipment Hours					64	TOTAL EQUIPMENT				\$3,504.64

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$502.09	\$502.09
						TOTAL MATERIAL
						\$502.09

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					TOTAL SUBCONTRACTS
					\$0.00

SUMMARY OF COSTS						
Labor Cost	\$10,041.86	Labor Burden @	0.0%	\$0.00		\$10,041.86
Material Cost	\$502.09	Material Tax @	7.75%	\$38.91		\$541.00
Equipment Cost	\$3,504.64	Equipment Tax @	7.75%	\$271.61		\$3,776.25
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$14,049			\$311	DIRECT COST SUBTOTALS	\$14,359
Additional Pay Item Notes :						
Production is based off of RSMs using Crew R3 (1 Forman and 1 Electrician,1 Crane). Considered one laborer for demolish the pole and helping placing poles in a designated place and loading it in the truck for disposal. Crews may be working simultaneously along the project alignment and substations, power plant and switchyard.						

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	5.013			Project	:	KRRP - Copco 1		
Description	:	Remove "Village Houses Distribution Poles" near dam (assumed 10)			Group	:	D05		
Quantity	:	10.00 EA							
Daily Production	:	3.75 EA per		10	hour shift	Project #	:	2	
Work Days	:	2.7		Days	Estimator	:	Mihaela Tomulescu	EA per	Total Cost
Unit Price	:	\$2,433.31 per EA			Probable Low Cost Parameter		4.3125	\$20,683	Unit Price Per EA
Total Cost	:	\$24,333			Probable High Cost Parameter		2.625	\$31,633	\$3,163.31

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	2.7	10	27.00	L	\$58.87	incl. in rate	incl. in rate	\$1,589.54
Electrician	Active	1.00	2.7	10	27.00	L	\$55.80	incl. in rate	incl. in rate	\$1,506.68
Hydraulic Crane (17tn)	Active	1.00	2.7	10	27.00	E	\$82.43	incl. in rate	incl. in rate	\$2,225.61
Equipment Operator (medium)	Active	1.00	2.7	10	27.00	L	\$72.34	incl. in rate	incl. in rate	\$1,953.07
Truck Driver (heavy)	Active	1.00	2.7	10	27.00	L	\$75.72	incl. in rate	incl. in rate	\$2,044.55
Truck, Flatbed (4x4, 10,000 gvw)	Active	1.00	2.7	10	27.00	E	\$27.09	incl. in rate	incl. in rate	\$731.43
Laborer	Active	1.00	2.7	10	27.00	L	\$51.07	incl. in rate	incl. in rate	\$1,378.97
Labor Hours					135	TOTAL LABOR				\$8,472.82
Equipment Hours					54	TOTAL EQUIPMENT				\$2,957.04

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$423.64	\$423.64
Topsoil placement and grading, loam or topsoil, F.E. loader, 1-1/2 C.Y., remove and stockpile on site, spread from pile to rough finish grade	10.00	CY	1.000	10.00	\$4.74	\$47.40
						TOTAL MATERIAL
						\$471.04

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					TOTAL SUBCONTRACTS
					\$0.00

SUMMARY OF COSTS						
Labor Cost	\$8,472.82	Labor Burden @	0.0%	\$0.00		\$8,472.82
Material Cost	\$471.04	Material Tax @	7.75%	\$36.51		\$507.55
Equipment Cost	\$2,957.04	Equipment Tax @	7.75%	\$229.17		\$3,186.21
Subcontractors	\$0.00	Subcontractor MU @				\$12,166.57
DIRECT COST SUBTOTALS	\$11,901		\$266		DIRECT COST SUBTOTALS	\$24,333

Additional Pay Item Notes :

Production is based off of RSMs using Crew R3 (1 Forman and 1 Electrician,1 Crane). Considered one laborer for demolish the pole and helping placing poles in a designated place and loading them in the truck for disposal. This process includes filling in pole locations with gravel, clean fill and topsoil. Crews may be working simultaneously along the project alignment and substations, power plant and switchyard.

5.014 Remove 69 KV Distribution line 1.6 miles (30 poles)

PAY ITEM NUMBER	:	5.014	Project	:	KRRP - Copco 1
Description	:	Remove 69 KV Distribution line 1.6 miles (30 poles)	Group	:	D05
Quantity	:	30.00 EA			
Daily Production	:	3.00 EA per	Project #	:	2
Work Days	:	10.0 Days	Estimator	:	Mihaela Tomulescu
Unit Price	:	\$4,194.72 per EA	Probable Low Cost Parameter	:	EA per 3.45
Total Cost	:	\$125,842	Probable High Cost Parameter	:	Total Cost \$106,965
					Unit Price Per EA \$3,565.51
					\$5,453.14

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	10.0	10	100.00	L	\$58.87	incl. in rate	incl. in rate	\$5,887.20
Laborer	Active	1.00	10.0	10	100.00	L	\$51.07	incl. in rate	incl. in rate	\$5,107.30
Equipment Operator (crane)	Active	2.00	10.0	10	200.00	L	\$81.60	incl. in rate	incl. in rate	\$16,319.60
Equipment Operator (medium)	Active	1.00	10.0	10	100.00	L	\$72.34	incl. in rate	incl. in rate	\$7,233.60
Electrician	Active	3.00	10.0	10	300.00	L	\$55.80	incl. in rate	incl. in rate	\$16,740.90
Steelworker	Active	1.00	10.0	10	100.00	L	\$78.10	incl. in rate	incl. in rate	\$7,810.00
Hydraulic Crane (80tn)	Active	2.00	10.0	10	200.00	E	\$197.66	incl. in rate	incl. in rate	\$39,532.00
Loader, FE Rubber Tire (5.25cy)	Active	1.00	10.0	10	100.00	E	\$76.00	incl. in rate	incl. in rate	\$7,600.00
Truck, Utility, with Man-Basket	Active	1.00	10.0	10	100.00	E	\$31.90	incl. in rate	incl. in rate	\$3,190.00
Labor Hours					900	TOTAL LABOR				\$59,098.60
Equipment Hours					400	TOTAL EQUIPMENT				\$50,322.00

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$5,909.86	\$5,909.86
Topsoil placement and grading, loam or topsoil, F.E. loader, 1-1/2 C.Y., remove and stockpile on site, spread from pile to rough finish grade	30.00	CY	1.000	30.00	\$4.74	\$142.20
TOTAL MATERIAL						\$6,052.06

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling cost to landfill	30.00	Loads	18 CY per load	\$200.00	\$6,000.00
TOTAL SUBCONTRACTS					\$6,000.00

Labor Cost	\$59,098.60	Labor Burden @	0.0%	\$0.00
Material Cost	\$6,052.06	Material Tax @	7.75%	\$469.03
Equipment Cost	\$50,322.00	Equipment Tax @	7.75%	\$3,899.96
Subcontractors	\$6,000.00			
DIRECT COST SUBTOTALS	\$121,473			\$4,369
Additional Pay Item Notes :				

This process includes filling in pole locations with gravel, clean fill and topsoil. Crews may be working simultaneously along the project alignment and substations, power plant and switchyard. Figuring crew will get three poles a day due to repositioning of equipment at each location. Loader will be used to do minor grading in the removal location for crane setup.

COPCO 2 DAM REMOVAL

3.001 Right Side Cofferdam- Furnish & Unload Material

PAY ITEM NUMBER :		3.001	Project :	KRRP - Copco 2
Description :		Right Side Coffor Dam- Furnish & Unload Material	Group :	D02
Quantity :		20.00 LD		
Daily Production :		20.00 LD per 10 hour shift	Project # :	3
Work Days :		1.0 Days	Estimator :	Eric Jones LD per
Unit Price :	\$2,009.34	per LD	Probable Low Cost Parameter	23 \$34,159 Unit Price Per LD
Total Cost :	\$40,187		Probable High Cost Parameter	16 \$48,224 \$2,411.20

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.0	10	10.00	L	\$58.87	incl. in rate	incl. in rate	\$588.72
Laborer	Active	1.00	1.0	10	10.00	L	\$51.07	incl. in rate	incl. in rate	\$510.73
Equipment Operator (medium)	Active	1.00	1.0	10	10.00	L	\$72.34	incl. in rate	incl. in rate	\$723.36
Equipment Operator (crane)	Active	1.00	1.0	10	10.00	L	\$81.60	incl. in rate	incl. in rate	\$815.98
Crawler Crane (130In)	Active	1.00	1.0	10	10.00	E	\$262.91	incl. in rate	incl. in rate	\$2,629.10
Loader, FE Rubber Tire (5.25cy)	Active	1.00	1.0	10	10.00	E	\$76.00	incl. in rate	incl. in rate	\$760.00
Pile Driver	Active	2.00	1.0	10	20.00	L	\$78.56			\$1,571.20
Labor Hours					60	TOTAL LABOR				\$4,209.99
Equipment Hours					20	TOTAL EQUIPMENT				\$3,389.10

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Sheet Pile Allowance	1.00	AL	1.060	1.00	\$15,000.00	\$15,000.00
Rigging Allowance (10% of Material Cost)	1.00	AL	1.000	1.00	\$15,000.00	\$15,000.00
TOTAL MATERIAL						\$30,000.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					\$0.00
					\$0.00
					\$0.00
			TOTAL SUBCONTRACTS		\$0.00

Labor Cost	\$4,209.99	Labor Burden @	0.0%	\$0.00			
Material Cost	\$30,000.00	Material Tax @	7.75%	\$2,325.00			
Equipment Cost	\$3,389.10	Equipment Tax @	7.75%	\$262.66			
Subcontractors	\$0.00						
DIRECT COST SUBTOTALS	\$37,599			\$2,588		DIRECT COST SUBTOTALS	\$40,187

This item is to account for the repositioning of the pile from the leftside coffer dam after the piles are extracted. Due to the tight area it is expected that there will be some rehandling of material before coffer cell pile installation begins. Material for coffer dam is purchased under payitem 3.005.

PAY ITEM INFORMATION

PAY ITEM NUMBER	:	3.001.1	Project	:	KRRP - Copco 2
Description	:	Right Side Coffe Dam- Drive Pile	Group	:	D02
Quantity	:	7,500.00 SF			
Daily Production	:	1,500.00 SF per	20 hour shift	Project #	: 3
Work Days	:	5.0 Days	Estimator	:	Eric Jones SF per
Unit Price	:	\$28.02 per SF	Probable Low Cost Parameter		1725 \$178,596
Total Cost	:	\$210,113	Probable High Cost Parameter		1200 \$252,136
					\$33.62

CREW COSTS

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	5.0	20	100.00	L	\$58.87	incl. in rate	incl. in rate	\$5,887.20
Laborer	Active	1.00	5.0	20	100.00	L	\$51.07	incl. in rate	incl. in rate	\$5,107.30
Equipment Operator (crane)	Active	1.00	5.0	20	100.00	L	\$81.60	incl. in rate	incl. in rate	\$8,159.80
Equipment Operator (oiler)	Active	1.00	5.0	20	100.00	L	\$73.43	incl. in rate	incl. in rate	\$7,342.50
Vibratory Hammer & Extractor	Active	1.00	5.0	20	100.00	E	\$94.14	incl. in rate	incl. in rate	\$9,414.00
Welder, Portable	Active	1.00	5.0	20	100.00	E	\$7.84	incl. in rate	incl. in rate	\$783.75
Crawler Crane (130tn)	Active	1.00	5.0	20	100.00	E	\$262.91	incl. in rate	incl. in rate	\$26,291.00
		0.00	5.0	20	0.00	0	\$0.00	incl. in rate	incl. in rate	\$0.00
		0.00	5.0	20	0.00	0	\$0.00	incl. in rate	incl. in rate	\$0.00
		0.00	5.0	20	0.00	0	\$0.00	incl. in rate	incl. in rate	\$0.00
		0.00	5.0	20	0.00	0	\$0.00	incl. in rate	incl. in rate	\$0.00
		0.00	5.0	20	0.00	0	\$0.00	incl. in rate	incl. in rate	\$0.00
Pile Driver	Active	3.00	5.0	20	300.00	L	\$78.56	incl. in rate	incl. in rate	\$23,568.00
D36 Hammer 36X100' Leads	Active	1.00	5.0	20	100.00	E	\$85.47	incl. in rate	incl. in rate	\$8,547.00
Labor Hours					700	TOTAL LABOR				\$50,064.80
Equipment Hours					400	TOTAL EQUIPMENT				\$45,035.75

MATERIAL COSTS

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
PDA Allowance	1.00	AL	1.000	1.00	\$15,000.00	\$15,000.00
TOTAL MATERIAL						\$15,000.00

SUBCONTRACT COSTS

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Predrilling for Pipe Pile (20' deep at 18 locations)	360	VLFT		\$126.00	\$45,360.00
Predrilling Equipment Mob and Demob	1	LS		\$50,000.00	\$50,000.00
					\$0.00
					\$0.00
			TOTAL SUBCONTRACTS		\$95,360.00

SUMMARY OF COSTS

Labor Cost	\$50,064.80	Labor Burden @	0.0%			\$50,064.80
Material Cost	\$15,000.00	Material Tax @	7.75%	\$1,162.50		\$16,162.50
Equipment Cost	\$45,035.75	Equipment Tax @	7.75%	\$3,490.27		\$48,526.02
Subcontractors	\$95,360.00					\$95,360.00
DIRECT COST SUBTOTALS	\$205,461			\$4,653	DIRECT COST SUBTOTALS	\$210,113

Additional Pay Item Notes :

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3.001.2 Right Side Cofferd Dam- Extract Pile

PAY ITEM NUMBER	:	3.001.2	Project	:	KRRP - Copco 2			
Description	:	Right Side Cofferdam- Extract Pile	Group	:	D02			
Quantity	:	7,500.00 SF						
Daily Production	:	3,000.00 SF per	20	hour shift	Project #	:	3	
Work Days	:	2.5 Days			Estimator	:	Eric Jones	SF per
Unit Price	:	\$8.63 per SF			Probable Low Cost Parameter		3450	\$54,987
Total Cost	:	\$64,691			Probable High Cost Parameter		2400	\$77,629
								Unit Price Per SF
								\$7.33
								\$10.35

[illegible]

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
						\$0.00
TOTAL MATERIAL						\$0.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
	-				\$0.00
Pile Load Allowance	20	LD		\$1,000.00	\$20,000.00
					\$0.00
					\$0.00
			TOTAL SUBCONTRACTS		\$20,000.00

Labor Cost	\$25,032.40	Labor Burden @	0.0%		\$25,032.40
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00	\$0.00
Equipment Cost	\$18,244.38	Equipment Tax @	7.75%	\$1,413.94	\$19,658.31
Subcontractors	\$20,000.00				\$20,000.00
DIRECT COST SUBTOTALS	\$63,277			\$1,414	DIRECT COST SUBTOTALS \$64,691
Additional Pay Item Notes :					
This estimate is to account for the extracting and removing pile and loading them on trucks for complete removal from the site.					

PAY ITEM COST DETAIL WORKSHEET

3.002 Access Trestle- Furnish & Unload Material

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.002	Project	:	KRRP - Copco 2				
Description	:	Access Trestle- Furnish & Unload Material	Group	:	D02				
Quantity	:	78.00 LD	Project #	:	3	LD per	Total Cost	Unit Price Per LD	
Daily Production	:	20.00 LD per 10 hour shift	Estimator	:	Eric Jones	23	\$415,412	\$5,325.79	
Work Days	:	3.9 Days	Probable Low Cost Parameter	:			\$586,464	\$7,518.77	
Unit Price	:	\$6,265.64 per LD	Probable High Cost Parameter	:					
Total Cost	:	\$488,720		:					

CREW COSTS									
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Labor / Equipment Cost
Labor Foreman	Active	1.00	3.9	10	39.00	L	\$58.87	incl. in rate	\$2,296.01
Laborer	Active	1.00	3.9	10	39.00	L	\$51.07	incl. in rate	\$1,991.85
Equipment Operator (medium)	Active	1.00	3.9	10	39.00	L	\$72.34	incl. in rate	\$2,821.10
Equipment Operator (crane)	Active	1.00	3.9	10	39.00	L	\$81.60	incl. in rate	\$3,182.32
Crawler Crane (130tn)	Active	1.00	3.9	10	39.00	E	\$262.91	incl. in rate	\$10,253.49
Loader, FE Rubber Tire (5.25cy)	Active	1.00	3.9	10	39.00	E	\$76.00	incl. in rate	\$2,964.00
Pile Driver	Active	2.00	3.9	10	78.00	L	\$78.56		\$6,127.68
Labor Hours					234	TOTAL LABOR			\$16,418.96
Equipment Hours					78	TOTAL EQUIPMENT			\$13,217.49

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
250' Long X 32' Wide Trestle						\$0.00
Trestle Bent Caps (W30X108X 33'long) 2 each 7 locations	49,896.00	Lbs	1.000	49,896.00	\$0.50	\$24,948.00
Trestle Logitudinal Beams (W36X135X250'Long) 4 each 2 locations	270,000.00	Lbs	1.000	270,000.00	\$0.50	\$135,000.00
24" Pipe Pile (.5" thick wall X 40' long 2each at each bent)	560.00	LF	1.000	560.00	\$20.00	\$11,200.00
30" Pipe Pile (.5" thick wall X 40' long 2each at each bent)	560.00	LF	1.000	560.00	\$24.00	\$13,440.00
Handrail and Kicker	500.00	LF	1.000	500.00	\$5.00	\$2,500.00
Bent Cap to Pile Sleeve Allowance (10% of Material Cost)	1.00	AL	1.000	1.00	\$18,709.00	\$18,709.00
Bolt and Stiffener Allowance (5% of Material Cost)	1.00	AL	1.000	1.00	\$9,355.00	\$9,355.00
Crane Mats 5'X30'	54.00	EA	1.000	54.00	\$1,500.00	\$81,000.00
Rigging Allowance (5% of Material Cost)	1.00	AL	1.000	1.00	\$14,807.60	\$14,807.60
TOTAL MATERIAL						\$310,959.60

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Freight Cost 10 ton/load (due to access restrictions) Allowance	29	LD		\$1,000.00	\$29,000.00
Freight Cost Crane Mats 5 ea/ Ld	54	LD		\$1,000.00	\$54,000.00
Mobilization of Crane and Equipment	1	LS		\$40,000.00	\$40,000.00
					\$0.00
TOTAL SUBCONTRACTS					\$123,000.00

SUMMARY OF COSTS						
Labor Cost	\$16,418.96	Labor Burden @	0.0%	\$0.00		\$16,418.96
Material Cost	\$310,959.60	Material Tax @	7.75%	\$24,099.37		\$335,058.97
Equipment Cost	\$13,217.49	Equipment Tax @	7.75%	\$1,024.36		\$14,241.85
Subcontractors	\$123,000.00					\$123,000.00
DIRECT COST SUBTOTALS	\$463,596			\$25,124	DIRECT COST SUBTOTALS	\$488,720
Additional Pay Item Notes :						
This payitem is to furnish and unload material for temporary work trestle at Copco 2 that is expected to be 8000 SF. Loads have been calculated by total weight of major structural steel items and adding 15% for misc items such as bolts, stiffeners, handrails ect. Mobilization of crane is expected to cost more than a standard mobilization due using smaller trucks due to access restrictions.						

3.002.4 Access Trestle- Extract Pile

PAY ITEM NUMBER	:	3.002.4	Project	:	KRRP - Copco 2			
Description	:	Access Trestle- Extract Pile	Group	:	D02			
Quantity	:	1,120.00 LF						
Daily Production	:	500.00 LF per	20	hour shift	Project #	:	3	
Work Days	:	2.2 Days			Estimator	:	Eric Jones LF per	
Unit Price	:	\$52.96 per LF			Probable Low Cost Parameter		575 \$50,418 \$45.02	
Total Cost	:	\$59,316			Probable High Cost Parameter		400 \$71,179 \$63.55	

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	2.2	20	44.00	L	\$58.87	incl. in rate	incl. in rate	\$2,590.37
Laborer	Active	1.00	2.2	20	44.00	L	\$51.07	incl. in rate	incl. in rate	\$2,247.21
Equipment Operator (crane)	Active	1.00	2.2	20	44.00	L	\$81.60	incl. in rate	incl. in rate	\$3,590.31
Equipment Operator (oiler)	Active	1.00	2.2	20	44.00	L	\$73.43	incl. in rate	incl. in rate	\$3,230.70
Carpenters	Active	2.00	2.2	20	88.00	L	\$85.49	incl. in rate	incl. in rate	\$7,523.30
Vibratory Hammer & Extractor	Active	1.00	2.2	20	44.00	E	\$94.14	incl. in rate	incl. in rate	\$4,142.16
Welder, Portable	Active	1.00	2.2	20	44.00	E	\$7.84	incl. in rate	incl. in rate	\$344.85
Crawler Crane (130tn)	Active	2.00	2.2	20	88.00	E	\$262.91	incl. in rate	incl. in rate	\$23,136.08
Pile Driver	Active	3.00	2.2	20	132.00	L	\$78.56	incl. in rate	incl. in rate	\$10,369.92
Labor Hours					396	TOTAL LABOR				\$29,551.81
Equipment Hours					176	TOTAL EQUIPMENT				\$27,623.09

Description	Item	Order	Conversion	Order	Order	Material
	Quantity	Unit	Factor / Waste	Quantity	Price	Cost
TOTAL MATERIAL						\$0.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					\$0.00
					\$0.00
					\$0.00
					\$0.00
TOTAL SUBCONTRACTS					\$0.00

Labor Cost	\$29,551.81	Labor Burden @	0.0%		\$29,551.81
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00	\$0.00
Equipment Cost	\$27,623.09	Equipment Tax @	7.75%	\$2,140.79	\$29,763.88
Subcontractors	\$0.00				\$0.00
DIRECT COST SUBTOTALS	\$57,175			\$2,141	DIRECT COST SUBTOTALS \$59,316
Additional Pay Item Notes :					

3.002.5 Access Trestle- Load & Hauloff Material

PAY ITEM NUMBER	:	3.002.5	Project	:	KRRP - Copco 2				
Description	:	Access Trestle- Load & Hauloff Material	Group	:	D02				
Quantity	:	78.00 LD							
Daily Production	:	30.00 LD per	10 hour shift	Project #	:	3			
Work Days	:	2.6 Days	Estimator	:	Eric Jones	LD per	Total Cost	Unit Price Per LD	
Unit Price	:	\$1,856.01 per LD	Probable Low Cost Parameter			34.5	\$123,053	\$1,577.60	
Total Cost	:	\$144,768	Probable High Cost Parameter			24	\$173,722	\$2,227.21	

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	2.6	10	26.00	L	\$58.87	incl. in rate	incl. in rate	\$1,530.67
Laborer	Active	2.00	2.6	10	52.00	L	\$51.07	incl. in rate	incl. in rate	\$2,655.80
Equipment Operator (medium)	Active	1.00	2.6	10	26.00	L	\$72.34	incl. in rate	incl. in rate	\$1,880.74
Equipment Operator (crane)	Active	1.00	2.6	10	26.00	L	\$81.60	incl. in rate	incl. in rate	\$2,121.55
Crawler Crane (130tn)	Active	1.00	2.6	10	26.00	E	\$262.91	incl. in rate	incl. in rate	\$6,835.66
Loader, FE Rubber Tire (5.25cy)	Active	1.00	2.6	10	26.00	E	\$76.00	incl. in rate	incl. in rate	\$1,976.00
Pile Driver	Active	2.00	2.6	10	52.00	L	\$78.56			\$4,085.12
Labor Hours					182	TOTAL LABOR				\$12,273.87
Equipment Hours					52	TOTAL EQUIPMENT				\$8,811.66

[illegible]

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Freight Cost 10 ton/load (due to access restrictions) Allowance	29	LD		\$1,000.00	\$29,000.00
Freight Cost Crane Mats 5 ea/ Ld	54	LD		\$1,000.00	\$54,000.00
Mobilization of Crane and Equipment	1	LS		\$40,000.00	\$40,000.00
					\$0.00
TOTAL SUBCONTRACTS					\$123,000.00

Labor Cost	\$12,273.87	Labor Burden @	0.0%	\$0.00	\$12,273.87
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00	\$0.00
Equipment Cost	\$8,811.66	Equipment Tax @	7.75%	\$682.90	\$9,494.56
Subcontractors	\$123,000.00				\$123,000.00
DIRECT COST SUBTOTALS	\$144,086			\$683	\$144,768

3.002.5

[illegible]

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Pump, Trash Pump, 6"+	Active	1.00	120.0	10	1,200.00	E	\$16.11	incl. in rate	incl. in rate	\$19,332.00
Laborer	Active	2.00	120.0	10	2,400.00	L	\$51.07	incl. in rate	incl. in rate	\$122,575.20
Labor Foreman	Active	1.00	60.0	10	600.00	L	\$58.87	incl. in rate	incl. in rate	\$35,323.20
0										
Labor Hours					3000	TOTAL LABOR				\$157,898.40
Equipment Hours					1200	TOTAL EQUIPMENT				\$19,332.00

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
TOTAL MATERIAL						\$0.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					\$0.00
					\$0.00
					\$0.00
					\$0.00
TOTAL SUBCONTRACTS					\$0.00

Labor Cost	\$157,898.40	Labor Burden @	0.0%	\$0.00		\$157,898.40
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00		\$0.00
Equipment Cost	\$19,332.00	Equipment Tax @	7.75%	\$1,498.23		\$20,830.23
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$177,230			\$1,498	DIRECT COST SUBTOTALS	\$178,729
Additional Pay Item Notes :						
<p>3" pump will be used for 4 months, 1 laborer will be managing the pump during the day and 1 laborer will be managing the pump at night, foreman will be involved with managing the pump 1/2 of the 4 months.</p>						

PAY ITEM NUMBER	:	3.004	Project	:	KRRP - Copco 2
Description	:	Remove Water from behind Cofferdams	Group	:	D02
Quantity	:	241,000.00 GAL			
Daily Production	:	150,625.00 GAL per	10 hour shift	Project #	3
Work Days	:	1.6 Days	Estimator	:	Eric Jones
Unit Price	:	\$0.02 per GAL	Probable Low Cost Parameter		165687.5
Total Cost	:	\$5,679	Probable High Cost Parameter		135562.5
				Total Cost	\$5,111
				Unit Price Per GAL	\$0.02
					\$6,247
					\$0.03

Description	Active	# in	Days	Hours	Total	L/E	Hourly	Hrly oper.	Burden	Labor / Equipment
	Idle	crew	Worked	/day	Hours		Rate	Cost	Rate	Cost
Pump, Trash Pump, 6"+	Active	1.00	1.6	10	16.00	E	\$16.11	incl. in rate	incl. in rate	\$257.76
Loader, FE Rubber Tire (5.25cy)	Active	1.00	1.0	10	10.00	E	\$76.00	incl. in rate	incl. in rate	\$760.00
Truck, Pickup (4x4, 3/4tn)	Active	1.00	1.6	10	16.00	E	\$16.99	incl. in rate	incl. in rate	\$271.84
Labor Foreman	Active	1.00	1.6	10	16.00	L	\$58.87	incl. in rate	incl. in rate	\$941.95
Laborer	Active	3.00	1.6	10	48.00	L	\$51.07	incl. in rate	incl. in rate	\$2,451.50
Equipment Operator (medium)	Active	1.00	1.0	10	10.00	L	\$72.34	incl. in rate	incl. in rate	\$723.36
Intake and Discharge Hose, 3" 20' lengths		4.00	1.6	10	64.00	E	\$2.50			\$160.00
Labor Hours					74	TOTAL LABOR				\$4,116.82
Equipment Hours					106	TOTAL EQUIPMENT				\$1,449.60

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
TOTAL MATERIAL						\$0.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					\$0.00
					\$0.00
					\$0.00
					\$0.00
TOTAL SUBCONTRACTS					\$0.00

Labor Cost	\$4,116.82	Labor Burden @	0.0%		\$4,116.82
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00	\$0.00
Equipment Cost	\$1,449.60	Equipment Tax @	7.75%	\$112.34	\$1,561.94
Subcontractors	\$0.00				\$0.00
DIRECT COST SUBTOTALS	\$5,566			\$112	\$5,679

It will take a 3" pump 2 days to dewater 241,000gallons of water, 1 laborer will manage pump at night and 1 laborer will manage the pump during the day, loader will be used half of the time to place pump. Foreman with truck will oversee operation.

Labor Cost	\$50,064.80	Labor Burden @	0.0%		\$50,064.80
Material Cost	\$15,000.00	Material Tax @	7.75%	\$1,162.50	\$16,162.50
Equipment Cost	\$45,035.75	Equipment Tax @	7.75%	\$3,490.27	\$48,526.02
Subcontractors	\$95,360.00				\$95,360.00
DIRECT COST SUBTOTALS	\$205,461			\$4,653	DIRECT COST SUBTOTALS \$210,113
Additional Pay Item Notes :					

PAY ITEM COST DETAIL WORKSHEET

3.005.2 Left Side Coffe Dam- Extract Pile

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.005.2	Project	:	KRRP - Copco 2				
Description	:	Left Side Coffe Dam- Extract Pile	Group	:	D07				
Quantity	:	7,500.00 SF							
Daily Production	:	3,000.00 SF per	20	hour shift	Project #	:	3		
Work Days	:	2.5 Days	Estimator	:	Eric Jones	SF per		Total Cost	Unit Price Per SF
Unit Price	:	\$6.76 per SF	Probable Low Cost Parameter			3450	\$43,087	\$5.74	
Total Cost	:	\$50,691	Probable High Cost Parameter			2400	\$60,829	\$8.11	

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	2.5	20	50.00	L	\$58.87	incl. in rate	incl. in rate	\$2,943.60
Laborer	Active	1.00	2.5	20	50.00	L	\$51.07	incl. in rate	incl. in rate	\$2,553.65
Equipment Operator (crane)	Active	1.00	2.5	20	50.00	L	\$81.60	incl. in rate	incl. in rate	\$4,079.90
Equipment Operator (oiler)	Active	1.00	2.5	20	50.00	L	\$73.43	incl. in rate	incl. in rate	\$3,671.25
Vibratory Hammer & Extractor	Active	1.00	2.5	20	50.00	E	\$94.14	incl. in rate	incl. in rate	\$4,707.00
Welder, Portable	Active	1.00	2.5	20	50.00	E	\$7.84	incl. in rate	incl. in rate	\$391.88
Crawler Crane (130tn)	Active	1.00	2.5	20	50.00	E	\$262.91	incl. in rate	incl. in rate	\$13,145.50
Pile Driver	Active	3.00	2.5	20	150.00	L	\$78.56	incl. in rate	incl. in rate	\$11,784.00
Labor Hours					350	TOTAL LABOR				\$25,032.40
Equipment Hours					150	TOTAL EQUIPMENT				\$18,244.38

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
			1.000	0.00	\$0.00	\$0.00
			1.000	0.00	\$0.00	\$0.00
			1.000	0.00	\$0.00	\$0.00
			1.000	0.00	\$0.00	\$0.00
			1.000	0.00	\$0.00	\$0.00
			1.000	0.00	\$0.00	\$0.00
			1.000	0.00	\$0.00	\$0.00
			1.000	0.00	\$0.00	\$0.00
			1.000	0.00	\$0.00	\$0.00
			1.000	0.00	\$0.00	\$0.00
			1.000	0.00	\$0.00	\$0.00
			1.000	0.00	\$0.00	\$0.00
			1.000	0.00	\$0.00	\$0.00
			1.000	0.00	\$0.00	\$0.00
			1.000	0.00	\$0.00	\$0.00
			1.000	0.00	\$0.00	\$0.00
			1.000	0.00	\$0.00	\$0.00
			1.000	0.00	\$0.00	\$0.00
TOTAL MATERIAL						\$0.00

SUBCONTRACT COSTS				
Description	Quantity	Units	Notes / Company	Contract or Quote Amount
Load Allowance	10	LD		\$6,000.00
				\$0.00
				\$0.00
				\$0.00
TOTAL SUBCONTRACTS				\$6,000.00

SUMMARY OF COSTS						
Labor Cost	\$25,032.40	Labor Burden @	0.0%			\$25,032.40
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00		\$0.00
Equipment Cost	\$18,244.38	Equipment Tax @	7.75%	\$1,413.94		\$19,658.31
Subcontractors	\$6,000.00					\$6,000.00
DIRECT COST SUBTOTALS	\$49,277			\$1,414	DIRECT COST SUBTOTALS	\$50,691
Additional Pay Item Notes :						

SUMMARY OF COSTS									
Labor Cost	\$0.00	Labor Burden @	0.0%						\$0.00
Material Cost	\$0.00	Material Tax @	7.75%		\$0.00				\$0.00
Equipment Cost	\$0.00	Equipment Tax @	7.75%		\$0.00				\$0.00
Subcontractors	\$50,000.00								\$50,000.00
DIRECT COST SUBTOTALS	\$50,000				\$0			DIRECT COST SUBTOTALS	\$50,000
Additional Pay Item Notes :									
<div style="border: 1px solid black; padding: 10px; min-height: 100px;"> <p>This items is to provide an allowance amount for base material in the coffer dams to demolish the concrete dam.</p> </div>									

It will take roughly 3 days to pump 300,000gallons with a 3" pump. 1 day will be need to set up pump and hoses, excavator will be used 1 day to set up pump, laborers will support equipment during set up and maintain the pump through the duration of the dewatering, 1 foreman with truck will oversee operation.

CREW COSTS

MATERIAL COSTS

SUBCONTRACT COSTS

SUMMARY OF COSTS

Additional Pay Item Notes :

3.01

PAY ITEM COST DETAIL WORKSHEET

3.014 Remove Concrete in Dam

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.014	Project	:	KRRP - Copco 2				
Description	:	Remove Concrete in Dam	Group	:	D10				
Quantity	:	4,430.00 cy							
Daily Production	:	120.00 cy per	10	hour shift	Project #	:	3		
Work Days	:	36.9 Days			Estimator	:	Eric Jones	cy per	Total Cost
Unit Price	:	\$168.51 per cy			Probable Low Cost Parameter		138	\$634,532	Unit Price Per cy
Total Cost	:	\$746,509			Probable High Cost Parameter		96	\$895,810	\$202.21

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	36.9	10	369.00	L	\$58.87	incl. in rate	incl. in rate	\$21,723.77
Laborer	Active	3.00	36.9	10	1,107.00	L	\$51.07	incl. in rate	incl. in rate	\$56,537.81
Equipment Operator (medium)	Active	3.00	36.9	10	1,107.00	L	\$72.34	incl. in rate	incl. in rate	\$80,075.95
Truck Driver (heavy)	Active	3.00	28.2	10	845.10	L	\$66.92	incl. in rate	incl. in rate	\$56,557.47
Hydraulic Excavator (5.0cy)	Active	1.00	36.9	10	369.00	E	\$276.50	incl. in rate	incl. in rate	\$102,028.50
Hydraulic Excavator (2.5cy)	Active	1.00	36.9	10	369.00	E	\$205.40	incl. in rate	incl. in rate	\$75,792.60
Loader, FE Rubber Tire (3.5cy)	Active	1.00	36.9	10	369.00	E	\$63.11	incl. in rate	incl. in rate	\$23,287.59
Hydraulic Impact Breaker Attachment (3k-4k ft-lb)	Active	1.00	36.9	10	369.00	E	\$36.81	incl. in rate	incl. in rate	\$13,582.89
Truck, On-Highway Dump (6x4, 12cy)	Active	3.00	28.2	10	845.10	E	\$57.41	incl. in rate	incl. in rate	\$48,517.19
Acetylene Torches	Active	1.00	36.9	10	369.00	E	\$0.44	incl. in rate	incl. in rate	\$162.36
Air Compressor 600 cfm	Active	1.00	36.9	10	369.00	E	\$21.74	incl. in rate	incl. in rate	\$8,021.66
3 Man Blasting Crew	Active	1.00	36.9	10	369.00	L	\$146.09	incl. in rate	incl. in rate	\$53,907.30
Air Track Drill 4", Air Hoses, Compressor	Active	1.00	36.9	10	369.00	E	\$212.49	incl. in rate	incl. in rate	\$78,407.15
Labor Hours					3,797	TOTAL LABOR				\$268,802.31
Equipment Hours					3,428	TOTAL EQUIPMENT				\$349,799.94

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables (5% labor)	1.00	LS	1.000	1.00	\$13,440.12	\$13,440.12
Blasting Material	4,430.00	CY	1.050	4,651.50	5.56	\$25,862.34
Drill Bit Wear Allowance (10% of Drilling Eq)	1.00	LS	1.000	1.00	\$7,840.71	\$7,840.71
TOTAL MATERIAL						\$47,143.17

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Concrete Saw Cutting and Drilling	10	EA	Cost per Mob	\$5,000.00	\$50,000.00
					\$0.00
					\$0.00
					\$0.00
TOTAL SUBCONTRACTS					\$50,000.00

SUMMARY OF COSTS						
Labor Cost	\$268,802.31	Labor Burden @	0.0%	\$0.00	Included in hourly labor rate.	\$268,802.31
Material Cost	\$47,143.17	Material Tax @	7.75%	\$3,653.60		\$50,796.77
Equipment Cost	\$349,799.94	Equipment Tax @	7.75%	\$27,109.50		\$376,909.44
Subcontractors	\$50,000.00					\$50,000.00
DIRECT COST SUBTOTALS	\$715,745			\$30,763	DIRECT COST SUBTOTALS	\$746,509

Additional Pay Item Notes :

Demolition of the the concrete dam is by a combination of blasting and hydrylic breakers. The material is expected to fall to the down stream side near the power house coffer dam. Equipment will be staged at bottom to process and load trucks as material is provided. Due to the narrow and steep haul routes small 12CY dump trucks have been used to transport material from load out area to the copco 1 disposal site. A concrete sawing subcontractor is expected to periodically be used during the demo process and an allowance by mob has been used to account for the cost. It is expected that the demolition activity will have reduced production due to the strength of concrete and the amount of oversize reinforcement embedded with in the concrete. Crew Break down is provided in the production notes. This item is to be double shifted with two 10 hour shifts to account for the California in water work retrictions.

Project	: KRRP - Copco 2			
Group	: D10			
Project #	: 3			
Estimator	: Eric Jones	CY per	Total Cost	Unit Price Per CY
Probable Low Cost Parameter		20.625	\$1,644	\$328.86
Probable High Cost Parameter		16.875	\$2,010	\$401.94

4 man crew roughly 3 hours to mobilize to area and haul off material

PAY ITEM INFORMATION

CREW COSTS

MATERIAL COSTS

SUBCONTRACT COSTS

SUMMARY OF COSTS

DIRECT COST SUBTOTALS

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3.017 Right Abutment Removal - Random Fill

PAY ITEM NUMBER	:	3.017	Project	:	KRRP - Copco 2
Description	:	Right Abutment Removal - Random Fill	Group	:	D10
Quantity	:	1,510.00 CY			
Daily Production	:	300.00 CY per	10	hour shift	
Work Days	:	5.0 Days	Project #	:	3
Unit Price	:	\$21.01 per CY	Estimator	:	Eric Jones
Total Cost	:	\$31,726	CY per	:	330
			Probable Low Cost Parameter	:	\$28,554
			Probable High Cost Parameter	:	240
				:	\$38,072
				:	\$18.91
				:	\$25.21

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	5.0	10	50.00	L	\$58.87	incl. in rate	incl. in rate	\$2,943.60
Laborer	Active	3.00	5.0	10	150.00	L	\$51.07	incl. in rate	incl. in rate	\$7,660.95
Equipment Operator (medium)	Active	1.00	5.0	10	50.00	L	\$72.34	incl. in rate	incl. in rate	\$3,616.80
Truck Driver (heavy)	Active	1.00	5.0	10	50.00	L	\$66.92	incl. in rate	incl. in rate	\$3,346.20
Hydraulic Excavator (2.5cy)	Active	1.00	5.0	10	50.00	E	\$205.40	incl. in rate	incl. in rate	\$10,270.00
Truck, On-Highway Dump (6x4, 12cy)	Active	1.00	5.0	10	50.00	E	\$57.41	incl. in rate	incl. in rate	\$2,870.50
Labor Hours					300	TOTAL LABOR				\$17,567.55
Equipment Hours					100	TOTAL EQUIPMENT				\$13,140.50

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price		Material Cost
TOTAL MATERIAL							\$0.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					\$0.00
					\$0.00
					\$0.00
					\$0.00
TOTAL SUBCONTRACTS					\$0.00

Labor Cost	\$17,567.55	Labor Burden @	0.0%		\$17,567.55
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00	\$0.00
Equipment Cost	\$13,140.50	Equipment Tax @	7.75%	\$1,018.39	\$14,158.89
Subcontractors	\$0.00				\$0.00
DIRECT COST SUBTOTALS	\$30,708			\$1,018	DIRECT COST SUBTOTALS
Additional Pay Item Notes :					\$31,726

Crew and production is based on moving 1510CY which is a total of 151 each 10 CY loads. 5 trucks will be used hauling 6 loads per day for 5 days. There will be 2 excavators loading trucks, 3 laborers directing truck traffic, 1 foreman will oversee operation. All material will be hauled to Copco disposal site.

PAY ITEM COST DETAIL WORKSHEET

3.019 Right Abutment Removal - Gunite Curtain Wall

PAY ITEM INFORMATION

PAY ITEM NUMBER	:	3.019			Project	:	KRRP - Copco 2			
Description	:	Right Abutment Removal - Gunite Curtain Wall			Group	:	D10			
Quantity	:	180.00	CY							
Daily Production	:	128.00	CY per	20	hour shift	Project #	:	3		
Work Days	:	1.4	Days			Estimator	:	Eric Jones	CY per	Total Cost
Unit Price	:	\$191.23	per CY			Probable Low Cost Parameter		140.8	\$30,978	\$172.10
Total Cost	:	\$34,421				Probable High Cost Parameter		115.2	\$37,863	\$210.35

CREW COSTS

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.4	20	28.00	L	\$58.87	incl. in rate	incl. in rate	\$1,648.42
Laborer	Active	4.00	1.4	20	112.00	L	\$51.07	incl. in rate	incl. in rate	\$5,720.18
Equipment Operator (medium)	Active	2.00	1.4	20	56.00	L	\$72.34	incl. in rate	incl. in rate	\$4,050.82
Truck Driver (heavy)	Active	1.00	1.4	20	28.00	L	\$66.92	incl. in rate	incl. in rate	\$1,873.87
Truck, On-Highway Dump (6x4, 12cy)	Active	1.00	1.4	20	28.00	E	\$57.41	incl. in rate	incl. in rate	\$1,607.48
Air Compressor 900 cfm	Active	1.00	1.4	20	28.00	E	\$38.87	incl. in rate	incl. in rate	\$1,088.33
Air Tool, Chipping Hammer	Active	4.00	1.4	20	112.00	E	\$1.64	incl. in rate	incl. in rate	\$183.57
Generator, Small Generator, 10 - 15 kW	Active	2.00	1.4	20	56.00	E	\$7.04	incl. in rate	incl. in rate	\$394.24
Hydraulic Excavator (5.0cy)	Active	1.00	1.4	20	28.00	E	\$276.50	incl. in rate	incl. in rate	\$7,742.00
Hydraulic Impact Breaker Attachment (5k+ ft-lb)	Active	1.00	1.4	20	28.00	E	\$63.28	incl. in rate	incl. in rate	\$1,771.84
Hydraulic Thumbs/Shear Attachment	Active	1.00	1.4	20	28.00	E	\$24.92	incl. in rate	incl. in rate	\$697.76
Hydraulic Excavator (2.5cy)	Active	1.00	1.4	20	28.00	E	\$205.40	incl. in rate	incl. in rate	\$5,751.20
					Labor Hours	224	TOTAL LABOR			\$13,293.28
					Equipment Hours	336	TOTAL EQUIPMENT			\$19,236.42

MATERIAL COSTS

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
TOTAL MATERIAL						\$0.00

SUBCONTRACT COSTS

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Reinforcement Disposal Fee	16,200	lbs.	90lbs Rebar per CY of Concrete		\$0.00
Rebar Hauling to Facility (30 Miles)	30	Miles	Yreka Recycle		\$0.00
Hauling Cost by Load	1.00	loads	40,000lbs per load	\$400.00	\$400.00
					\$0.00
			TOTAL SUBCONTRACTS		\$400.00

SUMMARY OF COSTS

Labor Cost	\$13,293.28	Labor Burden @	0.0%		\$13,293.28
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00	\$0.00
Equipment Cost	\$19,236.42	Equipment Tax @	7.75%	\$1,490.82	\$20,727.24
Subcontractors	\$400.00				\$400.00
DIRECT COST SUBTOTALS	\$32,930			\$1,491	DIRECT COST SUBTOTALS \$34,421

Additional Pay Item Notes :

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PAY ITEM COST DETAIL WORKSHEET

3.02 Remove & Dispose - Hand rails and Light Poles

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.020	Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose - Hand rails and Light Poles	Group	:	D08				
Quantity	:	5,000.00 LBS							
Daily Production	:	23,125.00 LBS per	10	hour shift	Project #	:	3		
Work Days	:	0.2 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.76 per LBS			Probable Low Cost Parameter			23125	\$3,442
Total Cost	:	\$3,825			Probable High Cost Parameter			23125	\$4,207
									Unit Price Per LBS
									\$0.69
									\$0.84

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Hydraulic Crane (80tn)	Active	1.00	0.2	10	2.00	E	\$197.66	incl. in rate	incl. in rate	\$395.32
Equipment Operator (crane)	Active	1.00	0.2	10	2.00	L	\$81.02	incl. in rate	incl. in rate	\$162.04
Loader, FE Rubber Tire (8.6cy)	Active	1.00	0.2	10	2.00	E	\$225.40	incl. in rate	incl. in rate	\$450.80
Electrician	Active	1.00	0.2	10	2.00	L	\$55.25	incl. in rate	incl. in rate	\$110.51
Millwright	Active	6.00	0.2	10	12.00	L	\$81.53	incl. in rate	incl. in rate	\$978.31
Labor Foreman	Active	2.00	0.2	10	4.00	L	\$58.35	incl. in rate	incl. in rate	\$233.39
Labor Hours					20	TOTAL LABOR				\$1,484.25
Equipment Hours					4	TOTAL EQUIPMENT				\$846.12

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$74.21	\$74.21
TOTAL MATERIAL						\$74.21

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (10%)	0.25	ton	1.000	0.25	\$595.00
Hauling Cost by Load	3.00	loads		\$400.00	\$1,200.00
TOTAL SUBCONTRACTS					\$1,348.75

SUMMARY OF COSTS						
Labor Cost	\$1,484.25	Labor Burden @	0.0%	\$0.00		\$1,484.25
Material Cost	\$74.21	Material Tax @	7.8%	\$5.75		\$79.96
Equipment Cost	\$846.12	Equipment Tax @	7.8%	\$65.57		\$911.69
Subcontractors	\$1,348.75					\$1,348.75
DIRECT COST SUBTOTALS	\$3,753			\$71	DIRECT COST SUBTOTALS	\$3,825

Additional Pay Item Notes :

Crews E-19 for metals demolition, E-12 for welding , E-25 for cutting steel and A-3H for equipment disposal. Assumed hazardous waste 100% of the total lbs, calculated 36 miles from Copco2 to Yreka Transfer Recycling.

PAY ITEM COST DETAIL WORKSHEET

3.021 Remove & Dispose - Radial Gates and Hoists

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.021	Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose - Radial Gates and Hoists	Group	:	D08				
Quantity	:	66,000.00 LBS							
Daily Production	:	37,500.00 LBS per	10	hour shift	Project #	:	3		
Work Days	:	1.8 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.58 per LBS			Probable Low Cost Parameter			43125	\$32,603
Total Cost	:	\$38,356			Probable High Cost Parameter			30000	\$46,027
									Unit Price Per LBS
									\$0.49
									\$0.70

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.8	10	18.00	L	\$58.35	incl. in rate	incl. in rate	\$1,050.25
Laborer	Active	2.00	1.8	10	36.00	L	\$51.01	incl. in rate	incl. in rate	\$1,836.36
Steelworker	Active	2.00	1.8	10	36.00	L	\$77.55	incl. in rate	incl. in rate	\$2,791.87
Equipment Operator (medium)	Active	1.00	1.8	10	18.00	L	\$72.39	incl. in rate	incl. in rate	\$1,302.98
Equipment Operator (crane)	Active	1.00	1.8	10	18.00	L	\$81.02	incl. in rate	incl. in rate	\$1,458.38
Loader, FE Rubber Tire (5.25cy)	Active	1.00	1.8	10	18.00	E	\$76.00	incl. in rate	incl. in rate	\$1,368.00
Crawler Crane (130tn)	Active	1.00	1.8	10	18.00	E	\$262.91	incl. in rate	incl. in rate	\$4,732.38
Welder	Active	1.00	1.8	10	18.00	L	\$8.62	incl. in rate	incl. in rate	\$155.23
					Labor Hours	144	TOTAL LABOR			\$8,595.07
					Equipment Hours	36	TOTAL EQUIPMENT			\$6,100.38

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$429.75	\$429.75
Selective demolition, torch cutting, steel, 1" thick plate (assumed qty)	2,500.00	LF	1.000	2,500.00	\$0.85	\$2,125.00
						TOTAL MATERIAL
						\$2,554.75

SUBCONTRACT COSTS						
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount	
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	33.00	ton	1.000	33.00	\$595.00	\$19,635.00
Hazardous waste cleanup/pickup/disposal, transportation to disposal site, truckload = 80 drums or 25 C.Y. or 18 tons, maximum	2.00	Load	1.000	2.00	\$400.00	\$800.00
						TOTAL SUBCONTRACTS
						\$20,435.00

SUMMARY OF COSTS									
Labor Cost	\$8,595.07	Labor Burden @	0.0%	\$0.00					\$8,595.07
Material Cost	\$2,554.75	Material Tax @	7.8%	\$197.99					\$2,752.75
Equipment Cost	\$6,100.38	Equipment Tax @	7.8%	\$472.78					\$6,573.16
Subcontractors	\$20,435.00								\$20,435.00
DIRECT COST SUBTOTALS	\$37,685			\$671				DIRECT COST SUBTOTALS	\$38,356
Additional Pay Item Notes :									

PAY ITEM COST DETAIL WORKSHEET

3.022 Remove & Dispose - 5-Radial Gate Stoplogs & Slots (steel)

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.022	Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose - 5-Radial Gate Stoplogs & Slots (steel)	Group	:	D08				
Quantity	:	95,800.00 LBS							
Daily Production	:	37,500.00 LBS per	10	hour shift	Project #	:	3		
Work Days	:	2.6 Days	Estimator	:	Mihaela Tomulescu	LBS per	43125	Total Cost	\$29,150
Unit Price	:	\$0.36 per LBS	Probable Low Cost Parameter						\$0.30
Total Cost	:	\$34,294	Probable High Cost Parameter				30000	\$41,153	\$0.43

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	2.6	10	26.00	L	\$58.35	incl. in rate	incl. in rate	\$1,517.02
Laborer	Active	2.00	2.6	10	52.00	L	\$51.01	incl. in rate	incl. in rate	\$2,652.52
Steelworker	Active	2.00	2.6	10	52.00	L	\$77.55	incl. in rate	incl. in rate	\$4,032.70
Equipment Operator (medium)	Active	1.00	2.6	10	26.00	L	\$72.39	incl. in rate	incl. in rate	\$1,882.09
Equipment Operator (crane)	Active	1.00	2.6	10	26.00	L	\$81.02	incl. in rate	incl. in rate	\$2,106.55
Loader, FE Rubber Tire (5.25cy)	Active	1.00	2.6	10	26.00	E	\$76.00	incl. in rate	incl. in rate	\$1,976.00
Crawler Crane (130tn)	Active	1.00	2.6	10	26.00	E	\$262.91	incl. in rate	incl. in rate	\$6,835.66
Welder	Active	2.00	2.6	10	52.00	L	\$8.62	incl. in rate	incl. in rate	\$448.44
					Labor Hours	234			TOTAL LABOR	\$12,639.32
					Equipment Hours	52			TOTAL EQUIPMENT	\$8,811.66

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$631.97	\$631.97
Selective demolition, torch cutting, steel, 1" thick plate (assumed qty)	5,000.00	LF	1.000	5,000.00	\$0.85	\$4,250.00
						TOTAL MATERIAL
						\$4,881.97

SUBCONTRACT COSTS						
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount	
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (20%)	9.58	ton	1.000	9.58	\$595.00	\$5,700.10
Hazardous waste cleanup/pickup/disposal, transportation to disposal site, truckload = 80 drums or 25 C.Y. or 18 tons, maximum	3.00	Load	1.000	3.00	\$400.00	\$1,200.00
						TOTAL SUBCONTRACTS
						\$6,900.10

SUMMARY OF COSTS						
Labor Cost	\$12,639.32	Labor Burden @	0.0%	\$0.00		\$12,639.32
Material Cost	\$4,881.97	Material Tax @	7.8%	\$378.35		\$5,260.32
Equipment Cost	\$8,811.66	Equipment Tax @	7.8%	\$682.90		\$9,494.56
Subcontractors	\$6,900.10					\$6,900.10
DIRECT COST SUBTOTALS	\$33,233			\$1,061	DIRECT COST SUBTOTALS	\$34,294
Additional Pay Item Notes :						

Additional Pay Item Notes :	
	Assumed that two electrician will work one day to unconnect and remove the control panel and the gate motor.

PAY ITEM NUMBER	:	3.024	Project	:	KRRP - Copco 2
Description	:	Remove & Dispose - Spillway radial gate motor & control panel	Group	:	D07
Quantity	:	1.00 EA			
Daily Production	:	1.25 EA per	10	hour shift	
Work Days	:	0.8	Days		
Unit Price	:	\$1,347.21 per EA	Project #	:	3
Total Cost	:	\$1,347	Estimator	:	Mihaela Tomulescu
			Probable Low Cost Parameter	:	1.375
			Probable High Cost Parameter	:	1.125
				EA per	\$1,212
				Total Cost	\$1,482
				Unit Price Per EA	\$1,212.49
					\$1,481.93

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician	Active	2.00	0.8	10	16.00	L	\$55.25	incl. in rate	incl. in rate	\$884.05
Labor Hours					16	TOTAL LABOR				\$884.05
Equipment Hours					0	TOTAL EQUIPMENT				\$0.00

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 0.5% labor (Side Cutter, Sharp-Nose Pliers, Sharp Tip Tweezers PCB Clamp, etc)	4.86	LS	1.000	4.86	\$88.40	\$429.85
TOTAL MATERIAL						\$429.85

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					\$0.00
					\$0.00
					\$0.00
			TOTAL SUBCONTRACTS		\$0.00

Labor Cost	\$884.05	Labor Burden @	0.0%	\$0.00		\$884.05
Material Cost	\$429.85	Material Tax @	7.8%	\$33.31		\$463.16
Equipment Cost	\$0.00	Equipment Tax @	7.8%	\$0.00		\$0.00
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$1,314			\$33	DIRECT COST SUBTOTALS	\$1,347

Assumed that two electrician will work one day to unconnect and remove the control panel and the gate motor.

<p>Additional Pay Item Notes :</p> <p>Assumed that electrical crew formed of 1 Foreman and 1 Electricians will work two days to disconnect and remove the distribution panels. They are going to use same crane and a truck for disposal of spillway intake, trash rake and radial motor & control panel.</p>
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Project	: KRRP - Copco 2			
Group	:			
Project #	: 3			
Estimator	: Eric Jones	SF per	Total Cost	Unit Price Per SF
Probable Low Cost Parameter	4812.5		\$11,511	\$1.64
Probable High Cost Parameter	3937.5		\$14,069	\$2.01

2 working days to strip roof organize and haul off material. The carpenters and laborers will remove roof and stack and organized material, Forklift will be used to load material in two dump trucks.

PAY ITEM COST DETAIL WORKSHEET

3.029 Remove Structural Steel items associated with Powerhouse

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.029			Project	:	KRRP - Copco 2		
Description	:	Remove Structural Steel items associated with Powerhouse			Group	:	D09		
Quantity	:	220,000.00 LBS							
Daily Production	:	19,000.00 LBS per		10	hour shift	Project #	:	3	
Work Days	:	11.6		Days	Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.64		per LBS	Probable Low Cost Parameter		21850	\$120,533	\$0.55
Total Cost	:	\$141,804			Probable High Cost Parameter		16150	\$163,074	\$0.74

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	11.6	10	116.00	L	\$58.35	incl. in rate	incl. in rate	\$6,768.25
Laborer	Active	3.00	11.6	10	348.00	L	\$51.01	incl. in rate	incl. in rate	\$17,751.48
Steelworker	Active	3.00	11.6	10	348.00	L	\$77.55	incl. in rate	incl. in rate	\$26,988.10
Equipment Operator (crane)	Active	1.00	11.6	10	116.00	L	\$81.02	incl. in rate	incl. in rate	\$9,398.44
Equipment Operator (medium)	Active	1.00	11.6	10	116.00	L	\$72.39	incl. in rate	incl. in rate	\$8,397.01
Crawler Crane (130tn)	Active	1.00	11.6	10	116.00	E	\$262.91	incl. in rate	incl. in rate	\$30,497.56
Loader, FE Rubber Tire (5.25cy)	Active	1.00	11.6	10	116.00	E	\$76.00	incl. in rate	incl. in rate	\$8,816.00
Oxygen and Acetylene Torches	Active	3.00	11.6	10	348.00	E	\$0.47	incl. in rate	incl. in rate	\$163.56
					Labor Hours	1044			TOTAL LABOR	\$69,303.27
					Equipment Hours	580			TOTAL EQUIPMENT	\$39,477.12

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 15% labor (saw blades, drill bits, wrenches, electrodes, welding accessories, etc)	1.00	LS	1.000	1.00	\$10,395.49	\$10,395.49
						TOTAL MATERIAL
						\$10,395.49

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (25% from total)					
	27.50	ton	Based on 25 % of total weight	\$ 595.00	\$16,362.50
Haul off of material	6.00	Loads	20 tons a load	\$ 400.00	\$2,400.00
					TOTAL SUBCONTRACTS
					\$18,762.50

SUMMARY OF COSTS						
Labor Cost	\$69,303.27	Labor Burden @	0.0%	\$0.00		\$69,303.27
Material Cost	\$10,395.49	Material Tax @	7.8%	\$805.65		\$11,201.14
Equipment Cost	\$39,477.12	Equipment Tax @	7.8%	\$3,059.48		\$42,536.60
Subcontractors	\$18,762.50					\$18,762.50
DIRECT COST SUBTOTALS	\$137,938			\$3,865	DIRECT COST SUBTOTALS	\$141,804
Additional Pay Item Notes :						
Includes columns, beams, crane girders, bracing, misc. shapes, roof trusses, purlins, etc. Assumed contains paint with heavy metals 25% of the total lbs, 36 miles from Copco lake to Yreka transfer recycling.						

PAY ITEM NUMBER	:	3.03	Project	:	KRRP - Copco 2
Description	:	Remove Control House Concrete	Group	:	D04
Quantity	:	30.00 CY			
Daily Production	:	37.50 CY per	10	hour shift	
Work Days	:	0.8 Days	Project #	:	3
Unit Price	:	\$261.14 per CY	Estimator	:	Eric Jones
Total Cost	:	\$7,834	Probable Low Cost Parameter	:	43.125
			Probable High Cost Parameter	:	30
					Total Cost
					Unit Price Per CY
					\$6,659
					\$221.97
					\$9,401
					\$313.36

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.8	10	8.00	L	\$58.87	incl. in rate	incl. in rate	\$470.98
Laborer	Active	1.00	0.8	10	8.00	L	\$51.07	incl. in rate	incl. in rate	\$408.58
Equipment Operator (medium)	Active	2.00	0.8	10	16.00	L	\$72.34	incl. in rate	incl. in rate	\$1,157.38
Truck Driver (heavy)	Active	1.00	0.8	10	8.00	L	\$66.92	incl. in rate	incl. in rate	\$535.39
Hydraulic Excavator (5.0cy)	Active	2.00	0.8	10	16.00	E	\$276.50	incl. in rate	incl. in rate	\$4,424.00
Truck, On-Highway Dump (6x4, 12cy)	Active	1.00	0.8	10	8.00	E	\$57.41	incl. in rate	incl. in rate	\$459.28
Labor Hours					40	TOTAL LABOR				\$2,572.33
Equipment Hours					24	TOTAL EQUIPMENT				\$4,883.22

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
TOTAL MATERIAL						\$0.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					\$0.00
					\$0.00
					\$0.00
					\$0.00
TOTAL SUBCONTRACTS					\$0.00

Labor Cost	\$2,572.33	Labor Burden @	0.0%			\$2,572.33
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00		\$0.00
Equipment Cost	\$4,883.28	Equipment Tax @	7.75%	\$378.45		\$5,261.73
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$7,456			\$378	DIRECT COST SUBTOTALS	\$7,834
Additional Pay Item Notes :						
1 truck 3 loads and 2 excavators 1 breaking and 1 loading material, foreman managing operation and labor flagging trucks.						

PAY ITEM COST DETAIL WORKSHEET

3.031 Remove Control House Structural Steel Items

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.031	Project	:	KRRP - Copco 2				
Description	:	Remove Control House Structural Steel Items	Group	:	D04				
Quantity	:	3,500.00 LBS							
Daily Production	:	22,500.00 LBS per	10	hour shift	Project #	:	3		
Work Days	:	0.2 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.80 per LBS			Probable Low Cost Parameter			25875	\$2,367
Total Cost	:	\$2,785			Probable High Cost Parameter			19125	\$3,202
									Unit Price Per LBS
									\$0.68
									\$0.91

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.2	10	2.00	L	\$58.35	incl. in rate	incl. in rate	\$116.69
Electrician	Active	1.00	0.2	10	2.00	L	\$55.25	incl. in rate	incl. in rate	\$110.51
Steelworker	Active	2.00	0.2	10	4.00	L	\$77.55	incl. in rate	incl. in rate	\$310.21
Welder	Active	1.00	0.2	10	2.00	L	\$8.62	incl. in rate	incl. in rate	\$17.25
Loader, FE Rubber Tire (8.6cy)	Active	1.00	0.2	10	2.00	E	\$225.40	incl. in rate	incl. in rate	\$450.80
Hydraulic Crane (17tn)	Active	1.00	0.2	10	2.00	E	\$82.43	incl. in rate	incl. in rate	\$164.86
Equipment Operator (medium)	Active	2.00	0.2	10	4.00	L	\$72.39	incl. in rate	incl. in rate	\$289.55
Gas Welding Machine	Active	1.00	0.2	10	2.00	E	\$2.88	incl. in rate	incl. in rate	\$5.75
Laborer	Active	4.00	0.2	10	8.00	L	\$51.01	incl. in rate	incl. in rate	\$408.08
					Labor Hours	22	TOTAL LABOR			\$1,252.29
					Equipment Hours	6	TOTAL EQUIPMENT			\$621.41

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 15% labor (saw blades, drill bits, wrenches, electrodes, welding accessories, etc)	1.00	LS	1.000	1.00	\$187.84	\$187.84
TOTAL MATERIAL						\$187.84

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (25% from total)					
	0.44	ton	1.000	0.44	\$595.00
Hauling to Yreka	1.00	load	20 tons per load	\$400.00	\$400.00
TOTAL SUBCONTRACTS					\$660.31

SUMMARY OF COSTS					
Labor Cost	\$1,252.29	Labor Burden @	0.0%	\$0.00	\$1,252.29
Material Cost	\$187.84	Material Tax @	7.8%	\$14.56	\$202.40
Equipment Cost	\$621.41	Equipment Tax @	7.8%	\$48.16	\$669.57
Subcontractors	\$660.31				\$660.31
DIRECT COST SUBTOTALS	\$2,722		\$63	DIRECT COST SUBTOTALS	\$2,785
Additional Pay Item Notes :					
Assumed structural frames contains paint with heavy metals 25% of the total lbs, 36 miles from Copco lake to Yreka transfer recycling. Crews E-19 for metals demolition, E-12 for welding , E-25 for cutting steel and A-3H for equipment disposal. Assuming using 1 cranes, 1 loader and 1 trucks for disposal.					

PAY ITEM COST DETAIL WORKSHEET

3.033 Remove & Dispose - 2 - Governor oil systems

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.033	Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose - 2 - Governor oil systems	Group	:	D10				
Quantity	:	38,000.00 LBS							
Daily Production	:	31,250.00 LBS per	10	hour shift	Project #	:	3		
Work Days	:	1.2 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.59 per LBS			Probable Low Cost Parameter			34375	\$20,119
Total Cost	:	\$22,355			Probable High Cost Parameter			25000	\$26,826
									Unit Price Per LBS
									\$0.53
									\$0.71

CREW COSTS										
Description	Active Idle	# In crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.2	10	12.00	L	\$58.35	incl. in rate	incl. in rate	\$700.16
Laborer	Active	4.00	1.2	10	48.00	L	\$51.01	incl. in rate	incl. in rate	\$2,448.48
Equipment Operator (crane)	Active	1.00	1.2	10	12.00	L	\$81.02	incl. in rate	incl. in rate	\$972.25
Equipment Operator (medium)	Active	1.00	1.2	10	12.00	L	\$72.39	incl. in rate	incl. in rate	\$868.66
Electrician	Active	1.00	1.2	10	12.00	L	\$55.25	incl. in rate	incl. in rate	\$663.04
Crawler Crane (130tn)	Active	1.00	1.2	10	12.00	E	\$262.91	incl. in rate	incl. in rate	\$3,154.92
Loader, FE Rubber Tire (5.25cy)	Active	1.00	1.2	10	12.00	E	\$76.00	incl. in rate	incl. in rate	\$912.00
Oxygen and Acetylene Torches	Active	1.00	1.2	10	12.00	E	\$0.47	incl. in rate	incl. in rate	\$5.64
					Labor Hours	96	TOTAL LABOR			\$5,652.59
					Equipment Hours	36	TOTAL EQUIPMENT			\$4,072.56

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, wrenches, electrodes, welding accessories, etc)	1.00	LS	1.000	1.00	\$565.26	\$565.26
TOTAL MATERIAL						\$565.26

SUBCONTRACT COSTS				
Description	Quantity	Units	Notes / Company	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	19.00	ton	1.000	\$11,305.00
Hazardous waste cleanup/pickup/disposal, transportation to disposal site, truckload = 80 drums or 25 C.Y. or 18 tons, maximum	1.00	Load	1.000	\$400.00
TOTAL SUBCONTRACTS				\$11,705.00

SUMMARY OF COSTS					
Labor Cost	\$5,652.59	Labor Burden @	0.0%	\$0.00	\$5,652.59
Material Cost	\$565.26	Material Tax @	7.8%	\$43.81	\$609.07
Equipment Cost	\$4,072.56	Equipment Tax @	7.8%	\$315.62	\$4,388.18
Subcontractors	\$11,705.00				\$11,705.00
DIRECT COST SUBTOTALS	\$21,995		\$359	DIRECT COST SUBTOTALS	\$22,355
Additional Pay Item Notes :					
Will be removed simultaneously with the demolition of the surrounding concrete. Assumed hazardous waste 100% of the total lbs, calculated 34 miles from Copco1 to Yreka Transfer Recycling.					

PAY ITEM COST DETAIL WORKSHEET

3.034 Remove & Dispose - Cooling water and bearing oil systems

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.034	Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose - Cooling water and bearing oil systems	Group	:	D10				
Quantity	:	13,300.00 LBS							
Daily Production	:	31,250.00 LBS per	10	hour shift	Project #	:	3		
Work Days	:	0.4 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.52 per LBS			Probable Low Cost Parameter			34375	\$6,167
Total Cost	:	\$6,852			Probable High Cost Parameter			25000	\$8,222
									Unit Price Per LBS
									\$0.46
									\$0.62

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.4	10	4.00	L	\$58.35	incl. in rate	incl. in rate	\$233.39
Steelworker	Active	2.00	0.4	10	8.00	L	\$77.55	incl. in rate	incl. in rate	\$620.42
Crawler Crane (130tn)	Active	1.00	0.4	10	4.00	E	\$262.91	incl. in rate	incl. in rate	\$1,051.64
Equipment Operator (medium)	Active	1.00	0.4	10	4.00	L	\$72.39	incl. in rate	incl. in rate	\$289.55
Electrician	Active	2.00	0.4	10	8.00	L	\$55.25	incl. in rate	incl. in rate	\$442.02
Laborer	Active	3.00	0.4	10	12.00	L	\$51.01	incl. in rate	incl. in rate	\$612.12
Loader, FE Rubber Tire (5.25cy)	Active	2.00	0.4	10	8.00	E	\$76.00	incl. in rate	incl. in rate	\$608.00
Oxygen and Acetylene Torches	Active	1.00	0.4	10	4.00	E	\$0.47	incl. in rate	incl. in rate	\$1.88
Labor Hours					36	TOTAL LABOR				\$2,197.50
Equipment Hours					16	TOTAL EQUIPMENT				\$1,661.52

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$219.75	\$219.75
Selective demolition, torch cutting, steel, 1" thick plate (assumption)	2,000.00	LF	1.000	2,000.00	\$0.85	\$1,700.00
						TOTAL MATERIAL
						\$1,919.75

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	0.67	ton	1.000	\$595.00	\$395.68
Hauling to Disposal or recycle site	1.00	Load	1.000	\$400.00	\$400.00
					TOTAL SUBCONTRACTS
					\$795.68

SUMMARY OF COSTS						
Labor Cost	\$2,197.50	Labor Burden @	0.0%	\$0.00		\$2,197.50
Material Cost	\$1,919.75	Material Tax @	7.8%	\$148.78		\$2,068.53
Equipment Cost	\$1,661.52	Equipment Tax @	7.8%	\$128.77		\$1,790.29
Subcontractors	\$795.68					\$795.68
DIRECT COST SUBTOTALS	\$6,574			\$278	DIRECT COST SUBTOTALS	\$6,852

Additional Pay Item Notes :

Used RS Means : Pipe, metal pipe, to 1-1/2" diam., selective demolition,4890 LF of 1 1/2" oil pipes at 2.72 Lbs. Used 1 Forman, 2 Steelworkers to cut the pipes and 3 Laborers to load the pipes in the truck. The cooling and lubrication systems for the Hydroelectric Barge turbine, speed increaser and generator will be a combination of water and oil. These systems will be isolated from the water passages so that no contamination of passing water will occur. The following is a list of hazardous materials, substances, chemicals, and wastes normally found at a hydropower facility that may require disposal actions if not recycled or reused for their intended purpose:

1. Polychlorinated Biphenyls (PCBs)
2. Asbestos
3. Paint/abrasive blast grit (red lead paint)
4. Oil
5. Mercury
6. Antifreeze
7. Halogenated and non-halogenated solvents
8. Greases
9. Pesticides (includes herbicides, insecticides, and wood preservatives)
10. Petroleum contaminated
11. Chlorinated fluorocarbons (CFCs) Freon/Halon
12. Gasoline/diesel (includes product and sludge in tanks)
13. Batteries (includes acid)
14. Water treatment sludge (septic tanks/wastewater treatment).

Based on the hazardous materials above assumed hazardous waste 100% of the total lbs

PAY ITEM COST DETAIL WORKSHEET

3.035 Remove & Dispose - Oil / Water separator tank and piping

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.035	Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose - Oil / Water separator tank and piping	Group	:	D03				
Quantity	:	2,700.00 LBS							
Daily Production	:	18,750.00 LBS per	10	hour shift	Project #	:	3		
Work Days	:	0.1 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.50 per LBS			Probable Low Cost Parameter			20625	\$1,204
Total Cost	:	\$1,338			Probable High Cost Parameter			15000	\$1,605
									Unit Price Per LBS
									\$0.45
									\$0.59

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.1	10	1.00	L	\$58.35	incl. in rate	incl. in rate	\$58.35
Steelworker	Active	4.00	0.1	10	4.00	L	\$77.55	incl. in rate	incl. in rate	\$310.21
Laborer	Active	4.00	0.1	10	4.00	L	\$51.01	incl. in rate	incl. in rate	\$204.04
Equipment Operator (crane)	Active	1.00	0.1	10	1.00	L	\$81.02	incl. in rate	incl. in rate	\$81.02
Hydraulic Crane (80tn)	Active	1.00	0.1	10	1.00	E	\$197.66	incl. in rate	incl. in rate	\$197.66
Oxygen and Acetylene Torches	Active	1.00	0.1	10	1.00	E	\$0.47	incl. in rate	incl. in rate	\$0.47
					Labor Hours	10	TOTAL LABOR		\$653.62	
					Equipment Hours	2	TOTAL EQUIPMENT		\$198.13	

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$65.36	\$65.36
TOTAL MATERIAL						\$65.36

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling to Disposal Site Or Recycle Site	1.00	Loads	20 tons a load	\$400.00	\$400.00
TOTAL SUBCONTRACTS					\$400.00

SUMMARY OF COSTS									
Labor Cost	\$653.62	Labor Burden @	0.0%	\$0.00					\$653.62
Material Cost	\$65.36	Material Tax @	7.8%	\$5.07					\$70.43
Equipment Cost	\$198.13	Equipment Tax @	7.8%	\$15.36					\$213.49
Subcontractors	\$400.00								\$400.00
DIRECT COST SUBTOTALS	\$1,317			\$20			DIRECT COST SUBTOTALS		\$1,338
Additional Pay Item Notes :									
Crews E-19 for metals demolition, E-25 for cutting steel and A-3H for equipment disposal. .Assumed a disposal fee will be required.									

PAY ITEM COST DETAIL WORKSHEET

3.036 Remove & Dispose - 12 - Cast Iron Columns

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.036	Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose - 12 - Cast Iron Columns	Group	:	D03				
Quantity	:	54,000.00 LBS							
Daily Production	:	27,500.00 LBS per	10	hour shift	Project #	:	3		
Work Days	:	2.0 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.32 per LBS			Probable Low Cost Parameter			31625	\$14,851
Total Cost	:	\$17,472			Probable High Cost Parameter			23375	\$20,092
								Unit Price Per LBS	\$0.28
									\$0.37

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	2.0	10	20.00	L	\$58.35	incl. in rate	incl. in rate	\$1,166.94
Laborer	Active	3.00	2.0	10	60.00	L	\$51.01	incl. in rate	incl. in rate	\$3,060.60
Steelworker	Active	2.00	2.0	10	40.00	L	\$77.55	incl. in rate	incl. in rate	\$3,102.08
Equipment Operator (crane)	Active	1.00	2.0	10	20.00	L	\$81.02	incl. in rate	incl. in rate	\$1,620.42
Equipment Operator (medium)	Active	1.00	2.0	10	20.00	L	\$72.39	incl. in rate	incl. in rate	\$1,447.76
Hydraulic Crane (50tn)	Active	1.00	2.0	10	20.00	E	\$136.20	incl. in rate	incl. in rate	\$2,724.00
Loader, FE Rubber Tire (5.25cy)	Active	1.00	2.0	10	20.00	E	\$76.00	incl. in rate	incl. in rate	\$1,520.00
Oxygen and Acetylene Torches	Active	2.00	2.0	10	40.00	E	\$0.47	incl. in rate	incl. in rate	\$18.80
					Labor Hours	160	TOTAL LABOR		\$10,397.80	
					Equipment Hours	80	TOTAL EQUIPMENT		\$4,262.80	

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 15% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$1,559.67	\$1,559.67
TOTAL MATERIAL						\$1,559.67

SUBCONTRACT COSTS				
Description	Quantity	Units	Notes / Company	Contract or Quote Amount
Hauling to Disposal Site Or Recycle Site	2.00	Loads	20 tons a load	\$800.00
TOTAL SUBCONTRACTS				\$800.00

SUMMARY OF COSTS					
Labor Cost	\$10,397.80	Labor Burden @	0.0%	\$0.00	\$10,397.80
Material Cost	\$1,559.67	Material Tax @	7.8%	\$120.87	\$1,680.54
Equipment Cost	\$4,262.80	Equipment Tax @	7.8%	\$330.37	\$4,593.17
Subcontractors	\$800.00				\$800.00
DIRECT COST SUBTOTALS	\$17,020		\$451	DIRECT COST SUBTOTALS	\$17,472
Additional Pay Item Notes :					
Assumed Crews E-19 for metals demolition, E-12 for welding , E-25 for cutting steel and A-3H for equipment disposal., B-34A for hauling. Assuming using 2 cranes, 1 loader and 2 trucks for disposal. Using hydraulic impact breaker because columns that are encased in concrete.					

3.037 Remove & Dispose - 2 - Francis Turbines

PAY ITEM NUMBER	:	3.037	Project	:	KRRP - Copco 2
Description	:	Remove & Dispose - 2 - Francis Turbines	Group	:	D03
Quantity	:	660,000.00 LBS			
Daily Production	:	28,000.00 LBS per 10 hour shift	Project #	:	3
Work Days	:	23.6 Days	Estimator	:	Mihaela Tomulescu
Unit Price	:	\$0.51 per LBS	LBS per		Total Cost
Total Cost	:	\$333,413	Probable Low Cost Parameter		\$283,401
			Probable High Cost Parameter		\$400,095
					Unit Price Per LBS
					\$0.43
					\$0.61

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	23.6	10	236.00	L	\$58.35	incl. in rate	incl. in rate	\$13,769.89
Laborer	Active	3.00	23.6	10	708.00	L	\$51.01	incl. in rate	incl. in rate	\$36,115.08
Electrician Foreman	Active	1.00	23.6	10	236.00	L	\$55.45	incl. in rate	incl. in rate	\$13,086.91
Electrician	Active	2.00	23.6	10	472.00	L	\$55.25	incl. in rate	incl. in rate	\$26,079.42
Steelworker	Active	2.00	23.6	10	472.00	L	\$77.55	incl. in rate	incl. in rate	\$36,604.54
Millwright	Active	2.00	23.6	10	472.00	L	\$81.53	incl. in rate	incl. in rate	\$38,480.27
Equipment Operator (medium)	Active	1.00	23.6	10	236.00	L	\$72.39	incl. in rate	incl. in rate	\$17,083.57
Equipment Operator (crane)	Active	2.00	23.6	10	472.00	L	\$81.02	incl. in rate	incl. in rate	\$38,241.91
Hydraulic Crane (50tn)	Active	1.00	23.6	10	236.00	E	\$136.20	incl. in rate	incl. in rate	\$32,143.20
Loader, FE Rubber Tire (3.5cy)	Active	1.00	23.6	10	236.00	E	\$63.11	incl. in rate	incl. in rate	\$14,893.96
Oxygen and Acetylene Torches	Active	2.00	23.6	10	472.00	E	\$0.47	incl. in rate	incl. in rate	\$221.84
Labor Hours					3304	TOTAL LABOR				\$219,461.59
Equipment Hours					944	TOTAL EQUIPMENT				\$47,259.00

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$21,946.16	\$21,946.16
Selective demolition, torch cutting, steel, 1" thick plate (assumption)	3,000.00	LF	1.000	3,000.00	\$0.85	\$2,550.00
TOTAL MATERIAL						\$24,496.16

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (10%)					
	33.00	ton	1.000	33.00	\$595.00
Wide Load Hauling to Recycle site	17.00	Loads	1.000	17.00	\$1,000.00
TOTAL SUBCONTRACTS					\$36,635.00

Labor Cost	\$219,461.59	Labor Burden @	0.0%	\$0.00		\$219,461.59
Material Cost	\$24,496.16	Material Tax @	7.8%	\$1,898.45		\$26,394.61
Equipment Cost	\$47,259.00	Equipment Tax @	7.8%	\$3,662.57		\$50,921.57
Subcontractors	\$36,635.00					\$36,635.00
DIRECT COST SUBTOTALS	\$327,852			\$5,561	DIRECT COST SUBTOTALS	\$333,413

The crew will open the engine side panels, and remove the nacelle access panels. Disconnect the engine thermocouple leads at the terminal board. Before disconnecting any lines all fuel, oil, and hydraulic fluid valves are closed. Plug all lines as they are disconnected to prevent entrance of foreign material. Remove the clamps securing the bleed-air ducts at the firewall. Then, disconnect the electrical connector plugs, engine breather and vent lines, and fuel, oil, and hydraulic lines. Disconnect the engine power lever and propeller control rods or cables. Remove the covers from the lift points, attach the sling, and remove slack from the cables using a suitable hoist. The sling must be adjusted to position. Remove the engine mount bolts. The engine ready to be removed. Move the engine forward, out of the nacelle structure. Lower the into position on the stand, and secure it prior to removing the engine sling. The crew of 4 Welder are going to cut in pieces the big parts of the turbine to be able to load them in the truck using a loader and dispose. Assumed contains paint with heavy metals 10% of the total lbs, 36 miles from Copco2 to Yreka transfer recycling, due to size of the loads it is expected to have extra cost to account for lead cars and potential permits.

PAY ITEM COST DETAIL WORKSHEET

3.038 Remove & Dispose - 2 - 40 Ton indoor cranes

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.038	Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose - 2 - 40 Ton indoor cranes	Group	:	D10				
Quantity	:	140,000.00 LBS							
Daily Production	:	28,000.00 LBS per	10	hour shift	Project #	:	3		
Work Days	:	5.0 Days	Estimator	:	Mihaela Tomulescu	LBS per		Total Cost	Unit Price Per LBS
Unit Price	:	\$0.62 per LBS	Probable Low Cost Parameter			32200	\$73,418	\$0.52	
Total Cost	:	\$86,374	Probable High Cost Parameter			22400	\$103,649	\$0.74	

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	5.0	10	50.00	L	\$58.35	incl. in rate	incl. in rate	\$2,917.35
Laborer	Active	4.00	5.0	10	200.00	L	\$51.01	incl. in rate	incl. in rate	\$10,202.00
Steelworker	Active	3.00	5.0	10	150.00	L	\$77.55	incl. in rate	incl. in rate	\$11,632.80
Equipment Operator (crane)	Active	2.00	5.0	10	100.00	L	\$81.02	incl. in rate	incl. in rate	\$8,102.10
Equipment Operator (medium)	Active	1.00	5.0	10	50.00	L	\$72.39	incl. in rate	incl. in rate	\$3,619.40
Electrician	Active	1.00	5.0	10	50.00	L	\$55.25	incl. in rate	incl. in rate	\$2,762.65
Crawler Crane (270tn)	Active	1.00	5.0	10	50.00	E	\$454.10	incl. in rate	incl. in rate	\$22,705.00
Hydraulic Crane (80tn)	Active	1.00	5.0	10	50.00	E	\$197.66	incl. in rate	incl. in rate	\$9,883.00
Loader, FE Rubber Tire (5.25cy)	Active	1.00	5.0	10	50.00	E	\$76.00	incl. in rate	incl. in rate	\$3,800.00
Oxygen and Acetylene Torches	Active	2.00	5.0	10	100.00	E	\$0.47	incl. in rate	incl. in rate	\$47.00
					Labor Hours	600	TOTAL LABOR		\$39,236.30	
					Equipment Hours	250	TOTAL EQUIPMENT		\$36,435.00	

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$1,961.82	\$1,961.82
TOTAL MATERIAL						\$1,961.82

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	7.00	ton	1.000	7.00	\$4,165.00
Hauling to Disposal Site Or Recycle Site	4.00	Loads	20 tons a load	\$400.00	\$1,600.00
TOTAL SUBCONTRACTS					\$5,765.00

SUMMARY OF COSTS									
Labor Cost	\$39,236.30	Labor Burden @	0.0%	\$0.00					\$39,236.30
Material Cost	\$1,961.82	Material Tax @	7.8%	\$152.04					\$2,113.86
Equipment Cost	\$36,435.00	Equipment Tax @	7.8%	\$2,823.71					\$39,258.71
Subcontractors	\$5,765.00								\$5,765.00
DIRECT COST SUBTOTALS	\$83,398			\$2,976				DIRECT COST SUBTOTALS	\$86,374
Additional Pay Item Notes :									

PAY ITEM COST DETAIL WORKSHEET

3.039 Remove & Dispose - Compressed Air Systems

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.039	Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose - Compressed Air Systems	Group	:	D03				
Quantity	:	1,000.00 LBS							
Daily Production	:	7,500.00 LBS per	10	hour shift	Project #	:	3		
Work Days	:	0.133 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$1.23 per LBS			Probable Low Cost Parameter			8250	\$1,105
Total Cost	:	\$1,227			Probable High Cost Parameter			6000	\$1,473
									Unit Price Per LBS
									\$1.10
									\$1.47

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	0.1	10	1.33	L	\$55.45	incl. in rate	incl. in rate	\$73.94
Steelworker	Active	1.00	0.1	10	1.33	L	\$77.55	incl. in rate	incl. in rate	\$103.40
Laborer	Active	3.00	0.1	10	4.00	L	\$51.01	incl. in rate	incl. in rate	\$204.04
Loader, FE Rubber Tire (8.6cy)	Active	1.00	0.1	10	1.33	E	\$225.40	incl. in rate	incl. in rate	\$300.53
Equipment Operator (medium)	Active	1.00	0.1	10	1.33	L	\$72.39	incl. in rate	incl. in rate	\$96.52
Labor Hours					8	TOTAL LABOR				\$477.90
Equipment Hours					1.333333333	TOTAL EQUIPMENT				\$300.53

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$23.89	\$23.89
						TOTAL MATERIAL
						\$23.89

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling to Disposal Site Or Recycle Site	1.00	Loads	20 tons a load	\$400.00	\$400.00
					TOTAL SUBCONTRACTS
					\$400.00

SUMMARY OF COSTS									
Labor Cost	\$477.90	Labor Burden @	0.0%	\$0.00					\$477.90
Material Cost	\$23.89	Material Tax @	7.8%	\$1.85					\$25.75
Equipment Cost	\$300.53	Equipment Tax @	7.8%	\$23.29					\$323.82
Subcontractors	\$400.00								\$400.00
DIRECT COST SUBTOTALS	\$1,202			\$25			DIRECT COST SUBTOTALS		\$1,227
Additional Pay Item Notes :									
Used RS Means : assumption for "Pipe, metal pipe, to 1-1/2" diam., selective demolition, 370 LF of 1 1/2" pipes at 2.72 Lbs. Used 1 Steelworkers to cut the pipes and 3 Laborers for hauling.									

PAY ITEM COST DETAIL WORKSHEET

3.040 Remove & Dispose - 2 - CO2 Systems

PAY ITEM INFORMATION												
PAY ITEM NUMBER	:	3.040				Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose - 2 - CO2 Systems				Group	:	D03				
Quantity	:	2,100.00		LBS								
Daily Production	:	7,500.00		LBS per	10	hour shift	Project #	:	3			
Work Days	:	0.3		Days			Estimator	:	Mihaela Tomulescu			
Unit Price	:	\$1.08		per LBS			Probable Low Cost Parameter		8250	\$2,039	Unit Price Per LBS \$0.97	
Total Cost	:	\$2,266					Probable High Cost Parameter		6000	\$2,719	\$1.29	

CREW COSTS											
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost	
Labor Foreman	Active	1.00	0.3	10	3.00	L	\$58.35	incl. in rate	incl. in rate		\$175.04
Steelworker	Active	2.00	0.3	10	6.00	L	\$77.55	incl. in rate	incl. in rate		\$465.31
Laborer	Active	2.00	0.3	10	6.00	L	\$51.01	incl. in rate	incl. in rate		\$306.06
Equipment Operator (medium)	Active	1.00	0.3	10	3.00	L	\$72.39	incl. in rate	incl. in rate		\$217.16
Loader, FE Rubber Tire (5.25cy)	Active	1.00	0.3	10	3.00	E	\$76.00	incl. in rate	incl. in rate		\$228.00
Electrician	Active	1.00	0.3	10	3.00	L	\$55.25	incl. in rate	incl. in rate		\$165.76
Equipment Operator (light)	Active	1.00	0.3	10	3.00	L	\$69.39	incl. in rate	incl. in rate		\$208.17
Labor Hours					24	TOTAL LABOR					\$1,537.51
Equipment Hours					3	TOTAL EQUIPMENT					\$228.00

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc	1.00	LS	1.000	1.00	\$76.88	\$76.88
TOTAL MATERIAL						\$76.88

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling to Disposal Site Or Recycle Site	1.00	Loads	20 tons a load	\$400.00	\$400.00
TOTAL SUBCONTRACTS					\$400.00

SUMMARY OF COSTS						
Labor Cost	\$1,537.51	Labor Burden @	0.0%	\$0.00		\$1,537.51
Material Cost	\$76.88	Material Tax @	7.8%	\$5.96		\$82.83
Equipment Cost	\$228.00	Equipment Tax @	7.8%	\$17.67		\$245.67
Subcontractors	\$400.00					\$400.00
DIRECT COST SUBTOTALS	\$2,242			\$24	DIRECT COST SUBTOTALS	\$2,266
Additional Pay Item Notes :						
Used RS Means : Pipe, metal pipe, to 1-1/2" diam., selective demolition, 772 LF of 1 1/2" pipes at 2.72 Lbs. Used 1 Forman, 2 Steelworkers to cut the pipes and 2 Laborers to load the pipes in the truck. 1 electrician for tools.						

PAY ITEM COST DETAIL WORKSHEET

3.041 Remove & Dispose - Plant Water and Fire Protection

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.041			Project	:	KRRP - Copco 2		
Description	:	Remove & Dispose - Plant Water and Fire Protection			Group	:	D05		
Quantity	:	3,100.00 LBS							
Daily Production	:	7,500.00 LBS per		10	hour shift	Project #	:	3	
Work Days	:	0.4 Days			Estimator	:	Mihaela Tomulescu		
Unit Price	:	\$0.96 per LBS			Probable Low Cost Parameter		8250	\$2,673	\$0.86
Total Cost	:	\$2,970			Probable High Cost Parameter		6000	\$3,564	\$1.15

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.4	10	4.00	L	\$58.35	incl. in rate	incl. in rate	\$233.39
Steelworker	Active	2.00	0.4	10	8.00	L	\$77.55	incl. in rate	incl. in rate	\$620.42
Laborer	Active	4.00	0.4	10	16.00	L	\$51.01	incl. in rate	incl. in rate	\$816.16
Electrician	Active	1.00	0.4	10	4.00	L	\$55.25	incl. in rate	incl. in rate	\$221.01
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.4	10	4.00	E	\$63.11	incl. in rate	incl. in rate	\$252.44
Equipment Operator (medium)	Active	1.00	0.4	10	4.00	L	\$72.39	incl. in rate	incl. in rate	\$289.55
					Labor Hours	36	TOTAL LABOR			\$2,180.53
					Equipment Hours	4	TOTAL EQUIPMENT			\$252.44

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$109.03	\$109.03
						TOTAL MATERIAL
						\$109.03

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling to Disposal Site Or Recycle Site	1.00	Loads	20 tons a load	\$400.00	\$400.00
					TOTAL SUBCONTRACTS
					\$400.00

SUMMARY OF COSTS									
Labor Cost	\$2,180.53	Labor Burden @	0.0%	\$0.00					\$2,180.53
Material Cost	\$109.03	Material Tax @	7.8%	\$8.45					\$117.48
Equipment Cost	\$252.44	Equipment Tax @	7.8%	\$19.56					\$272.00
Subcontractors	\$400.00								\$400.00
DIRECT COST SUBTOTALS	\$2,942			\$28				DIRECT COST SUBTOTALS	\$2,970
Additional Pay Item Notes :									
Used RS Means : Pipe, metal pipe, to 1-1/2" diam., selective demolition, 1140 LF of 1 1/2" pipes at 2.72 Lbs. Used 1 Forman, 2 Steelworkers to cut the pipes and 4 Laborers to load the pipes in the truck.									

PAY ITEM COST DETAIL WORKSHEET

3.042 Remove & Dispose - Transformer Oil Fire Protection

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.042	Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose - Transformer Oil Fire Protection	Group	:	D09				
Quantity	:	6,500.00 LBS							
Daily Production	:	23,125.00 LBS per	10	hour shift	Project #	:	3		
Work Days	:	0.3 Days	Estimator	:	Mihaela Tomulescu				
Unit Price	:	\$0.66 per LBS	Probable Low Cost Parameter		LBS per		25437.5	Total Cost	\$3,860
Total Cost	:	\$4,289	Probable High Cost Parameter				18500	\$5,146	Unit Price Per LBS \$0.79

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.3	10	3.00	L	\$58.35	incl. in rate	incl. in rate	\$175.04
Laborer	Active	2.00	0.3	10	6.00	L	\$51.01	incl. in rate	incl. in rate	\$306.06
Steelworker	Active	2.00	0.3	10	6.00	L	\$77.55	incl. in rate	incl. in rate	\$465.31
Loader, FE Rubber Tire (8.6cy)	Active	1.00	0.3	10	3.00	E	\$225.40	incl. in rate	incl. in rate	\$676.20
Equipment Operator (medium)	Active	1.00	0.3	10	3.00	L	\$72.39	incl. in rate	incl. in rate	\$217.16
Labor Hours					18	TOTAL LABOR				\$1,163.58
Equipment Hours					3	TOTAL EQUIPMENT				\$676.20

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$58.18	\$58.18
						TOTAL MATERIAL
						\$58.18

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	3.25	ton	1.000	3.25	\$595.00
Hauling to Disposal Site Or Recycle Site	1.00	Loads	20 tons a load	\$400.00	\$400.00
					TOTAL SUBCONTRACTS
					\$2,333.75

SUMMARY OF COSTS						
Labor Cost	\$1,163.58	Labor Burden @	0.0%	\$0.00		\$1,163.58
Material Cost	\$58.18	Material Tax @	7.8%	\$4.51		\$62.69
Equipment Cost	\$676.20	Equipment Tax @	7.8%	\$52.41		\$728.61
Subcontractors	\$2,333.75					\$2,333.75
DIRECT COST SUBTOTALS	\$4,232		\$57		DIRECT COST SUBTOTALS	\$4,289
Additional Pay Item Notes :						
Based on RS Means : Pipe, metal pipe, to 1-1/2" diam., selective demolition, 2390 LF of 1 1/2" fire protection pipes at 2.72 Lbs. Used 1 Forman and 1 Laborers to load in drums and put them in the truck. Calculated 36 miles from Copco 1 to Yreka Transfer Recycling. Each hydropower facility has at least 150,000 gallons to 250,000 gallon of oil currently in use. This oil would have to be properly disposed of in the event of decommissioning. Oil removed from the turbines and other equipment, including transformer oil, would be either a waste oil or used oil, depending on prior use and contaminants found in the oil. Containerized oil containing contaminants such as solvents are commonly encountered at hydropower facilities. Oil sludges are common in tanks. Oil disposal would likely be costly due to the large volumes found at hydropower facilities and the ease of contamination with other regulated hazardous wastes.						

PAY ITEM COST DETAIL WORKSHEET

3.043 Remove & Dispose - Unwatering Piping

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.043	Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose - Unwatering Piping	Group	:	D05				
Quantity	:	32,000.00 LBS							
Daily Production	:	22,500.00 LBS per	10	hour shift	Project #	:	3		
Work Days	:	1.4 Days	Estimator	:	Mihaela Tomulescu	LBS per		Total Cost	Unit Price Per LBS
Unit Price	:	\$0.48 per LBS	Probable Low Cost Parameter			24750	\$13,830	\$0.43	
Total Cost	:	\$15,367	Probable High Cost Parameter			18000	\$18,440	\$0.58	

CREW COSTS											
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost	
Labor Foreman	Active	1.00	1.4	10	14.00	L	\$58.35	incl. in rate	incl. in rate	\$816.86	
Laborer	Active	4.00	1.4	10	56.00	L	\$51.01	incl. in rate	incl. in rate	\$2,856.56	
Steelworker	Active	4.00	1.4	10	56.00	L	\$77.55	incl. in rate	incl. in rate	\$4,342.91	
Equipment Operator (medium)	Active	1.00	1.4	10	14.00	L	\$72.39	incl. in rate	incl. in rate	\$1,013.43	
Welder	Active	1.00	1.4	10	14.00	L	\$8.62	incl. in rate	incl. in rate	\$120.73	
Gas Welding Machine	Active	1.00	1.4	10	14.00	E	\$2.88	incl. in rate	incl. in rate	\$40.28	
Electrician	Active	1.00	1.4	10	14.00	L	\$55.25	incl. in rate	incl. in rate	\$773.54	
Loader, FE Rubber Tire (5.25cy)	Active	1.00	1.4	10	14.00	E	\$76.00	incl. in rate	incl. in rate	\$1,064.00	
					Labor Hours	168	TOTAL LABOR			\$9,924.04	
					Equipment Hours	28	TOTAL EQUIPMENT			\$1,104.28	

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$992.40	\$992.40
Selective demolition, torch cutting, steel, 1" thick plate (assumption)	2,000.00	LF	1.000	2,000.00	\$0.85	\$1,700.00
TOTAL MATERIAL						\$2,692.40

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum					
	1.60	ton	1.000	1.60	\$952.00
Hauling to Disposal Site Or Recycle Site	1.00	Loads	20 tons a load	\$400.00	\$400.00
TOTAL SUBCONTRACTS					\$1,352.00

SUMMARY OF COSTS									
Labor Cost	\$9,924.04	Labor Burden @	0.0%	\$0.00				\$9,924.04	
Material Cost	\$2,692.40	Material Tax @	7.8%	\$208.66				\$2,901.06	
Equipment Cost	\$1,104.28	Equipment Tax @	7.8%	\$85.58				\$1,189.86	
Subcontractors	\$1,352.00							\$1,352.00	
DIRECT COST SUBTOTALS	\$15,073			\$294			DIRECT COST SUBTOTALS	\$15,367	
Additional Pay Item Notes :									
Used RS Means : Assumed Pipe, metal pipe, to 1-1/2" diam., selective demolition, around 11765 LF of 1 1/2" pipes at 2.72 Lbs. Used Crew formed of 1 Forman, 2 Steelworkers to cut the pipes, 1 Welder to cut steel in inaccessible places , 2 Laborers to haul the pipes in the truck with the loader, 1 electrician to unplug the power and to assure the temporary power at the construction site. Calculated 36 miles from Copco to Yreka Transfer Recycling.									

PAY ITEM NUMBER	:	3.044	Project	:	KRRP - Copco 2
Description	:	Remove & Dispose - Drainage Piping	Group	:	D05
Quantity	:	10,000.00 LBS			
Daily Production	:	5,562.50 LBS per	10	hour shift	
Work Days	:	1.8 Days	Project #	:	3
Unit Price	:	\$0.82 per LBS	Estimator	:	Mihaela Tomulescu
Total Cost	:	\$8,231	LBS per	:	6118.75
			Total Cost	:	\$7,408
			Unit Price Per LBS	:	\$0.74
			Probable Low Cost Parameter	:	\$9,877
			Probable High Cost Parameter	:	\$0.99

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.8	10	18.00	L	\$58.35	incl. in rate	incl. in rate	\$1,050.25
Steelworker	Active	1.00	1.8	10	18.00	L	\$77.55	incl. in rate	incl. in rate	\$1,395.94
Electrician	Active	1.00	1.8	10	18.00	L	\$55.25	incl. in rate	incl. in rate	\$994.55
Equipment Operator (medium)	Active	1.00	1.8	10	18.00	L	\$72.39	incl. in rate	incl. in rate	\$1,302.98
Loader, FE Rubber Tire (5.25cy)	Active	1.00	1.8	10	18.00	E	\$76.00	incl. in rate	incl. in rate	\$1,368.00
Electrician	Active	1.00	1.8	10	18.00	L	\$55.25	incl. in rate	incl. in rate	\$994.55
Labor Hours					90	TOTAL LABOR				\$5,738.27
Equipment Hours					18	TOTAL EQUIPMENT				\$1,368.00

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$573.83	\$573.83
TOTAL MATERIAL						\$573.83

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling to Disposal Site Or Recycle Site	1.00	Loads	20 tons a load	\$400.00	\$400.00
TOTAL SUBCONTRACTS					\$400.00

Labor Cost	\$5,738.27	Labor Burden @	0.0%	\$0.00		\$5,738.27
Material Cost	\$573.83	Material Tax @	7.8%	\$44.47		\$618.30
Equipment Cost	\$1,368.00	Equipment Tax @	7.8%	\$106.02		\$1,474.02
Subcontractors	\$400.00					\$400.00
DIRECT COST SUBTOTALS	\$8,080			\$150	DIRECT COST SUBTOTALS	\$8,231

Assumed 2735 LF of 1 " drainage pipes at 3.66 Lbs. Used 1 Loader and 1 Forman, 1 Steelworkers to cut the pipes and 1 Laborers to load the pipes in the truck.

PAY ITEM COST DETAIL WORKSHEET

3.044a Remove & Dispose - Petroleum Products from Mechanical Equip.

PAY ITEM INFORMATION												
PAY ITEM NUMBER	:	3.044a				Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose - Petroleum Products from Mechanical Equip.				Group	:	D05				
Quantity	:	3,300.00		GAL								
Daily Production	:	1,375.00		GAL per	10	hour shift						
Work Days	:	2.4		Days								
Unit Price	:	\$4.74 per GAL				Project #	:	3				
Total Cost	:	\$15,652				Estimator	:	Mihaela Tomulescu		GAL per	Total Cost	
						Probable Low Cost Parameter		1512.5		\$14,087	Unit Price Per GAL	
						Probable High Cost Parameter		1168.75		\$18,000	\$5.45	

CREW COSTS											
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost	
Labor Foreman	Active	1.00	2.4	10	24.00	L	\$58.35	incl. in rate	incl. in rate	\$1,400.33	
Carpenters, Journeyman	Active	2.00	2.4	10	48.00	L	\$77.03	incl. in rate	incl. in rate	\$3,697.30	
Laborer	Active	2.00	2.4	10	48.00	L	\$51.01	incl. in rate	incl. in rate	\$2,448.48	
					Labor Hours	120	TOTAL LABOR				\$7,546.10
					Equipment Hours	0	TOTAL EQUIPMENT				\$0.00

MATERIAL COSTS							
Description	Item Quantity	Order Unit	onversion	Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 20% labor (absorbant materials, drums, etc)	1.00	LS		1.000	1.00	\$1,509.22	\$1,509.22
TOTAL MATERIAL							\$1,509.22

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, liquid pickup, vacuum truck, stainless steel tank, 5000 gallons, minimum charge, 4 hours, 2 compartment	24.00	hour	RSM Means 028120101260	\$270.00	\$6,480.00
TOTAL SUBCONTRACTS					\$6,480.00

SUMMARY OF COSTS							
Labor Cost	\$7,546.10	Labor Burden @	0.0%	\$0.00		\$7,546.10	
Material Cost	\$1,509.22	Material Tax @	7.8%	\$116.96		\$1,626.19	
Equipment Cost	\$0.00	Equipment Tax @	7.8%	\$0.00		\$0.00	
Subcontractors	\$6,480.00					\$6,480.00	
DIRECT COST SUBTOTALS	\$15,535			\$117	DIRECT COST SUBTOTALS	\$15,652	

Additional Pay Item Notes :

Petroleum-based products, ranging from fuel oil and hydraulic fluid to lubricating greases and oils, are found throughout every type of power generating plant or system. Lubrication supports bearings and moving parts in all sorts of equipment: pumps, conveyors, feeders, scrubbers, cranes, turbines, and more.A good oil/water separation system will result in a flow of concentrated waste oil to a collection area and a flow of oil-free water ready for secondary processing or discharge. Once an oil layer has been separated from free water, it must be removed for recycling or disposal. Many plants use one or more of these oil removal methods, but each has costly limitations:

1. Absorbent materials. Absorbent mats or materials are frequently used to dam up and absorb excess oils and greases resulting from accidents or the routine operation of machinery. These materials are very effective for preventing the spread of a source leak and very efficient in terms of oil pickup. Yet, their use on large volumes of waste oil results in multiple, recurring costs that can make them impractical as an everyday solution:

- the costs of the materials themselves
- the labor costs for ordering, stocking, application, and removal
- the costs of used-media collection, disposal, or re-processing/recycling.

2. Manually operated "slotted pipes." Many separators feature a "slotted pipe," a pipe located near the top of the vessel that has a horizontal opening. Oil is removed by turning the horizontal opening downward until it meets the floating oil layer, which drains through the pipe to a collection receptacle. These pipes work well on thick layers of oil, but cannot drain off a sheen of oil without draining off a large amount of water as well.

AECOM assumed the best is Vacuum truck removal method .Used a crew formed of 1 Foreman, 2 Laborers and 2 journeymen to takeout the petroleum waste, Vacuum-equipped tank trucks are used to remove waste oil from collection points (assumed existing drums or tanks) so that it can be transported to recycling or disposal locations. If the waste oil has been thoroughly separated, highly concentrated, and stored in an appropriate receptacle, this service can be used very efficiently. However, vacuum disposal units are often used to pump oil layers directly off of water. This results in the intake of a significant amount free water along with the waste oil -- and a significantly higher cost.

PAY ITEM COST DETAIL WORKSHEET

3.045 Remove & Dispose - AC Generator, Indoor Vertical

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.045	Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose - AC Generator, Indoor Vertical	Group	:	D09				
Quantity	:	2.00 EA							
Daily Production	:	0.25 EA per	10	hour shift					
Work Days	:	8.0	Days		Project #	:	3		
Unit Price	:	\$65,756.87	per EA		Estimator	:	Mihaela Tomulescu	EA per	Total Cost
Total Cost	:	\$131,514			Probable Low Cost Parameter			0.275	\$118,362
					Probable High Cost Parameter			0.225	\$144,665
									Unit Price Per EA
									\$59,181.18
									\$72,332.56

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	8.0	10	80.00	L	\$55.45	incl. in rate	incl. in rate	\$4,436.24
Electrician	Active	6.00	8.0	10	480.00	L	\$55.25	incl. in rate	incl. in rate	\$26,521.44
Equipment Operator (oiler)	Active	2.00	8.0	10	160.00	L	\$73.04	incl. in rate	incl. in rate	\$11,687.04
Equipment Operator (crane)	Active	1.00	8.0	10	80.00	L	\$81.02	incl. in rate	incl. in rate	\$6,481.68
Crawler Crane (130tn)	Active	1.00	8.0	10	80.00	E	\$262.91	incl. in rate	incl. in rate	\$21,032.80
Steelworker	Active	6.00	8.0	10	480.00	L	\$77.55	incl. in rate	incl. in rate	\$37,224.96
Labor Foreman	Active	1.00	8.0	10	80.00	L	\$58.35	incl. in rate	incl. in rate	\$4,667.76
Welder	Active	2.00	8.0	10	160.00	L	\$8.62	incl. in rate	incl. in rate	\$1,379.80
Gas Welding Machine	Active	2.00	8.0	10	160.00	E	\$2.88	incl. in rate	incl. in rate	\$460.32
Labor Hours					1520	TOTAL LABOR				\$92,398.92
Equipment Hours					240	TOTAL EQUIPMENT				\$21,493.12

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, e	1.00	LS	1.000	1.00	\$9,239.89	\$9,239.89
						TOTAL MATERIAL
						\$9,239.89

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling to Yreka increased amount for wide loads	6.00	Loads	20 tons a load	\$ 1,000.00	\$6,000.00
					TOTAL SUBCONTRACTS
					\$6,000.00

SUMMARY OF COSTS						
Labor Cost	\$92,398.92	Labor Burden @	0.0%	\$0.00		\$92,398.92
Material Cost	\$9,239.89	Material Tax @	7.8%	\$716.09		\$9,955.98
Equipment Cost	\$21,493.12	Equipment Tax @	7.8%	\$1,665.72		\$23,158.83
Subcontractors	\$6,000.00					\$6,000.00
DIRECT COST SUBTOTALS	\$129,132			\$2,382	DIRECT COST SUBTOTALS	\$131,514
Additional Pay Item Notes :						
Assumed removal of 2 units in 2 weeks, weight per unit around 230000 LBS (stator, rotor, base, exciter assembly). Used RS Means, 2 X R13 Crew formed of 1 Foreman, 3 Electricians, 1 Oiler, 0.25 Equipment Crane, 3 Steelworkers to cut adjacent appurtenances and 1 Welder to cut pipes.						

SUMMARY OF COSTS					
Labor Cost	\$5,487.16	Labor Burden @	0.0%	\$0.00	\$5,487.16
Material Cost	\$2,399.36	Material Tax @	7.8%	\$185.95	\$2,585.31
Equipment Cost	\$5,142.28	Equipment Tax @	7.8%	\$398.53	\$5,540.81
Subcontractors	\$400.00				\$400.00
DIRECT COST SUBTOTALS	\$13,429		\$584		DIRECT COST SUBTOTALS \$14,013
Additional Pay Item Notes :					
Production based on 1 Forman, 1 Electrician, 1 Welder to cut to remove the electrical equipment and 1 laborer to haul. Equipment used 1 Loader and 1 Crane for disposal. Assumed 2 sections, weight 1000LBS.					

SUMMARY OF COSTS									
Labor Cost	\$2,940.93	Labor Burden @	0.0%	\$0.00					\$2,940.93
Material Cost	\$147.05	Material Tax @	7.8%	\$11.40					\$158.44
Equipment Cost	\$0.00	Equipment Tax @	7.8%	\$0.00					\$0.00
Subcontractors	\$400.00								\$400.00
DIRECT COST SUBTOTALS		\$3,488		\$11				DIRECT COST SUBTOTALS	\$3,499
Additional Pay Item Notes :									
Assumption for Crew R3: 1 Forman, 1 Electrician, 2 Ironworker to cut rods and 2 laborer to haul in the truck. (500 lbs)									

PAY ITEM COST DETAIL WORKSHEET

3.049 Remove & Dispose - Generator Switchgear, 7.2kV-includes unit breakers

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.049			Project	:	KRRP - Copco 2		
Description	:	Remove & Dispose - Generator Switchgear, 7.2kV-includes unit breakers			Group	:	D04		
Quantity	:	1.00 EA			Project #	:	3		
Daily Production	:	0.50 EA per 10 hour shift			Estimator	:	Mihaela Tomulescu	EA per	Total Cost
Work Days	:	2.0 Days			Probable Low Cost Parameter	:	0.55	\$10,094	\$10,093.72
Unit Price	:	\$11,215.25 per EA			Probable High Cost Parameter	:	0.425	\$12,898	\$12,897.53
Total Cost	:	\$11,215							

CREW COSTS										
Description	Active Idle	# In crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	2.0	10	20.00	L	\$55.45	incl. in rate	incl. in rate	\$1,109.06
Electrician	Active	3.00	2.0	10	60.00	L	\$55.25	incl. in rate	incl. in rate	\$3,315.18
Laborer	Active	2.00	2.0	10	40.00	L	\$51.01	incl. in rate	incl. in rate	\$2,040.40
Loader, FE Rubber Tire (5.25cy)	Active	1.00	2.0	10	20.00	E	\$76.00	incl. in rate	incl. in rate	\$1,520.00
Welder	Active	1.00	2.0	10	20.00	L	\$8.62	incl. in rate	incl. in rate	\$172.48
Gas Welding Machine	Active	1.00	2.0	10	20.00	E	\$2.88	incl. in rate	incl. in rate	\$57.54
Equipment Operator (medium)	Active	1.00	2.0	10	20.00	L	\$72.39	incl. in rate	incl. in rate	\$1,447.76
Labor Hours					160	TOTAL LABOR				\$8,084.88
Equipment Hours					40	TOTAL EQUIPMENT				\$1,577.54

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$404.24	\$404.24
TOTAL MATERIAL						\$404.24

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	1.00	ton	1.000	1.00	\$595.00
Hauling to Disposal Site Or Recycle Site	1.00	Loads	20 tons a load	\$400.00	\$400.00
TOTAL SUBCONTRACTS					\$995.00

SUMMARY OF COSTS						
Labor Cost	\$8,084.88	Labor Burden @	0.0%	\$0.00		\$8,084.88
Material Cost	\$404.24	Material Tax @	7.8%	\$31.33		\$435.57
Equipment Cost	\$1,577.54	Equipment Tax @	7.8%	\$122.26		\$1,699.80
Subcontractors	\$995.00					\$995.00
DIRECT COST SUBTOTALS	\$11,062			\$154	DIRECT COST SUBTOTALS	\$11,215

Additional Pay Item Notes :

Used 1 Crews (2 sections each weight around 2400 LBS) formed of 1 Forman, 3 Electrician, 2 laborer to haul with the crane in the truck. Assumed containing hazardous waste that will be disposed at 36 miles away from the construction site to Yreka Transfer Recycling . In normal circumstances, decontaminated residual components could be accepted at landfill sites but Polychlorinated biphenyl, otherwise known as PCB, is a synthetic chemical that is widely used for industrial and commercial use as dielectric fluid in transformers and capacitors because of its high resistance to decomposition, low electrical conductivity, low flammability and high heat capacity. Transformer repair, reconditioning and retro-filling facilities are the major industry sectors that contributes to the spread of PCB contamination. Types of PCB Wastes: PCB wastes are discarded materials that contain PCB or have been contaminated with PCBs and that are without any commercial, industrial, or economic use. For the purpose of this Code of Practice, PCBs wastes are classified as follows: Liquid PCB wastes
o PCB-based dielectric fluids removed from transformers and other equipment
o PCB-based heat transfer and hydraulic fluids Metallic solid wastes
o PCB equipment such as capacitors, transformers, switchgears, circuit breakers, heat transfer systems, etc.
o Contaminated components removed from electrical equipment such as windings;
PCB-contaminated containers and equipment such as metal drums, tanks, pumps, metal filters, etc.

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.050	Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose - Station Service Switchgear, 600-volt (5 sections)	Group	:	D04				
Quantity	:	1.00 EA	Project #	:	3				
Daily Production	:	0.50 EA per 10 hour shift	Estimator	:	Mihaela Tomulescu				
Work Days	:	2.0 Days	Probable Low Cost Parameter		EA per	0.55	Total Cost	\$9,046	Unit Price Per EA
Unit Price	:	\$10,050.65 per EA	Probable High Cost Parameter		0.425	\$11,558	\$9,045.59	\$11,558.25	
Total Cost	:	\$10,051							

CREW COSTS											
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost	
Electrician Foreman	Active	1.00	2.0	10	20.00	L	\$55.45	incl. in rate	incl. in rate	\$1,109.06	
Electrician	Active	2.00	2.0	10	40.00	L	\$55.25	incl. in rate	incl. in rate	\$2,210.12	
Laborer	Active	2.00	2.0	10	40.00	L	\$51.01	incl. in rate	incl. in rate	\$2,040.40	
Loader, FE Rubber Tire (5.25cy)	Active	1.00	2.0	10	20.00	E	\$76.00	incl. in rate	incl. in rate	\$1,520.00	
Equipment Operator (medium)	Active	1.00	2.0	10	20.00	L	\$72.39	incl. in rate	incl. in rate	\$1,447.76	
Welder	Active	1.00	2.0	10	20.00	L	\$8.62	incl. in rate	incl. in rate	\$172.48	
Gas Welding Machine	Active	1.00	2.0	10	20.00	E	\$2.88	incl. in rate	incl. in rate	\$57.54	
Labor Hours					140	TOTAL LABOR					\$6,979.82
Equipment Hours					40	TOTAL EQUIPMENT					\$1,577.54

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$348.99	\$348.99
Selective demolition, torch cutting, steel, 1" thick plate (assumed qty)	0.00	LF	1.000	0.00	\$0.85	\$0.00
						TOTAL MATERIAL
						\$348.99

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum					
	1.00	ton	1.000	1.00	\$595.00
Hauling to Disposal Site Or Recycle Site	1.00	Loads	20 tons a load	\$400.00	\$400.00
					TOTAL SUBCONTRACTS
					\$995.00

SUMMARY OF COSTS									
Labor Cost	\$6,979.82	Labor Burden @	0.0%	\$0.00					\$6,979.82
Material Cost	\$348.99	Material Tax @	7.8%	\$27.05					\$376.04
Equipment Cost	\$1,577.54	Equipment Tax @	7.8%	\$122.26					\$1,699.80
Subcontractors	\$995.00								\$995.00
DIRECT COST SUBTOTALS	\$9,901			\$149				DIRECT COST SUBTOTALS	\$10,051
Additional Pay Item Notes :									
Used 1 Crew formed of 1 Forman, 2 Electrician, 1welder to cut, 2 laborer to haul with the loader in the truck. Assumed containing hazardous waste that will be disposed . Calculated 34 miles from Copco 1 to Yreka Transfer Recycling.									

CREW COSTS

MATERIAL COSTS

SUBCONTRACT COSTS

SUMMARY OF COSTS

Additional Pay Item Notes :

3.051

PAY ITEM COST DETAIL WORKSHEET

3.052 Remove & Dispose - Battery system

PAY ITEM INFORMATION											
PAY ITEM NUMBER	:	3.052				Project	:	KRRP - Copco 2			
Description	:	Remove & Dispose - Battery system				Group	:	D05			
Quantity	:	1.00 EA									
Daily Production	:	0.63 EA per 10 hour shift				Project #	:	3			
Work Days	:	1.6 Days				Estimator	:	Mihaela Tomulescu			
Unit Price	:	\$8,584.36 per EA				Probable Low Cost Parameter		EA per	Total Cost	Unit Price Per EA	
Total Cost	:	\$8,584				Probable High Cost Parameter		0.6875	\$7,726	\$7,725.93	
								0.53125	\$9,872	\$9,872.02	

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.6	10	16.00	L	\$58.35	incl. in rate	incl. in rate	\$933.55
Electrician	Active	2.00	1.6	10	32.00	L	\$55.25	incl. in rate	incl. in rate	\$1,768.10
Laborer	Active	4.00	1.6	10	64.00	L	\$51.01	incl. in rate	incl. in rate	\$3,264.64
Loader, FE Rubber Tire (3.5cy)	Active	1.00	1.0	10	10.00	E	\$63.11	incl. in rate	incl. in rate	\$631.10
Equipment Operator (light)	Active	1.00	1.0	10	10.00	L	\$69.39	incl. in rate	incl. in rate	\$693.90
Welder	Active	1.00	1.0	10	10.00	L	\$8.62	incl. in rate	incl. in rate	\$86.24
Gas Welding Machine	Active	1.00	1.0	10	10.00	E	\$2.88	incl. in rate	incl. in rate	\$28.77
Labor Hours					132	TOTAL LABOR				\$6,746.43
Equipment Hours					20	TOTAL EQUIPMENT				\$659.87

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$674.64	\$674.64
TOTAL MATERIAL						\$674.64

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling to Disposal Site Or Recycle Site	1.00	Loads	20 tons a load	\$400.00	\$0.00
TOTAL SUBCONTRACTS					\$400.00

SUMMARY OF COSTS						
Labor Cost	\$6,746.43	Labor Burden @	0.0%	\$0.00		\$6,746.43
Material Cost	\$674.64	Material Tax @	7.8%	\$52.28		\$726.93
Equipment Cost	\$659.87	Equipment Tax @	7.8%	\$51.14		\$711.01
Subcontractors	\$400.00					\$400.00
DIRECT COST SUBTOTALS	\$8,481			\$103	DIRECT COST SUBTOTALS	\$8,584

Additional Pay Item Notes :

Assuming 2 days of work disposing around 100 batteries, racks and supports. Using Crews E-19 for metals demolition, E-12 and E-25 for cutting steel and A-3H for equipment disposal, B-34A for hauling.

PAY ITEM INFORMATION												
PAY ITEM NUMBER	:	3.053				Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose - Raceways, Conduit and Cable				Group	:	D05				
Quantity	:	1.00		EA								
Daily Production	:	0.63		EA per	10	hour shift						
Work Days	:	1.6		Days								
Unit Price	:	\$14,076.70 per EA				Estimator	:	Mihaela Tomulescu		EA per	Total Cost	Unit Price Per EA
Total Cost	:	\$14,077				Probable Low Cost Parameter		0.6875		\$12,669	\$12,669.03	
						Probable High Cost Parameter		0.53125		\$16,188	\$16,188.21	

CREW COSTS												
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost		
Labor Foreman	Active	1.00	1.6	10	16.00	L	\$58.35	incl. in rate	incl. in rate	\$933.55		
Electrician	Active	4.00	1.6	10	64.00	L	\$55.25	incl. in rate	incl. in rate	\$3,536.19		
Laborer	Active	6.00	1.6	10	96.00	L	\$51.01	incl. in rate	incl. in rate	\$4,896.96		
Loader, FE Rubber Tire (3.5cy)	Active	1.00	1.6	10	16.00	E	\$63.11	incl. in rate	incl. in rate	\$1,009.76		
Equipment Operator (light)	Active	1.00	1.6	10	16.00	L	\$69.39	incl. in rate	incl. in rate	\$1,110.24		
Electrician Foreman	Active	1.00	1.6	10	16.00	L	\$55.45	incl. in rate	incl. in rate	\$887.25		
					Labor Hours	208					TOTAL LABOR	\$11,364.19
					Equipment Hours	16					TOTAL EQUIPMENT	\$1,009.76

MATERIAL COSTS							
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost	
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$1,136.42	\$1,136.42	
						TOTAL MATERIAL	\$1,136.42

SUBCONTRACT COSTS						
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount	
Hauling to Disposal Site Or Recycle Site	1.00	Loads	20 tons a load	\$400.00	\$400.00	
					TOTAL SUBCONTRACTS	\$400.00

SUMMARY OF COSTS									
Labor Cost	\$11,364.19	Labor Burden @	0.0%	\$0.00		\$11,364.19			
Material Cost	\$1,136.42	Material Tax @	7.8%	\$88.07		\$1,224.49			
Equipment Cost	\$1,009.76	Equipment Tax @	7.8%	\$78.26		\$1,088.02			
Subcontractors	\$400.00					\$400.00			
DIRECT COST SUBTOTALS	\$13,910			\$166	DIRECT COST SUBTOTALS	\$14,077			

Additional Pay Item Notes :

Assumption for removal of control power cable, conduit (3000 LF) and cable tray (300 LF) - using R3 electrical crew and laborers for hauling with the loader.

PAY ITEM NUMBER	:	3.056	Project	:	KRRP - Copco 2
Description	:	Remove & Dispose - 40-Ton Travelling Crane control equipment	Group	:	D10
Quantity	:	1.00 EA			
Daily Production	:	1.50 EA per	10	hour shift	
Work Days	:	0.7	Days		
Unit Price	:	\$3,671.60	per EA		
Total Cost	:	\$3,672			
			Project #	:	3
			Estimator	:	Mihaela Tomulescu
				EA per	Total Cost
			Probable Low Cost Parameter	1.65	\$3,304
			Probable High Cost Parameter	1.275	\$4,222.34

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.7	10	7.00	L	\$58.35	incl. in rate	incl. in rate	\$408.43
Hydraulic Crane (80tn)	Active	1.00	0.7	10	7.00	E	\$197.66	incl. in rate	incl. in rate	\$1,383.62
Laborer	Active	2.00	0.7	10	14.00	L	\$51.01	incl. in rate	incl. in rate	\$714.14
Equipment Operator (crane)	Active	1.00	0.7	10	7.00	L	\$81.02	incl. in rate	incl. in rate	\$567.15
Labor Hours					28	TOTAL LABOR				\$1,689.72
Equipment Hours					7	TOTAL EQUIPMENT				\$1,383.62

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$84.49	\$84.49
TOTAL MATERIAL						\$84.49

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling to Disposal Site Or Recycle Site	1.00	Loads	20 tons a load	\$400.00	\$400.00
					\$0.00
					\$0.00
TOTAL SUBCONTRACTS					\$400.00

Labor Cost	\$1,689.72	Labor Burden @	0.0%	\$0.00			\$1,689.72
Material Cost	\$84.49	Material Tax @	7.8%	\$6.55			\$91.03
Equipment Cost	\$1,383.62	Equipment Tax @	7.8%	\$107.23			\$1,490.85
Subcontractors	\$400.00						\$400.00
DIRECT COST SUBTOTALS	\$3,558			\$114		DIRECT COST SUBTOTALS	\$3,672

Assumed 5 cubicles: 2 Laborers and 1 Electrician will load in the truck with the crane the control equipment.

PAY ITEM NUMBER	:	3.057	Project	:	KRRP - Copco 2
Description	:	Remove & Dispose - 40-Ton Travelling Crane Festoon Cable	Group	:	D10
Quantity	:	1.00 EA			
Daily Production	:	2.50 EA per	10	hour shift	
Work Days	:	0.4	Days		
Unit Price	:	\$1,653.18	per EA		
Total Cost	:	\$1,653			
			Project #	:	3
			Estimator	:	Mihaela Tomulescu
			EA per		
			Total Cost		
			Unit Price Per EA		
			Probable Low Cost Parameter		
			Probable High Cost Parameter		
			2.75	\$1,488	\$1,487.86
			2.125	\$1,901	\$1,901.16

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Laborer	Active	2.00	0.4	10	8.00	L	\$51.01	incl. in rate	incl. in rate	\$408.08
Equipment Operator (medium)	Active	1.00	0.4	10	4.00	L	\$72.39	incl. in rate	incl. in rate	\$289.55
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.4	10	4.00	E	\$63.11	incl. in rate	incl. in rate	\$252.44
Labor Foreman	Active	1.00	0.4	10	4.00	L	\$58.35	incl. in rate	incl. in rate	\$233.39
Labor Hours					16	TOTAL LABOR				\$931.02
Equipment Hours					4	TOTAL EQUIPMENT				\$252.44

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$46.55	\$46.55
TOTAL MATERIAL						\$46.55

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling to Disposal Site Or Recycle Site	1.00	Loads	20 tons a load	\$400.00	\$400.00
TOTAL SUBCONTRACTS					\$400.00

Labor Cost	\$931.02	Labor Burden @	0.0%	\$0.00		\$931.02
Material Cost	\$46.55	Material Tax @	7.8%	\$3.61		\$50.16
Equipment Cost	\$252.44	Equipment Tax @	7.8%	\$19.56		\$272.00
Subcontractors	\$400.00					\$400.00
DIRECT COST SUBTOTALS	\$1,630			\$23	DIRECT COST SUBTOTALS	\$1,653

Assumed 200 LF of cable; 2 Laborers will load in the truck with the loader the overhead crane cable.

PAY ITEM NUMBER	:	3.058a	Project	:	KRRP - Copco 2
Description	:	Remove Oil from Oil-Filled Step-up Transformers	Group	:	D05
Quantity	:	23,000.00 GAL			
Daily Production	:	12,500.00 GAL per	10	hour shift	
Work Days	:	1.8	Days	Project #	: 3
Unit Price	:	\$0.46	per GAL	Estimator	: Mihaela Tomulescu
Total Cost	:	\$10,581		GAL per	13750
				Total Cost	\$9,523
				Unit Price Per GAL	\$0.41
				Probable Low Cost Parameter	11250
				Probable High Cost Parameter	\$11,639
					\$0.51

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.8	10	18.00	L	\$58.35	incl. in rate	incl. in rate	\$1,050.25
Electrician	Active	2.00	1.8	10	36.00	L	\$55.25	incl. in rate	incl. in rate	\$1,989.11
Laborer	Active	2.00	1.8	10	36.00	L	\$51.01	incl. in rate	incl. in rate	\$1,836.36
Labor Hours					90	TOTAL LABOR				\$4,875.71
Equipment Hours					0	TOTAL EQUIPMENT				\$0.00

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 20% labor (absorbant materials, etc)	1.00	LS	1.000	1.00	\$975.14	\$975.14
Hauling and disposal of oil transformers	16.00	hours	1.000	16.00	\$270.00	\$4,320.00
TOTAL MATERIAL						\$5,295.14

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, liquid pickup, vacuum truck, stainless steel tank, 5000 gallons, minimum charge, 4 hours, 2 compartment	16.00	hour	1.000	\$270.00	\$4,320.00
TOTAL SUBCONTRACTS					\$0.00

Labor Cost	\$4,875.71	Labor Burden @	0.0%	\$0.00		\$4,875.71
Material Cost	\$5,295.14	Material Tax @	7.8%	\$410.37		\$5,705.52
Equipment Cost	\$0.00	Equipment Tax @	7.8%	\$0.00		\$0.00
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$10,171			\$410	DIRECT COST SUBTOTALS	\$10,581

Used a crew formed of 1 Foreman, 2 Electricians, 2 Laborers to takeout the petroleum waste, Vacuum-equipped tank trucks are used to remove waste oil from collection points at plants so that it can be transported to recycling or disposal locations. Assumed new waste handling equipment, for handling hazardous waste materials, w/charcoal & HEPA filter, 55 gallon drum packer is new to storage the oil from 8 transformers.

Probable High Cost Parameter

Total Cost :

Probable High Cost Parameter

\$151,321

\$115.51

Demolition is done using hydraulic chipping hammers and excavator mounted claw. Allowance for saw cutting sub is included at one mobilization a week. Blasting method is not found to be feasible for this work. A C using RS Means was used: reference 03055110 (\$224/CY, excludes hauling, sawing, and dumping) - Selective concrete demolition, reinforcing more than 2% cross-sectional area.

PAY ITEM COST DETAIL WORKSHEET

3.063 Place Concrete Plugs for Tunnels

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.063	Project	:	KRRP - Copco 2				
Description	:	Place Concrete Plugs for Tunnels	Group	:	D05				
Quantity	:	100.00	cy						
Daily Production	:	13.75	cy per	10	hour shift	Project #	:	3	
Work Days	:	7.3	Days			Estimator	:	Eric Jones	cy per
Unit Price	:	\$1,536.52	per cy			Probable Low Cost Parameter		15.8125	Total Cost
Total Cost	:	\$153,652				Probable High Cost Parameter		11.6875	Unit Price Per cy
								\$130,604	\$1,306.04
								\$176,700	\$1,767.00

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Carpenter Foreman (out)	Active	2.00	7.3	10	146.00	L	\$85.49	incl. in rate	incl. in rate	\$12,481.83
Carpenters	Active	6.00	7.3	10	438.00	L	\$85.49	incl. in rate	incl. in rate	\$37,445.50
Carpenters, Journeyman	Active	4.00	7.3	10	292.00	L	\$77.54	incl. in rate	incl. in rate	\$22,641.39
Equipment Operator (medium)	Active	2.00	7.3	10	146.00	L	\$72.34	incl. in rate	incl. in rate	\$10,561.06
Truck Driver (heavy)	Active	1.00	7.3	10	73.00	L	\$66.92	incl. in rate	incl. in rate	\$4,885.45
Loader, FE Rubber Tire (5.25cy)	Active	1.00	7.3	10	73.00	E	\$76.00	incl. in rate	incl. in rate	\$5,548.00
Hydraulic Excavator (2.5cy)	Active	1.00	7.3	10	73.00	E	\$205.40	incl. in rate	incl. in rate	\$14,994.20
Truck, Flatbed (4x4, 10,000 gvw)	Active	1.00	7.3	10	73.00	E	\$27.09	incl. in rate	incl. in rate	\$1,977.57
0										
Labor Hours					1,095	TOTAL LABOR				\$88,015.22
Equipment Hours					219	TOTAL EQUIPMENT				\$22,519.77

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables (25% labor)	1.00	LS	1.000	1.00	\$22,003.81	\$22,003.81
Concrete	100.00	CY	1.200	120.00	\$150.00	\$15,000.00
TOTAL MATERIAL						\$37,003.81

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Concrete Pump	1	LS	1 Mobilization	\$1,500.00	\$1,500.00
					\$0.00
					\$0.00
					\$0.00
TOTAL SUBCONTRACTS					\$1,500.00

SUMMARY OF COSTS						
Labor Cost	\$88,015.22	Labor Burden @	0.0%	\$0.00	Included in hourly labor rate.	\$88,015.22
Material Cost	\$37,003.81	Material Tax @	7.75%	\$2,867.79		\$39,871.60
Equipment Cost	\$22,519.77	Equipment Tax @	7.75%	\$1,745.28		\$24,265.05
Subcontractors	\$1,500.00					\$1,500.00
DIRECT COST SUBTOTALS	\$149,039			\$4,613	DIRECT COST SUBTOTALS	\$153,652

Additional Pay Item Notes :		
There will be 2 crews work in two locations at 1 time. The loaders will support crews for providing materials/ equipment that a pick up truck can not handle. There is a total of 9 plugs and figured roughly 1 day per plug.		

PAY ITEM NUMBER	:	3.064	Project	:	KRRP - Copco 2
Description	:	Remove Concrete Items associated with Penstocks D/S from Tunnel No. 2	Group	:	D05
Quantity	:	3,500.00	cy		
Daily Production	:	100.00	cy per		10 hour shift
Work Days	:	35.0	Days	Project #	: 3
Unit Price	:	\$131.62	per cy	Estimator	: Eric Jones
Total Cost	:	\$460,672		cy per	
			Probable Low Cost Parameter	115	Total Cost \$391,571
			Probable High Cost Parameter	80	Unit Price Per cy \$111.88
					\$552,806 \$157.94

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	35.0	10	350.00	L	\$58.87	incl. in rate	incl. in rate	\$20,605.20
Laborer	Active	4.00	35.0	10	1,400.00	L	\$51.07	incl. in rate	incl. in rate	\$71,502.20
Equipment Operator (medium)	Active	2.00	35.0	10	700.00	L	\$72.34	incl. in rate	incl. in rate	\$50,635.20
Truck Driver (heavy)	Active	1.00	35.0	10	350.00	L	\$66.92	incl. in rate	incl. in rate	\$23,423.40
Air Compressor 900 cfm	Active	1.00	35.0	10	350.00	E	\$38.87	incl. in rate	incl. in rate	\$13,604.12
Air Compressor 600 cfm	Active	1.00	35.0	10	350.00	E	\$21.74	incl. in rate	incl. in rate	\$7,608.62
Air Tool, Chipping Hammer	Active	4.00	35.0	10	1,400.00	E	\$1.64	incl. in rate	incl. in rate	\$2,294.65
Generator, Small Generator, 10 - 15 kW	Active	2.00	35.0	10	700.00	E	\$7.04	incl. in rate	incl. in rate	\$4,928.00
Hydraulic Excavator (2.5cy)	Active	2.00	35.0	10	700.00	E	\$205.40	incl. in rate	incl. in rate	\$143,780.00
Hydraulic Impact Breaker Attachment (5k+ ft-lb)	Active	1.00	35.0	10	350.00	E	\$63.28	incl. in rate	incl. in rate	\$22,148.00
Hydraulic Thumbs/Shear Attachment	Active	1.00	35.0	10	350.00	E	\$24.92	incl. in rate	incl. in rate	\$8,722.00
Truck, Off-Road, Articulated Rear, 20cy	Active	1.00	35.0	10	350.00	E	\$117.28	incl. in rate	incl. in rate	\$41,048.00
Labor Hours					2,800	TOTAL LABOR				\$166,166.00
Equipment Hours					4,550	TOTAL EQUIPMENT				\$244,133.39

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables (5% labor)	1.00	LS	1.000	1.00	\$8,308.30	\$8,308.30
TOTAL MATERIAL						\$8,308.30

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Concrete Saw Cutting	9	EA	Cost per Mob	\$2,500.00	\$22,500.00
TOTAL SUBCONTRACTS					\$22,500.00

Labor Cost	\$166,166.00	Labor Burden @	0.0%	\$0.00	Included in hourly labor rate.		\$166,166.00
Material Cost	\$8,308.30	Material Tax @	7.75%	\$643.89			\$8,952.19
Equipment Cost	\$244,133.39	Equipment Tax @	7.75%	\$18,920.34			\$263,053.73
Subcontractors	\$22,500.00						\$22,500.00
DIRECT COST SUBTOTALS	\$441,108			\$19,564		DIRECT COST SUBTOTALS	\$460,672
Additional Pay Item Notes : <div style="border: 1px solid black; height: 100px; width: 100%;"></div>							

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.065	Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose of Caterpillar Gate (steel)	Group	:	D07				
Quantity	:	50,000.00 LBS							
Daily Production	:	31,250.00 LBS per	10	hour shift	Project #	:	3		
Work Days	:	1.6 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.66 per LBS			Probable Low Cost Parameter			34375	\$29,767
Total Cost	:	\$33,075			Probable High Cost Parameter			28125	\$36,382
									Unit Price Per LBS
									\$0.60
									\$0.73

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.6	10	16.00	L	\$58.35	incl. in rate	incl. in rate	\$933.55
Laborer	Active	4.00	1.6	10	64.00	L	\$51.01	incl. in rate	incl. in rate	\$3,264.64
Steelworker	Active	2.00	1.6	10	32.00	L	\$77.55	incl. in rate	incl. in rate	\$2,481.66
Loader, FE Rubber Tire (5.25cy)	Active	1.00	1.6	10	16.00	E	\$76.00	incl. in rate	incl. in rate	\$1,216.00
Hydraulic Crane (120tn)	Active	1.00	1.6	10	16.00	E	\$242.08	incl. in rate	incl. in rate	\$3,873.28
Equipment Operator (medium)	Active	1.00	1.6	10	16.00	L	\$72.39	incl. in rate	incl. in rate	\$1,158.21
Equipment Operator (crane)	Active	1.00	1.6	10	16.00	L	\$81.02	incl. in rate	incl. in rate	\$1,296.34
Labor Hours					144	TOTAL LABOR				\$9,134.40
Equipment Hours					32	TOTAL EQUIPMENT				\$5,089.28

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$456.72	\$456.72
Selective demolition, torch cutting, steel, 1" thick plate (assumed qty)	2,500.00	LF	1.000	2,500.00	\$0.85	\$2,125.00
TOTAL MATERIAL						\$2,581.72

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	25.00	ton	1.000	25.00	\$595.00
Hauling to Disposal Site Or Recycle Site	2.00	Loads	20 tons a load	\$400.00	\$800.00
TOTAL SUBCONTRACTS					\$15,675.00

SUMMARY OF COSTS						
Labor Cost	\$9,134.40	Labor Burden @	0.0%	\$0.00		\$9,134.40
Material Cost	\$2,581.72	Material Tax @	7.8%	\$200.08		\$2,781.80
Equipment Cost	\$5,089.28	Equipment Tax @	7.8%	\$394.42		\$5,483.70
Subcontractors	\$15,675.00					\$15,675.00
DIRECT COST SUBTOTALS	\$32,480			\$595	DIRECT COST SUBTOTALS	\$33,075
Additional Pay Item Notes :						
Assumed hazardous waste cleanup 100% disposal because of the engine Oil and Transmission Oil used for cranes .						

PAY ITEM COST DETAIL WORKSHEET

3.066 Remove & Dispose of Trash rack and trash rake (steel)

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.066	Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose of Trash rack and trash rake (steel)	Group	:	D10				
Quantity	:	86,000.00 LBS							
Daily Production	:	37,500.00 LBS per	10	hour shift	Project #	:	3		
Work Days	:	2.3 Days	Estimator	:	Mihaela Tomulescu	LBS per		Total Cost	Unit Price Per LBS
Unit Price	:	\$0.44 per LBS	Probable Low Cost Parameter			41250	\$33,996	\$0.40	
Total Cost	:	\$37,773	Probable High Cost Parameter			30000	\$45,327	\$0.53	

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	2.3	10	23.00	L	\$58.35	incl. in rate	incl. in rate	\$1,341.98
Laborer	Active	4.00	2.3	10	92.00	L	\$51.01	incl. in rate	incl. in rate	\$4,692.92
Steelworker	Active	3.00	2.3	10	69.00	L	\$77.55	incl. in rate	incl. in rate	\$5,351.09
Equipment Operator (medium)	Active	1.00	2.3	10	23.00	L	\$72.39	incl. in rate	incl. in rate	\$1,664.92
Equipment Operator (crane)	Active	1.00	2.3	10	23.00	L	\$81.02	incl. in rate	incl. in rate	\$1,863.48
Hydraulic Excavator (5.0cy)	Active	1.00	2.3	10	23.00	E	\$276.50	incl. in rate	incl. in rate	\$6,359.50
Hydraulic Crane (120tn)	Active	1.00	2.3	10	23.00	E	\$242.08	incl. in rate	incl. in rate	\$5,567.84
					Labor Hours	230	TOTAL LABOR		\$14,914.40	
					Equipment Hours	46	TOTAL EQUIPMENT		\$11,927.34	

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 15% labor (saw blades, drill bits, electrodes, wrenches, hard hats etc)	1.00	LS	1.000	1.00	\$2,237.16	\$2,237.16
TOTAL MATERIAL						\$2,237.16

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (25%)	10.75	ton	1.000	10.75	\$595.00
Hauling to Disposal Site Or Recycle Site	3.00	Loads	20 tons a load	\$400.00	\$1,200.00
TOTAL SUBCONTRACTS					\$7,596.25

SUMMARY OF COSTS					
Labor Cost	\$14,914.40	Labor Burden @	0.0%	\$0.00	\$14,914.40
Material Cost	\$2,237.16	Material Tax @	7.8%	\$173.38	\$2,410.54
Equipment Cost	\$11,927.34	Equipment Tax @	7.8%	\$924.37	\$12,851.71
Subcontractors	\$7,596.25				\$7,596.25
DIRECT COST SUBTOTALS	\$36,675		\$1,098	DIRECT COST SUBTOTALS	\$37,773
Additional Pay Item Notes :					

PAY ITEM COST DETAIL WORKSHEET

3.067 Remove & Dispose of Stop Logs and slots for intake (steel)

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.067			Project	:	KRRP - Copco 2		
Description	:	Remove & Dispose of Stop Logs and slots for intake (steel)			Group	:	D03		
Quantity	:	220,000.00	LBS						
Daily Production	:	25,000.00	LBS per	10	hour shift	Project #	:	3	
Work Days	:	8.8	Days			Estimator	:	Mihaela Tomulescu	
Unit Price	:	\$0.55	per LBS			LBS per		Total Cost	Unit Price Per LBS
Total Cost	:	\$120,510			Probable Low Cost Parameter		27500	\$108,459	\$0.49
					Probable High Cost Parameter		20000	\$144,612	\$0.66

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	8.8	10	88.00	L	\$58.35	incl. in rate	incl. in rate	\$5,134.54
Laborer	Active	4.00	8.8	10	352.00	L	\$51.01	incl. in rate	incl. in rate	\$17,955.52
Steelworker	Active	3.00	8.8	10	264.00	L	\$77.55	incl. in rate	incl. in rate	\$20,473.73
Equipment Operator (medium)	Active	1.00	8.8	10	88.00	L	\$72.39	incl. in rate	incl. in rate	\$6,370.14
Equipment Operator (crane)	Active	1.00	8.8	10	88.00	L	\$81.02	incl. in rate	incl. in rate	\$7,129.85
Hydraulic Excavator (5.0cy)	Active	1.00	8.8	10	88.00	E	\$276.50	incl. in rate	incl. in rate	\$24,332.00
Hydraulic Crane (120tn)	Active	1.00	8.8	10	88.00	E	\$242.08	incl. in rate	incl. in rate	\$21,303.04
Labor Hours					880	TOTAL LABOR				\$57,063.78
Equipment Hours					176	TOTAL EQUIPMENT				\$45,635.04

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$2,853.19	\$2,853.19
						TOTAL MATERIAL
						\$2,853.19

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Stop log lifter - Rent per day	8.80	day	1.000	8.80	\$1,000.00
Hauling to Disposal Site Or Recycle Site	6.00	Loads	20 tons a load		\$400.00
					TOTAL SUBCONTRACTS
					\$11,200.00

SUMMARY OF COSTS									
Labor Cost	\$57,063.78	Labor Burden @	0.0%	\$0.00					\$57,063.78
Material Cost	\$2,853.19	Material Tax @	7.8%	\$221.12					\$3,074.31
Equipment Cost	\$45,635.04	Equipment Tax @	7.8%	\$3,536.72					\$49,171.76
Subcontractors	\$11,200.00								\$11,200.00
DIRECT COST SUBTOTALS		\$116,752		\$3,758			DIRECT COST SUBTOTALS		\$120,510
Additional Pay Item Notes :									
The process of removing top logs is not manual, but done with hydraulic stop log lifters. The gate side guides and invert shall have a minimum weight of 4 lbs./ft. for wall mounted. The gate invert should contain a removable neoprene seal. Including stop log grooves, lifter, guide - weight around 220,000 lbs. This activity will be completed during the concrete demolition of the stop log area.									

PAY ITEM INFORMATION												
PAY ITEM NUMBER	:	3.068				Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose of Wood Staves Soaked in Creosote				Group	:	D03				
Quantity	:	1,100,000.00	LBS									
Daily Production	:	50,000.00	LBS per	10	hour shift							
Work Days	:	22.0	Days									
Unit Price	:	\$0.59	per LBS									
Total Cost	:	\$646,878										
Project #	:	3										
Estimator	:	Mihaela Tomulescu	LBS per	60000	Total Cost	\$517,502	Unit Price Per LBS	\$0.47				
Probable Low Cost Parameter				40000	\$776,253	\$0.71						
Probable High Cost Parameter												

CREW COSTS											
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost	
Labor Foreman	Active	1.00	22.0	10	220.00	L	\$58.35	incl. in rate	incl. in rate	\$12,836.34	
Laborer	Active	6.00	22.0	10	1,320.00	L	\$51.01	incl. in rate	incl. in rate	\$67,333.20	
Carpenters	Active	6.00	22.0	10	1,320.00	L	\$84.98	incl. in rate	incl. in rate	\$112,173.60	
Equipment Operator (crane)	Active	1.00	22.0	10	220.00	L	\$81.02	incl. in rate	incl. in rate	\$17,824.62	
Equipment Operator (medium)	Active	2.00	22.0	10	440.00	L	\$72.39	incl. in rate	incl. in rate	\$31,850.72	
Hydraulic Crane (80tn)	Active	1.00	22.0	10	220.00	E	\$197.66	incl. in rate	incl. in rate	\$43,485.20	
Loader, FE Rubber Tire (5.25cy)	Active	2.00	22.0	10	440.00	E	\$76.00	incl. in rate	incl. in rate	\$33,440.00	
					Labor Hours	3520	TOTAL LABOR				\$242,018.48
					Equipment Hours	660	TOTAL EQUIPMENT				\$76,925.20

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 30% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$72,605.54	\$72,605.54
						</

3.069 Remove & Dispose of Cradles (steel)

PAY ITEM NUMBER	:	3.069	Project	:	KRRP - Copco 2
Description	:	Remove & Dispose of Cradles (steel)	Group	:	D07
Quantity	:	290,000.00 LBS			
Daily Production	:	31,250.00 LBS per	10	hour shift	
Work Days	:	9.3 Days	Project #	:	3
Unit Price	:	\$0.55 per LBS	Estimator	:	Mihaela Tomulescu
Total Cost	:	\$159,276	LBS per		
			Total Cost		
			Unit Price Per LBS		
			Probable Low Cost Parameter		
			Probable High Cost Parameter		

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	9.3	10	93.00	L	\$58.35	incl. in rate	incl. in rate	\$5,426.27
Laborer	Active	6.00	9.3	10	558.00	L	\$51.01	incl. in rate	incl. in rate	\$28,463.58
Steelworker	Active	3.00	9.3	10	279.00	L	\$77.55	incl. in rate	incl. in rate	\$21,637.01
Equipment Operator (crane)	Active	1.00	9.3	10	93.00	L	\$81.02	incl. in rate	incl. in rate	\$7,534.95
Equipment Operator (medium)	Active	2.00	9.3	10	186.00	L	\$72.39	incl. in rate	incl. in rate	\$13,464.17
Hydraulic Crane (80tn)	Active	1.00	9.3	10	93.00	E	\$197.66	incl. in rate	incl. in rate	\$18,382.38
Loader, FE Rubber Tire (5.25cy)	Active	2.00	9.3	10	186.00	E	\$76.00	incl. in rate	incl. in rate	\$14,136.00
Labor Hours					1209	TOTAL LABOR				\$76,525.98
Equipment Hours					279	TOTAL EQUIPMENT				\$32,518.38

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Selective demolition, torch cutting, steel, 1" thick plate (assumption)	1,500.00	LF	1.000	1,500.00	\$0.85	\$1,275.00
TOTAL MATERIAL						\$1,275.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (50% of total QTY)	72.50	ton	1.000	72.50	\$595.00
Hauling to Disposal Site Or Recycle Site	8.00	Loads	20 tons a load	\$400.00	\$3,200.00
TOTAL SUBCONTRACTS					\$46,337.50

Labor Cost	\$76,525.98	Labor Burden @	0.0%	\$0.00		\$76,525.98
Material Cost	\$1,275.00	Material Tax @	7.8%	\$98.81		\$1,373.81
Equipment Cost	\$32,518.38	Equipment Tax @	7.8%	\$2,520.17		\$35,038.55
Subcontractors	\$46,337.50					\$46,337.50
DIRECT COST SUBTOTALS	\$156,657			\$2,619	DIRECT COST SUBTOTALS	\$159,276
Additional Pay Item Notes :						

PAY ITEM COST DETAIL WORKSHEET

3.071 Remove & Dispose of Penstock after bifurcation to butterfly valves

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.071			Project	:	KRRP - Copco 2		
Description	:	Remove & Dispose of Penstock after bifurcation to butterfly valves			Group	:	D07		
Quantity	:	860,000.00	LBS						
Daily Production	:	30,300.00	LBS per	10	hour shift	Project #	:	3	
Work Days	:	28.4	Days		Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.80	per LBS		Probable Low Cost Parameter	:	36360	\$547,203	\$0.64
Total Cost	:	\$684,003			Probable High Cost Parameter	:	24240	\$820,804	\$0.95

CREW COSTS											
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost	
Labor Foreman	Active	1.00	28.4	10	284.00	L	\$58.35	incl. in rate	incl. in rate	\$16,570.55	
Laborer	Active	4.00	28.4	10	1,136.00	L	\$51.01	incl. in rate	incl. in rate	\$57,947.36	
Steelworker	Active	2.00	28.4	10	568.00	L	\$77.55	incl. in rate	incl. in rate	\$44,049.54	
Equipment Operator (crane)	Active	2.00	28.4	10	568.00	L	\$81.02	incl. in rate	incl. in rate	\$46,019.93	
Equipment Operator (medium)	Active	2.00	28.4	10	568.00	L	\$72.39	incl. in rate	incl. in rate	\$41,116.38	
Crawler Crane (90tn)	Active	1.00	28.4	10	284.00	E	\$211.22	incl. in rate	incl. in rate	\$59,986.48	
Crawler Crane (270tn)	Active	1.00	28.4	10	284.00	E	\$454.10	incl. in rate	incl. in rate	\$128,964.40	
Loader, FE Rubber Tire (5.25cy)	Active	1.00	28.4	10	284.00	E	\$76.00	incl. in rate	incl. in rate	\$21,584.00	
Hydraulic Excavator (5.0cy)	Active	1.00	28.4	10	284.00	E	\$276.50	incl. in rate	incl. in rate	\$78,526.00	
Boomlift (JLG 60')	Active	2.00	28.4	10	568.00	E	\$52.87	incl. in rate	incl. in rate	\$30,030.16	
Acetylene Torches	Active	4.00	28.4	10	1,136.00	E	\$0.47	incl. in rate	incl. in rate	\$533.92	
Air Compressor 600 cfm	Active	2.00	28.4	10	568.00	E	\$21.74	incl. in rate	incl. in rate	\$12,348.32	
Generator, Small Generator, 10 - 15 kW	Active	2.00	28.4	10	568.00	E	\$7.04	incl. in rate	incl. in rate	\$3,998.72	
Hepa Vac System	Active	4.00	28.4	10	1,136.00	E	\$0.47	incl. in rate	incl. in rate	\$533.92	
					Labor Hours	3124	TOTAL LABOR				\$205,703.76
					Equipment Hours	5112	TOTAL EQUIPMENT				\$336,505.92

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$16,825.30	\$16,825.30
TOTAL MATERIAL						\$16,825.30

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	43.00	ton	1.000	43.00	\$595.00
Hauling to Disposal Site Or Recycle Site	22.00	Loads	20 tons a load	\$1,000.00	\$22,000.00
Shoring Allowance	1	AL		\$50,000.00	\$50,000.00
TOTAL SUBCONTRACTS					\$97,585.00

SUMMARY OF COSTS						
Labor Cost	\$205,703.76	Labor Burden @	0.0%	\$0.00		\$205,703.76
Material Cost	\$16,825.30	Material Tax @	7.8%	\$1,303.96		\$18,129.26
Equipment Cost	\$336,505.92	Equipment Tax @	7.8%	\$26,079.21		\$362,585.13
Subcontractors	\$97,585.00					\$97,585.00
DIRECT COST SUBTOTALS	\$656,620			\$27,383	DIRECT COST SUBTOTALS	\$684,003

Additional Pay Item Notes :	

PAY ITEM COST DETAIL WORKSHEET

3.072 Remove & Dispose of Bifurcated vent pipes and support structure

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.072	Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose of Bifurcated vent pipes and support structure	Group	:	D02				
Quantity	:	19,500.00 LBS							
Daily Production	:	53,750.00 LBS per	10	hour shift	Project #	:	3		
Work Days	:	0.4 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.43 per LBS			Probable Low Cost Parameter			64500	\$6,761
Total Cost	:	\$8,451			Probable High Cost Parameter			43000	\$10,141
									Unit Price Per LBS
									\$0.35
									\$0.52

CREW COSTS											
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost	
Labor Foreman	Active	1.00	0.4	10	4.00	L	\$58.35	incl. in rate	incl. in rate	\$233.39	
Laborer	Active	4.00	0.4	10	16.00	L	\$51.01	incl. in rate	incl. in rate	\$816.16	
Steelworker	Active	2.00	0.4	10	8.00	L	\$77.55	incl. in rate	incl. in rate	\$620.42	
Equipment Operator (crane)	Active	2.00	0.4	10	8.00	L	\$81.02	incl. in rate	incl. in rate	\$648.17	
Equipment Operator (medium)	Active	2.00	0.4	10	8.00	L	\$72.39	incl. in rate	incl. in rate	\$579.10	
Crawler Crane (90tn)	Active	1.00	0.4	10	4.00	E	\$211.22	incl. in rate	incl. in rate	\$844.88	
Loader, FE Rubber Tire (5.25cy)	Active	1.00	0.4	10	4.00	E	\$76.00	incl. in rate	incl. in rate	\$304.00	
Hydraulic Excavator (5.0cy)	Active	1.00	0.4	10	4.00	E	\$276.50	incl. in rate	incl. in rate	\$1,106.00	
					Labor Hours	44	TOTAL LABOR				\$2,897.24
					Equipment Hours	12	TOTAL EQUIPMENT				\$2,254.88

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$289.72	\$289.72
Selective demolition, torch cutting, steel, 1" thick plate (assumption)	2,000.00	LF	1.000	2,000.00	\$0.85	\$1,700.00
						TOTAL MATERIAL
						\$1,989.72

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	0.98	ton	1.000	0.98	\$580.13
Hauling to Disposal Site Or Recycle Site	1.00	Loads	20 tons a load	\$400.00	\$400.00
					TOTAL SUBCONTRACTS
					\$980.13

SUMMARY OF COSTS						
Labor Cost	\$2,897.24	Labor Burden @	0.0%	\$0.00		\$2,897.24
Material Cost	\$1,989.72	Material Tax @	7.8%	\$154.20		\$2,143.93
Equipment Cost	\$2,254.88	Equipment Tax @	7.8%	\$174.75		\$2,429.63
Subcontractors	\$980.13					\$980.13
DIRECT COST SUBTOTALS	\$8,122			\$329	DIRECT COST SUBTOTALS	\$8,451
Additional Pay Item Notes :						
Assumed the process of removing pipes, expansion joints and support rings encased in concrete is done in around 20 days by 3 crew formed of 1 foreman, 4 journeymen, 4 steelworkers ;6 equipment operators 1 for each excavator, crane and loader. We dispose pipes with 1 trucks per day for each crew. Assumed contains paint with heavy metals 10% of the total lbs, 36 miles from Copco lake to Yreka transfer recycling. Based on the current production rate, only 1 trips a day would be necessary. Demolition is done using one crawler crane, excavator and welding machine.						

PAY ITEM COST DETAIL WORKSHEET

3.073 Remove & Dispose of 2 - 138" Butterfly valves

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	3.073	Project	:	KRRP - Copco 2				
Description	:	Remove & Dispose of 2 - 138" Butterfly valves	Group	:	D07				
Quantity	:	148,000.00 LBS							
Daily Production	:	31,250.00 LBS per	10	hour shift					
Work Days	:	4.7	Days		Project #	:	3		
Unit Price	:	\$0.98 per LBS			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Total Cost	:	\$145,180			Probable Low Cost Parameter			37500	\$116,144
					Probable High Cost Parameter			25000	\$174,216
									Unit Price Per LBS
									\$0.78
									\$1.18

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	4.7	10	47.00	L	\$58.35	incl. in rate	incl. in rate	\$2,742.31
Laborer	Active	4.00	4.7	10	188.00	L	\$51.01	incl. in rate	incl. in rate	\$9,589.88
Steelworker	Active	2.00	4.7	10	94.00	L	\$77.55	incl. in rate	incl. in rate	\$7,289.89
Equipment Operator (crane)	Active	2.00	4.7	10	94.00	L	\$81.02	incl. in rate	incl. in rate	\$7,615.97
Equipment Operator (medium)	Active	2.00	4.7	10	94.00	L	\$72.39	incl. in rate	incl. in rate	\$6,804.47
Crawler Crane (90tn)	Active	1.00	4.7	10	47.00	E	\$211.22	incl. in rate	incl. in rate	\$9,927.34
Crawler Crane (270tn)	Active	1.00	4.7	10	47.00	E	\$454.10	incl. in rate	incl. in rate	\$21,342.70
Loader, FE Rubber Tire (5.25cy)	Active	1.00	4.7	10	47.00	E	\$76.00	incl. in rate	incl. in rate	\$3,572.00
Hydraulic Excavator (5.0cy)	Active	1.00	4.7	10	47.00	E	\$276.50	incl. in rate	incl. in rate	\$12,995.50
Boomlift (JLG 60')	Active	2.00	4.7	10	94.00	E	\$52.87	incl. in rate	incl. in rate	\$4,969.78
Acetylene Torches	Active	4.00	4.7	10	188.00	E	\$0.47	incl. in rate	incl. in rate	\$88.36
Air Compressor 600 cfm	Active	2.00	4.7	10	94.00	E	\$21.74	incl. in rate	incl. in rate	\$2,043.56
Generator, Small Generator, 10 - 15 kW	Active	2.00	4.7	10	94.00	E	\$7.04	incl. in rate	incl. in rate	\$661.76
Hepa Vac System	Active	4.00	4.7	10	188.00	E	\$0.47	incl. in rate	incl. in rate	\$88.36
					Labor Hours	517			TOTAL LABOR	\$34,042.52
					Equipment Hours	846			TOTAL EQUIPMENT	\$55,689.36

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 15% labor (saw blades, electrodes, drill bits, etc)	1.00	LS	1.000	1.00	\$5,106.38	\$5,106.38
						TOTAL MATERIAL
						\$5,106.38

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	74.00	ton	1.000	74.00	\$595.00
					\$44,030.00
Hauling to Disposal Site Or Recycle Site	4.00	Loads	20 tons a load	\$400.00	\$1,600.00
					TOTAL SUBCONTRACTS
					\$45,630.00

SUMMARY OF COSTS					
Labor Cost	\$34,042.52	Labor Burden @	0.0%	\$0.00	\$34,042.52
Material Cost	\$5,106.38	Material Tax @	7.8%	\$395.74	\$5,502.12
Equipment Cost	\$55,689.36	Equipment Tax @	7.8%	\$4,315.93	\$60,005.29
Subcontractors	\$45,630.00				\$45,630.00
DIRECT COST SUBTOTALS	\$140,468		\$4,712	DIRECT COST SUBTOTALS	\$145,180
Additional Pay Item Notes :					
Assumed the process of removing 138" butterfly valves is done in around 6 days by 2 crew formed of 1 foreman, 2 journeymen, 2 steelworkers ;We dispose cradles with 1 trucks per day for each crew. Assumed contains paint with heavy metals 100% of the total lbs, 36 miles from Copco lake to Yreka transfer recycling. Based on the current production rate, only 1 trips a day would be necessary. Demolition is done using one crawler crane, excavator and welding machine.					

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	5.017			Project	:	KRRP - Copco 2		
Description	:	Disconnect and remove MV Transformers 115 KV @ Substation			Group	:	D10		
Quantity	:	2.00 EA			Project #	:	3	EA per	Total Cost
Daily Production	:	2.24	EA per	10					
Work Days	:	0.9 Days			Estimator	:	Mihaela Tomulescu		Unit Price Per EA
Unit Price	:	\$1,756.68 per EA			Probable Low Cost Parameter		2.46125	\$3,162	\$1,581.01
Total Cost	:	\$3,513			Probable High Cost Parameter		1.79	\$4,216	\$2,108.01

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	0.9	10	8.90	L	\$55.45	incl. in rate	incl. in rate	\$493.53
Electrician	Active	1.00	0.9	10	8.90	L	\$55.25	incl. in rate	incl. in rate	\$491.75
Hydraulic Excavator (1.5cy)	Active	1.00	0.9	10	8.90	E	\$140.73	incl. in rate	incl. in rate	\$1,252.50
Equipment Operator (light)	Active	0.50	0.9	10	4.45	L	\$69.39	incl. in rate	incl. in rate	\$308.79
					Labor Hours	22.25	TOTAL LABOR			\$1,294.07
					Equipment Hours	8.9	TOTAL EQUIPMENT			\$1,252.50

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$64.70	\$64.70
TOTAL MATERIAL						\$64.70

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling to Disposal Site Or Recycle Site	2.00	Loads	20 tons a load	\$400.00	\$800.00
TOTAL SUBCONTRACTS					\$800.00

SUMMARY OF COSTS										
Labor Cost	\$1,294.07	Labor Burden @	0.0%	\$0.00					\$1,294.07	
Material Cost	\$64.70	Material Tax @	7.8%	\$5.01					\$69.72	
Equipment Cost	\$1,252.50	Equipment Tax @	7.8%	\$97.07					\$1,349.57	
Subcontractors	\$800.00								\$800.00	
DIRECT COST SUBTOTALS		\$3,411					\$102	DIRECT COST SUBTOTALS		\$3,513
Additional Pay Item Notes :										

PAY ITEM COST DETAIL WORKSHEET

5.019 Disconnect and remove MV Transformers 12 KV @ Substation

PAY ITEM INFORMATION									
PAY ITEM NUMBER		: 5.019		Project		: KRRP - Copco 2			
Description		: Disconnect and remove MV Transformers 12 KV @ Substation		Group		: D10			
Quantity		: 1.00 EA							
Daily Production		: 5.00 EA per		10		hour shift		Project #	
Work Days		: 0.2 Days				Estimator		: Mihaela Tomulescu	
Unit Price		: \$1,403.33 per EA				EA per		Total Cost	
Total Cost		: \$1,403				Probable Low Cost Parameter		5.5 \$1,263 \$1,262.99	
						Probable High Cost Parameter		4 \$1,684 \$1,683.99	

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	0.2	10	2.00	L	\$55.45	incl. in rate	incl. in rate	\$110.91
Electrician	Active	1.00	0.2	10	2.00	L	\$55.25	incl. in rate	incl. in rate	\$110.51
Loader, FE Rubber Tire (8.6cy)	Active	1.00	0.2	10	2.00	E	\$225.40	incl. in rate	incl. in rate	\$450.80
Equipment Operator (light)	Active	1.00	0.2	10	2.00	L	\$69.39	incl. in rate	incl. in rate	\$138.78
Truck Driver (light)	Active	1.00	0.2	10	2.00	L	\$65.47	incl. in rate	incl. in rate	\$130.94
Labor Hours					8	TOTAL LABOR				\$491.13
Equipment Hours					2	TOTAL EQUIPMENT				\$450.80

MATERIAL COSTS							
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost	
Consumables 5% labor (saw blades, drill bits, etc	1.00	LS	1.000	1.00	\$24.56	\$24.56	
TOTAL MATERIAL							\$24.56

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling to Disposal Site Or Recycle Site	1.00	Loads		\$400.00	\$400.00
TOTAL SUBCONTRACTS					\$400.00

SUMMARY OF COSTS									
Labor Cost	\$491.13	Labor Burden @	0.0%	\$0.00					\$491.13
Material Cost	\$24.56	Material Tax @	7.8%	\$1.90					\$26.46
Equipment Cost	\$450.80	Equipment Tax @	7.8%	\$34.94					\$485.74
Subcontractors	\$400.00								\$400.00
DIRECT COST SUBTOTALS	\$1,366			\$37				DIRECT COST SUBTOTALS	\$1,403
Additional Pay Item Notes :									
Production is based off of RSMs using Crew formed of 1 Forman, 1 Electrician,1 Loader to discharge the transformer in the truck for disposal.									

SUMMARY OF COSTS					
Labor Cost	\$10,577.92	Labor Burden @	0.0%	\$0.00	\$10,577.92
Material Cost	\$528.90	Material Tax @	7.8%	\$40.99	\$569.89
Equipment Cost	\$6,984.00	Equipment Tax @	7.8%	\$541.26	\$7,525.26
Subcontractors	\$6,800.00				\$6,800.00
DIRECT COST SUBTOTALS		\$24,891	\$582		DIRECT COST SUBTOTALS
					\$25,473
Additional Pay Item Notes :					
When a transmission line is decommissioned and is not converted to another use, the decommissioning typically includes the removal of all infrastructure if it is no longer required, or has reached end-of-life conditions. Removed parts will be re-used, recycled or disposed. Production is based off of RSMs using Crew B-1C and B-3 (1 Forman, 2 laborer, 1 Excavator& 1 crane for lift, position and load in the truck, 1 Hydraulic rock-splitting/rock-drilling equipment to break equipment foundations and concrete) for demo :4 Electrician,, 1 utility truck access poles, string conductor, modify structure arms, provide guard structures, etc. Crews may be working simultaneously along the project alignment and substations, hydro plant and switchyard. .					

PAY ITEM COST DETAIL WORKSHEET

5.022 Demolish overhead transmission line and structure 69 KV Copco#1 to Iron Gate

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	5.022	Project	:	KRRP - Copco 2				
Description	:	Demolish overhead transmission line and structure 69 KV Copco#1 to Iron Gate	Group	:	D03				
Quantity	:	5.00 Miles	Project #	:	3				
Daily Production	:	0.13 Miles per 10 hour shift	Estimator	:	Mihaela Tomulescu				
Work Days	:	40.0 Days	Miles per	:	0.1375	Total Cost	Unit Price Per Miles		
Unit Price	:	\$106,556.17 per Miles	Probable Low Cost Parameter	:	0.1	\$479,503	\$95,900.55		
Total Cost	:	\$532,781	Probable High Cost Parameter	:		\$639,337	\$127,867.40		

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	40.0	10	400.00	L	\$55.45	incl. in rate	incl. in rate	\$22,181.20
Electrician	Active	2.00	40.0	10	800.00	L	\$55.25	incl. in rate	incl. in rate	\$44,202.40
Truck, Utility, with Man-Basket	Active	2.00	40.0	10	800.00	E	\$31.90	incl. in rate	incl. in rate	\$25,520.00
Laborer	Active	2.00	40.0	10	800.00	L	\$51.01	incl. in rate	incl. in rate	\$40,808.00
Hydraulic Excavator (1.5cy)	Active	1.00	40.0	10	400.00	E	\$140.73	incl. in rate	incl. in rate	\$56,292.00
Hydraulic Crane (80tn)	Active	1.00	40.0	10	400.00	E	\$197.66	incl. in rate	incl. in rate	\$79,064.00
Equipment Operator (crane)	Active	1.00	40.0	10	400.00	L	\$81.02	incl. in rate	incl. in rate	\$32,408.40
Equipment Operator (light)	Active	1.00	40.0	10	400.00	L	\$69.39	incl. in rate	incl. in rate	\$27,756.00
Vibratory Hammer & Extractor	Active	1.00	40.0	10	400.00	E	\$94.14	incl. in rate	incl. in rate	\$37,656.00
					Labor Hours	2800			TOTAL LABOR	\$167,356.00
					Equipment Hours	2000			TOTAL EQUIPMENT	\$198,532.00

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$8,367.80	\$8,367.80
Topsoil placement and grading, loam or topsoil, F.E. loader, 1-1/2 C.Y., remove and stockpile on site, spread from pile to rough finish grade	96.00	CY	1.000	96.00	\$4.74	\$455.04
TOTAL MATERIAL						\$8,822.84

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Rent trailer with cable pulling rig, for high voltage line work - Rent per day	40.00	days		\$3,000.00	\$120,000.00
Hauling to Disposal Wire	5.00	Loads	1 load per mile of wire	\$400.00	\$2,000.00
Hauling to Disposal Structures	50.00	Loads	2 Structures per Load	\$400.00	\$20,000.00
TOTAL SUBCONTRACTS					\$142,000.00

SUMMARY OF COSTS					
Labor Cost	\$167,356.00	Labor Burden @	0.0%	\$0.00	\$167,356.00
Material Cost	\$8,822.84	Material Tax @	7.8%	\$683.77	\$9,506.61
Equipment Cost	\$198,532.00	Equipment Tax @	7.8%	\$15,386.23	\$213,918.23
Subcontractors	\$142,000.00				\$142,000.00
DIRECT COST SUBTOTALS	\$516,711			\$16,070	DIRECT COST SUBTOTALS \$532,781

Additional Pay Item Notes :

When a transmission line is decommissioned and is not converted to another use, the decommissioning typically includes the removal of all infrastructure if it is no longer required, or has reached end-of-life conditions. Removed parts will be re-used, recycled or disposed. Production is based off of RSMs using Crew B-1C and B-3 (1 Foreman, 2 laborer, 1 Excavator & 1 crane for lift, position and load in the truck, 1 Hydraulic rock-splitting/rock-drilling equipment to break equipment foundations and concrete for demo :2 Electrician,, 1 utility truck to access poles, string conductor, modify structure arms, provide guard structures, etc. Crews may be working simultaneously along the project alignment and substations, hydro plant and switchyard. Transmission line poles or structures are commonly between 60 and 140 feet tall. There are several different kinds of transmission structures. Transmission structures can be constructed of metal or wood. They can be single-poled or multi-poled. They can be single-circuited, carrying one set of transmission lines or double-circuited with two sets of lines. Assumed based on RSMs we have "Communications transmission tower, radio towers self-supporting, wind load 70 mph basic wind speed, 120' high" (33811310). Pole height and load capacity limitations determine the distance between poles (span length) either on the basis of ground clearance or ability to support heavy wind and ice loads. Assumed average span between structures to be 275 feet so for 5 miles of overhead transmission we will have approximately 96 structures. In areas where single-pole structures are preferred, weak or wet soils may require concrete foundations for support. Where a transmission line must cross a street or slightly change direction, larger angle structures or guy wires may be required. Poles with guy wires impact a much larger area. Angle structures are usually more than double the diameter of other steel poles. They are made of steel, usually five to six feet in diameter, and have a large concrete base. The base may be buried ten or more feet below the ground surface. The diameter of the pole and the depth the base is buried depends on the condition of the soils and the voltage of the line. Assumed the structures are disposed to Yreka recycling, 34 miles away. This estimate is made as the best AECOM assumption, as actual pricing would occur during the detailed engineering and construction bid process.

PAY ITEM COST DETAIL WORKSHEET

5.024 Remove structures between pole 2/007 and Iron Gate

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	5.024	Project	:	KRRP - Copco 2				
Description	:	Remove structures between pole 2/007 and Iron Gate	Group	:	D03				
Quantity	:	6.00 EA							
Daily Production	:	2.50 EA per	10	hour shift	Project #	:	3		
Work Days	:	2.4 Days			Estimator	:	Mihaela Tomulescu	EA per	Total Cost
Unit Price	:	\$3,334.27 per EA			Probable Low Cost Parameter			2.75	\$18,005
Total Cost	:	\$20,006			Probable High Cost Parameter			2	\$24,007
									Unit Price Per EA
									\$3,000.84
									\$4,001.13

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	2.4	10	24.00	L	\$55.45	incl. in rate	incl. in rate	\$1,330.87
Electrician	Active	1.00	2.4	10	24.00	L	\$55.25	incl. in rate	incl. in rate	\$1,326.07
Truck, Utility, with Man-Basket	Active	1.00	2.4	10	24.00	E	\$31.90	incl. in rate	incl. in rate	\$765.60
Laborer	Active	2.00	2.4	10	48.00	L	\$51.01	incl. in rate	incl. in rate	\$2,448.48
Hydraulic Excavator (1.5cy)	Active	1.00	2.4	10	24.00	E	\$140.73	incl. in rate	incl. in rate	\$3,377.52
Hydraulic Crane (50tn)	Active	1.00	2.4	10	24.00	E	\$136.20	incl. in rate	incl. in rate	\$3,268.80
Equipment Operator (crane)	Active	1.00	2.4	10	24.00	L	\$81.02	incl. in rate	incl. in rate	\$1,944.50
Equipment Operator (light)	Active	1.00	2.4	10	24.00	L	\$69.39	incl. in rate	incl. in rate	\$1,665.36
Vibratory Hammer & Extractor	Active	1.00	2.4	10	24.00	E	\$94.14	incl. in rate	incl. in rate	\$2,259.36
					Labor Hours	144	TOTAL LABOR			\$8,715.29
					Equipment Hours	96	TOTAL EQUIPMENT			\$9,671.28

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$435.76	\$435.76
						TOTAL MATERIAL
						\$435.76

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling to Disposal Site Or Recycle Site	1.00	Loads	20 tons a load	\$400.00	\$400.00
					TOTAL SUBCONTRACTS
					\$400.00

SUMMARY OF COSTS					
Labor Cost	\$8,715.29	Labor Burden @	0.0%	\$0.00	\$8,715.29
Material Cost	\$435.76	Material Tax @	7.8%	\$33.77	\$469.54
Equipment Cost	\$9,671.28	Equipment Tax @	7.8%	\$749.52	\$10,420.80
Subcontractors	\$400.00				\$400.00
DIRECT COST SUBTOTALS	\$19,222		\$783	DIRECT COST SUBTOTALS	\$20,006

Additional Pay Item Notes :			
		The switchyard site and transmission line rights-of-way will be restored to the natural conditions. Production is based off of RSMs using Crew B-1C and B-3 (1 Forman, 2 laborer, 1 Excavator& 1 crane for lift, position and load in the truck, 1 Hydraulic rock-splitting/rock-drilling equipment to break equipment foundations and concrete for demo :4 Electrician,, 1 utility truck access poles, string conductor, modify structure arms, provide guard structures, etc. Crews may be working simultaneously along the project alignment. Assumed the structures are disposed to Yreka recycling, 34 miles away. These are only estimates as actual pricing would occur during the detailed engineering and construction bid process.	

IRON GATE DAM REMOVAL

PAY ITEM NUMBER	:	4.001	Project	:	KRRP - Iron Gate
Description	:	Furnish, Install, and Remove Barge-Mounted Crane in Reservoir	Group	:	D02
Quantity	:	1.00	Is	:	
Daily Production	:	0.13	Is per	:	10 hour shift
Work Days	:	8.0	Days	:	
Unit Price	:	\$151,385.72	per Is	:	
Total Cost	:	\$151,386		:	
			Project #	:	4
			Estimator	:	Eric Jones
			Probable Low Cost Parameter	:	0.1375
			Probable High Cost Parameter	:	0.10625
			Total Cost	:	\$136,247
			Unit Price Per Is	:	\$155,648.74
				:	\$174,094
				:	\$198,884.50

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	8.0	10	80.00	L	\$53.10	incl. in rate	incl. in rate	\$4,247.76
Laborer	Active	2.00	8.0	10	160.00	L	\$50.38	incl. in rate	incl. in rate	\$8,060.80
Equipment Operator (crane)	Active	1.00	8.0	10	80.00	L	\$75.25	incl. in rate	incl. in rate	\$6,020.08
Equipment Operator (oiler)	Active	1.00	8.0	10	80.00	L	\$69.23	incl. in rate	incl. in rate	\$5,538.72
Tugboat Captain	Active	1.00	8.0	10	80.00	L	\$74.54	incl. in rate	incl. in rate	\$5,962.88
Tugboat Hand	Active	1.00	8.0	10	80.00	L	\$50.38	incl. in rate	incl. in rate	\$4,030.40
Barge Operator	Active	1.00	8.0	10	80.00	L	\$44.33	incl. in rate	incl. in rate	\$3,546.40
Barge, Deck Engineer, Winch Operator	Active	1.00	8.0	10	80.00	L	\$70.69	incl. in rate	incl. in rate	\$5,654.88
Crawler Crane (270tn)	Active	2.00	8.0	10	160.00	E	\$399.50	incl. in rate	incl. in rate	\$63,920.00
Labor Hours					720	TOTAL LABOR				\$43,061.92
Equipment Hours					160	TOTAL EQUIPMENT				\$63,920.00

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price		Material Cost
TOTAL MATERIAL						\$0.00	

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Barge Rental 3 Months	3.00	month	1.000	3.00	\$28,800.00
Tug Boat Rental 3 Months	3.00	month	1.000	3.00	\$10,650.00
TOTAL SUBCONTRACTS					\$39,450.00

Labor Cost	\$43,061.92	Labor Burden @	0.0%	\$0.00	\$43,061.92
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00	\$0.00
Equipment Cost	\$63,920.00	Equipment Tax @	7.75%	\$4,953.80	\$68,873.80
Subcontractors	\$39,450.00				\$39,450.00
DIRECT COST SUBTOTALS	\$146,432			\$4,954	DIRECT COST SUBTOTALS \$151,386
Additional Pay Item Notes :					

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PAY ITEM NUMBER	:	4.003	Project	:	KRRP - Iron Gate
Description	:	Remove Reinforced Concrete Ring Located D/S of Closure Gate and U/S for Flap Gate	Group	:	D02
Quantity	:	46.00 CY			
Daily Production	:	11.56 CY per	10	hour shift	
Work Days	:	4.0	Days	Project #	4
Unit Price	:	\$331.68	per CY	Estimator	Eric Jones
Total Cost	:	\$15,257		CY per	
				Total Cost	\$12,969
				Unit Price Per CY	\$322.08
				Probable Low Cost Parameter	13.296875
				Probable High Cost Parameter	8.671875
					\$19,072
					\$473.64

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	4.0	10	40.00	L	\$53.10	incl. in rate	incl. in rate	\$2,123.88
Equipment Operator (medium)	Active	1.00	4.0	10	40.00	L	\$72.91	incl. in rate	incl. in rate	\$2,916.32
Laborer	Active	4.00	4.0	10	160.00	L	\$50.38	incl. in rate	incl. in rate	\$8,060.80
Air Tool, Chipping Hammer	Active	4.00	4.0	10	160.00	E	\$1.64	incl. in rate	incl. in rate	\$262.25
Air Compressor 600 cfm	Active	2.00	4.0	10	80.00	E	\$21.74	incl. in rate	incl. in rate	\$1,739.11
Labor Hours					240	TOTAL LABOR				\$13,101.00
Equipment Hours					240	TOTAL EQUIPMENT				\$2,001.36

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
TOTAL MATERIAL						\$0.00

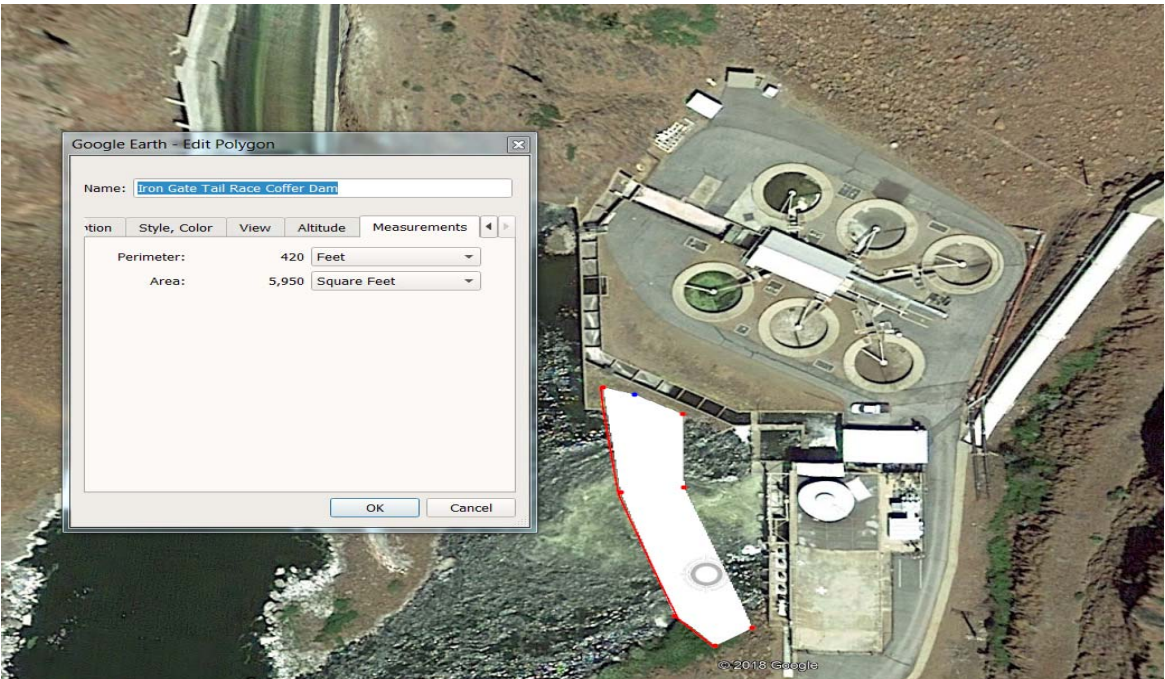
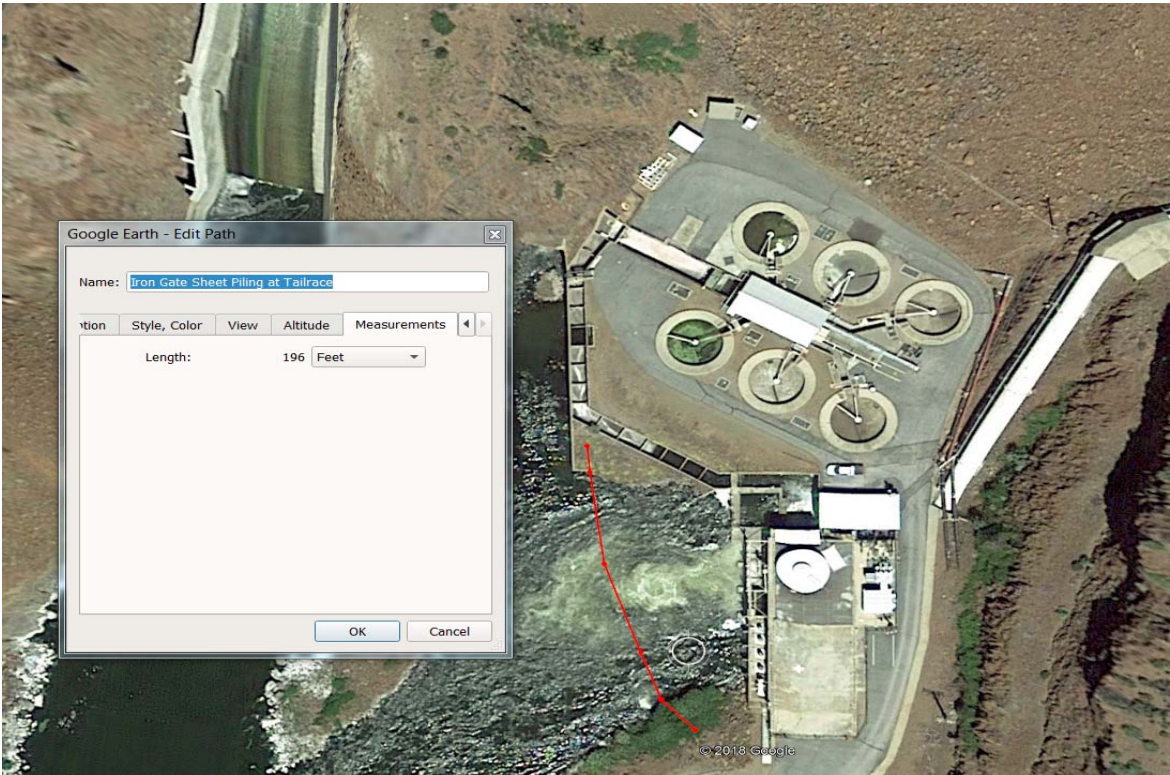
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
TOTAL SUBCONTRACTS					\$0.00

Labor Cost	\$13,101.00	Labor Burden @	0.0%		\$13,101.00
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00	\$0.00
Equipment Cost	\$2,001.36	Equipment Tax @	7.75%	\$155.11	\$2,156.46
Subcontractors	\$0.00				\$0.00
DIRECT COST SUBTOTALS	\$15,102			\$155	DIRECT COST SUBTOTALS \$15,257
Additional Pay Item Notes :					

SUMMARY OF COSTS									
Labor Cost	\$3,253.25	Labor Burden @	0.0%						\$3,253.25
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00					\$0.00
Equipment Cost	\$2,536.64	Equipment Tax @	7.75%	\$196.59					\$2,733.23
Subcontractors	\$0.00								\$0.00
DIRECT COST SUBTOTALS	\$5,790			\$197			DIRECT COST SUBTOTALS		\$5,986
Additional Pay Item Notes : <div style="border: 1px solid black; height: 100px; width: 100%;"></div>									

4.007.1 Tailrace Cofferdam- Drive Pile Details				
High Cost Factors			Low Cost Factors	
Bad Weather	0%		No Bad Weather	0%
Gas Price Increase	10%		Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	5%		No Unforeseen Contaminated Mats/ Access Issues	0%
	15%			10%

Production Per Hour		Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)	Overall Production	
		1500	8	70%	8400
		100	10	70%	700



4.010 Upstream Cofferdam to be Removed in the Wet Details			
High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	10%	Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	5%	No Unforeseen Contaminated Mats/ Access Issues	5%
	15%		15%
Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)	Overall Production
	120		65%
		20	65%
Haul Notes		Excavator Loading Production per shift	
CY	10,000.00	CY per Hour	57
Swell Factor	30%	CY Bucket Size	5.00
Bulk CY	13,000.00	Buckets Per Hour	11
Haul Vehicle 80% Capacity (1.3 tons per CY)	27	# of Excavators	1.00
# of Haul Vehicles		CY per Hour (5 CY Bucket)	57
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)		CY Per Hour Ideal Production Per 8 Hour Shift	160
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)		Efficient Compared to Ideal Production	35%
Haul Speed (Loaded MPH)	8.8	Inefficiencies Compared to Ideal Production	65%
Return Speed (Unloaded MPH)	15		
Haul Distance (Miles)	1.00		
Shift Length (Hours)	20		
Cycle Time			
Load Time (Load Time Minutes / Minutes)	0.00		
Haul Time (haul Distance / Haul Speed)	0.11		
Dump Time (Dump Time Minutes / 40 Mins)	0.00		
Return Time (haul Distance / Return Speed)	0.02		
Hours Per Cycle	0.31		
Efficiency Factor (night Work, Traffic Restrictions, Coffee Breaks, ECT)	65%		
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.48		
Number of Cycles Bulk CY (Haul Vehicle Cap X # of Haul Vehicles)	229		
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	114.72		
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	2.08		
Number of Haul Days	5.7		
Speed Loaded			
Max Weight lbs of loaded 745	164,500.00		
Tons	82.25		
20lbs/Ton Rolling weight	4		
Rolling Resistance (1% for each 20lbs/Ton)	4%		
Slope Grade	8%		
Total Resistance	12%		
Max Gear per CAT Chart	4		
Max MPH	8.8		
Speed Empty			
Max Weight lbs of Empty 745	74,100.00		
Tons Empty	37.05		
20lbs/Ton Rolling weight Empty	2		
Rolling Resistance (1% per 20lbs/Ton) Empty	2%		
Average Slope Empty	8%		
Total Resistance Empty	10%		
Max Gear per CAT Chart Empty	N/A		
Max MPH Empty	N/A		

Other Notes
This is for removal of Up stream coffer dam. Total CY is expected to be 20,000 and assumption is that 50% of that Quantity will be washed out when the coffer dam is breached. It is expected that the remaining 10,000 CY can be removed with excavators and haul trucks. The efficiency of this pay item is expected to be lower than other excavation items due to haul road maintenance or temp construction due to the material traveled on will be wet.

PAY ITEM COST DETAIL WORKSHEET

4.011 Remove 9' dia. hinged blind flange

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.011	Project	:	KRRP - Iron Gate				
Description	:	Remove 9' dia. hinged blind flange	Group	:	D02				
Quantity	:	19,000.00 LBS							
Daily Production	:	9,500.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	2.0 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$3.20 per LBS			Probable Low Cost Parameter			10925	\$51,624
Total Cost	:	\$60,734			Probable High Cost Parameter			7600	\$72,881
									Unit Price Per LBS
									\$3.10
									\$4.38

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	2.0	10	20.00	L	\$53.10	incl. in rate	incl. in rate	\$1,061.94
Laborer	Active	4.00	2.0	10	80.00	L	\$50.38	incl. in rate	incl. in rate	\$4,030.40
Steelworker	Active	2.00	2.0	10	40.00	L	\$72.07	incl. in rate	incl. in rate	\$2,882.88
Equipment Operator (medium)	Active	1.00	2.0	10	20.00	L	\$72.91	incl. in rate	incl. in rate	\$1,458.16
Equipment Operator (crane)	Active	1.00	2.0	10	20.00	L	\$75.25	incl. in rate	incl. in rate	\$1,505.02
Hydraulic Crane (80tn)	Active	1.00	2.0	10	20.00	E	\$190.46	incl. in rate	incl. in rate	\$3,809.20
Loader, FE Rubber Tire (3.5cy)	Active	1.00	2.0	10	20.00	E	\$64.23	incl. in rate	incl. in rate	\$1,284.60
Forklift, Rough Terrain (9,000 lb capacity)	Active	1.00	2.0	10	20.00	E	\$54.70	incl. in rate	incl. in rate	\$1,094.00
Labor Hours					180	TOTAL LABOR				\$10,938.40
Equipment Hours					60	TOTAL EQUIPMENT				\$6,187.80

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$1,093.84	\$1,093.84
Skid Allowance	1.00	AL	1.00	1.00	\$20,000.00	\$20,000.00
TOTAL MATERIAL						\$21,093.84

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal Cost 40 Miles to Yreka	1.00	Loads	20 tons a load	\$400.00	\$400.00
Cutting, steel, to 1/4" thick, by hand, incl prep, torch cutting & grinding, excl staging (assumed qty)	1,000.00	lf	1.000	1,000.00	\$20,000.00
TOTAL SUBCONTRACTS					\$20,400.00

SUMMARY OF COSTS						
Labor Cost	\$10,938.40	Labor Burden @	49.7%	\$0.00		\$10,938.40
Material Cost	\$21,093.84	Material Tax @	7.75%	\$1,634.77		\$22,728.61
Equipment Cost	\$6,187.80	Equipment Tax @	7.75%	\$479.55		\$6,667.35
Subcontractors	\$20,400.00					\$20,400.00
DIRECT COST SUBTOTALS	\$58,620			\$2,114	DIRECT COST SUBTOTALS	\$60,734
Additional Pay Item Notes :						
Turning of the actuating bolts and nuts - accomplished by steelworker / welder crew using only standard hand tools - spreads the yoke halves until they are fully separated, allowing the head to be swung open on its hinge. Contact surfaces of the clamping yokes, head and hub are tapered and when the head is closed and the yoke bolts are tightened, the head and hub are wedged together, compressing the O-ring and effecting a leakproof seal. Removing flanges is cumbersome and time consuming because of the tunnel work and the rusted fasteners. There is need to tug or hammer at bulky flanges or to struggle with bulky lugs and threads. Using loader, crane to load the flange and associated metal work in the truck. Included 5' of pipe spool. Expecting flange to be removed with a combination of a forklift and skids.						

PAY ITEM COST DETAIL WORKSHEET

4.012 Remove 18" plug valve and 7' of 18" drainage pipe

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.012			Project	:	KRRP - Iron Gate		
Description	:	Remove 18" plug valve and 7' of 18" drainage pipe			Group	:	D03		
Quantity	:	2,620.00 LBS							
Daily Production	:	3,275.00 LBS per		10	hour shift	Project #	:	4	
Work Days	:	0.8		Days		Estimator	:	Mihaela Tomulescu	
Unit Price	:	\$2.18		per LBS		Probable Low Cost Parameter		3766.25	Total Cost \$4,852
Total Cost	:	\$5,708				Probable High Cost Parameter		2620	\$6,850
									Unit Price Per LBS \$2.12
									\$2.99

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Truck Driver (heavy)	Active	1.00	0.8	10	8.00	L	\$63.35	incl. in rate	incl. in rate	\$506.79
Trencher	Active	2.00	0.8	10	16.00	E	\$4.07	incl. in rate	incl. in rate	\$65.12
Equipment Operator (crane)	Active	1.00	0.8	10	8.00	L	\$75.25	incl. in rate	incl. in rate	\$602.01
Hydraulic Crane (17tn)	Active	1.00	0.8	10	8.00	E	\$81.52	incl. in rate	incl. in rate	\$652.16
Truck, On-Highway Dump (6x4, 12cy)	Active	1.00	0.8	10	8.00	E	\$70.35	incl. in rate	incl. in rate	\$562.80
Hydraulic Excavator (1.5cy)	Active	1.00	0.8	10	8.00	E	\$141.92	incl. in rate	incl. in rate	\$1,135.36
Equipment Operator (medium)	Active	1.00	0.8	10	8.00	L	\$72.91	incl. in rate	incl. in rate	\$583.26
Steelworker	Active	2.00	0.8	10	16.00	L	\$72.07	incl. in rate	incl. in rate	\$1,153.15
Labor Hours					40	TOTAL LABOR				\$2,845.22
Equipment Hours					40	TOTAL EQUIPMENT				\$2,415.44

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, e	1.00	LS	1.000	1.00	\$241.54	\$241.54
						TOTAL MATERIAL
						\$241.54

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					TOTAL SUBCONTRACTS
					\$0.00

SUMMARY OF COSTS									
Labor Cost	\$2,845.22	Labor Burden @	49.7%	\$0.00				\$2,845.22	
Material Cost	\$241.54	Material Tax @	7.75%	\$18.72				\$260.26	
Equipment Cost	\$2,415.44	Equipment Tax @	7.75%	\$187.20				\$2,602.64	
Subcontractors	\$0.00							\$0.00	
DIRECT COST SUBTOTALS	\$5,502			\$206			DIRECT COST SUBTOTALS	\$5,708	
Additional Pay Item Notes :									
This is tunnel work. Assumed 7' ductile iron 18" pipe at 78.5LBS /LF= 550 LBS, weight of the valve assumed API 600 gate valve for 18" is 2070 LBS.									

4.013.1 Installation of 15.5'w X 16.5't Roller Gate and Gate Structure

PAY ITEM NUMBER :	4.013.1	Project :	KRRP - Iron Gate		
Description :	Installation of 15.5'w X 16.5' Roller Gate and Gate Structure	Group :	D02		
Quantity :	1.00 LS				
Daily Production :	0.03 LS per 20	Project # :	4		
Work Days :	40.0 Days	Estimator :	Mihaela Tomulescu	LS per	Total Cost
Unit Price :	\$3,791,299.91 per LS	Probable Low Cost Parameter	0.0275	\$3,412,170	\$3,898,063
Total Cost :	\$3,791,300	Probable High Cost Parameter	0.0225	\$4,170,430	\$4,764,299

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	40.0	20	800.00	L	\$53.10	incl. in rate	incl. in rate	\$42,477.60
Laborer	Active	3.00	40.0	20	2,400.00	L	\$50.38	incl. in rate	incl. in rate	\$120,912.00
Carpenter Foreman (out)	Active	1.00	40.0	20	800.00	L	\$51.04	incl. in rate	incl. in rate	\$40,832.00
Carpenters	Active	4.00	40.0	20	3,200.00	L	\$79.86	incl. in rate	incl. in rate	\$255,552.00
Equipment Operator (crane)	Active	1.00	40.0	20	800.00	L	\$75.25	incl. in rate	incl. in rate	\$60,200.80
Steelworker	Active	2.00	40.0	20	1,600.00	L	\$72.07	incl. in rate	incl. in rate	\$115,315.20
Electrician	Active	1.00	40.0	20	800.00	L	\$49.75	incl. in rate	incl. in rate	\$39,802.40
Crawler Crane (270tn)	Active	1.00	40.0	20	800.00	E	\$399.50	incl. in rate	incl. in rate	\$319,600.00
Conc Pump (small)	Active	1.00	3.0	20	60.00	E	\$121.58	incl. in rate	incl. in rate	\$7,294.80
Equipment Operator (light)	Active	1.00	3.0	20	60.00	L	\$71.39	incl. in rate	incl. in rate	\$4,283.40
Labor Hours					10460	TOTAL LABOR				\$679,375.40
Equipment Hours					860	TOTAL EQUIPMENT				\$326,894.80

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Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Welding inspection technician, per day	2.00	EA	1.000	2.00	\$480.00
					\$960.00
TOTAL SUBCONTRACTS					\$960.00

Labor Cost	\$679,375.40	Labor Burden @	49.7%	\$0.00		\$679,375.40
Material Cost	\$2,560,311.24	Material Tax @	7.75%	\$198,424.12		\$2,758,735.36
Equipment Cost	\$326,894.80	Equipment Tax @	7.75%	\$25,334.35		\$352,229.15
Subcontractors	\$960.00					\$960.00
DIRECT COST SUBTOTALS	\$3,567,541			\$223,758		DIRECT COST SUBTOTALS
Additional Pay Item Notes :						\$3,791,300
<p>This item is to build the diversion roller gate structure for the Iron Gate reservoir draw down. It is expected that the fish bays will be backfilled and a crane will be placed near the existing diversion tunnel down stream end to support construction of the roller gate structure. Material items have been accounted for using allowance amounts. Concrete pump is expected to be used 3 days to accommodate pouring concrete</p>						

SUMMARY OF COSTS				
Labor Cost	\$192,569.61	Labor Burden @	49.7%	\$0.00
Material Cost	\$19,506.96	Material Tax @	7.75%	\$1,511.79
Equipment Cost	\$71,504.72	Equipment Tax @	7.75%	\$5,541.62
Subcontractors	\$4,472.50			
DIRECT COST SUBTOTALS	\$288,054		\$7,053	DIRECT COST SUBTOTALS
				\$295,107
Additional Pay Item Notes :				
<p>This estimate is to remove the grating and gates on the existing diversion tunnel. Due to the depth of the and distance to the gate it is expected that the divers will only be able to spend 20 mins at the location of the grates or the gates. Extra divers have been added to account for the circulation due to the depth restriction. It is expected that there will be a total of 3 divers working on the removal at each time. A total of 9 divers will be need to ensure coverage for the demolition operation. This accounts for 3 divers needing to rotate every 20 mins.</p>				

PAY ITEM COST DETAIL WORKSHEET

4.013.3 Remove New Roller Gate Structure

PAY ITEM INFORMATION										
PAY ITEM NUMBER	:	4.013.3			Project	:	KRRP - Iron Gate			
Description	:	Remove New Roller Gate Structure			Group	:	D02			
Quantity	:	300.00 CY								
Daily Production	:	100.00	CY per	20						hour shift
Work Days	:	3.0 Days			Project #	:	4			
Unit Price	:	\$424.46 per CY			Estimator	:	Mihaela Tomulescu	CY per	Total Cost	Unit Price Per CY
Total Cost	:	\$127,339			Probable Low Cost Parameter		110	\$114,605	\$436	
	Probable High Cost Parameter					90	\$140,073	\$533		

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	3.0	20	60.00	L	\$53.10	incl. in rate	incl. in rate	\$3,185.82
Equipment Operator (medium)	Active	2.00	3.0	20	120.00	L	\$72.91	incl. in rate	incl. in rate	\$8,748.96
Equipment Operator (crane)	Active	1.00	3.0	20	60.00	L	\$75.25	incl. in rate	incl. in rate	\$4,515.06
Crawler Crane (270tn)	Active	1.00	3.0	20	60.00	E	\$399.50	incl. in rate	incl. in rate	\$23,970.00
Laborer	Active	4.00	3.0	20	240.00	L	\$50.38	incl. in rate	incl. in rate	\$12,091.20
Truck Driver (heavy)	Active	3.00	3.0	20	180.00	L	\$63.35	incl. in rate	incl. in rate	\$11,402.82
Hydraulic Excavator (5.0cy)	Active	2.00	3.0	20	120.00	E	\$274.63	incl. in rate	incl. in rate	\$32,955.60
Hydraulic Impact Breaker Attachment (5k+ ft-lb)	Active	2.00	3.0	20	120.00	E	\$62.72	incl. in rate	incl. in rate	\$7,526.40
Truck, On-Highway Dump (6x4, 12cy)	Active	3.00	3.0	20	180.00	E	\$70.35	incl. in rate	incl. in rate	\$12,663.00
Labor Hours					660	TOTAL LABOR				\$39,943.86
Equipment Hours					480	TOTAL EQUIPMENT				\$77,115.00

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$3,994.39	\$3,994.39
						TOTAL MATERIAL
						\$3,994.39

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					TOTAL SUBCONTRACTS
					\$0.00

SUMMARY OF COSTS									
Labor Cost	\$39,943.86	Labor Burden @	49.7%	\$0.00					\$39,943.86
Material Cost	\$3,994.39	Material Tax @	7.75%	\$309.56					\$4,303.95
Equipment Cost	\$77,115.00	Equipment Tax @	7.75%	\$5,976.41					\$83,091.41
Subcontractors	\$0.00								\$0.00
DIRECT COST SUBTOTALS		\$121,053		\$6,286		DIRECT COST SUBTOTALS		\$127,339	
Additional Pay Item Notes :									
Crane will be used to remove gate material as it because free from gate structure. Estimated 300 CY of concrete to be removed and the production reflected are adjusted to account for other items that need to be removed in regards to the gate. It is expected access for equipment will be where the existing fish bays are. This item is double shifted with two 10 hour shifts due to the California in water work restrictions.									

4.014 Remove Concrete in Observation Platform, Crest Wall and Wall Extension			
Details			
High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	5%	Gas Price Decrease	5%
Unforeseen Contaminated Mats/ Access Issues	5%	No Unforeseen Contaminated Mats/ Access Issues	5%
Total	10%	Total	10%
Production Per Hour		Overall Production	
Hours	15	8	120.00
		10	150.00
Haul Notes		Excavator Loading Production per shift	
CY	780.00	CY per Hour	42.67
Swell Factor	60%	CY Bucket Size	2.50
Bulk CY	1248	Buckets Per Hour	17
Haul Vehicle 60% Capacity (2 tons per CY)	19.2	# of Excavators	1.00
# of Haul Vehicles	1	CY per Hour (2.5 CY Bucket)	42.66666667
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	8	CY Per Hour Ideal Production Per 8 Hour Shift	95
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) Minutes)	3	Efficient Compared to Ideal Production	45%
Haul Speed (Loaded MPH)	9	Inefficiencies Compared to Ideal Production	55%
Return Speed (Unloaded MPH)	20		
Haul Distance (Miles)	1		
Shift Length (Hours)	10		
Cyce Time		Breaker Production	
Load Time (Load Time Minutes / 60mins)	0.13	Hydraulic Hammer CY per Hour	15
Haul Time (Haul Distance / Haul Speed)	0.11	# of Hammers	1.00
Dump Time (Dump Time Minutes / 60 Mins)	0.05	CY per Hour	42.66666667
Return Time (Haul Distance / Return Speed)	0.05	CY per Hour Back Check	15
Hours Per Cycle	0.34	32CY per HR per 8hr shift (Ideal prod)	32
Efficiency Factor (Night Work, Traffic Retrictions, Coffee Breaks, ECT)	75%	Efficient Compared to Ideal Production	45%
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.45	Inefficiencies Compared to Ideal Production	55%
Number of Cycles/Bulk CY (Haul Vehicle Cap X # of Haul Vehicles)	65		
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	29.25		
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	2.22		
Number of Haul Days	2.925		
Speed Loaded			
Max Weight lbs of loaded 745	164,500.00		
Tons	82		
20lbs/Ton Rolling weighth	4		
Rolling Resitance (1% for each 20lbs/Ton)	4%		
Average Slope	2%		
Total Resistance	6%		
Max Gear per CAT Chart	4		
Max MPH	8.8		
Speed Empty	0		
Max Weight lbs of Empty 745	74,100.00		
Tons Empty	37		
20lbs/Ton Rolling weight Empty	2		
Rolling Resitance (1% per 20lbs/Ton) Empty	2%		
Average Slope Empty	2%		
Total Resistance Empty	0%		
Max Gear per CAT Chart Empty N/A			
Max MPH Empty N/A			
Other Notes			

4.015 Remove Concrete in Diversion Tunnel Intake Structure				
Details				
High Cost Factors		Low Cost Factors		
Bad Weather	0%	No Bad Weather		0%
Gas Price Increase	5%	Gas Price Decrease		5%
Unforeseen Contaminated Mats/ Access Issues	5%	No Unforeseen Contaminated Mats/ Access Issues		5%
Total	10%	Total		10%
Production Per Hour	Hours	Overall Production		
	15	8	120.00	
		10	150.00	
Haul Notes		Excavator Loading Production per shift		
CY	715.00	CY per Hour		40.00
Swell Factor	60%	CY Bucket Size		2.50
Bulk CY	1144	Buckets Per Hour		16
Haul Vehicle 60% Capacity (2 tons per CY)	19.2	# of Excavators		1.00
# of Haul Vehicles	1	CY per Hour (2.5 CY Bucket)		40
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)		9 CY Per Hour Ideal Production Per 8 Hour Shift		95
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) Minute		3 Efficient Compared to Ideal Production		42%
Haul Speed (Loaded MPH)		9 Inefficiencies Compared to Ideal Production		58%
Return Speed (Unloaded MPH)	20			
Haul Distance (Miles)	1			
Shift Length (Hours)	10			
Cyce Time		Breaker Production		
Load Time (Load Time Minutes / 60mins)	0.15	Hydraulic Hammer CY per Hour		15
Haul Time (Haul Distance / Haul Speed)	0.11	# of Hammers		1.00
Dump Time (Dump Time Minutes / 60 Mins)	0.05	CY per Hour		40
Return Time (Haul Distance / Return Speed)	0.05	CY per Hour Back Check		15
Hours Per Cycle	0.36	32CY per HR per 8hr shift (Ideal prod)		32
Efficiency Factor (Night Work, Traffic Retrictions, Coffee Breaks, ECT)	75%	Efficient Compared to Ideal Production		42%
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.48	Inefficiencies Compared to Ideal Production		58%
Number of Cycles(Bulk CY/ (Haul Vehicle Cap X # of Haul Vehicles)	60			
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	28.8			
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	2.08			
Number of Haul Days	2.88			
Speed Loaded				
Max Weight lbs of loaded 745	164,500.00			
Tons	82			
20lbs/Ton Rolling weighth	4			
Rolling Resitance (1% for each 20lbs/Ton)	4%			
Average Slope	2%			
Total Resistance	6%			
Max Gear per CAT Chart	4			
Max MPH	8.8			
Speed Empty	0			
Max Weight lbs of Empty 745	74,100.00			
Tons Empty	37			
20lbs/Ton Rolling weight Empty	2			
Rolling Resitance (1% per 20lbs/Ton) Empty	2%			
Average Slope Empty	2%			
Total Resistance Empty	0%			
Max Gear per CAT Chart Empty	N/A			
Max MPH Empty	N/A			
Other Notes				

[illegible]

PAY ITEM COST DETAIL WORKSHEET

4.017 Remove Steel Footbridge to Gate Tower

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.017	Project	:	KRRP - Iron Gate				
Description	:	Remove Steel Footbridge to Gate Tower	Group	:	D10				
Quantity	:	13,000.00 LBS							
Daily Production	:	12,500.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	1.0 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.72 per LBS			Probable Low Cost Parameter			14375	\$7,960
Total Cost	:	\$9,365			Probable High Cost Parameter			10625	\$10,770
								Unit Price Per LBS	\$0.70
									\$0.95

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.0	10	10.40	L	\$53.10	incl. in rate	incl. in rate	\$552.21
Electrician	Active	1.00	1.0	10	10.40	L	\$49.75	incl. in rate	incl. in rate	\$517.43
Hydraulic Crane (50tn)	Active	1.00	1.0	10	10.40	E	\$134.32	incl. in rate	incl. in rate	\$1,396.93
Equipment Operator (crane)	Active	1.00	1.0	10	10.40	L	\$75.25	incl. in rate	incl. in rate	\$782.61
Vibratory Hammer & Extractor	Active	1.00	1.0	10	10.40	E	\$94.34	incl. in rate	incl. in rate	\$981.14
Laborer	Active	2.00	1.0	10	20.80	L	\$50.38	incl. in rate	incl. in rate	\$1,047.90
Equipment Operator (light)	Active	1.00	1.0	10	10.40	L	\$71.39	incl. in rate	incl. in rate	\$742.46
Steelworker	Active	2.00	1.0	10	20.80	L	\$72.07	incl. in rate	incl. in rate	\$1,499.10
Labor Hours					83.2	TOTAL LABOR				\$5,141.71
Equipment Hours					20.8	TOTAL EQUIPMENT				\$2,378.06

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$257.09	\$257.09
						TOTAL MATERIAL
						\$257.09

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Rent aerial lift, articulating boom, to 80' high, 500 lb. capacity, diesel - Rent per day (RS Means 01543340)	1.00	days	1.000	1.00	\$584.00
Hauling Disposal Cost 40 Mile to Yreka	2.00	Loads		\$400.00	\$800.00
					TOTAL SUBCONTRACTS
					\$1,384.00

SUMMARY OF COSTS						
Labor Cost	\$5,141.71	Labor Burden @	49.7%	\$0.00		\$5,141.71
Material Cost	\$257.09	Material Tax @	7.75%	\$19.92		\$277.01
Equipment Cost	\$2,378.06	Equipment Tax @	7.75%	\$184.30		\$2,562.36
Subcontractors	\$1,384.00					\$1,384.00
DIRECT COST SUBTOTALS	\$9,161			\$204	DIRECT COST SUBTOTALS	\$9,365

Additional Pay Item Notes :			
		The bridge steel grid, excess steel members and similar materials shall be removed from each span prior to removing the main supporting beams, girders or trusses over land. Assumed crew is formed of 1 Forman, 1 Electrician (temporary power for tools), 2 steelworkers to cut steel in the articulated boom and 2 Laborers (Load, Haul, help with the crane ropes, etc).	

PAY ITEM COST DETAIL WORKSHEET

4.019 Place Concrete Plugs for Diversion Tunnel

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.019	Project	:	KRRP - Iron Gate				
Description	:	Place Concrete Plugs for Diversion Tunnel	Group	:	D02				
Quantity	:	86.00 CY							
Daily Production	:	3.00 CY per	10	hour shift	Project #	:	4		
Work Days	:	28.7 Days			Estimator	:	Mihaela Tomulescu	CY per	
Unit Price	:	\$2,769.61 per CY			Probable Low Cost Parameter			3.3	Total Cost
Total Cost	:	\$238,186			Probable High Cost Parameter			2.7	\$214,368
									Unit Price Per CY
									\$2,848
									\$3,480

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Carpenter Foreman (out)	Active	1.00	28.7	10	287.00	L	\$51.04	incl. in rate	incl. in rate	\$14,648.48
Carpenters	Active	2.00	28.7	10	574.00	L	\$79.86	incl. in rate	incl. in rate	\$45,839.64
Carpenters, Journeyman	Active	2.00	28.7	10	574.00	L	\$71.91	incl. in rate	incl. in rate	\$41,274.62
Equipment Operator (crane)	Active	2.00	14.4	10	287.00	L	\$75.25	incl. in rate	incl. in rate	\$21,597.04
Equipment Operator (light)	Active	2.00	2.0	10	40.00	L	\$71.39	incl. in rate	incl. in rate	\$2,855.60
Hydraulic Crane (80tn)	Active	1.00	14.4	10	143.50	E	\$190.46	incl. in rate	incl. in rate	\$27,331.01
Conc Pump (small)	Active	1.00	2.0	10	20.00	E	\$121.58	incl. in rate	incl. in rate	\$2,431.60
Steelworker	Active	2.00	5.0	10	100.00	L	\$72.07	incl. in rate	incl. in rate	\$7,207.20
Welder	Active	1.00	28.7	10	287.00	E	\$7.84	incl. in rate	incl. in rate	\$2,249.36
Labor Hours					1862	TOTAL LABOR				\$133,422.58
Equipment Hours					450.5	TOTAL EQUIPMENT				\$32,011.97

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Concrete	86.00	CY	1.100	94.60	\$159.23	\$15,063.16
Reinforcement (At 90lbs per CY)	3.87	Ton	1.100	4.26	\$1,000.00	\$4,257.00
FormWork Allowance (20% of Labor)	1.00	LS	1.100	1.10	\$26,684.52	\$29,352.97
Consumables (10% of Equip & Labor)	1.00	LS	1.000	1.00	\$16,543.45	\$16,543.45
						TOTAL MATERIAL
						\$65,216.58

SUBCONTRACT COSTS				
Description	Quantity	Units	Notes / Company	Contract or Quote Amount
				TOTAL SUBCONTRACTS
				\$0.00

SUMMARY OF COSTS					
Labor Cost	\$133,422.58	Labor Burden @	49.7%	\$0.00	\$133,422.58
Material Cost	\$65,216.58	Material Tax @	7.75%	\$5,054.28	\$70,270.86
Equipment Cost	\$32,011.97	Equipment Tax @	7.75%	\$2,480.93	\$34,492.90
Subcontractors	\$0.00				\$0.00
DIRECT COST SUBTOTALS	\$230,651			\$7,535	DIRECT COST SUBTOTALS
					\$238,186
Additional Pay Item Notes :					
The 2 Plugs are expected to be formed in two sections. The inner section will be formed and braced off of the tunnel walls. After the inner form (set form) is installed the face form will be built similar to the set form by bracing off of the tunnel walls. To ensure consolidation a high slump small aggregate mix will be used and concrete vibrators will have access through the Bat opening block out at the top. One 5 man crew will be used to construct the formwork, place the concrete, and strip the form work. One crew of 3 rodusters will be used to tie and brace reinforcement. Expected duration is 5 days to form the plug , 2 days to reinforce the plug, 1 days to pour the plug, and 2 days to strip the plug. Crane will be used 1/2 of time to support crew by flying material close to plug location. A small pump will be used to install concrete. Please note the production is adjusted to account for the duration as listed above.					

4.020 Remove Concrete Closure Gates in Gate Tower

PAY ITEM NUMBER	:	4.020	Project	:	KRRP - Iron Gate
Description	:	Remove Concrete Closure Gates in Gate Tower	Group	:	D07
Quantity	:	85.00 CY			
Daily Production	:	40.00 CY per			
Work Days	:	2.1 Days	Project #	:	4
Unit Price	:	\$408.92 per CY	Estimator	:	Mihaela Tomulescu
Total Cost	:	\$34,758	CY per	:	46
			Total Cost	:	\$29,544
			Unit Price Per CY	:	\$397
			Probable Low Cost Parameter	:	46
			Probable High Cost Parameter	:	34
					\$39,972
					\$537

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	2.1	10	21.00	L	\$53.10	incl. in rate	incl. in rate	\$1,115.04
Equipment Operator (medium)	Active	2.00	2.1	10	42.00	L	\$72.91	incl. in rate	incl. in rate	\$3,062.14
Steelworker	Active	2.00	2.1	10	42.00	L	\$72.07	incl. in rate	incl. in rate	\$3,027.02
Electrician	Active	1.00	2.1	10	21.00	L	\$49.75	incl. in rate	incl. in rate	\$1,044.81
Truck Driver (heavy)	Active	1.00	2.1	10	21.00	L	\$63.35	incl. in rate	incl. in rate	\$1,330.33
Vibratory Hammer & Extractor	Active	1.00	2.1	10	21.00	E	\$94.34	incl. in rate	incl. in rate	\$1,981.14
Hydraulic Excavator (6.0cy)	Active	1.00	2.1	10	21.00	E	\$322.48	incl. in rate	incl. in rate	\$6,772.08
Loader, FE Rubber Tire (8.6cy)	Active	1.00	2.1	10	21.00	E	\$221.50	incl. in rate	incl. in rate	\$4,651.50
Diver, Wet	Active	2.00	2.1	10	42.00	L	\$137.03	incl. in rate	incl. in rate	\$5,755.13
Barge, Sectional, 20'x10'	Active	1.00	2.1	10	21.00	E	\$4.48	incl. in rate	incl. in rate	\$94.08
Barge Operator	Active	1.00	2.1	10	21.00	L	\$44.33	incl. in rate	incl. in rate	\$930.93
CAT 745 (32 CY) OFF ROAD TRUCK	Active	1.00	2.1	10	21.00	E	\$174.47	incl. in rate	incl. in rate	\$3,663.87
					Labor Hours	210	TOTAL LABOR			\$16,265.40
					Equipment Hours	105	TOTAL EQUIPMENT			\$17,162.67

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
TOTAL MATERIAL						\$0.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
TOTAL SUBCONTRACTS					\$0.00

Labor Cost	\$16,265.40	Labor Burden @	49.7%	\$0.00		\$16,265.40
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00		\$0.00
Equipment Cost	\$17,162.67	Equipment Tax @	7.75%	\$1,330.11		\$18,492.78
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$33,428			\$1,330	DIRECT COST SUBTOTALS	\$34,758
Additional Pay Item Notes :						

4.021 Remove Upstream Riprap (10' thick upstream side of Dam)

PAY ITEM NUMBER	:	4.021	Project	:	KRRP - Iron Gate
Description	:	Remove Upstream Riprap (10' thick upstream side of Dam)	Group	:	D08
Quantity	:	92,400.00 cy			
Daily Production	:	8,800.00 cy per	20 hour shift	Project #	: 4
Work Days	:	10.5 Days	Estimator	:	Eric Jones
Unit Price	:	\$6.21 per cy		cy per	Total Cost Unit Price Per cy
Total Cost	:	\$574,262	Probable Low Cost Parameter	9680	\$516,836 \$6.39
			Probable High Cost Parameter	7040	\$689,115 \$8.52

CREW COSTS

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Hydraulic Excavator (5.0cy)	Active	1.00	10.5	20	210.00	E	\$274.63	incl. in rate	incl. in rate	\$57,672.30
Loader, FE Rubber Tire (5.25cy)	Active	1.00	10.5	20	210.00	E	\$75.42	incl. in rate	incl. in rate	\$15,838.20
Equipment Operator (medium)	Active	3.00	10.5	20	630.00	L	\$72.91	incl. in rate	incl. in rate	\$45,932.04
Truck Driver (heavy)	Active	8.00	9.4	20	1,501.44	L	\$63.35	incl. in rate	incl. in rate	\$95,114.72
Laborer	Active	4.00	10.5	20	840.00	L	\$50.38	incl. in rate	incl. in rate	\$42,319.20
Labor Foreman	Active	1.00	10.5	20	210.00	L	\$53.10	incl. in rate	incl. in rate	\$11,150.37
Grader, 180hp, 13' blade	Active	1.00	10.5	20	210.00	E	\$80.79	incl. in rate	incl. in rate	\$16,965.90
CAT 745 (32 CY) OFF ROAD TRUCK	Active	8.00	9.4	20	1,501.44	E	\$174.47	incl. in rate	incl. in rate	\$261,956.24
Labor Hours					3181.44	TOTAL LABOR				\$194,516.33
Equipment Hours					2131.44	TOTAL EQUIPMENT				\$352,432.64

MATERIAL COSTS

[illegible]

SUBCONTRACT COSTS

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
TOTAL SUBCONTRACTS					\$0.00

SUMMARY OF COSTS

Summary of Costs				
Labor Cost	\$194,516.33	Labor Burden @	49.7%	\$0.00
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00
Equipment Cost	\$352,432.64	Equipment Tax @	7.75%	\$27,313.53
Subcontractors	\$0.00			\$0.00
DIRECT COST SUBTOTALS	\$546,949		\$27,314	DIRECT COST SUBTOTALS
				\$574,262

\$546.949

\$27,314

DIRECT COST SUBTOTALS

Additional Pay Item Notes :

See production and sequence notes

4.021 Remove Upstream Riprap (10' thick upstream side of Dam)			
Details			
High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	10%	Gas Price Decrease	10%
Unforeseen Contaminated Mater/ Access Issues	10%	No Unforeseen Contaminated Mater/ Access Issues	0%
		20%	
		10%	
Production Per Hour		Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Etc)	
Hours		Overall Production	
550		8	3520
		20	8800
Haul Notes		Excavator Loading Production per shift	
CY	92,400.00	CY per Hour	-
Swell Factor	30%	CY Bucket Size	5.00
Bulk CY	120,120.00	Buckets Per Hour	26
Haul Vehicle 85% Capacity (1.3 tons per CY)	27.2	# of Excavators	1.00
# of Haul Vehicles		CY per Hour (5 CY Bucket)	128
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	5.0	CY Per Hour Ideal Production Per 8 Hour Shift	160
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)	3.0	Efficient Compared to Ideal Production	80%
Haul Speed (Loaded MPH)	8.8	Inefficiencies Compared to Ideal Production	20%
Return Speed (Unloaded MPH)	20		
Haul Distance (Miles)	1.00		
Shift Length (Hours)	20		
Cycle Time			
Load Time (Load Time Minutes / Minutes)	0.09		
Haul Time (Haul Distance / Haul Speed)	0.11		
Dump Time (Dump Time Minutes / 60 Min)	0.05		
Return Time (Haul Distance / Return Speed)	0.05		
Hours Per Cycle	0.29		
Efficiency Factor (Night Work, Traffic Restrictions, Coffin Breaks, ETC)	85%		
Actual Hours Per Cycle (Hours per Cycle Efficiency Factor)	0.34		
Number of Cycles (Bulk CY/Haul Vehicle Cap X # of Haul Vehicles)	552		
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	187.68		
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	2.94		
Number of Haul Days	9.384		
Speed Loaded			
Max Weight lbs of loaded 745	164,500.00		
Tons	82		
20lbs/Ton Rolling weight	4		
Rolling Resistance (1%for each 20lbs/Ton)	4%		
Slope Grade	7%		
Total Resistance	11%		
Max Gear per CAT Chart	4		
Max MPH	8.8		
Speed Empty			
Max Weight lbs of Empty 745	74,100.00		
Tons Empty	37		
20lbs/Ton Rolling weight Empty	2		
Rolling Resistance (1% per 20lbs/Ton) Empty	2%		
Average Slope Empty	7%		
Total Resistance Empty	9%		
Max Gear per CAT Chart Empty	N/A		
Max MPH Empty	N/A		
		Notes Due to weight and Grade Speed Calculation is not applicable	

Other Notes
This estimate is for excavating the rip rap off of the earth dam at Iron Gate. This activity is expected to have similar production as 4.023.1.

4.022 Remove Downstream Riprap				
Details				
High Cost Factors			Low Cost Factors	
Bad Weather	0%		No Bad Weather	0%
Gas Price Increase	10%		Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	10%		No Unforeseen Contaminated Mats/ Access Issues	0%
	20%			10%
Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)	Overall Production	
	500	8	80%	3200
		20	80%	8000
Haul Notes		Excavator Loading Production per shift		
CY		23,400.00 CY per Hour		128
Swell Factor		30% CY Bucket Size		5.00
Bulk CY		30,420.00 Buckets Per Hour		26
Haul Vehicle 85% Capacity (1.3 tons per CY)		27.2 # of Excavators		1.00
# of Haul Vehicles		7 CY per Hour (5 CY Bucket)		128
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)		5.0 CY Per Hour Ideal Production Per 8 Hour Shift		160
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)		3.0 Efficient Compared to Ideal Production		80%
Haul Speed (Loaded MPH)		8.8 Inefficiencies Compared to Ideal Production		20%
Return Speed (Unloaded MPH)				
Haul Distance (Miles)				
Shift Length (Hours)				
Cycle Time				
Load Time (Load Time Minutes / 60mins)		0.08		
Haul Time (Haul Distance / Haul Speed)		0.11		
Dump Time (Dump Time Minutes / 60 Mins)		0.05		
Return Time (Haul Distance / Return Speed)		0.05		
Hours Per Cycle		0.29		
Efficiency Factor (night Work, Traffic Rearndoms, Coffee Breaks, ECT)		85%		
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)		0.34		
Number of Cycles(Bulk CY/ (Haul Vehicle Cap X # of Haul Vehicles)		160		
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)		54.4		
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)		2.94		
Number of Haul Days		2.72		
Speed Loaded				
	Max Weight lbs of loaded 745	164,500.00		
	Tons	82		
	20lbs/Ton Rolling weight	4		
	Rolling Resistance (1% for each 20lbs/Ton)	4%		
	Slope Grade	7%		
	Total Resistance	11%		
	Max Gear per CAT Chart	4		
	Max MPH	8.8		
Speed Empty				
	Max Weight lbs of Empty 745	74,100.00		
	Tons Empty	37		
	20lbs/Ton Rolling weight Empty	2		
	Rolling Resistance (1% per 20lbs/Ton) Empty	2%		
	Average Slope Empty	7%		
	Total Resistance Empty	-5%		
	Max Gear per CAT Chart Empty	N/A		
	Max MPH Empty	N/A		
	Notes Due to weight and Grade Speed Calculation is not applicable			

Other Notes
This estimate is for excavating the rip rap off of the earth dam at Iron Gate. This activity is expected to have similar production as 4.023.1.

4.023 Dam Fill Excavation to Spillway

SUMMARY OF COSTS					
Labor Cost	\$626,207.87	Labor Burden @	49.7%	\$0.00	\$626,207.87
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00	\$0.00
Equipment Cost	\$944,162.44	Equipment Tax @	7.75%	\$73,172.59	\$1,017,335.03
Subcontractors	\$0.00				\$0.00
DIRECT COST SUBTOTALS	\$1,570,370		\$73,173		DIRECT COST SUBTOTALS \$1,643,543
Additional Pay Item Notes :					

4.023 Dam Fill Excavation to Spillway				
Details				
High Cost Factors			Low Cost Factors	
Bad Weather	0%		No Bad Weather	0%
Gas Price Increase	10%		Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	10%		No Unforeseen Contaminated Mats/ Access Issues	0%
	20%			10%
Production Per Hour		Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Etc)		Overall Production
	Hours			
	800	8	50%	3200
		20	50%	8000
Haul Notes		Excavator Loading Production per shift		
CY	270,000.00	CY per Hour		68
Swell Factor	30%	CY Bucket Size		5.00
Bulk CY	351,000.00	Buckets Per Hour		14
Haul Vehicle 85% Capacity (1.3 tons per CY)	27.2	# of Excavators		1.00
# of Haul Vehicles	1	CY per Hour (5 CY Bucket)		68
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	50	CY Per Hour Ideal Production Per 8 Hour Shift		160
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)	10	Efficient Compared to Ideal Production		43%
Haul Speed (Loaded MPH)	50	Inefficiencies Compared to Ideal Production		58%
Return Speed (Unloaded MPH)	50			
Haul Distance (Miles)	0.35			
Shift Length (Hours)	20			
Cycle Time				
Load Time (Load Time Minutes / 60mins)	0.08			
Haul Time (haul Distance / Haul Speed)	0.05			
Dump Time (Dump Time Minutes / 60 Mins)	0.02			
Return Time (haul Distance / Return Speed)	0.05			
Hours Per Cycle	0.20			
Efficiency Factor (Night Work, Traffic, Barriers, Coffee Breaks, ECT)	50%			
Actual Hours Per Cycle (hours per Cycle / Efficiency Factor)	0.40			
Number of Cycles(Bulk CY/ (Haul Vehicle Cap X # of Haul Vehicles)	2151			
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	866.4			
Loads Per Hour (number of Cycles / Total Number of Haul Hours)	2.50			
Number of Haul Days	43.02			
Speed Loaded				
	Max Weight lbs of loaded 745	164,500.00		
	Tons	82		
	20lbs/Ton Rolling weighth	4		
	Rolling Resistance (1% for each 20lbs/Ton)	4%		
	Slope Grade	7%		
	Total Resistance	11%		
	Max Gear per CAT Chart	4		
	Max MPH	8.8		
Speed Empty				
	Max Weight lbs of Empty 745	74,100.00		
	Tons Empty	37		
	20lbs/Ton Rolling weight Empty	2		
	Rolling Resistance (1% per 20lbs/Ton) Empty	2%		
	Average Slope Empty	7%		
	Total Resistance Empty	9%		
	Max Gear per CAT Chart Empty	N/A		
	Max MPH Empty	N/A		
	Notes Due to weight and Grade Speed Calculation is not applicable			

Other Notes
This estimate is to account for excavating 1/4 of the Iron Gate Dam Material and hauling it into the spill way section. The production of this activity is expected to be 50% efficient due to access restrictions and haul road adjustment requirements. It is expected that material from the dam will be used to create a haul road into the spill to provide access for equipment and haul trucks. A dozer will be used to push material down the spill way as it dumped by the haul trucks and a roller will be used to compact material in lifts.

4.023.1 Dam Fill Excavation to Disposal Site

PAY ITEM NUMBER	:	4.023.1	Project	:	KRRP - Iron Gate
Description	:	Dam Fill Excavation to Disposal Site	Group	:	D08
Quantity	:	761,159.00 cy			
Daily Production	:	12,800.00 cy per	20	hour shift	
Work Days	:	59.5 Days	Project #	:	4
Unit Price	:	\$4.14 per cy	Estimator	:	Eric Jones
Total Cost	:	\$3,151,693	Probable Low Cost Parameter	:	14080
			Probable High Cost Parameter	:	10240
					Total Cost
					Unit Price Per cy
					\$2,836,524
					\$4.26
					\$3,782,032
					\$5.68

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Hydraulic Excavator (5.0cy)	Active	1.00	59.5	20	1,190.00	E	\$274.63	incl. in rate	incl. in rate	\$326,809.70
Loader, FE Rubber Tire (5.25cy)	Active	1.00	59.5	20	1,190.00	E	\$75.42	incl. in rate	incl. in rate	\$89,749.80
Equipment Operator (medium)	Active	4.00	59.5	20	4,760.00	L	\$72.91	incl. in rate	incl. in rate	\$347,042.08
Truck Driver (heavy)	Active	7.00	59.5	20	8,330.00	L	\$63.35	incl. in rate	incl. in rate	\$527,697.17
Laborer	Active	4.00	59.5	20	4,760.00	L	\$50.38	incl. in rate	incl. in rate	\$239,808.80
Labor Foreman	Active	1.00	59.5	20	1,190.00	L	\$53.10	incl. in rate	incl. in rate	\$63,185.43
Grader, 180hp, 13' blade	Active	1.00	59.5	20	1,190.00	E	\$80.79	incl. in rate	incl. in rate	\$96,140.10
Dozer (235hp)(CATD7)	Active	1.00	59.5	20	1,190.00	E	\$165.11	incl. in rate	incl. in rate	\$196,480.90
CAT 745 (32 CY) OFF ROAD TRUCK	Active	7.00	59.5	20	8,330.00	E	\$134.79	incl. in rate	incl. in rate	\$1,122,800.70
Labor Hours					19040	TOTAL LABOR				\$1,177,733.48
Equipment Hours					13090	TOTAL EQUIPMENT				\$1,831,981.20

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
TOTAL MATERIAL						\$0.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
TOTAL SUBCONTRACTS					\$0.00

Labor Cost										\$1,177,733.48	Labor Burden @		49.7%	\$0.00			\$1,177,733.48
Material Cost										\$0.00	Material Tax @		7.75%	\$0.00			\$0.00
Equipment Cost										\$1,831,981.20	Equipment Tax @		7.75%	\$141,978.54			\$1,973,959.74
Subcontractors										\$0.00							\$0.00
DIRECT COST SUBTOTALS										\$3,009,715				\$141,979	DIRECT COST SUBTOTALS		\$3,151,693
Additional Pay Item Notes :																	
See production notes																	

4.023.1 Dam Fill Excavation to Disposal Site				
Details				
High Cost Factors			Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%	
Gas Price Increase	10%	Gas Price Decrease	10%	
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues	0%	
	20%		10%	
Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Etc)	Overall Production	
	800	8	80%	5120
		20	80%	12800
Haul Notes		Excavator Loading Production per shift		
CY	761,159.00	CY per Hour		128
Swell Factor	30%	CY Bucket Size		5.00
Bulk CY	989,506.70	Buckets Per Hour		26
Haul Vehicle 85% Capacity (1.3 tons per CY)	27.2	# of Excavators		1.00
# of Haul Vehicles	7	CY per Hour (5 CY Bucket)		128
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	1.0	CY Per Hour Ideal Production Per 8 Hour Shift		160
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)	1.0	Efficient Compared to Ideal Production		80%
Haul Speed (Loaded MPH)	6.0	Inefficiencies Compared to Ideal Production		20%
Return Speed (Unloaded MPH)	30			
Haul Distance (Miles)	1.00			
Shift Length (Hours)	20			
Cycle Time				
Load Time (Load Time Minutes / Minutes)	0.02			
Haul Time (Haul Distance / Haul Speed)	0.11			
Dump Time (Dump Time Minutes / 60 Mins)	0.02			
Return Time (Haul Distance / Return Speed)	0.05			
Hours Per Cycle	0.20			
Efficiency Factor (night Work, Traffic Restrictions, Coffee Breaks, ECT)	90%			
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.25			
Number of Cycles (Bulk CY/ (Haul Vehicle Cap X # of Haul Vehicles)	5197			
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	1299.25			
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	4.00			
Number of Haul Days	64.9625			
Speed Loaded				
Max Weight lbs of loaded 745	164,500.00			
Tons	82			
20lbs/Ton Rolling weighth	4			
Rolling Resistance (1% for each 20lbs/Ton)	4%			
Slope Grade	7%			
Total Resistance	11%			
Max Gear per CAT Chart	4			
Max MPH	8.8			
Speed Empty				
Max Weight lbs of Empty 745	74,100.00			
Tons Empty	37			
20lbs/Ton Rolling weight Empty	2			
Rolling Resistance (1% per 20lbs/Ton) Empty	2%			
Average Slope Empty	7%			
Total Resistance Empty	-5%			
Max Gear per CAT Chart Empty	N/A			
Max MPH Empty	N/A			
Notes Due to weight and Grade Speed Calculation is not applicable				

Other Notes
This estimate accounts for excavating the remaining material of the Iron Gate Dam after the spill way is backfilled (Pay Item 4.023). It is expected that the excavation operation will be 80% efficient after accounting for equipment positioning, haul road maintenance, staff breaks ect. The excavation operation will be completed with an 5 CY excavator running at roughly 80% efficient. Max haul speeds have been calculated per the haul truck manufactures data and have been adjusted based on area of the haul. A grader and a loader will be used to maintain the haul road. It is expected that there will be some inefficiencies when first starting operation by establishing a haul road which allows trucks to drive forward only in a loop around the excavator. Once haul route is established it is expected the excavator will be sitting on a stock pile of material for loading haul trucks, which will allow the trucks to be loaded as mentioned above. A dozer will be used at the disposal site to spread material.

PAY ITEM INFORMATION

CREW COSTS

MATERIAL COSTS

SUBCONTRACT COSTS

SUMMARY OF COSTS

Additional Pay Item Notes :

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PAY ITEM COST DETAIL WORKSHEET

4.029 Remove and Dispose of Intake Structure

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.029	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Intake Structure	Group	:	D07				
Quantity	:	72,000.00 LBS							
Daily Production	:	20,000.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	3.6 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.75 per LBS			Probable Low Cost Parameter			23000	\$46,052
Total Cost	:	\$54,179			Probable High Cost Parameter			16000	\$65,014
									Unit Price Per LBS
									\$0.73
									\$1.03

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	3.6	10	36.00	L	\$53.10	\$0.00		\$1,911.49
Laborer	Active	4.00	3.6	10	144.00	L	\$50.38	\$0.00		\$7,254.72
Steelworker	Active	2.00	3.6	10	72.00	L	\$72.07	\$0.00		\$5,189.18
Equipment Operator (medium)	Active	1.00	3.6	10	36.00	L	\$72.91	\$0.00		\$2,624.69
Equipment Operator (crane)	Active	1.00	3.6	10	36.00	L	\$75.25	\$0.00		\$2,709.04
Crawler Crane (130tn)	Active	1.00	3.6	10	36.00	E	\$258.66	\$258.66		\$9,311.76
Hydraulic Excavator (5.0cy)	Active	1.00	3.6	10	36.00	E	\$274.63	\$274.63		\$9,886.68
Hydraulic Impact Breaker Attachment (5k+ ft-lb)	Active	2.00	3.6	10	72.00	E	\$62.72	\$62.72		\$4,515.84
Labor Hours					324	TOTAL LABOR				\$19,689.12
Equipment Hours					144	TOTAL EQUIPMENT				\$23,714.28

MATERIAL COSTS						
Description	Item	Order	Conversion	Order	Order	Material
	Quantity	Unit	Factor / Waste	Quantity	Price	Cost
Consumables 15% labor (saw blades, drill bits, electrodes, wrenches, hard hats etc)	1.00	LS	1.000	1.00	\$2,953.37	\$2,953.37
TOTAL MATERIAL						\$2,953.37

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (25%)	9.00	ton	1.000	9.00	\$595.00
Hauling Disposal Cost	2.00	Loads	20 tons a load	\$200.00	\$400.00
TOTAL SUBCONTRACTS					\$5,755.00

SUMMARY OF COSTS									
Labor Cost	\$19,689.12	Labor Burden @	49.7%	\$0.00					\$19,689.12
Material Cost	\$2,953.37	Material Tax @	7.75%	\$228.89					\$3,182.25
Equipment Cost	\$23,714.28	Equipment Tax @	7.75%	\$1,837.86					\$25,552.14
Subcontractors	\$5,755.00								\$5,755.00
DIRECT COST SUBTOTALS	\$52,112			\$2,067				DIRECT COST SUBTOTALS	\$54,179
Additional Pay Item Notes :									

PAY ITEM COST DETAIL WORKSHEET

4.031 Remove and Dispose of Hoist Stem - 6" Dia. Sch 160' x150'

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.031	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Hoist Stem - 6" Dia. Sch 160' x150'	Group	:	D03				
Quantity	:	7,500.00 LBS							
Daily Production	:	15,625.00 LBS per	10	hour shift					
Work Days	:	0.5 Days	Project #	:	4				
Unit Price	:	\$0.92 per LBS	Estimator	:	Mihaela Tomulescu	LBS per	Total Cost	Unit Price Per LBS	
Total Cost	:	\$6,866	Probable Low Cost Parameter			17968.75	\$5,836	\$0.89	
			Probable High Cost Parameter			12500	\$8,240	\$1.26	

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.5	10	5.00	L	\$53.10	\$0.00		\$265.49
Electrician	Active	1.00	0.5	10	5.00	L	\$49.75	\$0.00		\$248.77
Steelworker	Active	3.00	0.5	10	15.00	L	\$72.07	\$0.00		\$1,081.08
Loader, FE Rubber Tire (8.6cy)	Active	1.00	0.5	10	5.00	E	\$221.50	\$221.50		\$1,107.50
Truck Driver (heavy)	Active	2.00	0.5	10	10.00	L	\$63.35	\$0.00		\$633.49
Truck, Flatbed (4x4, 10,000 gvw)	Active	2.00	0.5	10	10.00	E	\$31.90	\$31.90		\$319.00
Hydraulic Crane (120tn)	Active	1.00	0.5	10	5.00	E	\$239.06	\$239.06		\$1,195.30
Welder	Active	2.00	0.5	10	10.00	E	\$7.84	\$7.84		\$78.38
Gas Welding Machine	Active	2.00	0.5	10	10.00	E	\$2.88	\$2.88		\$28.77
Equipment Operator (medium)	Active	1.00	0.5	10	5.00	L	\$72.91	\$0.00		\$364.54
Equipment Operator (crane)	Active	1.00	0.5	10	5.00	L	\$75.25	\$0.00		\$376.26
Laborer	Active	3.00	0.5	10	15.00	L	\$50.38	\$0.00		\$755.70
					Labor Hours	60	TOTAL LABOR			\$3,725.32
					Equipment Hours	40	TOTAL EQUIPMENT			\$2,728.94

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc	1.00	LS	1.000	1.00	\$186.27	\$186.27
TOTAL MATERIAL						\$186.27

SUBCONTRACT COSTS				
Description	Quantity	Units	Notes / Company	Unit Price
TOTAL SUBCONTRACTS				\$0.00

SUMMARY OF COSTS					
Labor Cost	\$3,725.32	Labor Burden @	49.7%	\$0.00	\$3,725.32
Material Cost	\$186.27	Material Tax @	7.75%	\$14.44	\$200.70
Equipment Cost	\$2,728.94	Equipment Tax @	7.75%	\$211.49	\$2,940.44
Subcontractors	\$0.00				\$0.00
DIRECT COST SUBTOTALS	\$6,641			\$226	DIRECT COST SUBTOTALS \$6,866
Additional Pay Item Notes :					
The removal hoist stem 150 LF is done by one 9-men crew (1 foreman, 3 steelworkers, 1 welder, 3 laborer,1 electrician and 2 equipment operators). Based on the fact that we dispose big pieces of steel we use 2 trucks per day. Assumed is not taking around 1/2 day of work.					

PAY ITEM COST DETAIL WORKSHEET

4.032 Remove and Dispose of Air Vent Pipe - 8" Dia. Sch 40 x160'

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.032	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Air Vent Pipe - 8" Dia. Sch 40 x160'	Group	:	D03				
Quantity	:	4,650.00 LBS							
Daily Production	:	4,650.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	1.0 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$1.25 per LBS			Probable Low Cost Parameter			5347.5	\$4,959
Total Cost	:	\$5,834			Probable High Cost Parameter			3720	\$7,001
									Unit Price Per LBS
									\$1.22
									\$1.72

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Truck Driver (light)	Active	1.00	1.0	10	10.00	L	\$61.92	incl. in rate	incl. in rate	\$619.19
Laborer	Active	1.00	1.0	10	10.00	L	\$50.38	incl. in rate	incl. in rate	\$503.80
Equipment Operator (light)	Active	1.00	1.0	10	10.00	L	\$71.39	incl. in rate	incl. in rate	\$713.90
Loader, FE Rubber Tire (3.5cy)	Active	1.00	1.0	10	10.00	E	\$64.23	incl. in rate	incl. in rate	\$642.30
Truck, Off-Road, Articulated Rear, 20cy	Active	1.00	1.0	10	10.00	E	\$111.64	incl. in rate	incl. in rate	\$1,116.40
Steelworker	Active	1.00	1.0	10	10.00	L	\$72.07	incl. in rate	incl. in rate	\$720.72
					Labor Hours	40			TOTAL LABOR	\$2,557.61
					Equipment Hours	20			TOTAL EQUIPMENT	\$1,758.70

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$175.87	\$175.87
						TOTAL MATERIAL
						\$175.87

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Forklift crew, all-terrain forklift, 45' lift, 35' reach, 9000 lb. capacity, weekly use	0.20	week	1.000	\$5,961.23	\$1,192.25
					\$0.00
					\$0.00
					\$0.00
					TOTAL SUBCONTRACTS
					\$1,192.25

SUMMARY OF COSTS									
Labor Cost	\$2,557.61	Labor Burden @	49.7%	\$0.00					\$2,557.61
Material Cost	\$175.87	Material Tax @	7.75%	\$13.63					\$189.50
Equipment Cost	\$1,758.70	Equipment Tax @	7.75%	\$136.30					\$1,895.00
Subcontractors	\$1,192.25								\$1,192.25
DIRECT COST SUBTOTALS	\$5,684			\$150				DIRECT COST SUBTOTALS	\$5,834
Additional Pay Item Notes :									
Assumed we need forklift because of work in the tunnel near sluice gate, based on RS Means, Utility removal, pipe, sewer/water, 8" diameter, remove, excludes excavation, B12Z Crew is formed of 2 laborers loading 1 truck with the crane for disposal based on daily production.									

PAY ITEM COST DETAIL WORKSHEET

4.034 Remove and Dispose of Air Vent Pipe - 12" Dia. Sch 40 x560'

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.034	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Air Vent Pipe - 12" Dia. Sch 40 x560'	Group	:	D03				
Quantity	:	30,250.00 LBS							
Daily Production	:	15,000.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	2.0 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.48 per LBS			Probable Low Cost Parameter			17250	\$12,346
Total Cost	:	\$14,525			Probable High Cost Parameter			12000	\$17,430
									Unit Price Per LBS
									\$0.47
									\$0.66

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Truck Driver (heavy)	Active	1.00	2.0	10	20.00	L	\$63.35	incl. in rate	incl. in rate	\$1,266.98
Laborer	Active	2.00	2.0	10	40.00	L	\$50.38	incl. in rate	incl. in rate	\$2,015.20
Equipment Operator (medium)	Active	1.00	2.0	10	20.00	L	\$72.91	incl. in rate	incl. in rate	\$1,458.16
Loader, FE Rubber Tire (5.25cy)	Active	1.00	2.0	10	20.00	E	\$75.42	incl. in rate	incl. in rate	\$1,508.40
Truck, On-Highway Dump (6x4, 12cy)	Active	1.00	2.0	10	20.00	E	\$70.35	incl. in rate	incl. in rate	\$1,407.00
Steelworker	Active	2.00	2.0	10	40.00	L	\$72.07	incl. in rate	incl. in rate	\$2,882.88
Labor Foreman	Active	1.00	2.0	10	20.00	L	\$53.10	incl. in rate	incl. in rate	\$1,061.94
					Labor Hours	140			TOTAL LABOR	\$8,685.16
					Equipment Hours	40			TOTAL EQUIPMENT	\$2,915.40

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$291.54	\$291.54
						TOTAL MATERIAL
						\$291.54

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Forklift crew, all-terrain forklift, 45' lift, 35' reach, 9000 lb. capacity, weekly use	0.40	week	1.000	0.40	\$5,961.23
					TOTAL SUBCONTRACTS
					\$2,384.49

SUMMARY OF COSTS						
Labor Cost	\$8,685.16	Labor Burden @	49.7%	\$0.00		\$8,685.16
Material Cost	\$291.54	Material Tax @	7.75%	\$22.59		\$314.13
Equipment Cost	\$2,915.40	Equipment Tax @	7.75%	\$225.94		\$3,141.34
Subcontractors	\$2,384.49					\$2,384.49
DIRECT COST SUBTOTALS	\$14,277			\$249	DIRECT COST SUBTOTALS	\$14,525
Additional Pay Item Notes :						
Assumed we need forklift because of work in the tunnel from gate to outlet works, based on RS Means, Utility removal, pipe, sewer/water, 12" diameter, remove, excludes excavation & Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 30 miles, 50 MPH. Using CREW B6 .						

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.038			Project	:	KRRP - Iron Gate D05		
Description	:	Remove and Dispose of Power Cable and 4" Conduit from Penstock Structure			Group	:			
Quantity	:	800.00	LF						
Daily Production	:	400.00	LF per	10	hour shift	Project #	:	4	
Work Days	:	2.0	Days			Estimator	:	Mihaela Tomulescu	
Unit Price	:	\$16.95	per LF			LF per		Total Cost	Unit Price Per LF
Total Cost	:	\$13,560				Probable Low Cost Parameter		460	\$11,526
						Probable High Cost Parameter		340	\$15,594
									\$22

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	2.0	10	20.00	L	\$51.95	incl. in rate	incl. in rate	\$1,039.06
Electrician	Active	4.00	2.0	10	80.00	L	\$49.75	incl. in rate	incl. in rate	\$3,980.24
Laborer	Active	2.00	2.0	10	40.00	L	\$50.38	incl. in rate	incl. in rate	\$2,015.20
Truck, Off-Road, Articulated Rear, 20cy	Active	2.00	2.0	10	40.00	E	\$111.64	incl. in rate	incl. in rate	\$4,465.60
Truck Driver (heavy)	Active	1.00	2.0	10	20.00	L	\$63.35	incl. in rate	incl. in rate	\$1,266.98
					Labor Hours	160	TOTAL LABOR			\$8,301.48
					Equipment Hours	40	TOTAL EQUIPMENT			\$4,465.60

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$415.07	\$415.07
						TOTAL MATERIAL
						\$415.07

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					TOTAL SUBCONTRACTS
					\$0.00

SUMMARY OF COSTS						
Labor Cost	\$8,301.48	Labor Burden @	49.7%	\$0.00		\$8,301.48
Material Cost	\$415.07	Material Tax @	7.75%	\$32.17		\$447.24
Equipment Cost	\$4,465.60	Equipment Tax @	7.75%	\$346.08		\$4,811.68
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$13,182			\$378	DIRECT COST SUBTOTALS	\$13,560
Additional Pay Item Notes :						
Based on RS Means:26050510- Armored cable, (BX), #8, 3 wire, average 50' runs, electrical demolition, remove we use crew Elec2 and 26050510 -Conduit, rigid galvanized steel, 4" to 6" diameter, electrical demolition, remove conduit to 10' high, including fittings & hangers						

SUMMARY OF COSTS						
Labor Cost	\$209,354.05	Labor Burden @	0.0%	\$0.00	Included in hourly labor rate.	\$209,354.05
Material Cost	\$117,669.58	Material Tax @	7.75%	\$9,119.39		\$126,788.97
Equipment Cost	\$410,598.52	Equipment Tax @	7.75%	\$31,821.39		\$442,419.90
Subcontractors	\$34,000.00					\$34,000.00
DIRECT COST SUBTOTALS	\$771,622			\$40,941	DIRECT COST SUBTOTALS	\$812,563
Additional Pay Item Notes :						

4.039 Remove Powerhouse Concrete down to spring-line of turbine				
Details				
High Cost Factors			Low Cost Factors	
Bad Weather	0%		No Bad Weather	0%
Gas Price Increase	10%		Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	10%		No Unforeseen Contaminated Mats/ Access Issues	0%
	20%			10%
Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)	Overall Production	
	38	8	35%	106.40
		10	35%	133.00
Haul Notes		Excavator Loading Production per shift		
CY	5,200.00	CY per Hour		34
Swell Factor	60%	CY Bucket Size		2.50
Bulk CY	8320	Buckets Per Hour		14
Haul Vehicle 60% Capacity (2 tons per CY)	19.2	# of Excavators		1.00
# of Haul Vehicles	1	CY per Hour (5 CY Bucket)		34
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	5	CY Per Hour Ideal Production Per 8 Hour Shift		95
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)	3	Efficient Compared to Ideal Production		36%
Haul Speed (Loaded MPH)	5.00	Inefficiencies Compared to Ideal Production		64%
Return Speed (Unloaded MPH)	15.00			
Haul Distance (Miles)	1.20			
Shift Length (Hours)	10			
Cyce Time		Breaker Production		
Load Time (Load Time Minutes / 60mins)	0.08			
Haul Time (Haul Distance / Haul Speed)	0.24	Hydraulic Hammer CY per Hour		1
Dump Time (Dump Time Minutes / 60 Mins)	0.05	# of Hammers		13.30
Return Time (Haul Distance / Return Speed)	0.08	CY per Hour		34.28571429
Hours Per Cycle	0.45	CY per Hour Back Check		32
Efficiency Factor (Night Work, Traffic Retrictions, Coffee Breaks, ECT)	80%	32CY per HR per 8hr shift (Ideal prod)		0.415625
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.56	Efficient Compared to Ideal Production		36%
Number of Cycles Bulk CY (Haul Vehicle Cap X # of Haul Vehicles)	433	Inefficiencies Compared to Ideal Production		64%
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	242.48			
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	1.79			
Number of Haul Days	24			
		Drilling and Blasting Production per shift		
		Drilling and Blasting CY per Hour		13.3
		# of Drills		1.00
		CY per Hour		34.28571429
		CY per Hour Back Check		32
		38CY per HR per 8hr shift (Ideal prod)		38
		Efficient Compared to Ideal Production		36%
		Inefficiencies Compared to Ideal Production		64%
Other Notes				
This estimate presents that the power house concrete will be demolished by using a combination of blasting and concrete breakers/ Crushers. A CPM 100 crusher attachment with a magnet option will be used to help sort reinforcement for the demolished concrete. . It is expected that the power house concrete will have dense reinforcement and other embedded items and the efficiency has been reduced to account for the time it will take for extra processing time. Steel cutting and a crane have been added for .25 of the time to account for removing the draft tube as the concrete demolition progresses.				

PAY ITEM INFORMATION

PAY ITEM NUMBER	4.040	Project	KRRP - Iron Gate			
Description	Remove and Dispose of Turbine Unit	Group	D03			
Quantity	344,058.00 LBS					
Daily Production	28,000.00 LBS per	10	hour shift			
Work Days	12.3 Days	Project #	4			
Unit Price	\$0.47 per LBS	Estimator	Mihaela Tomulescu	LBS per	Total Cost	Unit Price Per LBS
Total Cost	\$163,016	Probable Low Cost Parameter	32200	\$138,564	\$0	
		Probable High Cost Parameter	23800	\$187,469	\$1	

CREW COSTS

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	12.3	10	123.00	L	\$53.10	incl. in rate	incl. in rate	\$6,530.93
Laborer	Active	3.00	12.3	10	369.00	L	\$50.38	incl. in rate	incl. in rate	\$18,590.22
Electrician Foreman	Active	1.00	12.3	10	123.00	L	\$51.95	incl. in rate	incl. in rate	\$6,390.22
Electrician	Active	2.00	12.3	10	246.00	L	\$49.75	incl. in rate	incl. in rate	\$12,239.24
Steelworker	Active	2.00	12.3	10	246.00	L	\$72.07	incl. in rate	incl. in rate	\$17,729.71
Millwright	Active	2.00	12.3	10	246.00	L	\$76.41	incl. in rate	incl. in rate	\$18,795.88
Equipment Operator (medium)	Active	1.00	12.3	10	123.00	L	\$72.91	incl. in rate	incl. in rate	\$8,967.68
Equipment Operator (crane)	Active	2.00	12.3	10	246.00	L	\$75.25	incl. in rate	incl. in rate	\$18,511.75
Hydraulic Crane (50tn)	Active	1.00	12.3	10	123.00	E	\$134.32	incl. in rate	incl. in rate	\$16,521.36
Loader, FE Rubber Tire (3.5cy)	Active	1.00	12.3	10	123.00	E	\$64.23	incl. in rate	incl. in rate	\$7,900.29
Labor Hours					1722	TOTAL LABOR				\$107,755.63
Equipment Hours					246	TOTAL EQUIPMENT				\$24,421.65

MATERIAL COSTS

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$10,775.56	\$10,775.56
TOTAL MATERIAL						\$10,775.56

SUBCONTRACT COSTS

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid	17.20	ton	1.000	17.20	\$595.00
Hauling Disposal Cost	9.00	Loads	20 tons a load		\$600.00
plate (assumption)	2,000.00	LF	1.000	2,000.00	\$0.85
TOTAL SUBCONTRACTS					\$17,335.73

SUMMARY OF COSTS

Labor Cost	\$107,755.63	Labor Burden @	49.7%	\$0.00		\$107,755.63
Material Cost	\$10,775.56	Material Tax @	7.75%	\$835.11		\$11,610.67
Equipment Cost	\$24,421.65	Equipment Tax @	7.75%	\$1,892.68		\$26,314.33
Subcontractors	\$17,335.73					\$17,335.73
DIRECT COST SUBTOTALS	\$160,289			\$2,728	DIRECT COST SUBTOTALS	\$163,016

Additional Pay Item Notes :

Working crew will disconnect power and take care of the temporary electrical power they need at the site. Then the crew will open the engine side panels, and remove the nacelle access panels. Disconnect the engine thermocouple leads at the terminal board. Before disconnecting any lines all fuel, oil, and hydraulic fluid valves are closed. Plug all lines as they are disconnected to prevent entrance of foreign material. Remove the clamps securing the bleed-air ducts at the firewall. Then, disconnect the electrical connector plugs, engine breather and vent lines, and fuel, oil, and hydraulic lines. Disconnect the engine power lever and propeller control rods or cables. Remove the covers from the lift points, attach the sling, and remove slack from the cables using a suitable hoist. The sling must be adjusted to position. Remove the engine mount bolts. The engine is ready to be removed. Move the engine forward, out of the nacelle structure, until it clears the and then lower into position on the stand, and secure it prior to removing the engine sling. The crew will then cut it into pieces the big parts for disposal. Per load price is more expensive due to potential permits or more smaller loads due to haul route restrictions.

PAY ITEM COST DETAIL WORKSHEET

4.041 Remove and Dispose of Draft Tube Bulkheads

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.041			Project	:	KRRP - Iron Gate		
Description	:	Remove and Dispose of Draft Tube Bulkheads			Group	:	D07		
Quantity	:	16,500.00 LBS							
Daily Production	:	25,000.00 LBS per		10	hour shift	Project #	:	4	
Work Days	:	0.7 Days			Estimator	:	Mihaela Tomulescu		
Unit Price	:	\$0.46 per LBS			Probable Low Cost Parameter	:	28750	LBS per	Total Cost
Total Cost	:	\$7,630			Probable High Cost Parameter	:	20000	\$9,157	Unit Price Per LBS
								\$6,486	\$0.45
								\$9,157	\$0.63

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.7	10	7.00	L	\$53.10	incl. in rate	incl. in rate	\$371.68
Laborer	Active	3.00	0.7	10	21.00	L	\$50.38	incl. in rate	incl. in rate	\$1,057.98
Steelworker	Active	3.00	0.7	10	21.00	L	\$72.07	incl. in rate	incl. in rate	\$1,513.51
Equipment Operator (crane)	Active	1.00	0.7	10	7.00	L	\$75.25	incl. in rate	incl. in rate	\$526.76
Equipment Operator (medium)	Active	1.00	0.7	10	7.00	L	\$72.91	incl. in rate	incl. in rate	\$510.36
Crawler Crane (130tn)	Active	1.00	0.7	10	7.00	E	\$258.66	incl. in rate	incl. in rate	\$1,810.62
Loader, FE Rubber Tire (5.25cy)	Active	1.00	0.7	10	7.00	E	\$75.42	incl. in rate	incl. in rate	\$527.94
Oxygen and Acetylene Torches	Active	3.00	0.7	10	21.00	E	\$0.47	incl. in rate	incl. in rate	\$9.87
Labor Hours					63	TOTAL LABOR				\$3,980.28
Equipment Hours					35	TOTAL EQUIPMENT				\$2,348.43

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$398.03	\$398.03
						TOTAL MATERIAL
						\$398.03

SUBCONTRACT COSTS						
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount	
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum						
	0.83	ton	1.000	0.83	\$595.00	\$490.88
Haul off of material	1.00	Loads	20 tons a load		\$200.00	\$200.00
						TOTAL SUBCONTRACTS
						\$690.88

SUMMARY OF COSTS						
Labor Cost	\$3,980.28	Labor Burden @	49.7%	\$0.00		\$3,980.28
Material Cost	\$398.03	Material Tax @	7.75%	\$30.85		\$428.88
Equipment Cost	\$2,348.43	Equipment Tax @	7.75%	\$182.00		\$2,530.43
Subcontractors	\$690.88					\$690.88
DIRECT COST SUBTOTALS	\$7,418			\$213	DIRECT COST SUBTOTALS	\$7,630
Additional Pay Item Notes :						

PAY ITEM COST DETAIL WORKSHEET

4.042 Remove and Dispose of Crane

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.042	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Crane	Group	:	D10				
Quantity	:	24,000.00 LBS							
Daily Production	:	25,000.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	1.0 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.53 per LBS			Probable Low Cost Parameter			28750	\$10,761
Total Cost	:	\$12,659			Probable High Cost Parameter			18750	\$15,824
									Unit Price Per LBS
									\$0.51
									\$0.75

CREW COSTS										
Description	Active Idle	# In crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.0	10	10.00	L	\$53.10	incl. in rate	incl. in rate	\$530.97
Laborer	Active	3.00	1.0	10	30.00	L	\$50.38	incl. in rate	incl. in rate	\$1,511.40
Steelworker	Active	3.00	1.0	10	30.00	L	\$72.07	incl. in rate	incl. in rate	\$2,162.16
Equipment Operator (crane)	Active	1.00	1.0	10	10.00	L	\$75.25	incl. in rate	incl. in rate	\$752.51
Equipment Operator (medium)	Active	1.00	1.0	10	10.00	L	\$72.91	incl. in rate	incl. in rate	\$729.08
Crawler Crane (130tn)	Active	1.00	1.0	10	10.00	E	\$258.66	incl. in rate	incl. in rate	\$2,586.60
Loader, FE Rubber Tire (5.25cy)	Active	1.00	1.0	10	10.00	E	\$75.42	incl. in rate	incl. in rate	\$754.20
Oxygen and Acetylene Torches	Active	3.00	1.0	10	30.00	E	\$0.47	incl. in rate	incl. in rate	\$14.10
					Labor Hours	90	TOTAL LABOR		\$5,686.12	
					Equipment Hours	50	TOTAL EQUIPMENT		\$3,354.90	

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$568.61	\$568.61
Selective demolition, torch cutting, steel, 1" thick plate (assumption)	2,000.00	LF	1.000	2,000.00	\$0.85	\$1,700.00
TOTAL MATERIAL						\$2,268.61

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	1.20	ton	1.000	1.20	\$595.00
Haul off of material	1.00	Loads	20 tons a load	\$200.00	\$200.00
TOTAL SUBCONTRACTS					\$914.00

SUMMARY OF COSTS									
Labor Cost	\$5,686.12	Labor Burden @	49.7%	\$0.00					\$5,686.12
Material Cost	\$2,268.61	Material Tax @	7.75%	\$175.82					\$2,444.43
Equipment Cost	\$3,354.90	Equipment Tax @	7.75%	\$260.00					\$3,614.90
Subcontractors	\$914.00								\$914.00
DIRECT COST SUBTOTALS	\$12,224			\$436				DIRECT COST SUBTOTALS	\$12,659
Additional Pay Item Notes :									

PAY ITEM COST DETAIL WORKSHEET

4.043 Remove and Dispose of Governor

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.043	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Governor	Group	:	D04				
Quantity	:	20,310.00 LBS							
Daily Production	:	25,000.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	0.8 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.40 per LBS			Probable Low Cost Parameter			28750	\$6,922
Total Cost	:	\$8,144			Probable High Cost Parameter			20000	\$9,772
									Unit Price Per LBS
									\$0.39
									\$0.55

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.8	10	8.00	L	\$53.10	incl. in rate	incl. in rate	\$424.78
Laborer	Active	3.00	0.8	10	24.00	L	\$50.38	incl. in rate	incl. in rate	\$1,209.12
Steelworker	Active	3.00	0.8	10	24.00	L	\$72.07	incl. in rate	incl. in rate	\$1,729.73
Equipment Operator (medium)	Active	2.00	0.8	10	16.00	L	\$72.91	incl. in rate	incl. in rate	\$1,166.53
Hydraulic Excavator (2.5cy)	Active	1.00	0.8	10	8.00	E	\$203.63	incl. in rate	incl. in rate	\$1,629.04
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.8	10	8.00	E	\$64.23	incl. in rate	incl. in rate	\$513.84
Oxygen and Acetylene Torches	Active	3.00	0.8	10	24.00	E	\$0.47	incl. in rate	incl. in rate	\$11.28
					Labor Hours	72	TOTAL LABOR		\$4,530.15	
					Equipment Hours	40	TOTAL EQUIPMENT		\$2,154.16	

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$453.02	\$453.02
TOTAL MATERIAL						\$453.02

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	1.02	ton	1.000	1.02	\$595.00
Haul off of material	1.00	Loads	20 tons a load		\$200.00
					\$0.00
					\$0.00
TOTAL SUBCONTRACTS					\$804.22

SUMMARY OF COSTS						
Labor Cost	\$4,530.15	Labor Burden @	49.7%	\$0.00		\$4,530.15
Material Cost	\$453.02	Material Tax @	7.75%	\$35.11		\$488.12
Equipment Cost	\$2,154.16	Equipment Tax @	7.75%	\$166.95		\$2,321.11
Subcontractors	\$804.22					\$804.22
DIRECT COST SUBTOTALS	\$7,942			\$202	DIRECT COST SUBTOTALS	\$8,144
Additional Pay Item Notes :						

PAY ITEM COST DETAIL WORKSHEET

4.044 Remove and Dispose of Bearing Oil System and Cooling Water System

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.044	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Bearing Oil System and Cooling Water System	Group	:	D03				
Quantity	:	9,182.00 LBS	Project #	:	4	LBS per	Total Cost	Unit Price Per LBS	
Daily Production	:	25,000.00 LBS per	Estimator	:	Mihaela Tomulescu	28750	\$5,507	\$0.69	
Work Days	:	0.4 Days	Probable Low Cost Parameter	:		20000	\$7,775	\$0.97	
Unit Price	:	\$0.71 per LBS	Probable High Cost Parameter	:					
Total Cost	:	\$6,479		:					

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.4	10	4.00	L	\$53.10	incl. in rate	incl. in rate	\$212.39
Laborer	Active	3.00	0.4	10	12.00	L	\$50.38	incl. in rate	incl. in rate	\$604.56
Steelworker	Active	3.00	0.4	10	12.00	L	\$72.07	incl. in rate	incl. in rate	\$864.86
Equipment Operator (medium)	Active	2.00	0.4	10	8.00	L	\$72.91	incl. in rate	incl. in rate	\$583.26
Hydraulic Excavator (2.5cy)	Active	1.00	0.4	10	4.00	E	\$203.63	incl. in rate	incl. in rate	\$814.52
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.4	10	4.00	E	\$64.23	incl. in rate	incl. in rate	\$256.92
Oxygen and Acetylene Torches	Active	3.00	0.4	10	12.00	E	\$0.47	incl. in rate	incl. in rate	\$5.64
Labor Hours					36	TOTAL LABOR				\$2,265.08
Equipment Hours					20	TOTAL EQUIPMENT				\$1,077.08

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$113.25	\$113.25
TOTAL MATERIAL						\$113.25

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	4.59	ton	1.000	4.59	\$2,731.65
Haul off of material	1.00	Loads	20 tons a load	\$200.00	\$200.00
TOTAL SUBCONTRACTS					\$2,931.65

SUMMARY OF COSTS					
Labor Cost	\$2,265.08	Labor Burden @	49.7%	\$0.00	\$2,265.08
Material Cost	\$113.25	Material Tax @	7.75%	\$8.78	\$122.03
Equipment Cost	\$1,077.08	Equipment Tax @	7.75%	\$83.47	\$1,160.55
Subcontractors	\$2,931.65				\$2,931.65
DIRECT COST SUBTOTALS	\$6,387		\$92	DIRECT COST SUBTOTALS	\$6,479
Additional Pay Item Notes :					

PAY ITEM COST DETAIL WORKSHEET

4.045 Remove and Dispose of CO2 Systems

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.045	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of CO2 Systems	Group	:	D03				
Quantity	:	2,568.00 LBS							
Daily Production	:	25,000.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	0.1 Days			Estimator	:	Mihaela Tomulescu	LBS per	27500
Unit Price	:	\$0.72 per LBS			Probable Low Cost Parameter			Total Cost	\$1,666
Total Cost	:	\$1,851			Probable High Cost Parameter			Unit Price Per LBS	\$0.99

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.1	10	1.00	L	\$53.10	incl. in rate	incl. in rate	\$53.10
Laborer	Active	3.00	0.1	10	3.00	L	\$50.38	incl. in rate	incl. in rate	\$151.14
Steelworker	Active	3.00	0.1	10	3.00	L	\$72.07	incl. in rate	incl. in rate	\$216.22
Equipment Operator (medium)	Active	2.00	0.1	10	2.00	L	\$72.91	incl. in rate	incl. in rate	\$145.82
Hydraulic Excavator (2.5cy)	Active	1.00	0.1	10	1.00	E	\$203.63	incl. in rate	incl. in rate	\$203.63
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.1	10	1.00	E	\$64.23	incl. in rate	incl. in rate	\$64.23
Oxygen and Acetylene Torches	Active	3.00	0.1	10	3.00	E	\$0.47	incl. in rate	incl. in rate	\$1.41
Labor Hours					9	TOTAL LABOR				\$566.27
Equipment Hours					5	TOTAL EQUIPMENT				\$269.27

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$28.31	\$28.31
						TOTAL MATERIAL
						\$28.31

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	1.28	ton	1.000	1.28	\$595.00
Haul off of material	1.00	Loads	20 tons a load		\$200.00
					TOTAL SUBCONTRACTS
					\$963.98

SUMMARY OF COSTS									
Labor Cost	\$566.27	Labor Burden @	49.7%	\$0.00					\$566.27
Material Cost	\$28.31	Material Tax @	7.75%	\$2.19					\$30.51
Equipment Cost	\$269.27	Equipment Tax @	7.75%	\$20.87					\$290.14
Subcontractors	\$963.98								\$963.98
DIRECT COST SUBTOTALS	\$1,828			\$23				DIRECT COST SUBTOTALS	\$1,851
Additional Pay Item Notes :									

PAY ITEM COST DETAIL WORKSHEET

4.046 Remove and Dispose of Plant Water and Fire Protection System

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.046	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Plant Water and Fire Protection System	Group	:	D05				
Quantity	:	9,182.00 LBS							
Daily Production	:	25,000.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	0.4 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.71 per LBS			Probable Low Cost Parameter			27500	\$5,831
Total Cost	:	\$6,479			Probable High Cost Parameter			20000	\$7,775
									Unit Price Per LBS
									\$0.73
									\$0.97

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.4	10	4.00	L	\$53.10	incl. in rate	incl. in rate	\$212.39
Laborer	Active	3.00	0.4	10	12.00	L	\$50.38	incl. in rate	incl. in rate	\$604.56
Steelworker	Active	3.00	0.4	10	12.00	L	\$72.07	incl. in rate	incl. in rate	\$864.86
Equipment Operator (medium)	Active	2.00	0.4	10	8.00	L	\$72.91	incl. in rate	incl. in rate	\$583.26
Hydraulic Excavator (2.5cy)	Active	1.00	0.4	10	4.00	E	\$203.63	incl. in rate	incl. in rate	\$814.52
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.4	10	4.00	E	\$64.23	incl. in rate	incl. in rate	\$256.92
Oxygen and Acetylene Torches	Active	3.00	0.4	10	12.00	E	\$0.47	incl. in rate	incl. in rate	\$5.64
Labor Hours					36	TOTAL LABOR				\$2,265.08
Equipment Hours					20	TOTAL EQUIPMENT				\$1,077.08

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$113.25	\$113.25
TOTAL MATERIAL						\$113.25

SUBCONTRACT COSTS									
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount				
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	4.59	ton	1.000	4.59	\$595.00	\$2,731.65			
Haul off of material	1.00	Loads	20 tons a load		\$200.00	\$200.00			
TOTAL SUBCONTRACTS									\$2,931.65

SUMMARY OF COSTS									
Labor Cost	\$2,265.08	Labor Burden @	49.7%	\$0.00				\$2,265.08	
Material Cost	\$113.25	Material Tax @	7.75%	\$8.78				\$122.03	
Equipment Cost	\$1,077.08	Equipment Tax @	7.75%	\$83.47				\$1,160.55	
Subcontractors	\$2,931.65							\$2,931.65	
DIRECT COST SUBTOTALS		\$6,387		\$92		DIRECT COST SUBTOTALS		\$6,479	
Additional Pay Item Notes :									

4.047 Remove and Dispose of Oil Sump Pumps

PAY ITEM NUMBER	:	4.047	Project	:	KRRP - Iron Gate
Description	:	Remove and Dispose of Oil Sump Pumps	Group	:	D05
Quantity	:	2,000.00 LBS			
Daily Production	:	25,000.00 LBS per	10	hour shift	
Work Days	:	0.1	Days		
Unit Price	:	\$0.84	per LBS		
Total Cost	:	\$1,682			
			Project #	:	4
			Estimator	:	Mihaela Tomulescu
					LBS per
			Probable Low Cost Parameter		27500
			Probable High Cost Parameter		20000
					Total Cost
					Unit Price Per LBS
					\$0.86
					\$1.15

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.1	10	1.00	L	\$53.10	incl. in rate	incl. in rate	\$53.10
Laborer	Active	3.00	0.1	10	3.00	L	\$50.38	incl. in rate	incl. in rate	\$151.14
Steelworker	Active	3.00	0.1	10	3.00	L	\$72.07	incl. in rate	incl. in rate	\$216.22
Equipment Operator (medium)	Active	2.00	0.1	10	2.00	L	\$72.91	incl. in rate	incl. in rate	\$145.82
Hydraulic Excavator (2.5cy)	Active	1.00	0.1	10	1.00	E	\$203.63	incl. in rate	incl. in rate	\$203.63
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.1	10	1.00	E	\$64.23	incl. in rate	incl. in rate	\$64.23
Oxygen and Acetylene Torches	Active	3.00	0.1	10	3.00	E	\$0.47	incl. in rate	incl. in rate	\$1.41
Labor Hours					9	TOTAL LABOR				\$566.27
Equipment Hours					5	TOTAL EQUIPMENT				\$269.27

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$28.31	\$28.31
TOTAL MATERIAL						\$28.31

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	1.00	ton	1.000	1.00	\$595.00
Haul off of material	1.00	Loads	20 tons a load		\$200.00
TOTAL SUBCONTRACTS					\$795.00

Labor Cost	\$566.27	Labor Burden @	49.7%	\$0.00		\$566.27
Material Cost	\$28.31	Material Tax @	7.75%	\$2.19		\$30.51
Equipment Cost	\$269.27	Equipment Tax @	7.75%	\$20.87		\$290.14
Subcontractors	\$795.00					\$795.00
DIRECT COST SUBTOTALS	\$1,659			\$23	DIRECT COST SUBTOTALS	\$1,682

Additional Pay Item Notes :

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PAY ITEM COST DETAIL WORKSHEET

4.048 Remove and Dispose of Pumps

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.048	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Pumps	Group	:	D03				
Quantity	:	22,000.00 LBS							
Daily Production	:	25,000.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	0.9 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.68 per LBS			Probable Low Cost Parameter			27500	\$13,489
Total Cost	:	\$14,988			Probable High Cost Parameter			20000	\$17,986
									Unit Price Per LBS
									\$0.70
									\$0.93

CREW COSTS										
Description	Active Idle	# In crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.9	10	9.00	L	\$53.10	incl. in rate	incl. in rate	\$477.87
Laborer	Active	3.00	0.9	10	27.00	L	\$50.38	incl. in rate	incl. in rate	\$1,360.26
Steelworker	Active	3.00	0.9	10	27.00	L	\$72.07	incl. in rate	incl. in rate	\$1,945.94
Equipment Operator (medium)	Active	2.00	0.9	10	18.00	L	\$72.91	incl. in rate	incl. in rate	\$1,312.34
Hydraulic Excavator (2.5cy)	Active	1.00	0.9	10	9.00	E	\$203.63	incl. in rate	incl. in rate	\$1,832.67
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.9	10	9.00	E	\$64.23	incl. in rate	incl. in rate	\$578.07
					Labor Hours	81	TOTAL LABOR			\$5,096.42
					Equipment Hours	18	TOTAL EQUIPMENT			\$2,410.74

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$509.64	\$509.64
						TOTAL MATERIAL
						\$509.64

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	11.00	ton	1.000	11.00	\$595.00
Haul off of material	1.00	Loads	20 tons a load		\$200.00
					TOTAL SUBCONTRACTS
					\$6,745.00

SUMMARY OF COSTS									
Labor Cost	\$5,096.42	Labor Burden @	49.7%	\$0.00					\$5,096.42
Material Cost	\$509.64	Material Tax @	7.75%	\$39.50					\$549.14
Equipment Cost	\$2,410.74	Equipment Tax @	7.75%	\$186.83					\$2,597.57
Subcontractors	\$6,745.00								\$6,745.00
DIRECT COST SUBTOTALS	\$14,762			\$226				DIRECT COST SUBTOTALS	\$14,988
Additional Pay Item Notes :									

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PAY ITEM COST DETAIL WORKSHEET

4.05 Remove and Dispose of Unwatering Piping

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.050	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Unwatering Piping	Group	:	D05				
Quantity	:	19,291.00 LBS	Project #	:	4				
Daily Production	:	25,000.00 LBS per	Estimator	:	Mihaela Tomulescu				
Work Days	:	0.8 Days	Probable Low Cost Parameter	:	27500	LBS per	Total Cost	Unit Price Per LBS	
Unit Price	:	\$0.68 per LBS	Probable High Cost Parameter	:	21250	LBS per	\$11,731	\$0.69	
Total Cost	:	\$13,034					\$14,990	\$0.89	

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.8	10	8.00	L	\$53.10	incl. in rate	incl. in rate	\$424.78
Laborer	Active	3.00	0.8	10	24.00	L	\$50.38	incl. in rate	incl. in rate	\$1,209.12
Steelworker	Active	3.00	0.8	10	24.00	L	\$72.07	incl. in rate	incl. in rate	\$1,729.73
Equipment Operator (medium)	Active	2.00	0.8	10	16.00	L	\$72.91	incl. in rate	incl. in rate	\$1,166.53
Hydraulic Excavator (2.5cy)	Active	1.00	0.8	10	8.00	E	\$203.63	incl. in rate	incl. in rate	\$1,629.04
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.8	10	8.00	E	\$64.23	incl. in rate	incl. in rate	\$513.84
Oxygen and Acetylene Torches	Active	3.00	0.8	10	24.00	E	\$0.47	incl. in rate	incl. in rate	\$11.28
Labor Hours					72	TOTAL LABOR				\$4,530.15
Equipment Hours					40	TOTAL EQUIPMENT				\$2,154.16

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$226.51	\$226.51
						TOTAL MATERIAL
						\$226.51

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	9.65	ton	1.000	9.65	\$595.00
Haul off of material	1.00	Loads	20 tons a load	\$200.00	\$200.00
					TOTAL SUBCONTRACTS
					\$5,939.07

SUMMARY OF COSTS									
Labor Cost	\$4,530.15	Labor Burden @	49.7%	\$0.00					\$4,530.15
Material Cost	\$226.51	Material Tax @	7.75%	\$17.55					\$244.06
Equipment Cost	\$2,154.16	Equipment Tax @	7.75%	\$166.95					\$2,321.11
Subcontractors	\$5,939.07								\$5,939.07
DIRECT COST SUBTOTALS	\$12,850			\$185				DIRECT COST SUBTOTALS	\$13,034
Additional Pay Item Notes :									

PAY ITEM COST DETAIL WORKSHEET

4.051 Remove and Dispose of Drainage Piping

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.051			Project	:	KRRP - Iron Gate		
Description	:	Remove and Dispose of Drainage Piping			Group	:	D05		
Quantity	:	9,518.00 LBS							
Daily Production	:	25,000.00 LBS per			10	hour shift			
Work Days	:	0.4 Days			Project #	:	4		
Unit Price	:	\$0.69 per LBS			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Total Cost	:	\$6,573			Probable Low Cost Parameter	:	27500	\$5,916	Unit Price Per LBS
					Probable High Cost Parameter	:	21250	\$7,559	\$0.71
									\$0.91

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.4	10	4.00	L	\$53.10	incl. in rate	incl. in rate	\$212.39
Laborer	Active	3.00	0.4	10	12.00	L	\$50.38	incl. in rate	incl. in rate	\$604.56
Steelworker	Active	3.00	0.4	10	12.00	L	\$72.07	incl. in rate	incl. in rate	\$864.86
Equipment Operator (medium)	Active	2.00	0.4	10	8.00	L	\$72.91	incl. in rate	incl. in rate	\$583.26
Hydraulic Excavator (2.5cy)	Active	1.00	0.4	10	4.00	E	\$203.63	incl. in rate	incl. in rate	\$814.52
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.4	10	4.00	E	\$64.23	incl. in rate	incl. in rate	\$256.92
Labor Hours					36	TOTAL LABOR				\$2,265.08
Equipment Hours					8	TOTAL EQUIPMENT				\$1,071.44

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$113.25	\$113.25
						TOTAL MATERIAL
						\$113.25

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	4.76	ton	1.000	4.76	\$595.00
Haul off of material	1.00	Loads	20 tons a load		\$200.00
					TOTAL SUBCONTRACTS
					\$3,031.61

SUMMARY OF COSTS									
Labor Cost	\$2,265.08	Labor Burden @	49.7%	\$0.00				\$2,265.08	
Material Cost	\$113.25	Material Tax @	7.75%	\$8.78				\$122.03	
Equipment Cost	\$1,071.44	Equipment Tax @	7.75%	\$83.04				\$1,154.48	
Subcontractors	\$3,031.61							\$3,031.61	
DIRECT COST SUBTOTALS		\$6,481				\$92	DIRECT COST SUBTOTALS		\$6,573
Additional Pay Item Notes :									

PAY ITEM NUMBER	:	4.052	Project	:	KRRP - Iron Gate
Description	:	Remove and Dispose of Transformer Oil and Fire Protection Pipes	D05		
Quantity	:	9,182.00 LBS	Group	:	
Daily Production	:	25,000.00 LBS per			
Work Days	:	0.4 Days	Project #	:	4
Unit Price	:	\$0.94 per LBS	Estimator	:	Mihaela Tomulescu
Total Cost	:	\$8,633	LBS per		26250
			Total Cost		\$8,202
			Unit Price Per LBS		\$1.02
			Probable Low Cost Parameter		22500
			Probable High Cost Parameter		\$9,497
					\$1.18

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.4	10	4.00	L	\$53.10	incl. in rate	incl. in rate	\$212.39
Laborer	Active	3.00	0.4	10	12.00	L	\$50.38	incl. in rate	incl. in rate	\$604.56
Steelworker	Active	3.00	0.4	10	12.00	L	\$72.07	incl. in rate	incl. in rate	\$864.86
Equipment Operator (medium)	Active	2.00	0.4	10	8.00	L	\$72.91	incl. in rate	incl. in rate	\$583.26
Hydraulic Excavator (2.5cy)	Active	1.00	0.4	10	4.00	E	\$203.63	incl. in rate	incl. in rate	\$814.52
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.4	10	4.00	E	\$64.23	incl. in rate	incl. in rate	\$256.92
Labor Hours					36	TOTAL LABOR				\$2,265.08
Equipment Hours					8	TOTAL EQUIPMENT				\$1,071.44

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$113.25	\$113.25
						\$0.00
						\$0.00
						\$0.00
						\$0.00
TOTAL MATERIAL						\$113.25

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum					
	4.59	ton	1.000	4.59	\$595.00
Hazardous waste cleanup/pickup/disposal, liquid pickup, vacuum truck, stainless steel tank, 5000 gallons, minimum charge, 4 hours, 2 compartment	8.00	hour	RSM Means 028120101260		\$270.00
Haul off of material	1.00	Loads	20 tons a load		\$200.00
TOTAL SUBCONTRACTS					\$5,091.65

Labor Cost	\$2,265.08	Labor Burden @	49.7%	\$0.00		\$2,265.08
Material Cost	\$113.25	Material Tax @	7.75%	\$8.78		\$122.03
Equipment Cost	\$1,071.44	Equipment Tax @	7.75%	\$83.04		\$1,154.48
Subcontractors	\$5,091.65					\$5,091.65
DIRECT COST SUBTOTALS	\$8,541			\$92	DIRECT COST SUBTOTALS	\$8,633
Additional Pay Item Notes :						

PAY ITEM COST DETAIL WORKSHEET

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.053	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Compressed Air System	Group	:	D05				
Quantity	:	1,450.00 LBS							
Daily Production	:	25,000.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	0.058 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.79 per LBS			Probable Low Cost Parameter			27500	\$1,030
Total Cost	:	\$1,145			Probable High Cost Parameter			21250	\$1,317
									Unit Price Per LBS
									\$0.81
									\$1.04

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.1	10	0.58	L	\$53.10	incl. in rate	incl. in rate	\$30.80
Laborer	Active	3.00	0.1	10	1.74	L	\$50.38	incl. in rate	incl. in rate	\$87.66
Steelworker	Active	3.00	0.1	10	1.74	L	\$72.07	incl. in rate	incl. in rate	\$125.41
Equipment Operator (medium)	Active	2.00	0.1	10	1.16	L	\$72.91	incl. in rate	incl. in rate	\$84.57
Hydraulic Excavator (2.5cy)	Active	1.00	0.1	10	0.58	E	\$203.63	incl. in rate	incl. in rate	\$118.11
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.1	10	0.58	E	\$64.23	incl. in rate	incl. in rate	\$37.25
					Labor Hours	5.22	TOTAL LABOR			\$328.44
					Equipment Hours	1.16	TOTAL EQUIPMENT			\$155.36

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$16.42	\$16.42
						TOTAL MATERIAL
						\$16.42

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	0.73	ton	1.000	\$0.73	\$431.38
Haul off of material	1.00	Loads	20 tons a load	\$200.00	\$200.00
					TOTAL SUBCONTRACTS
					\$631.38

SUMMARY OF COSTS									
Labor Cost	\$328.44	Labor Burden @	49.7%	\$0.00					\$328.44
Material Cost	\$16.42	Material Tax @	7.75%	\$1.27					\$17.69
Equipment Cost	\$155.36	Equipment Tax @	7.75%	\$12.04					\$167.40
Subcontractors	\$631.38								\$631.38
DIRECT COST SUBTOTALS	\$1,132			\$13				DIRECT COST SUBTOTALS	\$1,145
Additional Pay Item Notes :									

PAY ITEM COST DETAIL WORKSHEET

4.053a Remove & Dispose - Petroleum Products from Mechanical Equip.

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.053a			Project	:	KRRP - Iron Gate		
Description	:	Remove & Dispose - Petroleum Products from Mechanical Equip.			Group	:	D09		
Quantity	:	1,100.00	GAL						
Daily Production	:	5,000.00	GAL per	10					
Work Days	:	0.2	Days		Project #	:	4		
Unit Price	:	\$2.72	per GAL		Estimator	:	Mihaela Tomulescu	GAL per	Total Cost
Total Cost	:	\$2,996			Probable Low Cost Parameter			5250	\$2,846
					Probable High Cost Parameter			4500	\$3,296
									Unit Price Per GAL
									\$3
									\$3

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.2	10	2.00	L	\$53.10	incl. in rate	incl. in rate	\$106.19
Electrician	Active	1.00	0.2	10	2.00	L	\$49.75	incl. in rate	incl. in rate	\$99.51
Laborer	Active	5.00	0.2	10	10.00	L	\$50.38	incl. in rate	incl. in rate	\$503.80
Truck Driver (heavy)	Active	1.00	0.2	10	2.00	L	\$63.35	incl. in rate	incl. in rate	\$126.70
Labor Hours					16	TOTAL LABOR				\$836.20
Equipment Hours					0	TOTAL EQUIPMENT				\$0.00

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
						TOTAL MATERIAL
						\$0.00

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, liquid pickup, vacuum truck, stainless steel tank, 5000 gallons, minimum charge, 4 hours, 2 compartment	8.00	hour	RSM Means 028120101260	\$270.00	\$2,160.00
					TOTAL SUBCONTRACTS
					\$2,160.00

SUMMARY OF COSTS						
Labor Cost	\$836.20	Labor Burden @	49.7%	\$0.00		\$836.20
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00		\$0.00
Equipment Cost	\$0.00	Equipment Tax @	7.75%	\$0.00		\$0.00
Subcontractors	\$2,160.00					\$2,160.00
DIRECT COST SUBTOTALS	\$2,996			\$0	DIRECT COST SUBTOTALS	\$2,996

Additional Pay Item Notes :

Petroleum-based products, ranging from fuel oil and hydraulic fluid to lubricating greases and oils, are found throughout every type of power generating plant or system. Lubrication supports bearings and moving parts in all sorts of equipment: pumps, conveyors, feeders, scrubbers, cranes, turbines, and more. A good oil/water separation system will result in a flow of concentrated waste oil to a collection area and a flow of oil-free water ready for secondary processing or discharge. Once an oil layer has been separated from free water, it must be removed for recycling or disposal. Many plants use one or more of these oil removal methods, but each has costly limitations:

- 1. Absorbent materials. Absorbent mats or materials are frequently used to dam up and absorb excess oils and greases resulting from accidents or the routine operation of machinery. These materials are very effective for preventing the spread of a source leak and very efficient in terms of oil pickup. Yet, their use on large volumes of waste oil results in multiple, recurring costs that can make them impractical as an everyday solution:
 - the costs of the materials themselves
 - the labor costs for ordering, stocking, application, and removal
 - the costs of used-media collection, disposal, or re-processing/recycling.
- 2. Manually operated "slotted pipes." Many separators feature a "slotted pipe," a pipe located near the top of the vessel that has a horizontal opening. Oil is removed by turning the horizontal opening downward until it meets the floating oil layer, which drains through the pipe to a collection receptacle. These pipes work well on thick layers of oil, but cannot drain off a sheen of oil without draining off a large amount of water as well.

AECOM assumed the best is Vacuum truck removal method. Used a crew formed of 1 Foreman, 5 Laborers to takeout the petroleum waste. 1 Electrician to unplug the power and to assure the temporary power at the construction site. Vacuum-equipped tank trucks are used to remove waste oil from collection points at plants so that it can be transported to recycling or disposal locations. If the waste oil has been thoroughly separated, highly concentrated, and stored in an appropriate receptacle, this service can be used very efficiently. However, vacuum disposal units are often used to pump oil layers directly off of water. This results in the intake of a significant amount free water along with the waste oil – and a significantly higher cost.

4.054

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.056			Project	:	KRRP - Iron Gate		
Description	:	Remove and Dispose of Surge protection equip. for 18.975 MVA Generator			Group	:	D04		
Quantity	:	1.00 EA							
Daily Production	:	2.50 EA per		10	hour shift	Project #	:	4	
Work Days	:	0.4		Days		Estimator	:	Mihaela Tomulescu	EA per
Unit Price	:	\$2,988.63 per EA				Probable Low Cost Parameter		2.75	Total Cost
Total Cost	:	\$2,989				Probable High Cost Parameter		2.125	\$2,690
								\$3,437	Unit Price Per EA
								\$3,926	

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	0.4	10	4.00	L	\$51.95	incl. in rate	incl. in rate	\$207.81
Electrician	Active	1.00	0.4	10	4.00	L	\$49.75	incl. in rate	incl. in rate	\$199.01
Laborer	Active	1.00	0.4	10	4.00	L	\$50.38	incl. in rate	incl. in rate	\$201.52
Loader, FE Rubber Tire (8.6cy)	Active	1.00	0.5	10	5.00	E	\$221.50	incl. in rate	incl. in rate	\$1,107.50
Equipment Operator (medium)	Active	1.00	0.5	10	5.00	L	\$72.91	incl. in rate	incl. in rate	\$364.54
					Labor Hours	17	TOTAL LABOR			\$972.88
					Equipment Hours	5	TOTAL EQUIPMENT			\$1,107.50

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$48.64	\$48.64
						TOTAL MATERIAL
						\$48.64

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling to Yreka Transfer 40 Miles	1.00	Load	20 tons per load	\$400.00	\$400.00
Disposal Fee	5.00	Ton		\$74.00	\$370.00
					TOTAL SUBCONTRACTS
					\$770.00

SUMMARY OF COSTS									
Labor Cost	\$972.88	Labor Burden @	49.7%	\$0.00					\$972.88
Material Cost	\$48.64	Material Tax @	7.75%	\$3.77					\$52.41
Equipment Cost	\$1,107.50	Equipment Tax @	7.75%	\$85.83					\$1,193.33
Subcontractors	\$770.00								\$770.00
DIRECT COST SUBTOTALS		\$2,899					\$90	DIRECT COST SUBTOTALS	\$2,989
Additional Pay Item Notes :									
Used 1 Forman, 1 Electrician to remove the electrical equipment and 1 laborer to haul.									

PAY ITEM COST DETAIL WORKSHEET

4.057 Remove and Dispose of Neutral grounding equip. for 18.975 MVA Generator

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.057			Project	:	KRRP - Iron Gate D04		
Description	:	Remove and Dispose of Neutral grounding equip. for 18.975 MVA Generator			Group	:			
Quantity	:	1.00 EA							
Daily Production	:	1.25 EA per		10	hour shift	Project #	:	4	
Work Days	:	0.8 Days			Estimator	:	Mihaela Tomulescu	EA per	Total Cost
Unit Price	:	\$2,737.67 per EA			Probable Low Cost Parameter		1.375	\$2,464	\$2,815
Total Cost	:	\$2,738			Probable High Cost Parameter		1.0625	\$3,148	\$3,597

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	0.8	10	8.00	L	\$51.95	incl. in rate	incl. in rate	\$415.62
Electrician	Active	1.00	0.8	10	8.00	L	\$49.75	incl. in rate	incl. in rate	\$398.02
Ironworkers	Active	1.00	0.8	10	8.00	L	\$70.35	incl. in rate	incl. in rate	\$562.76
Laborer	Active	1.00	0.8	10	8.00	L	\$50.38	incl. in rate	incl. in rate	\$403.04
Gas Welding Machine	Active	1.00	0.8	10	8.00	E	\$2.88	incl. in rate	incl. in rate	\$23.02
Welder	Active	1.00	0.8	10	8.00	E	\$7.84	incl. in rate	incl. in rate	\$62.70
					Labor Hours	32				TOTAL LABOR \$1,779.45
					Equipment Hours	16				TOTAL EQUIPMENT \$85.72

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$88.97	\$88.97
						TOTAL MATERIAL \$88.97

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling to Yreka Transfer 40 Miles	1.00	Load	20 tons per load	\$400.00	\$400.00
Disposal Fee	5.00	Ton		\$74.00	\$370.00
					TOTAL SUBCONTRACTS \$770.00

SUMMARY OF COSTS									
Labor Cost	\$1,779.45	Labor Burden @	49.7%	\$0.00					\$1,779.45
Material Cost	\$88.97	Material Tax @	7.75%	\$6.90					\$95.87
Equipment Cost	\$85.72	Equipment Tax @	7.75%	\$6.64					\$92.36
Subcontractors	\$770.00								\$770.00
DIRECT COST SUBTOTALS		\$2,724		\$14				DIRECT COST SUBTOTALS	\$2,738
Additional Pay Item Notes :									

PAY ITEM NUMBER	:	4.058	Project	:	KRRP - Iron Gate
Description	:	Remove and Dispose of Station Service Switchgear, 600 volt - (5 sections)	Group	:	D04
Quantity	:	1.00 EA			
Daily Production	:	1.25 EA per	10	hour shift	
Work Days	:	0.8	Days		
Unit Price	:	\$5,177.87	per EA		
Total Cost	:	\$5,178			
			Project #	:	4
			Estimator	:	Mihaela Tomulescu
			Probable Low Cost Parameter	:	EA per 1.375 \$4,660 Unit Price Per EA \$5,324
			Probable High Cost Parameter	:	1.0625 \$5,955 \$6,802

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	0.8	10	8.00	L	\$51.95	incl. in rate	incl. in rate	\$415.62
Electrician	Active	3.00	0.8	10	24.00	L	\$49.75	incl. in rate	incl. in rate	\$1,194.07
Laborer	Active	2.00	0.8	10	16.00	L	\$50.38	incl. in rate	incl. in rate	\$806.08
Hydraulic Crane (35tn)	Active	1.00	0.8	10	8.00	E	\$116.30	incl. in rate	incl. in rate	\$930.40
Equipment Operator (crane)	Active	1.00	0.8	10	8.00	L	\$75.25	incl. in rate	incl. in rate	\$602.01
Labor Hours					56	TOTAL LABOR				\$3,017.78
Equipment Hours					8	TOTAL EQUIPMENT				\$930.40

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$150.89	\$150.89
TOTAL MATERIAL						\$150.89

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (assumed qty)	1.00	ton	1.000	1.00	\$595.00
Hauling to Yreka Transfer 40 Miles	1.00	Load	20 tons per load		\$400.00
TOTAL SUBCONTRACTS					\$995.00

Labor Cost	\$3,017.78	Labor Burden @	49.7%	\$0.00		\$3,017.78
Material Cost	\$150.89	Material Tax @	7.75%	\$11.69		\$162.58
Equipment Cost	\$930.40	Equipment Tax @	7.75%	\$72.11		\$1,002.51
Subcontractors	\$995.00					\$995.00
DIRECT COST SUBTOTALS	\$5,094			\$84	DIRECT COST SUBTOTALS	\$5,178

Used 1 Forman, 3 Electrician, 2 laborer to haul with the crane in the truck. Assumed containing hazardous waste that will be disposed at 28 miles away from the construction site. In normal circumstances, decontaminated residual components could be accepted at landfill sites but Polychlorinated biphenyl, otherwise known as PCB, is a synthetic chemical that is widely used for industrial and commercial use as dielectric fluid in transformers and capacitors because of its high resistance to decomposition, low electrical conductivity, low flammability and high heat capacity. Transformer repair, reconditioning and retro-filling facilities are the major industry sectors that contributes to the spread of PCB contamination. Types of PCB Wastes:

PCB wastes are discarded materials that contain PCB or have been contaminated with PCBs and that are without any commercial, industrial, or economic use. For the purpose of this Code of Practice, PCBs wastes are classified as follows:

- o Liquid PCB wastes
- o PCB-based dielectric fluids removed from transformers and other equipment
- o PCB-based heat transfer and hydraulic fluids
- o Metallic solid wastes
- o PCB equipment such as capacitors, transformers, switchgears, circuit breakers, heat transfer systems, etc.
- o Contaminated components removed from electrical equipment such as windings; PCB-contaminated containers and equipment such as metal drums, tanks, pumps, metal filters, etc.

Calculated 28 miles from Iron Gate Dam to Yreka Transfer Recycling

PAY ITEM COST DETAIL WORKSHEET

4.063 Remove and Dispose of Unit and plant control switchboard

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.063			Project	:	KRRP - Iron Gate		
Description	:	Remove and Dispose of Unit and plant control switchboard			Group	:	D05		
Quantity	:	1.00 EA							
Daily Production	:	0.81 EA per		10	hour shift	Project #	:	4	
Work Days	:	1.2		Days		Estimator	:	Mihaela Tomulescu	
Unit Price	:	\$6,566.41 per EA				EA per	Total Cost	Unit Price Per EA	
Total Cost	:	\$6,566				Probable Low Cost Parameter	0.89375	\$5,910	\$6,751
						Probable High Cost Parameter	0.690625	\$7,551	\$8,627

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	1.2	10	12.00	L	\$51.95	incl. in rate	incl. in rate	\$623.44
Electrician	Active	3.00	1.2	10	36.00	L	\$49.75	incl. in rate	incl. in rate	\$1,791.11
Laborer	Active	2.00	1.2	10	24.00	L	\$50.38	incl. in rate	incl. in rate	\$1,209.12
Loader, FE Rubber Tire (3.5cy)	Active	1.00	1.2	10	12.00	E	\$64.23	incl. in rate	incl. in rate	\$770.76
Equipment Operator (medium)	Active	1.00	1.2	10	12.00	L	\$72.91	incl. in rate	incl. in rate	\$874.90
Labor Hours					84	TOTAL LABOR				\$4,498.56
Equipment Hours					12	TOTAL EQUIPMENT				\$770.76

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$224.93	\$224.93
						TOTAL MATERIAL
						\$224.93

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	1.00	ton	1.000	1.00	\$595.00
Hauling to Yreka Transfer 40 Miles	1.00	Load	20 tons per load	\$400.00	\$400.00
					TOTAL SUBCONTRACTS
					\$995.00

SUMMARY OF COSTS						
Labor Cost	\$4,498.56	Labor Burden @	49.7%	\$0.00		\$4,498.56
Material Cost	\$224.93	Material Tax @	7.75%	\$17.43		\$242.36
Equipment Cost	\$770.76	Equipment Tax @	7.75%	\$59.73		\$830.49
Subcontractors	\$995.00					\$995.00
DIRECT COST SUBTOTALS	\$6,489			\$77	DIRECT COST SUBTOTALS	\$6,566
Additional Pay Item Notes :						
<div>Used 1 Forman, 3 Electrician, 2 laborer to haul with the loader in the truck. Assumed containing hazardous waste that will be disposed at 200 miles away from the construction site. In normal circumstances, decontaminated residual components could be accepted at landfill sites but Polychlorinated biphenyl, otherwise known as PCB, is a synthetic chemical that is widely used for industrial and commercial use as dielectric fluid in transformers and capacitors because of its high resistance to decomposition, low electrical conductivity, low flammability and high heat capacity. Transformer repair, reconditioning and retro-filling facilities are the major industry sectors that contributes to the spread of PCB contamination. Types of PCB Wastes: PCB wastes are discarded materials that contain PCB or have been contaminated with PCBs and that are without any commercial, industrial, or economic use. For the purpose of this Code of Practice, PCBs wastes are classified as follows: Liquid PCB wastes o PCB-based dielectric fluids removed from transformers and other equipment o PCB-based heat transfer and hydraulic fluids Metallic solid wastes o PCB equipment such as capacitors, transformers, switchgears, circuit breakers, heat transfer systems, etc. o Contaminated components removed from electrical equipment such as windings; PCB-contaminated containers and equipment such as metal drums, tanks, pumps, metal filters, etc. Calculated 28 miles from Iron Gate Dam to Yreka Transfer Recycling</div>						

PAY ITEM NUMBER	:	4.066	Project	:	KRRP - Iron Gate		
Description	:	Remove and Dispose of Transformer (3 phase, 300 kVA, 6600/480V est.)	Group	:	D05		
Quantity	:	1.00 EA					
Daily Production	:	1.25 EA per	10	hour shift	Project #	:	4
Work Days	:	0.8	Days		Estimator	:	Mihaela Tomulescu
Unit Price	:	\$4,953.90 per EA			EA per		Total Cost
Total Cost	:	\$4,954			Probable Low Cost Parameter	1.375	\$4,459
					Probable High Cost Parameter	1.0625	\$5,697
							Unit Price Per EA
							\$5,093
							\$6,508

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	0.8	10	8.00	L	\$51.95	incl. in rate	incl. in rate	\$415.62
Electrician	Active	2.00	0.8	10	16.00	L	\$49.75	incl. in rate	incl. in rate	\$796.05
Hydraulic Crane (50tn)	Active	1.00	0.8	10	8.00	E	\$134.32	incl. in rate	incl. in rate	\$1,074.56
Equipment Operator (crane)	Active	1.00	0.8	10	8.00	L	\$75.25	incl. in rate	incl. in rate	\$602.01
Equipment Operator (medium)	Active	1.00	0.8	10	8.00	L	\$72.91	incl. in rate	incl. in rate	\$583.26
Truck, Utility, with Man-Basket	Active	1.00	0.8	10	8.00	E	\$31.90	incl. in rate	incl. in rate	\$255.20
Labor Hours					40	TOTAL LABOR				\$2,396.94
Equipment Hours					16	TOTAL EQUIPMENT				\$1,329.76

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$119.85	\$119.85
TOTAL MATERIAL						\$119.85

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	1.00	ton	1.000	1.00	\$595.00
Hauling to Yreka Transfer 40 Miles	1.00	Load	20 tons per load		\$400.00
TOTAL SUBCONTRACTS					\$995.00

Labor Cost	\$2,396.94	Labor Burden @	49.7%	\$0.00		\$2,396.94
Material Cost	\$119.85	Material Tax @	7.75%	\$9.29		\$129.14
Equipment Cost	\$1,329.76	Equipment Tax @	7.75%	\$103.06		\$1,432.82
Subcontractors	\$995.00					\$995.00
DIRECT COST SUBTOTALS	\$4,842			\$112	DIRECT COST SUBTOTALS	\$4,954

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PAY ITEM COST DETAIL WORKSHEET

4.067 Remove and Dispose of Step-up Transformer, outdoor, oil-filled, 3-phase, 18.947 kVA, 6.600/69.000 volt

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.067			Project	:	KRRP - Iron Gate		
Description	:	Remove and Dispose of Step-up Transformer, outdoor, oil-filled, 3-phase, 18.947 kVA, 6.600/69.000 volt			Group	:	D09		
Quantity	:	1.00	EA		Project #	:	4		
Daily Production	:	1.00	EA per	10	hour shift	Estimator	:	Mihaela Tomulescu	
Work Days	:	1.0	Days		Probable Low Cost Parameter		EA per	Total Cost	Unit Price Per EA
Unit Price	:	\$37,330.80 per EA			Probable High Cost Parameter		1.1	\$33,598	\$38,382
Total Cost	:	\$37,331					0.85	\$42,930	\$49,044

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	2.00	1.0	10	20.00	L	\$51.95	incl. in rate	incl. in rate	\$1,039.06
Electrician	Active	2.00	1.0	10	20.00	L	\$49.75	incl. in rate	incl. in rate	\$995.06
Laborer	Active	4.00	1.0	10	40.00	L	\$50.38	incl. in rate	incl. in rate	\$2,015.20
Hydraulic Excavator (6.0cy)	Active	1.00	1.0	10	10.00	E	\$322.48	incl. in rate	incl. in rate	\$3,224.80
Truck Driver (heavy)	Active	1.00	1.0	10	10.00	L	\$63.35	incl. in rate	incl. in rate	\$633.49
Truck, Flatbed (4x4, 10,000 gvw)	Active	1.00	1.0	10	10.00	E	\$31.90	incl. in rate	incl. in rate	\$319.00
Crawler Crane (130tn)	Active	2.00	1.0	10	20.00	E	\$258.66	incl. in rate	incl. in rate	\$5,173.20
Truck, Utility, with Man-Basket	Active	2.00	1.0	10	20.00	E	\$31.90	incl. in rate	incl. in rate	\$638.00
Equipment Operator (crane)	Active	2.00	1.0	10	20.00	L	\$75.25	incl. in rate	incl. in rate	\$1,505.02
Equipment Operator (medium)	Active	1.00	1.0	10	10.00	L	\$72.91	incl. in rate	incl. in rate	\$729.08
					Labor Hours	120	TOTAL LABOR		\$6,916.91	
					Equipment Hours	60	TOTAL EQUIPMENT		\$9,355.00	

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$345.85	\$345.85
TOTAL MATERIAL						\$345.85

SUBCONTRACT COSTS						
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount	
Disposal fee	1	EA	1.000	1.00	\$1,000.00	\$1,000.00
Remove oil from oil-filled step-up transformer (allowance for oil containers, filters, etc)	1	EA	1.000	1.00	\$13,000.00	\$13,000.00
Forklift crew, all-terrain forklift, 45' lift, 35' reach, 9000 lb. capacity, weekly use	1	week	1.000	1.00	\$5,961.23	\$5,961.23
TOTAL SUBCONTRACTS						\$19,961.23

SUMMARY OF COSTS							
Labor Cost	\$6,916.91	Labor Burden @	49.7%	\$0.00			\$6,916.91
Material Cost	\$345.85	Material Tax @	7.75%	\$26.80			\$372.65
Equipment Cost	\$9,355.00	Equipment Tax @	7.75%	\$725.01			\$10,080.01
Subcontractors	\$19,961.23						\$19,961.23
DIRECT COST SUBTOTALS	\$36,579			\$752		DIRECT COST SUBTOTALS	\$37,331
Additional Pay Item Notes :							
Weight and dimensions of the transformers have particular importance so transport vehicles must be adequate. A considerable proportion of the weight is due to the oil, so the direct consequence is that the big transformers have to be transported empty. During transport the transformers are filled either by dry air or nitrogen. Because of transportation, the auxiliaries have to be removed . For this reason the collaboration with all the people involved in the project is essential. AECOM best assumption - 2 crew R3 formed of 1 Forman, 1 Electricians, 1 utility man-bucket truck to work on the electrical line, 1 crane for disposal of each transformer in the truck and 2 laborers to remove the auxiliaries and the pad (1 excavator).							

PAY ITEM COST DETAIL WORKSHEET

4.068 Remove and Dispose of Lattice steel structure, with 69-kV disconnect switches and insulators

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.068	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Lattice steel structure, with 69-kV disconnect switches and insulators	Group	:	D05				
Quantity	:	1.00 EA							
Daily Production	:	1.25 EA per	10	hour shift	Project #	:	4		
Work Days	:	0.8	Days		Estimator	:	Mihaela Tomulescu	EA per	Total Cost
Unit Price	:	\$7,869.60	per EA		Probable Low Cost Parameter			1.375	\$7,083
Total Cost	:	\$7,870			Probable High Cost Parameter			1.0625	\$9,050
									Unit Price Per EA
									\$8,091.20
									\$10,338.76

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.8	10	8.00	L	\$53.10	\$0.00		\$424.78
Electrician	Active	1.00	0.8	10	8.00	L	\$49.75	\$0.00		\$398.02
Hydraulic Crane (35tn)	Active	1.00	0.8	10	8.00	E	\$116.30	\$116.30		\$930.40
Equipment Operator (crane)	Active	1.00	0.8	10	8.00	L	\$75.25	\$0.00		\$602.01
Steelworker	Active	2.00	0.8	10	16.00	L	\$72.07	\$0.00		\$1,153.15
Truck, Off-Road, Articulated Rear, 20cy	Active	1.00	0.8	10	8.00	E	\$111.64	\$111.64		\$893.12
Truck Driver (light)	Active	1.00	0.8	10	8.00	L	\$61.92	\$0.00		\$495.35
Laborer	Active	2.00	0.8	10	16.00	L	\$50.38	\$0.00		\$806.08
Gas Welding Machine	Active	1.00	0.8	10	8.00	E	\$2.88	\$2.88		\$23.02
Welder	Active	1.00	0.8	10	8.00	E	\$7.84	\$7.84		\$62.70

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$193.97	\$193.97
						TOTAL MATERIAL
						\$193.97

SUBCONTRACT COSTS						
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount	
Rent aerial lift, articulating boom, to 80' high, 500 lb. capacity, diesel - Rent per day (RS Means 01543340)	1.00	days	1.000	1.00	\$584.00	\$584.00
Hauling to Yreka Transfer 40 Miles	1.00	Load	20 tons per load		\$400.00	\$400.00
Disposal Fee	10.00	Ton			\$74.00	\$740.00
						TOTAL SUBCONTRACTS
						\$1,724.00

SUMMARY OF COSTS									
Labor Cost	\$3,879.39	Labor Burden @	49.7%	\$0.00					\$3,879.39
Material Cost	\$193.97	Material Tax @	7.75%	\$15.03					\$209.00
Equipment Cost	\$1,909.24	Equipment Tax @	7.75%	\$147.97					\$2,057.20
Subcontractors	\$1,724.00								\$1,724.00
DIRECT COST SUBTOTALS	\$7,707			\$163				DIRECT COST SUBTOTALS	\$7,870
Additional Pay Item Notes :									
Production is based off of RSMs using Crew formed of 1 Foreman, 1 Electrician disconnect switches and insulators, 2 steelworkers to cut in pieces the structure, 2 laborer to help loading and hauling lattice steel members. It will require the use of steel haul trucks; carry all's, boom cranes. the structure will be dismantle on a basis of top to bottom, thus avoiding any form of collapse or toppling over.									

PAY ITEM COST DETAIL WORKSHEET

4.069 Remove and Dispose of Generator Switchgear, outdoor, 7.2kV includes unit breaker (5 sections)

PAY ITEM INFORMATION									
PAY ITEM NUMBER	4.069	Project	KRRP - Iron Gate D05						
Description	Remove and Dispose of Generator Switchgear, outdoor, 7.2kV includes unit breaker (5 sections)	Group							
Quantity	1.00 EA	Project #	4						
Daily Production	0.63 EA per	Estimator	Mihaela Tomulescu						
Work Days	1.6 Days	Probable Low Cost Parameter	0.6875						
Unit Price	\$22,733.54 per EA	Probable High Cost Parameter	0.53125						
Total Cost	\$22,734	EA per	Total Cost		Unit Price Per EA				
			0.6875		\$20,460		\$23,373.72		
			0.53125		\$26,144		\$29,866.41		

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	2.00	1.6	10	32.00	L	\$53.10	\$0.00		\$1,699.10
Electrician	Active	6.00	1.6	10	96.00	L	\$49.75	\$0.00		\$4,776.29
Hydraulic Crane (50tn)	Active	1.00	2.0	10	20.00	E	\$134.32	\$134.32		\$2,686.40
Equipment Operator (crane)	Active	1.00	2.0	10	20.00	L	\$75.25	\$0.00		\$1,505.02
Laborer	Active	4.00	1.6	10	64.00	L	\$50.38	\$0.00		\$3,224.32
Steelworker	Active	2.00	1.6	10	32.00	L	\$72.07	\$0.00		\$2,306.30
Labor Hours					244	TOTAL LABOR				\$13,511.04
Equipment Hours					20	TOTAL EQUIPMENT				\$2,686.40

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$675.55	\$675.55
TOTAL MATERIAL						\$675.55

SUBCONTRACT COSTS						
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount	
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	6.00	ton	1.000	6.00	\$595.00	\$3,570.00
Hazardous waste cleanup/pickup/disposal, transportation to disposal site, truckload = 80 drums or 25 C.Y. or 18 tons, maximum	280.00	mile	1.000	280.00	\$7.25	\$2,030.00
TOTAL SUBCONTRACTS						\$5,600.00

SUMMARY OF COSTS									
Labor Cost	\$13,511.04	Labor Burden @	49.7%	\$0.00					\$13,511.04
Material Cost	\$675.55	Material Tax @	7.75%	\$52.36					\$727.91
Equipment Cost	\$2,686.40	Equipment Tax @	7.75%	\$208.20					\$2,894.60
Subcontractors	\$5,600.00								\$5,600.00
DIRECT COST SUBTOTALS	\$22,473			\$261			DIRECT COST SUBTOTALS		\$22,734
Additional Pay Item Notes :									
Used 2 Crews (2 sections each weight around 2400 LBS per crew) formed of 1 Foreman, 3 Electrician, 2 laborer to haul with the crane in the truck considering one way for each section. Assumed containing hazardous waste that will be disposed (12000 LBS) at 28 miles away from the construction site to Yreka Transfer Recycling .									

4.071 Remove Concrete in Penstock Intake Structure
Details

High Cost Factors				Low Cost Factors			
Bad Weather		0%		No Bad Weather		0%	
Gas Price Increase		5%		Gas Price Decrease		5%	
Unforeseen Contaminated Mats/ Access Issues		5%		No Unforeseen Contaminated Mats/ Access Issues		5%	
Total		10%		Total		10%	

Production Per Hour		Overall Production	
Hours	15	8	120.00
		10	150.00

Haul Notes		Excavator Loading Production per shift	
CY	460.00	CY per Hour	35.56
Swell Factor	60%	CY Bucket Size	2.50
Bulk CY	736	Buckets Per Hour	14
Haul Vehicle 60% Capacity (2 tons per CY)	19.2	# of Excavators	1.00
# of Haul Vehicles	1	CY per Hour (2.5 CY Bucket)	35.5555556
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)		CY Per Hour Ideal Production Per 8 Hour Shift	95
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) Minute:	3	Efficient Compared to Ideal Production	37%
Haul Speed (Loaded MPH)	9	Inefficiencies Compared to Ideal Production	63%
Return Speed (Unloaded MPH)	20		
Haul Distance (Miles)	1		
Shift Length (Hours)	10		
Cyce Time		Breaker Production	
Load Time (Load Time Minutes / 60mins)	0.13	Hydraulic Hammer CY per Hour	15
Haul Time (Haul Distance / Haul Speed)	0.14	# of Hammers	3.00
Dump Time (Dump Time Minutes / 60 Mins)	0.05	CY per Hour	35.5555556
Return Time (Haul Distance / Return Speed)	0.06	CY per Hour Back Check	5
Hours Per Cycle	0.38	32CY per HR per 8hr shift (Ideal prod)	32
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	70%	Efficient Compared to Ideal Production	37%
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.54	Inefficiencies Compared to Ideal Production	63%
Number of Cycles(Bulk CY/ (Haul Vehicle Cap X # of Haul Vehicles)	38		
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	20.52		
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	1.85		
Number of Haul Days	2.052		
Speed Loaded			
Max Weight lbs of loaded 745	164,500.00		
Tons	82		
20lbs/Ton Rolling weight	4		
Rolling Resistance (1% for each 20lbs/Ton)	4%		
Average Slope	2%		
Total Resistance	6%		
Max Gear per CAT Chart	4		
Max MPH	8.8		
Speed Empty			
Max Weight lbs of Empty 745	74,100.00		
Tons Empty	37		
20lbs/Ton Rolling weight Empty	2		
Rolling Resistance (1% per 20lbs/Ton) Empty	2%		
Average Slope Empty	2%		
Total Resistance Empty	4%		
Max Gear per CAT Chart Empty	N/A		
Max MPH Empty	N/A		

Other Notes

4.072 Remove Concrete in Penstock Encasement
Details

High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	5%	Gas Price Decrease	5%
Unforeseen Contaminated Mats/ Access Issues	5%	No Unforeseen Contaminated Mats/ Access Issues	5%
Total	10%	Total	10%

Production Per Hour	Hours	Overall Production	
	15	8	120.00
		10	150.00

Haul Notes	Excavator Loading Production per shift	
CY	710.00	CY per Hour 35.56
Swell Factor	60%	CY Bucket Size 2.50
Bulk CY	1136	Buckets Per Hour 14
Haul Vehicle 60% Capacity (2 tons per CY)	19.2	# of Excavators 0.50
# of Haul Vehicles	1	CY per Hour (2.5 CY Bucket) 71.11111111
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	8	CY Per Hour Ideal Productio 95
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) Minute	3	Efficient Compared to Ideal I 75%
Haul Speed (Loaded MPH)	9	Inefficiencies Compared to I 25%
Return Speed (Unloaded MPH)	20	
Haul Distance (Miles)	1	
Shift Length (Hours)	10	

Cyce Time	Breaker Production	
Load Time (Load Time Minutes / 60mins)	0.13	Hydraulic Hammer CY per H 15
Haul Time (Haul Distance / Haul Speed)	0.14	# of Hammers 2.00
Dump Time (Dump Time Minutes / 60 Mins)	0.05	CY per Hour 35.55555556
Return Time (Haul Distance / Return Speed)	0.06	CY per Hour Back Check 7.5
Hours Per Cycle	0.38	32CY per HR per 8hr shift (Ic 32
Efficiency Factor (Night Work, Traffic Retricrions, Coffee Breaks, ECT)	70%	Efficient Compared to Ideal I 75%
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.54	Inefficiencies Compared to I 25%
Number of Cycles(Bulk CY/ (Haul Vehicle Cap X # of Haul Vehicles)	59	
Total Number of Haul Hours(Actual Cycle Hours X Number of Cycles)	31.86	
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	1.85	
Number of Haul Days	3.186	

Speed Loaded		
Max Weight lbs of loaded 745	164,500.00	
Tons	82	
20lbs/Ton Rolling weight	4	
Rolling Resistance (1% for each 20lbs/Ton)	4%	
Average Slope	2%	
Total Resistance	6%	
Max Gear per CAT Chart	4	
Max MPH	8.8	
Speed Empty		
Max Weight lbs of Empty 745	74,100.00	
Tons Empty	37	
20lbs/Ton Rolling weight Empty	2	
Rolling Resistance (1% per 20lbs/Ton) Empty	2%	
Average Slope Empty	2%	
Total Resistance Empty	4%	
Max Gear per CAT Chart Empty	N/A	
Max MPH Empty	N/A	

Other Notes

SUMMARY OF COSTS						
Labor Cost	\$107,091.98	Labor Burden @	0.0%	\$0.00	Included in hourly labor rate.	\$107,091.98
Material Cost	\$5,354.60	Material Tax @	7.75%	\$414.98		\$5,769.58
Equipment Cost	\$155,758.18	Equipment Tax @	7.75%	\$12,071.26		\$167,829.44
Subcontractors	\$17,800.00					\$17,800.00
DIRECT COST SUBTOTALS	\$286,005			\$12,486	DIRECT COST SUBTOTALS	\$298,491
Additional Pay Item Notes :						

4.073 Remove Concrete in 3 Penstock Anchors and 7 Penstock Supports				
Details				
High Cost Factors			Low Cost Factors	
Bad Weather	0%		No Bad Weather	0%
Gas Price Increase	5%		Gas Price Decrease	5%
Unforeseen Contaminated Mats/ Access Issues	5%		No Unforeseen Contaminated Mats/ Access Issues	5%
Total	10%		Total	10%
Production Per Hour	Hours	Overall Production		
	15	8	120.00	
		10	150.00	
Haul Notes		Excavator Loading Production per shift		
CY	3,110.00	CY per Hour	35.56	
Swell Factor	60%	CY Bucket Size	2.50	
Bulk CY	4976	Buckets Per Hour	14	
Haul Vehicle 60% Capacity (2 tons per CY)	19.2	# of Excavators	1.00	
# of Haul Vehicles	2	CY per Hour (2.5 CY Bucket)	35.5555556	
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	8	CY Per Hour Ideal Production Per 8 Hour Shift	95	
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)	3	Efficient Compared to Ideal Production	37%	
Haul Speed (Loaded MPH)	9	Inefficiencies Compared to Ideal Production	63%	
Return Speed (Unloaded MPH)	20			
Haul Distance (Miles)	1			
Shift Length (Hours)	10			
Cyce Time		Breaker Production		
Load Time (Load Time Minutes / 60mins)	0.13	Hydraulic Hammer CY per Hour	15	
Haul Time (Haul Distance / Haul Speed)	0.14	# of Hammers	2.00	
Dump Time (Dump Time Minutes / 60 Mins)	0.05	CY per Hour	35.5555556	
Return Time (Haul Distance / Return Speed)	0.06	CY per Hour Back Check	7.5	
Hours Per Cycle	0.38	32CY per HR per 8hr shift (Ideal prod)	32	
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	70%	Efficient Compared to Ideal Production	37%	
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.54	Inefficiencies Compared to Ideal Production	63%	
Number of Cycles(Bulk CY/ (Haul Vehicle Cap X # of Haul Vehicles)	130			
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	70.2			
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	1.85			
Number of Haul Days	7.02			
Speed Loaded				
	Max Weight lbs of loaded 745	164,500.00		
	Tons	82		
	20lbs/Ton Rolling weight	4		
	Rolling Resistance (1% for each 20lbs/Ton)	4%		
	Average Slope	2%		
	Total Resistance	6%		
	Max Gear per CAT Chart	4		
	Max MPH	8.8		
Speed Empty		0		
	Max Weight lbs of Empty 745	74,100.00		
	Tons Empty	37		
	20lbs/Ton Rolling weight Empty	2		
	Rolling Resistance (1% per 20lbs/Ton) Empty	2%		
	Average Slope Empty	2%		
	Total Resistance Empty	4%		
	Max Gear per CAT Chart Empty	N/A		
	Max MPH Empty	N/A		
Other Notes				

PAY ITEM COST DETAIL WORKSHEET

4.074 Remove Steel Footbridge to Intake Structure

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.074	Project	:	KRRP - Iron Gate				
Description	:	Remove Steel Footbridge to Intake Structure	Group	:	D10				
Quantity	:	11,000.00 LBS							
Daily Production	:	12,500.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	0.9 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.98 per LBS			Probable Low Cost Parameter			14375	\$9,204
Total Cost	:	\$10,829			Probable High Cost Parameter			10625	\$12,453
									Unit Price Per LBS
									\$0.96
									\$1.29

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.9	10	8.80	L	\$53.10	incl. in rate	incl. in rate	\$467.25
Electrician	Active	1.00	0.9	10	8.80	L	\$49.75	incl. in rate	incl. in rate	\$437.83
Hydraulic Crane (50tn)	Active	1.00	0.9	10	8.80	E	\$134.32	incl. in rate	incl. in rate	\$1,182.02
Equipment Operator (crane)	Active	1.00	0.9	10	8.80	L	\$75.25	incl. in rate	incl. in rate	\$662.21
Vibratory Hammer & Extractor	Active	1.00	0.9	10	8.80	E	\$94.34	incl. in rate	incl. in rate	\$830.19
Laborer	Active	2.00	0.9	10	17.60	L	\$50.38	incl. in rate	incl. in rate	\$886.69
Truck Driver (heavy)	Active	2.00	0.9	10	17.60	L	\$63.35	incl. in rate	incl. in rate	\$1,114.94
Equipment Operator (light)	Active	2.00	0.9	10	17.60	L	\$71.39	incl. in rate	incl. in rate	\$1,256.46
Steelworker	Active	2.00	0.9	10	17.60	L	\$72.07	incl. in rate	incl. in rate	\$1,268.47
CAT 745 (32 CY) OFF ROAD TRUCK	Active	1.00	0.9	10	8.80	E	\$174.47	incl. in rate	incl. in rate	\$1,535.34
Labor Hours					96.8	TOTAL LABOR				\$6,093.85
Equipment Hours					26.4	TOTAL EQUIPMENT				\$3,547.54

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$304.69	\$304.69
						TOTAL MATERIAL
						\$304.69

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Rent aerial lift, articulating boom, to 80' high, 500 lb. capacity, diesel - Rent per day (RS Means 01543340)	1.00	days	1.000	1.00	\$584.00
					TOTAL SUBCONTRACTS
					\$584.00

SUMMARY OF COSTS						
Labor Cost	\$6,093.85	Labor Burden @	49.7%	\$0.00		\$6,093.85
Material Cost	\$304.69	Material Tax @	7.75%	\$23.61		\$328.31
Equipment Cost	\$3,547.54	Equipment Tax @	7.75%	\$274.93		\$3,822.48
Subcontractors	\$584.00					\$584.00
DIRECT COST SUBTOTALS	\$10,530			\$299	DIRECT COST SUBTOTALS	\$10,829

Additional Pay Item Notes :	
The bridge steel grid, excess steel members and similar materials shall be removed from each span prior to removing the main supporting beams, girders or trusses over land. Assumed crew is formed of 1 Foreman, 1 Electrician (temporary power for tools), 2 steelworkers to cut steel and 2 Laborers (Load, Haul, help with the crane ropes, etc).	

SUMMARY OF COSTS						
Labor Cost	\$463.78	Labor Burden @	0.0%	\$0.00	Included in hourly labor rate.	\$463.78
Material Cost	\$23.19	Material Tax @	7.75%	\$1.80		\$24.99
Equipment Cost	\$1,103.91	Equipment Tax @	7.75%	\$85.55		\$1,189.46
Subcontractors	\$2,700.00					\$2,700.00
DIRECT COST SUBTOTALS	\$4,291			\$87	DIRECT COST SUBTOTALS	\$4,378
Additional Pay Item Notes :						

PAY ITEM COST DETAIL WORKSHEET

4.076 Remove and Dispose of Intake Structure

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.076	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Intake Structure	Group	:	D07				
Quantity	:	131,630.00 LBS							
Daily Production	:	31,250.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	4.2 Days	Estimator	:	Mihaela Tomulescu	LBS per	35937.5	Total Cost	Unit Price Per LBS
Unit Price	:	\$0.87 per LBS	Probable Low Cost Parameter				\$97,037		\$0.84
Total Cost	:	\$114,162	Probable High Cost Parameter			26562.5	\$131,286		\$1.14

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Barge, Bargeman, Deckhand, Fireman, Oiler	Active	1.00	4.2	10	42.00	L	\$67.06	incl. in rate	incl. in rate	\$2,816.35
Carpenter Foreman (out)	Active	1.00	4.2	10	42.00	L	\$51.04	incl. in rate	incl. in rate	\$2,143.68
Carpenters, Journeyman	Active	6.00	4.2	10	252.00	L	\$71.91	incl. in rate	incl. in rate	\$18,120.56
Hydraulic Excavator (6.0cy)	Active	2.00	4.2	10	84.00	E	\$322.48	incl. in rate	incl. in rate	\$27,088.32
Hydraulic Crane (120tn)	Active	1.00	4.2	10	42.00	E	\$239.06	incl. in rate	incl. in rate	\$10,040.52
Hydraulic Impact Breaker Attachment (5k+ ft-lb)	Active	1.00	4.2	10	42.00	E	\$62.72	incl. in rate	incl. in rate	\$2,634.24
Truck Driver (heavy)	Active	2.00	4.2	10	84.00	L	\$63.35	incl. in rate	incl. in rate	\$5,321.32
Truck, On-Highway Dump (6x4, 12cy)	Active	2.00	4.2	10	84.00	E	\$70.35	incl. in rate	incl. in rate	\$5,909.40
Labor Hours					420	TOTAL LABOR				\$28,401.91
Equipment Hours					252	TOTAL EQUIPMENT				\$45,672.48

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Permeable Floating Turbidity Barrier	600.00	lf	1.000	600.00	\$38.00	\$22,800.00
Floating Marker Buoy	7.00	ea	1.000	7.00	\$32.00	\$224.00
Anchor Systems	13.00	ea	1.000	13.00	\$215.00	\$2,795.00
Tow Bridles	2.00	ea	1.000	2.00	\$50.00	\$100.00
Pile Template	1.00	ls	1.000	1.00	\$8,000.00	\$8,000.00
TOTAL MATERIAL						\$33,919.00

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
TOTAL SUBCONTRACTS					\$0.00

SUMMARY OF COSTS						
Labor Cost	\$28,401.91	Labor Burden @	49.7%	\$0.00		\$28,401.91
Material Cost	\$33,919.00	Material Tax @	7.75%	\$2,628.72		\$36,547.72
Equipment Cost	\$45,672.48	Equipment Tax @	7.75%	\$3,539.62		\$49,212.10
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$107,993			\$6,168	DIRECT COST SUBTOTALS	\$114,162
Additional Pay Item Notes :						
AECOM best estimate - the crew is formed of 1 Forman, 6 journeyman working with 2 excavators, 1 hydraulic breaker and 1 crane. Using 2 trucks per day for disposal based on daily production.						

PAY ITEM COST DETAIL WORKSHEET

4.081 Remove and Dispose of Penstock Vent - 46" Dia, 0.25" Thick x 60'

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.081	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Penstock Vent - 46" Dia, 0.25" Thick x 60'	Group	:	D03				
Quantity	:	7,440.00 LBS							
Daily Production	:	30,300.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	0.2 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$1.32 per LBS			Probable Low Cost Parameter			34845	\$8,359
Total Cost	:	\$9,834			Probable High Cost Parameter			25755	\$11,309
									Unit Price Per LBS
									\$1.28
									\$1.74

CREW COSTS											
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost	
Labor Foreman	Active	1.00	0.2	10	2.00	L	\$53.10	incl. in rate	incl. in rate	\$106.19	
Laborer	Active	4.00	0.2	10	8.00	L	\$50.38	incl. in rate	incl. in rate	\$403.04	
Steelworker	Active	2.00	0.2	10	4.00	L	\$72.07	incl. in rate	incl. in rate	\$288.29	
Equipment Operator (crane)	Active	2.00	0.2	10	4.00	L	\$75.25	incl. in rate	incl. in rate	\$301.00	
Equipment Operator (medium)	Active	2.00	0.2	10	4.00	L	\$72.91	incl. in rate	incl. in rate	\$291.63	
Crawler Crane (90tn)	Active	1.00	0.2	10	2.00	E	\$208.09	incl. in rate	incl. in rate	\$416.18	
Crawler Crane (270tn)	Active	1.00	0.2	10	2.00	E	\$399.50	incl. in rate	incl. in rate	\$799.00	
Loader, FE Rubber Tire (5.25cy)	Active	1.00	0.2	10	2.00	E	\$75.42	incl. in rate	incl. in rate	\$150.84	
Hydraulic Excavator (5.0cy)	Active	1.00	0.2	10	2.00	E	\$274.63	incl. in rate	incl. in rate	\$549.26	
Boomlift (JLG 60')	Active	2.00	0.2	10	4.00	E	\$52.87	incl. in rate	incl. in rate	\$211.48	
Acetylene Torches	Active	4.00	0.2	10	8.00	E	\$0.47	incl. in rate	incl. in rate	\$3.76	
Air Compressor 600 cfm	Active	2.00	0.2	10	4.00	E	\$21.74	incl. in rate	incl. in rate	\$86.96	
Generator, Small Generator, 10 - 15 kW	Active	2.00	0.2	10	4.00	E	\$7.04	incl. in rate	incl. in rate	\$28.16	
Hepa Vac System	Active	4.00	0.2	10	8.00	E	\$0.47	incl. in rate	incl. in rate	\$3.76	
					Labor Hours	22				TOTAL LABOR	\$1,390.16
					Equipment Hours	36				TOTAL EQUIPMENT	\$2,249.40

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
torch gas, etc)	1.00	LS	1.000	1.00	\$278.03	\$278.03
HEPA Vac Systems For Grinders	4.00	EA	1.000	4.00	\$1,000.00	\$4,000.00
Handheld Grinders	4.00	EA	1.000	4.00	\$250.00	\$1,000.00
						TOTAL MATERIAL
						\$5,278.03

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (10% of total)	0.37	ton		\$595.00	\$221.34
Hauling Disposal Cost	0.19	Loads	20 tons a load	\$600.00	\$111.60
					TOTAL SUBCONTRACTS
					\$332.94

SUMMARY OF COSTS						
Labor Cost	\$1,390.16	Labor Burden @	49.7%	\$0.00		\$1,390.16
Material Cost	\$5,278.03	Material Tax @	7.75%	\$409.05		\$5,687.08
Equipment Cost	\$2,249.40	Equipment Tax @	7.75%	\$174.33		\$2,423.73
Subcontractors	\$332.94					\$332.94
DIRECT COST SUBTOTALS	\$9,251			\$583	DIRECT COST SUBTOTALS	\$9,834
Additional Pay Item Notes :						

PAY ITEM COST DETAIL WORKSHEET

4.082 Remove and Dispose of Penstock - 12' Dia, 0.25" Thick x 698'

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.082	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Penstock - 12' Dia, 0.25" Thick x 698'	Group	:	D03				
Quantity	:	294,426.00 LBS							
Daily Production	:	30,300.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	9.7 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$1.04 per LBS			Probable Low Cost Parameter			34845	\$260,274
Total Cost	:	\$306,205			Probable High Cost Parameter			25755	\$352,136
								Unit Price Per LBS	\$1.01
									\$1.37

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	9.7	10	97.00	L	\$53.10	incl. in rate	incl. in rate	\$5,150.41
Laborer	Active	4.00	9.7	10	388.00	L	\$50.38	incl. in rate	incl. in rate	\$19,547.44
Steelworker	Active	2.00	9.7	10	194.00	L	\$72.07	incl. in rate	incl. in rate	\$13,981.97
Equipment Operator (crane)	Active	2.00	9.7	10	194.00	L	\$75.25	incl. in rate	incl. in rate	\$14,598.69
Equipment Operator (medium)	Active	2.00	9.7	10	194.00	L	\$72.91	incl. in rate	incl. in rate	\$14,144.15
Crawler Crane (90tn)	Active	1.00	9.7	10	97.00	E	\$208.09	incl. in rate	incl. in rate	\$20,184.73
Crawler Crane (270tn)	Active	1.00	9.7	10	97.00	E	\$399.50	incl. in rate	incl. in rate	\$38,751.50
Loader, FE Rubber Tire (5.25cy)	Active	1.00	9.7	10	97.00	E	\$75.42	incl. in rate	incl. in rate	\$7,315.74
Hydraulic Excavator (5.0cy)	Active	1.00	9.7	10	97.00	E	\$274.63	incl. in rate	incl. in rate	\$26,639.11
Boomlift (JLG 60')	Active	2.00	9.7	10	194.00	E	\$52.87	incl. in rate	incl. in rate	\$10,256.78
Acetylene Torches	Active	4.00	9.7	10	388.00	E	\$0.47	incl. in rate	incl. in rate	\$182.36
Air Compressor 600 cfm	Active	2.00	9.7	10	194.00	E	\$21.74	incl. in rate	incl. in rate	\$4,217.56
Generator, Small Generator, 10 - 15 kW	Active	2.00	9.7	10	194.00	E	\$7.04	incl. in rate	incl. in rate	\$1,365.76
Hepa Vac System	Active	4.00	9.7	10	388.00	E	\$0.47	incl. in rate	incl. in rate	\$182.36
					Labor Hours	1067			TOTAL LABOR	\$67,422.66
					Equipment Hours	1746			TOTAL EQUIPMENT	\$109,095.90

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
torch gas, etc)	1.00	LS	1.000	1.00	\$13,484.53	\$13,484.53
HEPA Vac Systems For Grinders	4.00	EA	1.000	4.00	\$1,000.00	\$4,000.00
Handheld Grinders	4.00	EA	1.000	4.00	\$250.00	\$1,000.00
						TOTAL MATERIAL
						\$18,484.53

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Access Allowance Down slope	1	AL		\$25,000.00	\$25,000.00
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (25% of total)					
	36.80	ton		\$595.00	\$21,898.08
Hauling Disposal Cost	7.36	Loads	20 tons a load	\$600.00	\$4,416.42
Shoring Allowance	1	AL		\$50,000.00	\$50,000.00
					TOTAL SUBCONTRACTS
					\$101,314.50

SUMMARY OF COSTS					
Labor Cost	\$67,422.66	Labor Burden @	49.7%	\$0.00	\$67,422.66
Material Cost	\$18,484.53	Material Tax @	7.75%	\$1,432.55	\$19,917.08
Equipment Cost	\$109,095.90	Equipment Tax @	7.75%	\$8,454.93	\$117,550.83
Subcontractors	\$101,314.50				\$101,314.50
DIRECT COST SUBTOTALS	\$296,318			\$9,887	DIRECT COST SUBTOTALS
					\$306,205
Additional Pay Item Notes :					

PAY ITEM NUMBER	:	4.083	Project	:	KRRP - Iron Gate		
Description	:	Remove and Dispose of Bypass Outlet - 96" Dia, 0.25" Thick x 50'	Group	:	D03		
Quantity	:	12,800.00 LBS					
Daily Production	:	50,500.00 LBS per	10	hour shift	Project #	:	4
Work Days	:	0.3 Days			Estimator	:	Mihaela Tomulescu
Unit Price	:	\$0.99 per LBS				LBS per	Total Cost
							Unit Price Per LBS
Total Cost	:	\$12,702			Probable Low Cost Parameter	58075	\$10,796
					Probable High Cost Parameter	42925	\$14,607

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.3	10	3.00	L	\$53.10	\$0.00		\$159.29
Laborer	Active	4.00	0.3	10	12.00	L	\$50.38	\$0.00		\$604.56
Steelworker	Active	2.00	0.3	10	6.00	L	\$72.07	\$0.00		\$432.43
Equipment Operator (crane)	Active	2.00	0.3	10	6.00	L	\$75.25	\$0.00		\$451.51
Equipment Operator (medium)	Active	2.00	0.3	10	6.00	L	\$72.91	\$0.00		\$437.45
Crawler Crane (90tn)	Active	1.00	0.3	10	3.00	E	\$208.09	\$208.09		\$624.27
Crawler Crane (270tn)	Active	1.00	0.3	10	3.00	E	\$399.50	\$446.84		\$1,198.50
Loader, FE Rubber Tire (5.25cy)	Active	1.00	0.3	10	3.00	E	\$75.42	\$75.42		\$226.26
Hydraulic Excavator (5.0cy)	Active	1.00	0.3	10	3.00	E	\$274.63	\$274.63		\$823.89
Boomlift (JLG 60')	Active	2.00	0.3	10	6.00	E	\$52.87	incl. in rate	incl. in rate	\$317.22
Acetylene Torches	Active	4.00	0.3	10	12.00	E	\$0.47	incl. in rate	incl. in rate	\$5.64
Air Compressor 600 cfm	Active	2.00	0.3	10	6.00	E	\$21.74	incl. in rate	incl. in rate	\$130.44
Generator, Small Generator, 10 - 15 kW	Active	2.00	0.3	10	6.00	E	\$7.04	incl. in rate	incl. in rate	\$42.24
Hepa Vac System	Active	4.00	0.3	10	12.00	E	\$0.47	incl. in rate	incl. in rate	\$5.64
Labor Hours					33	TOTAL LABOR				\$2,085.24
Equipment Hours					54	TOTAL EQUIPMENT				\$3,374.10

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
gas, etc)	1.00	LS	1.000	1.00	\$417.05	\$417.05
HEPA Vac Systems For Grinders	4.00	EA	1.000	4.00	\$1,000.00	\$4,000.00
Handheld Grinders	4.00	EA	1.000	4.00	\$250.00	\$1,000.00
TOTAL MATERIAL						\$5,417.05

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (25% of total)	1.60	ton		\$595.00	\$952.00
Hauling Disposal Cost	0.32	Loads	20 tons a load	\$600.00	\$192.00
TOTAL SUBCONTRACTS					\$1,144.00

Labor Cost	\$2,085.24	Labor Burden @	49.7%	\$0.00		\$2,085.24
Material Cost	\$5,417.05	Material Tax @	7.75%	\$419.82		\$5,836.87
Equipment Cost	\$3,374.10	Equipment Tax @	7.75%	\$261.49		\$3,635.59
Subcontractors	\$1,144.00					\$1,144.00
DIRECT COST SUBTOTALS	\$12,020			\$681	DIRECT COST SUBTOTALS	\$12,702

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PAY ITEM INFORMATION

CREW COSTS

MATERIAL COSTS

SUBCONTRACT COSTS

SUMMARY OF COSTS

Additional Pay Item Notes :

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4.103 Remove Concrete in Fish Ladder

SUMMARY OF COSTS						
Labor Cost	\$44,680.60	Labor Burden @	0.0%	\$0.00	Included in hourly labor rate.	\$44,680.60
Material Cost	\$2,234.03	Material Tax @	7.75%	\$173.14		\$2,407.17
Equipment Cost	\$67,246.83	Equipment Tax @	7.75%	\$5,211.63		\$72,458.46
Subcontractors	\$8,100.00					\$8,100.00
DIRECT COST SUBTOTALS		\$122,261		\$5,385	DIRECT COST SUBTOTALS	\$127,646
Additional Pay Item Notes :						
<div>The work is done by two 6-men crew (foreman, 4 laborers, and 1 equipment operator). Concrete hauling to disposal site - based on the current production rate, only 5 trips a day would be necessary. Demolition is done using hydraulic chipping hammers and excavator mounted claw. Allowance for saw cutting sub is included at one mobilization a week. Blasting method is not found to be feasible for this work. A check using RS Means was used: reference 03055110 (\$224/CY, excludes hauling, sawing, and dumping) - Selective concrete demolition, reinforcing more than 2% cross-sectional area.</div>						

4.103 Remove Concrete in Fish Ladder Details				
High Cost Factors			Low Cost Factors	
Bad Weather	0%		No Bad Weather	0%
Gas Price Increase	5%		Gas Price Decrease	5%
Unforeseen Contaminated Mats/ Access Issues	5%		No Unforeseen Contaminated Mats/ Access Issues	5%
Total	10%		Total	10%
Production Per Hour	Hours	Overall Production		
	15	8	120.00	
		10	150.00	
Haul Notes		Excavator Loading Production per shift		
CY	1,240.00	CY per Hour	35.56	
Swell Factor	60%	CY Bucket Size	2.50	
Bulk CY	1984	Buckets Per Hour	14	
Haul Vehicle 60% Capacity (2 tons per CY)	19.2	# of Excavators	0.50	
# of Haul Vehicles		1 CY per Hour (2.5 CY Bucket)	71.11111111	
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)		8 CY Per Hour Ideal Production Per 8 Hour Shift	95	
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) Minutes)		3 Efficient Compared to Ideal Production	75%	
Haul Speed (Loaded MPH)		9 Inefficiencies Compared to Ideal Production	25%	
Return Speed (Unloaded MPH)	20			
Haul Distance (Miles)	1			
Shift Length (Hours)	10			
Cyce Time		Breaker Production		
Load Time (Load Time Minutes / 60mins)	0.13	Hydraulic Hammer CY per Hour	15	
Haul Time (Haul Distance / Haul Speed)	0.14	# of Hammers	2.00	
Dump Time (Dump Time Minutes / 60 Mins)	0.05	CY per Hour	35.55555556	
Return Time (Haul Distance / Return Speed)	0.06	CY per Hour Back Check	7.5	
Hours Per Cycle	0.38	32CY per HR per 8hr shift (Ideal prod)	32	
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	70%	Efficient Compared to Ideal Production	75%	
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.54	Inefficiencies Compared to Ideal Production	25%	
Number of Cycles(Bulk CY/ (Haul Vehicle Cap X # of Haul Vehicles)	103			
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	55.62			
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	1.85			
Number of Haul Days	5.562			
Speed Loaded				
	Speed Loaded	-		
	Max Weight lbs of loaded 745	164,500		
	Tons	82		
	20lbs/Ton Rolling weight	411%		
	Rolling Resistance (1% for each 20lbs/Ton)	4%		
	Average Slope	2%		
	Total Resistance	0.061125		
	Max Gear per CAT Chart	4		
Max MPH				
	Speed Empty	-		
	Max Weight lbs of Empty 745	74,100		
	Tons Empty	37		
	20lbs/Ton Rolling weight Empty	185%		
	Rolling Resistance (1% per 20lbs/Ton) Empty	2%		
	Average Slope Empty	2%		
	Total Resistance Empty	0.038525		
	Max Gear per CAT Chart Empty	N/A		
Other Notes				

4.104 Remove Concrete in Holding Ponds #1 thru #6

[illegible]

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hourly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	9.2	10	92.00	L	\$53.10	incl. in rate	incl. in rate	\$4,884.92
Laborer	Active	3.00	9.2	10	276.00	L	\$50.38	incl. in rate	incl. in rate	\$13,904.88
Equipment Operator (medium)	Active	4.00	9.2	10	368.00	L	\$72.91	incl. in rate	incl. in rate	\$26,830.14
Truck Driver (heavy)	Active	1.00	4.7	10	47.15	L	\$63.35	incl. in rate	incl. in rate	\$2,986.91
Hydraulic Excavator (2.5cy)	Active	1.00	9.2	10	92.00	E	\$203.63	incl. in rate	incl. in rate	\$18,733.96
Hydraulic Excavator (5.0cy)	Active	1.00	9.2	10	92.00	E	\$274.63	incl. in rate	incl. in rate	\$25,265.96
Loader, FE Rubber Tire (3.5cy)	Active	2.00	9.2	10	184.00	E	\$64.23	incl. in rate	incl. in rate	\$11,818.32
Hydraulic Impact Breaker Attachment (5k+ ft-lb)	Active	1.00	9.2	10	92.00	E	\$62.72	incl. in rate	incl. in rate	\$5,770.24
Air Compressor 600 CFM	Active	1.00	9.2	10	92.00	E	\$21.74	incl. in rate	incl. in rate	\$2,000.08
Kobelco SK260LC-10 Ex With CP100 Magnet	Active	1.00	9.2	10	92.00	E	\$89.29	incl. in rate	incl. in rate	\$8,214.68
Air Tool Chipping Hammer	Active	2.00	9.2	10	184.00	E	\$1.64	incl. in rate	incl. in rate	\$301.76
CAT 745 (32 CY) OFF ROAD TRUCK	Active	1.00	4.7	10	47.15	E	\$174.47	incl. in rate	incl. in rate	\$8,226.26
Labor Hours					783.15	TOTAL LABOR				\$48,606.85
Equipment Hours					875.15	TOTAL EQUIPMENT				\$80,331.26

[illegible]

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal Cost	4.00	Loads	90lbs per CY	\$200.00	\$800.00
TOTAL SUBCONTRACTS					\$800.00

Labor Cost	\$48,606.85	Labor Burden @	49.7%	\$0.00		\$48,606.85
Material Cost	\$0.00	Material Tax @	7.8%	\$0.00		\$0.00
Equipment Cost	\$80,331.26	Equipment Tax @	7.8%	\$6,225.67		\$86,556.93
Subcontractors	\$800.00					\$800.00
DIRECT COST SUBTOTALS	\$129,738			\$6,226	DIRECT COST SUBTOTALS	\$135,964
Additional Pay Item Notes :						

4.104 Details

4.105 Remove Concrete in Fish Facility Items				
Details				
High Cost Factors			Low Cost Factors	
Bad Weather	5%		No Bad Weather	0%
Gas Price Increase	5%		Gas Price Decrease	5%
Unforeseen Contaminated Mats/ Access Issues	5%		No Unforeseen Contaminated Mats/ Access Issues	5%
Total	15%		Total	10%

Production Per Hour		Overall Production	
Hours	15	8	120.00
		10	150.00

Haul Notes		Excavator Loading Production per shift	
CY	1,200.00	CY per Hour	46.83
Swell Factor	60%	CY Bucket Size	2.50
Bulk CY	1920	Buckets Per Hour	19
Haul Vehicle 60% Capacity (2 tons per CY)	19.2	# of Excavators	1.00
# of Haul Vehicles	1	CY per Hour (2.5 CY Bucket)	46.82926829
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	8	CY Per Hour Ideal Production Per 8 Hour Shift	95
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) Minutes)	3	Efficient Compared to Ideal Production	49%
Haul Speed (Loaded MPH)	10	Inefficiencies Compared to Ideal Production	51%
Return Speed (Unloaded MPH)	20		
Haul Distance (Miles)	1		
Shift Length (Hours)	10		

Cyce Time		Breaker Production	
Load Time (Load Time Minutes / 60mins)	0.13	Hydraulic Hammer CY per Hour	15
Haul Time (Haul Distance / Haul Speed)	0.13	# of Hammers	1.00
Dump Time (Dump Time Minutes / 60 Mins)	0.05	CY per Hour	46.82926829
Return Time (Haul Distance / Return Speed)	0.06	CY per Hour Back Check	15
Hours Per Cycle	0.37	32CY per HR per 8hr shift (Ideal prod)	32
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	90%	Efficient Compared to Ideal Production	49%
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.41	Inefficiencies Compared to Ideal Production	51%
Number of Cycles(Bulk CY/ (Haul Vehicle Cap X # of Haul Vehicles)	100		
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	41		
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	2.44		
Number of Haul Days	4.1		

Speed Loaded		
Max Weight lbs of loaded 745	164,500.00	
Tons	82	
20lbs/Ton Rolling weight	4	
Rolling Resistance (1% for each 20lbs/Ton)	4%	
Average Slope	2%	
Total Resistance	6%	
Max Gear per CAT Chart	4	
Max MPH	8.8	

Speed Empty		
Max Weight lbs of Empty 745	74,100.00	
Tons Empty	37	
20lbs/Ton Rolling weight Empty	2	
Rolling Resistance (1% per 20lbs/Ton) Empty	2%	
Average Slope Empty	2%	
Total Resistance Empty	4%	
Max Gear per CAT Chart Empty N/A		
Max MPH Empty N/A		

Other Notes

PAY ITEM COST DETAIL WORKSHEET

4.106 Remove Miscellaneous Metalwork in Fish Facilities

PAY ITEM INFORMATION										
PAY ITEM NUMBER	:	4.106			Project	:	KRRP - Iron Gate			
Description	:	Remove Miscellaneous Metalwork in Fish Facilities			Group	:	D10			
Quantity	:	12,000.00	LBS							
Daily Production	:	53,750.00	LBS per	10	hour shift	Project #	:	4		
Work Days	:		0.2	Days		Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:		\$0.70	per LBS		Probable Low Cost Parameter			61812.5	\$7,132
Total Cost	:		\$8,390			Probable High Cost Parameter			43000	\$10,068
										Unit Price Per LBS
										\$0.68
										\$0.96

CREW COSTS										
Description	Active	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	3.00	0.2	10	6.00	L	\$53.10	\$0.00		\$318.58
Steelworker	Active	12.00	0.2	10	24.00	L	\$72.07	\$0.00		\$1,729.73
Crawler Crane (270tn)	Active	2.00	0.2	10	4.00	E	\$399.50	\$446.84		\$1,598.00
Equipment Operator (crane)	Active	2.00	0.2	10	4.00	L	\$75.25	\$0.00		\$301.00
Welder	Active	3.00	0.2	10	6.00	E	\$7.84	\$7.84		\$47.03
Gas Welding Machine	Active	3.00	0.2	10	6.00	E	\$2.88	\$2.88		\$17.26
Electrician	Active	1.00	0.2	10	2.00	L	\$49.75	\$0.00		\$99.51
Carpenters, Journeyman	Active	12.00	0.2	10	24.00	L	\$71.91	\$0.00		\$1,725.77
Hydraulic Impact Breaker Attachment (3k-4k ft-lb)	Active	1.00	0.2	10	2.00	E	\$36.58	\$36.58		\$73.16
Hydraulic Excavator (6.0cy)	Active	1.00	0.2	10	2.00	E	\$322.48	\$322.48		\$644.96
Labor Hours					60	TOTAL LABOR				\$4,174.59
Equipment Hours					20	TOTAL EQUIPMENT				\$2,380.41

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$417.46	\$417.46
TOTAL MATERIAL						\$417.46

SUBCONTRACT COSTS						
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount	
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	0.60	ton	1.000	0.60	\$595.00	\$357.00
Hauling to Yreka Transfer 40 Miles	1.00	Load	20 tons per load		\$400.00	\$400.00
Disposal Fee	6.00	Ton			\$74.00	\$444.00
TOTAL SUBCONTRACTS						\$1,201.00

SUMMARY OF COSTS						
Labor Cost	\$4,174.59	Labor Burden @	49.7%	\$0.00		\$4,174.59
Material Cost	\$417.46	Material Tax @	7.75%	\$32.35		\$449.81
Equipment Cost	\$2,380.41	Equipment Tax @	7.75%	\$184.48		\$2,564.89
Subcontractors	\$1,201.00					\$1,201.00
DIRECT COST SUBTOTALS	\$8,173			\$217	DIRECT COST SUBTOTALS	\$8,390
Additional Pay Item Notes :						
Assumed the process of removing and disposing of Miscellaneous Metalwork in Fish Facilities (frames, grating, handrails, ladders, mechanical sweeps) is done in around 1/2 day by 3 crew formed of 1 foreman, 4 journeymen, 4 steelworkers. We dispose metal with 1 trucks per day for each crew. Assumed contains paint with heavy metals 10% of the total lbs, 28 miles from Iron Gate to Yreka transfer recycling. Based on the current production rate, only 1 trips a day would be necessary. Demolition is done using one crawler crane, excavator and welding machine.						

4.107 Remove Concrete Associated with 30" Dia. water supply line

PAY ITEM NUMBER	: 4.107	Project	: KRRP - Iron Gate
Description	: Remove Concrete Associated with 30" Dia. water supply line	Group	: D03
Quantity	: 80.00 CY		
Daily Production	: 187.50 CY per 10 hour shift	Project #	: 4
Work Days	: 0.4 Days	Estimator	: Mihaela Tomulescu
Unit Price	: \$68.90 per CY	Probable Low Cost Parameter	215.625
Total Cost	: \$5,512	Probable High Cost Parameter	159.375
			\$4,685
			\$67
			\$91

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.4	10	4.00	L	\$53.10	incl. in rate	incl. in rate	\$212.39
Laborer	Active	3.00	0.4	10	12.00	L	\$50.38	incl. in rate	incl. in rate	\$604.56
Equipment Operator (medium)	Active	3.00	0.4	10	12.00	L	\$72.91	incl. in rate	incl. in rate	\$874.90
Truck Driver (heavy)	Active	1.00	0.4	10	4.00	L	\$63.35	incl. in rate	incl. in rate	\$253.40
Hydraulic Excavator (2.5cy)	Active	1.00	0.4	10	4.00	E	\$203.63	incl. in rate	incl. in rate	\$814.52
Hydraulic Excavator (5.0cy)	Active	1.00	0.4	10	4.00	E	\$274.63	incl. in rate	incl. in rate	\$1,098.52
Loader, FE Rubber Tire (3.5cy)	Active	2.00	0.4	10	8.00	E	\$64.23	incl. in rate	incl. in rate	\$513.84
Hydraulic Impact Breaker Attachment (5k+ ft-lb)	Active	1.00	0.4	10	4.00	E	\$62.72	incl. in rate	incl. in rate	\$250.88
Truck, Off-Road, Articulated Rear, 20cy	Active	1.00	0.4	10	4.00	E	\$111.64	incl. in rate	incl. in rate	\$446.56
Labor Hours					32	TOTAL LABOR				\$1,945.24
Equipment Hours					24	TOTAL EQUIPMENT				\$3,124.32

[illegible]

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal Cost	1.00	Loads	90lbs per CY	\$200.00	\$200.00
TOTAL SUBCONTRACTS					\$200.00

Labor Cost	\$1,945.24	Labor Burden @	49.7%	\$0.00					\$1,945.24
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00					\$0.00
Equipment Cost	\$3,124.32	Equipment Tax @	7.75%	\$242.13					\$3,366.45
Subcontractors	\$200.00								\$200.00
DIRECT COST SUBTOTALS	\$5,270			\$242			DIRECT COST SUBTOTALS		\$5,512

4.112 Remove Restroom Building near Aerator Structure

PAY ITEM NUMBER	:	4.112	Project	:	KRRP - Iron Gate		
Description	:	Remove Restroom Building near Aerator Structure	Group	:	D10		
Quantity	:	340.00 SF					
Daily Production	:	1,125.00 SF per	10	hour shift	Project #	:	4
Work Days	:	0.3 Days			Estimator	:	Mihaela Tomulescu
Unit Price	:	\$14.00 per SF				SF per	Total Cost
Total Cost	:	\$4,761			Probable Low Cost Parameter	1237.5	\$4,285
					Probable High Cost Parameter	956.25	\$5,475
							\$14
							\$18

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.3	10	3.00	L	\$53.10	incl. in rate	incl. in rate	\$159.29
Laborer	Active	4.00	0.3	10	12.00	L	\$50.38	incl. in rate	incl. in rate	\$604.56
Equipment Operator (oiler)	Active	2.00	0.3	10	6.00	L	\$69.23	incl. in rate	incl. in rate	\$415.40
Hydraulic Excavator (5.0cy)	Active	1.00	0.3	10	3.00	E	\$274.63	incl. in rate	incl. in rate	\$823.89
Loader, FE Rubber Tire (5.25cy)	Active	1.00	0.3	10	3.00	E	\$75.42	incl. in rate	incl. in rate	\$226.26
Labor Hours					21	TOTAL LABOR				\$1,179.26
Equipment Hours					6	TOTAL EQUIPMENT				\$1,050.15

Description	Item	Order	Conversion	Order	Order		Material
	Quantity	Unit	Factor / Waste	Quantity	Price		Cost
TOTAL MATERIAL						\$0.00	

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Dump Fee Conversion (SFXH*.33/27)	50	CY			
Conversion CY to Tons (2 tons per CY)	25.00	tons	Klamath County Landfill	\$74.00	\$1,850.00
Hauling cost to landfill	3.00	Loads	18 CY per load	\$200.00	\$600.00
TOTAL SUBCONTRACTS					\$2,450.00

Labor Cost	\$1,179.26	Labor Burden @	49.7%	\$0.00		\$1,179.26
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00		\$0.00
Equipment Cost	\$1,050.15	Equipment Tax @	7.75%	\$81.39		\$1,131.54
Subcontractors	\$2,450.00					\$2,450.00
DIRECT COST SUBTOTALS				\$81		DIRECT COST SUBTOTALS
						\$4,761
Additional Pay Item Notes :						

4.113 Remove Storage Shed near Aerator Structure

PAY ITEM NUMBER	:	4.113	Project	:	KRRP - Iron Gate
Description	:	Remove Storage Shed near Aerator Structure	Group	:	D10
Quantity	:	90.00 SF			
Daily Production	:	1,125.00 SF per	10	hour shift	
Work Days	:	0.1	Days		
Unit Price	:	\$14.82 per SF	Estimator	:	Mihaela Tomulescu
Total Cost	:	\$1,334	Probable Low Cost Parameter	:	1237.5
			Probable High Cost Parameter	:	956.25
					Total Cost
					Unit Price Per SF
					\$15
					\$19

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.1	10	0.80	L	\$53.10	incl. in rate	incl. in rate	\$42.48
Laborer	Active	4.00	0.1	10	3.20	L	\$50.38	incl. in rate	incl. in rate	\$161.22
Equipment Operator (oiler)	Active	2.00	0.1	10	1.60	L	\$69.23	incl. in rate	incl. in rate	\$110.77
Hydraulic Excavator (5.0cy)	Active	1.00	0.1	10	0.80	E	\$274.63	incl. in rate	incl. in rate	\$219.70
Loader, FE Rubber Tire (5.25cy)	Active	1.00	0.1	10	0.80	E	\$75.42	incl. in rate	incl. in rate	\$60.34
Labor Hours					5.6	TOTAL LABOR				\$314.47
Equipment Hours					1.6	TOTAL EQUIPMENT				\$280.04

[illegible]

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Dump Fee Conversion (SFXH*.33/27)	13	CY			
Conversion CY to Tons (2 tons per CY)	7.00	tons	Klamath County Landfill	\$74.00	\$518.00
Hauling cost to landfill	1.00	Loads	18 CY per load	\$200.00	\$200.00
TOTAL SUBCONTRACTS					\$718.00

Labor Cost	\$314.47	Labor Burden @	49.7%	\$0.00		\$314.47
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00		\$0.00
Equipment Cost	\$280.04	Equipment Tax @	7.75%	\$21.70		\$301.74
Subcontractors	\$718.00					\$718.00
DIRECT COST SUBTOTALS	\$1,313			\$22	DIRECT COST SUBTOTALS	\$1,334

The cost of removal can vary based on the area lived in and the typical wages in the region. We assumed that we need 1 Forman, 2 Laborer's and 1 Excavator to load the rubbish in the truck in 1/2 day.

4.116 Berm Removal			
Details			
High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	10%	Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues	0%
	20%		10%
Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Etc)	Overall Production
	800	8	80%
		20	80%
			5120
			12800
Haul Notes			
		Excavator Loading Production per shift	
CY	53,000.00	CY per Hour	128
Swell Factor	30%	CY Bucket Size	5.00
Bulk CY	68,900.00	Buckets Per Hour	26
Haul Vehicle 85% Capacity (1.3 tons per CY)	27.7	# of Excavators	1.00
# of Haul Vehicles	7	CY per Hour (5 CY Bucket)	128
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	10	CY Per Hour Ideal Production Per 8 Hour Shift	160
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)	10	Efficient Compared to Ideal Production	80%
Haul Speed (Loaded MPH)	8.6	Inefficiencies Compared to Ideal Production	20%
Return Speed (Unloaded MPH)	30		
Haul Distance (Miles)	1.00		
Shift Length (Hours)	20		
Cycle Time			
Load Time (Load Time Minutes / @mins)	0.00		
Haul Time (Haul Distance / Haul Speed)	0.11		
Dump Time (Dump Time Minutes / @ Mins)	0.00		
Return Time (Haul Distance / Return Speed)	0.00		
Hours Per Cycle	0.20		
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	80%		
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.25		
Number of Cycles(Bulk CY/ (Haul Vehicle Cap X # of Haul Vehicles)	362		
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	90.5		
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	4.00		
Number of Haul Days	4.525		
Speed Loaded			
	Max Weight lbs of loaded 745	164,900.00	
	Tons	82	
	20lbs/Ton Rolling weight	4	
	Rolling Resistance (1% for each 20lbs/Ton)	4%	
	Slope Grade	7%	
	Total Resistance	11%	
	Max Gear per CAT Chart	4	
	Max MPH	8.8	
Speed Empty			
	Max Weight lbs of Empty 745	74,100.00	
	Tons Empty	37	
	20lbs/Ton Rolling weight Empty	2	
	Rolling Resistance (1% per 20lbs/Ton) Empty	2%	
	Average Slope Empty	7%	
	Total Resistance Empty	-5%	
	Max Gear per CAT Chart Empty	N/A	
	Max MPH Empty	N/A	
	Notes Due to weight and Grade Speed Calculation is not applicable		

Other Notes

PAY ITEM COST DETAIL WORKSHEET

4.122 Remove and Dispose of Piping- 30-in. Dia. x 0.25 Thickness x 90'

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.122	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Piping- 30-in. Dia. x 0.25 Thickness x 90'	Group	:	D03				
Quantity	:	7,200.00 LBS							
Daily Production	:	9,000.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	0.8 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.36 per LBS			Probable Low Cost Parameter			10350	\$2,194
Total Cost	:	\$2,581			Probable High Cost Parameter			7200	\$3,097
									Unit Price Per LBS
									\$0.35
									\$0.49

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Laborer	Active	2.00	0.8	10	16.00	L	\$50.38	incl. in rate	incl. in rate	\$806.08
Equipment Operator (crane)	Active	1.00	0.8	10	8.00	L	\$75.25	incl. in rate	incl. in rate	\$602.01
Hydraulic Crane (17tn)	Active	1.00	0.8	10	8.00	E	\$81.52	incl. in rate	incl. in rate	\$652.16
Labor Hours					24	TOTAL LABOR				\$1,408.09
Equipment Hours					8	TOTAL EQUIPMENT				\$652.16

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$65.22	\$65.22
						TOTAL MATERIAL
						\$65.22

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling to Yreka Transfer 40 Miles	1.00	Load	20 tons per load	\$400.00	\$400.00
					TOTAL SUBCONTRACTS
					\$400.00

SUMMARY OF COSTS						
Labor Cost	\$1,408.09	Labor Burden @	49.7%	\$0.00		\$1,408.09
Material Cost	\$65.22	Material Tax @	7.75%	\$5.05		\$70.27
Equipment Cost	\$652.16	Equipment Tax @	7.75%	\$50.54		\$702.70
Subcontractors	\$400.00					\$400.00
DIRECT COST SUBTOTALS	\$2,525			\$56	DIRECT COST SUBTOTALS	\$2,581
Additional Pay Item Notes :						
Based on RS Means, Utility removal, pipe, sewer/water, 27" to 36" diameter, remove, excludes excavation & Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 30 miles, 50 MPH. Using CREW B12Z .						

PAY ITEM COST DETAIL WORKSHEET

4.123 Remove and Dispose of Piping- 24-in. Dia. x 0.25 Thikness x 248'

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.123	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Piping- 24-in. Dia. x 0.25 Thikness x 248'	Group	:	D03				
Quantity	:	15,872.00 LBS							
Daily Production	:	9,500.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	1.7 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.32 per LBS			Probable Low Cost Parameter			10925	\$4,280
Total Cost	:	\$5,035			Probable High Cost Parameter			7600	\$6,042
									Unit Price Per LBS
									\$0.31
									\$0.43

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Laborer	Active	2.00	1.7	10	34.00	L	\$50.38	incl. in rate	incl. in rate	\$1,712.92
Equipment Operator (crane)	Active	1.00	1.7	10	17.00	L	\$75.25	incl. in rate	incl. in rate	\$1,279.27
Hydraulic Crane (17tn)	Active	1.00	1.7	10	17.00	E	\$81.52	incl. in rate	incl. in rate	\$1,385.84
					Labor Hours	51	TOTAL LABOR			\$2,992.19
					Equipment Hours	17	TOTAL EQUIPMENT			\$1,385.84

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$138.58	\$138.58
						TOTAL MATERIAL
						\$138.58

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal to Yreka	1.00	Loads	40 Mile Haul	\$400.00	\$400.00
					TOTAL SUBCONTRACTS
					\$400.00

SUMMARY OF COSTS						
Labor Cost	\$2,992.19	Labor Burden @	49.7%	\$0.00		\$2,992.19
Material Cost	\$138.58	Material Tax @	7.75%	\$10.74		\$149.32
Equipment Cost	\$1,385.84	Equipment Tax @	7.75%	\$107.40		\$1,493.24
Subcontractors	\$400.00					\$400.00
DIRECT COST SUBTOTALS	\$4,917			\$118	DIRECT COST SUBTOTALS	\$5,035
Additional Pay Item Notes :						
Based on RS Means, Utility removal, pipe, sewer/water, 21" to 24" diameter, remove, excludes excavation & Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 30 miles, 50 MPH. Using CREW B12Z .						

PAY ITEM COST DETAIL WORKSHEET

4.124 Remove and Dispose of Piping- 20-in. Dia. x 0.25 Thickness x 85'

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.124	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Piping- 20-in. Dia. x 0.25 Thickness x 85'	Group	:	D03				
Quantity	:	4,505.00 LBS							
Daily Production	:	9,500.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	0.5 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.39 per LBS			Probable Low Cost Parameter			10925	\$1,499
Total Cost	:	\$1,763			Probable High Cost Parameter			7600	\$2,116
									Unit Price Per LBS
									\$0.38
									\$0.54

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Laborer	Active	2.00	0.5	10	10.00	L	\$50.38	incl. in rate	incl. in rate	\$503.80
Equipment Operator (crane)	Active	1.00	0.5	10	5.00	L	\$75.25	incl. in rate	incl. in rate	\$376.26
Hydraulic Crane (17tn)	Active	1.00	0.5	10	5.00	E	\$81.52	incl. in rate	incl. in rate	\$407.60
Labor Hours					15	TOTAL LABOR				\$880.06
Equipment Hours					5	TOTAL EQUIPMENT				\$407.60

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$40.76	\$40.76
						TOTAL MATERIAL
						\$40.76

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal to Yreka	1.00	Loads	40 Mile Haul	\$400.00	\$400.00
					TOTAL SUBCONTRACTS
					\$400.00

SUMMARY OF COSTS						
Labor Cost	\$880.06	Labor Burden @	49.7%	\$0.00		\$880.06
Material Cost	\$40.76	Material Tax @	7.75%	\$3.16		\$43.92
Equipment Cost	\$407.60	Equipment Tax @	7.75%	\$31.59		\$439.19
Subcontractors	\$400.00					\$400.00
DIRECT COST SUBTOTALS	\$1,728			\$35	DIRECT COST SUBTOTALS	\$1,763
Additional Pay Item Notes :						

PAY ITEM COST DETAIL WORKSHEET

4.125 Remove and Dispose of Piping- 18-in. Dia. x 0.25 Thickness x 432'

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.125	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Piping- 18-in. Dia. x 0.25 Thickness x 432'	Group	:	D03				
Quantity	:	29,088.00 LBS							
Daily Production	:	13,750.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	2.1 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.37 per LBS			Probable Low Cost Parameter			15812.5	\$9,049
Total Cost	:	\$10,646			Probable High Cost Parameter			11000	\$12,775
									Unit Price Per LBS
									\$0.36
									\$0.50

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	2.1	10	21.00	L	\$53.10	incl. in rate	incl. in rate	\$1,115.04
Laborer	Active	3.00	2.1	10	63.00	L	\$50.38	incl. in rate	incl. in rate	\$3,173.94
Steelworker	Active	2.00	2.1	10	42.00	L	\$72.07	incl. in rate	incl. in rate	\$3,027.02
Equipment Operator (medium)	Active	1.00	2.1	10	21.00	L	\$72.91	incl. in rate	incl. in rate	\$1,531.07
Loader, FE Rubber Tire (3.5cy)	Active	1.00	2.1	10	21.00	E	\$64.23	incl. in rate	incl. in rate	\$1,348.83
Labor Hours					147	TOTAL LABOR				\$8,847.07
Equipment Hours					21	TOTAL EQUIPMENT				\$1,348.83

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$134.88	\$134.88
						TOTAL MATERIAL
						\$134.88

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal Cost	1.00	Loads	20 tons a load	\$200.00	\$200.00
					TOTAL SUBCONTRACTS
					\$200.00

SUMMARY OF COSTS						
Labor Cost	\$8,847.07	Labor Burden @	49.7%	\$0.00		\$8,847.07
Material Cost	\$134.88	Material Tax @	7.75%	\$10.45		\$145.34
Equipment Cost	\$1,348.83	Equipment Tax @	7.75%	\$104.53		\$1,453.36
Subcontractors	\$200.00					\$200.00
DIRECT COST SUBTOTALS	\$10,531			\$115	DIRECT COST SUBTOTALS	\$10,646
Additional Pay Item Notes :						

PAY ITEM COST DETAIL WORKSHEET

4.126 Remove and Dispose of Piping- 16-in. Dia. x 0.25 Thikness x 166'

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.126	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Piping- 16-in. Dia. x 0.25 Thikness x 166'	Group	:	D03				
Quantity	:	6,972.00 LBS	Project #	:	4				
Daily Production	:	9,875.00 LBS per	Estimator	:	Mihaela Tomulescu				
Work Days	:	0.7 Days	Probable Low Cost Parameter	:	11356.25	LBS per	Total Cost	:	Unit Price Per LBS
Unit Price	:	\$0.37 per LBS	Probable High Cost Parameter	:	7900	\$3,080	\$0.50	:	
Total Cost	:	\$2,566		:				:	

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Laborer	Active	2.00	0.7	10	14.00	L	\$50.38	incl. in rate	incl. in rate	\$705.32
Equipment Operator (crane)	Active	1.00	0.7	10	7.00	L	\$75.25	incl. in rate	incl. in rate	\$526.76
Hydraulic Crane (17tn)	Active	1.00	0.7	10	7.00	E	\$81.52	incl. in rate	incl. in rate	\$570.64
					Labor Hours	21	TOTAL LABOR			\$1,232.08
					Equipment Hours	7	TOTAL EQUIPMENT			\$570.64

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$57.06	\$57.06
						TOTAL MATERIAL
						\$57.06

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal to Yreka	1.00	Loads	40 Mile Haul	\$400.00	\$400.00
Disposal Fee	3.49	Tons		\$74.00	\$257.96
					\$0.00
					\$0.00
					TOTAL SUBCONTRACTS
					\$657.96

SUMMARY OF COSTS									
Labor Cost	\$1,232.08	Labor Burden @	49.7%	\$0.00				\$1,232.08	
Material Cost	\$57.06	Material Tax @	7.75%	\$4.42				\$61.49	
Equipment Cost	\$570.64	Equipment Tax @	7.75%	\$44.22				\$614.86	
Subcontractors	\$657.96							\$657.96	
DIRECT COST SUBTOTALS		\$2,518		\$49			DIRECT COST SUBTOTALS	\$2,566	
Additional Pay Item Notes :									
Based on RS Means, Utility removal, pipe, sewer/water, 15" to 18" diameter, remove, excludes excavation & Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 30 miles, 50 MPH. Using CREW B12Z .									

SUMMARY OF COSTS					
Labor Cost	\$352.02	Labor Burden @	49.7%	\$0.00	\$352.02
Material Cost	\$16.30	Material Tax @	7.75%	\$1.26	\$17.57
Equipment Cost	\$163.04	Equipment Tax @	7.75%	\$12.64	\$175.68
Subcontractors	\$474.00				\$474.00
DIRECT COST SUBTOTALS	\$1,005		\$14	DIRECT COST SUBTOTALS	\$1,019
Additional Pay Item Notes : Based on RS Means, Utility removal, pipe, sewer/water, 10" diameter, remove, excludes excavation & Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 30 miles, 50 MPH. Using CREW B6 .					

PAY ITEM COST DETAIL WORKSHEET

4.131 Remove and Dispose of Gate Valves

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.131	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Gate Valves	Group	:	D03				
Quantity	:	21,792.00 LBS							
Daily Production	:	13,750.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	1.6 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.42 per LBS			Probable Low Cost Parameter			15812.5	\$7,838
Total Cost	:	\$9,221			Probable High Cost Parameter			11000	\$11,066
									Unit Price Per LBS
									\$0.41
									\$0.58

CREW COSTS										
Description	Active Idle	# In crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	2.00	1.6	10	31.70	L	\$53.10	incl. in rate	incl. in rate	\$1,683.17
Laborer	Active	2.00	1.6	10	31.70	L	\$50.38	incl. in rate	incl. in rate	\$1,597.05
Steelworker	Active	1.00	1.6	10	15.85	L	\$72.07	incl. in rate	incl. in rate	\$1,142.34
Equipment Operator (medium)	Active	1.00	1.6	10	15.85	L	\$72.91	incl. in rate	incl. in rate	\$1,155.59
Loader, FE Rubber Tire (3.5cy)	Active	2.00	1.6	10	31.70	E	\$64.23	incl. in rate	incl. in rate	\$2,036.09
					Labor Hours	95.1	TOTAL LABOR			\$5,578.15
					Equipment Hours	31.7	TOTAL EQUIPMENT			\$2,036.09

MATERIAL COSTS						
Description	Item	Order	Conversion	Order	Order	Material
	Quantity	Unit	Factor / Waste	Quantity	Price	Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$557.82	\$557.82
						TOTAL MATERIAL
						\$557.82

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	1.09	ton	1.000	1.09	\$595.00
Hauling Disposal Cost	1.00	Loads	20 tons a load	\$200.00	\$200.00
					TOTAL SUBCONTRACTS
					\$848.31

SUMMARY OF COSTS									
Labor Cost	\$5,578.15	Labor Burden @	0.0%	\$0.00					\$5,578.15
Material Cost	\$557.82	Material Tax @	7.75%	\$43.23					\$601.05
Equipment Cost	\$2,036.09	Equipment Tax @	7.75%	\$157.80					\$2,193.89
Subcontractors	\$848.31								\$848.31
DIRECT COST SUBTOTALS	\$9,020			\$201				DIRECT COST SUBTOTALS	\$9,221
Additional Pay Item Notes :									

PAY ITEM COST DETAIL WORKSHEET

4.132 Remove and Dispose of Basin #1

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.132	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Basin #1	Group	:	D07				
Quantity	:	2,880.00 LBS							
Daily Production	:	13,750.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	0.2 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.89 per LBS			Probable Low Cost Parameter			15812.5	\$2,190
Total Cost	:	\$2,577			Probable High Cost Parameter			11000	\$3,092
									Unit Price Per LBS
									\$0.87
									\$1.23

CREW COSTS										
Description	Active	# in	Days	Hours	Total	L/E	Hourly	Hrly oper.	Burden	Labor / Equipment
	Idle	crew	Worked	/day	Hours		Rate	Cost	Rate	Cost
Labor Foreman	Active	1.00	0.2	10	2.00	L	\$53.10	incl. in rate	incl. in rate	\$106.19
Steelworker	Active	2.00	0.2	10	4.00	L	\$72.07	incl. in rate	incl. in rate	\$288.29
Crawler Crane (90tn)	Active	1.00	0.2	10	2.00	E	\$208.09	incl. in rate	incl. in rate	\$416.18
Equipment Operator (crane)	Active	1.00	0.2	10	2.00	L	\$75.25	incl. in rate	incl. in rate	\$150.50
Welder	Active	2.00	0.2	10	4.00	E	\$7.84	incl. in rate	incl. in rate	\$31.35
Gas Welding Machine	Active	2.00	0.2	10	4.00	E	\$2.88	incl. in rate	incl. in rate	\$11.51
Electrician	Active	1.00	0.2	10	2.00	L	\$49.75	incl. in rate	incl. in rate	\$99.51
Carpenters, Journeyman	Active	1.00	0.2	10	2.00	L	\$71.91	incl. in rate	incl. in rate	\$143.81
Truck, Flatbed (4x4, 10,000 gvw)	Active	1.00	0.2	10	2.00	E	\$31.90	incl. in rate	incl. in rate	\$63.80
Truck Driver (heavy)	Active	1.00	0.2	10	2.00	L	\$63.35	incl. in rate	incl. in rate	\$126.70
					Labor Hours	14	TOTAL LABOR		\$915.00	
					Equipment Hours	12	TOTAL EQUIPMENT		\$522.84	

MATERIAL COSTS						
Description	Item	Order	Conversion	Order	Order	Material
	Quantity	Unit	Factor / Waste	Quantity	Price	Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$91.50	\$91.50
TOTAL MATERIAL						\$91.50

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Stop log lifter - Rent per day	1.00	day	1.000	1.00	\$1,000.00
TOTAL SUBCONTRACTS					\$1,000.00

SUMMARY OF COSTS									
Labor Cost	\$915.00	Labor Burden @	0.0%	\$0.00					\$915.00
Material Cost	\$91.50	Material Tax @	7.75%	\$7.09					\$98.59
Equipment Cost	\$522.84	Equipment Tax @	7.75%	\$40.52					\$563.36
Subcontractors	\$1,000.00								\$1,000.00
DIRECT COST SUBTOTALS	\$2,529			\$48				DIRECT COST SUBTOTALS	\$2,577
Additional Pay Item Notes :									
Assumed the process of removing and disposing of basin#6 (manually operated 18" slide gate and stop logs) is done in around 1 day by crew formed of foreman, journeymen, steelworkers. We dispose metal with 1 trucks per day for each crew. Assumed contains petroleum products 10% of the total lbs, 28 miles from Iron Gate to Yreka transfer recycling. Based on the current production rate, only 1 trips a day would be necessary.									

PAY ITEM COST DETAIL WORKSHEET

4.133 Remove and Dispose of Basin #2

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.133	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Basin #2	Group	:	D07				
Quantity	:	3,660.00 LBS							
Daily Production	:	13,750.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	0.3 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.92 per LBS			Probable Low Cost Parameter			15812.5	\$2,861
Total Cost	:	\$3,365			Probable High Cost Parameter			11000	\$4,039
									Unit Price Per LBS
									\$0.89
									\$1.26

CREW COSTS										
Description	Active	# in	Days	Hours	Total	L/E	Hourly	Hrly oper.	Burden	Labor / Equipment
	Idle	crew	Worked	/day	Hours		Rate	Cost	Rate	Cost
Labor Foreman	Active	1.00	0.3	10	3.00	L	\$53.10	incl. in rate	incl. in rate	\$159.29
Steelworker	Active	2.00	0.3	10	6.00	L	\$72.07	incl. in rate	incl. in rate	\$432.43
Crawler Crane (90tn)	Active	1.00	0.3	10	3.00	E	\$208.09	incl. in rate	incl. in rate	\$624.27
Equipment Operator (crane)	Active	1.00	0.3	10	3.00	L	\$75.25	incl. in rate	incl. in rate	\$225.75
Welder	Active	2.00	0.3	10	6.00	E	\$7.84	incl. in rate	incl. in rate	\$47.03
Gas Welding Machine	Active	2.00	0.3	10	6.00	E	\$2.88	incl. in rate	incl. in rate	\$17.26
Electrician	Active	1.00	0.3	10	3.00	L	\$49.75	incl. in rate	incl. in rate	\$149.26
Carpenters, Journeyman	Active	1.00	0.3	10	3.00	L	\$71.91	incl. in rate	incl. in rate	\$215.72
Truck, Flatbed (4x4, 10,000 gvw)	Active	1.00	0.3	10	3.00	E	\$31.90	incl. in rate	incl. in rate	\$95.70
Truck Driver (heavy)	Active	1.00	0.3	10	3.00	L	\$63.35	incl. in rate	incl. in rate	\$190.05
					Labor Hours	21	TOTAL LABOR			\$1,372.50
					Equipment Hours	18	TOTAL EQUIPMENT			\$784.26

MATERIAL COSTS						
Description	Item	Order	Conversion	Order	Order	Material
	Quantity	Unit	Factor / Waste	Quantity	Price	Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$137.25	\$137.25
TOTAL MATERIAL						\$137.25

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Stop log lifter - Rent per day	1.00	day	1.000	1.00	\$1,000.00
TOTAL SUBCONTRACTS					\$1,000.00

SUMMARY OF COSTS									
Labor Cost	\$1,372.50	Labor Burden @	0.0%	\$0.00					\$1,372.50
Material Cost	\$137.25	Material Tax @	7.75%	\$10.64					\$147.89
Equipment Cost	\$784.26	Equipment Tax @	7.75%	\$60.78					\$845.04
Subcontractors	\$1,000.00								\$1,000.00
DIRECT COST SUBTOTALS	\$3,294			\$71				DIRECT COST SUBTOTALS	\$3,365
Additional Pay Item Notes :									
Assumed the process of removing and disposing of basin#6 (manually operated 18" slide gate and stop logs) is done in around 1 day by crew formed of foreman, journeymen, steelworkers. We dispose metal with 1 trucks per day for each crew. Assumed contains petroleum products 10% of the total lbs, 28 miles from Iron Gate to Yreka transfer recycling. Based on the current production rate, only 1 trips a day would be necessary.									

PAY ITEM COST DETAIL WORKSHEET

4.134 Remove and Dispose of Basin #3

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.134	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Basin #3	Group	:	D07				
Quantity	:	2,880.00 LBS							
Daily Production	:	3,600.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	0.8 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$2.39 per LBS			Probable Low Cost Parameter			4140	\$5,841
Total Cost	:	\$6,871			Probable High Cost Parameter			2880	\$8,246
									Unit Price Per LBS
									\$2.32
									\$3.27

CREW COSTS										
Description	Active	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.8	10	8.00	L	\$53.10	incl. in rate	incl. in rate	\$424.78
Steelworker	Active	2.00	0.8	10	16.00	L	\$72.07	incl. in rate	incl. in rate	\$1,153.15
Crawler Crane (90tn)	Active	1.00	0.8	10	8.00	E	\$208.09	incl. in rate	incl. in rate	\$1,664.72
Equipment Operator (crane)	Active	1.00	0.8	10	8.00	L	\$75.25	incl. in rate	incl. in rate	\$602.01
Welder	Active	2.00	0.8	10	16.00	E	\$7.84	incl. in rate	incl. in rate	\$125.40
Gas Welding Machine	Active	2.00	0.8	10	16.00	E	\$2.88	incl. in rate	incl. in rate	\$46.03
Electrician	Active	1.00	0.8	10	8.00	L	\$49.75	incl. in rate	incl. in rate	\$398.02
Carpenters, Journeyman	Active	1.00	0.8	10	8.00	L	\$71.91	incl. in rate	incl. in rate	\$575.26
					Labor Hours	48			TOTAL LABOR	\$3,153.22
					Equipment Hours	40			TOTAL EQUIPMENT	\$1,836.15

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$315.32	\$315.32
TOTAL MATERIAL						\$315.32

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Stop log lifter - Rent per day	1.00	day	1.000	1.00	\$1,000.00
Hauling to Yreka Transfer 40 Miles	1.00	Load	20 tons per load		\$400.00
TOTAL SUBCONTRACTS					\$1,400.00

SUMMARY OF COSTS									
Labor Cost	\$3,153.22	Labor Burden @	0.0%	\$0.00					\$3,153.22
Material Cost	\$315.32	Material Tax @	7.75%	\$24.44					\$339.76
Equipment Cost	\$1,836.15	Equipment Tax @	7.75%	\$142.30					\$1,978.45
Subcontractors	\$1,400.00								\$1,400.00
DIRECT COST SUBTOTALS	\$6,705			\$167				DIRECT COST SUBTOTALS	\$6,871
Additional Pay Item Notes :									
Assumed the process of removing and disposing of basin#6 (manually operated 18" slide gate and stop logs) is done in around 1 day by crew formed of foreman, journeymen, steelworkers. We dispose metal with 1 trucks per day for each crew. Assumed contains petroleum products 10% of the total lbs, 28 miles from Iron Gate to Yreka transfer recycling. Based on the current production rate, only 1 trips a day would be necessary.									

PAY ITEM COST DETAIL WORKSHEET

4.135 Remove and Dispose of Basin #4

PAY ITEM INFORMATION											
PAY ITEM NUMBER	:	4.135				Project	:	KRRP - Iron Gate			
Description	:	Remove and Dispose of Basin #4				Group	:	D07			
Quantity	:	3,580.00		LBS							
Daily Production	:	4,475.00		LBS per	10	hour shift	Project #	:	4		
Work Days	:	0.8		Days				Estimator	:	Mihaela Tomulescu	
Unit Price	:	\$1.92 per LBS				Probable Low Cost Parameter		LBS per	5146.25	Total Cost	\$5,841
Total Cost	:	\$6,871				Probable High Cost Parameter			3580	\$8,246	Unit Price Per LBS \$2.63

CREW COSTS											
Description	Active	# in	Days	Hours	Total	L/E	Hourly	Hrly oper.	Burden	Labor / Equipment	
	Idle	crew	Worked	/day	Hours		Rate	Cost	Rate	Cost	
Labor Foreman	Active	1.00	0.8	10	8.00	L	\$53.10	incl. in rate	incl. in rate	\$424.78	
Steelworker	Active	2.00	0.8	10	16.00	L	\$72.07	incl. in rate	incl. in rate	\$1,153.15	
Crawler Crane (90tn)	Active	1.00	0.8	10	8.00	E	\$208.09	incl. in rate	incl. in rate	\$1,664.72	
Equipment Operator (crane)	Active	1.00	0.8	10	8.00	L	\$75.25	incl. in rate	incl. in rate	\$602.01	
Welder	Active	2.00	0.8	10	16.00	E	\$7.84	incl. in rate	incl. in rate	\$125.40	
Gas Welding Machine	Active	2.00	0.8	10	16.00	E	\$2.88	incl. in rate	incl. in rate	\$46.03	
Electrician	Active	1.00	0.8	10	8.00	L	\$49.75	incl. in rate	incl. in rate	\$398.02	
Carpenters, Journeyman	Active	1.00	0.8	10	8.00	L	\$71.91	incl. in rate	incl. in rate	\$575.26	
Labor Hours					48	TOTAL LABOR					\$3,153.22
Equipment Hours					40	TOTAL EQUIPMENT					\$1,836.15

MATERIAL COSTS						
Description	Item	Order	Conversion	Order	Order	Material
	Quantity	Unit	Factor / Waste	Quantity	Price	Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$315.32	\$315.32
TOTAL MATERIAL						\$315.32

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Stop log lifter - Rent per day	1.00	day	1.000	1.00	\$1,000.00
Hauling to Yreka Transfer 40 Miles	1.00	Load	20 tons per load		\$400.00
TOTAL SUBCONTRACTS					\$1,400.00

SUMMARY OF COSTS						
Labor Cost	\$3,153.22	Labor Burden @	0.0%	\$0.00		\$3,153.22
Material Cost	\$315.32	Material Tax @	7.75%	\$24.44		\$339.76
Equipment Cost	\$1,836.15	Equipment Tax @	7.75%	\$142.30		\$1,978.45
Subcontractors	\$1,400.00					\$1,400.00
DIRECT COST SUBTOTALS	\$6,705			\$167	DIRECT COST SUBTOTALS	\$6,871
Additional Pay Item Notes :						
Assumed the process of removing and disposing of basin#6 (manually operated 18" slide gate and stop logs) is done in around 1 day by crew formed of foreman, journeymen, steelworkers. We dispose metal with 1 trucks per day for each crew. Assumed contains petroleum products 10% of the total lbs, 28 miles from Iron Gate to Yreka transfer recycling. Based on the current production rate, only 1 trips a day would be necessary.						

PAY ITEM COST DETAIL WORKSHEET

4.136 Remove and Dispose of Basin #5

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.136	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Basin #5	Group	:	D07				
Quantity	:	1,440.00 LBS							
Daily Production	:	1,800.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	0.8 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$4.77 per LBS			Probable Low Cost Parameter			2070	\$5,841
Total Cost	:	\$6,871			Probable High Cost Parameter			1440	\$8,246
									Unit Price Per LBS
									\$4.63
									\$6.54

CREW COSTS										
Description	Active	# in	Days	Hours	Total	L/E	Hourly	Hrly oper.	Burden	Labor / Equipment
	Idle	crew	Worked	/day	Hours		Rate	Cost	Rate	Cost
Labor Foreman	Active	1.00	0.8	10	8.00	L	\$53.10	incl. in rate	incl. in rate	\$424.78
Steelworker	Active	2.00	0.8	10	16.00	L	\$72.07	incl. in rate	incl. in rate	\$1,153.15
Crawler Crane (90tn)	Active	1.00	0.8	10	8.00	E	\$208.09	incl. in rate	incl. in rate	\$1,664.72
Equipment Operator (crane)	Active	1.00	0.8	10	8.00	L	\$75.25	incl. in rate	incl. in rate	\$602.01
Welder	Active	2.00	0.8	10	16.00	E	\$7.84	incl. in rate	incl. in rate	\$125.40
Gas Welding Machine	Active	2.00	0.8	10	16.00	E	\$2.88	incl. in rate	incl. in rate	\$46.03
Electrician	Active	1.00	0.8	10	8.00	L	\$49.75	incl. in rate	incl. in rate	\$398.02
Carpenters, Journeyman	Active	1.00	0.8	10	8.00	L	\$71.91	incl. in rate	incl. in rate	\$575.26
					Labor Hours	48			TOTAL LABOR	\$3,153.22
					Equipment Hours	40			TOTAL EQUIPMENT	\$1,836.15

MATERIAL COSTS						
Description	Item	Order	Conversion	Order	Order	Material
	Quantity	Unit	Factor / Waste	Quantity	Price	Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$315.32	\$315.32
TOTAL MATERIAL						\$315.32

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Stop log lifter - Rent per day	1.00	day	1.000	1.00	\$1,000.00
Hauling to Yreka Transfer 40 Miles	1.00	Load	20 tons per load		\$400.00
TOTAL SUBCONTRACTS					\$1,400.00

SUMMARY OF COSTS									
Labor Cost	\$3,153.22	Labor Burden @	0.0%	\$0.00					\$3,153.22
Material Cost	\$315.32	Material Tax @	7.75%	\$24.44					\$339.76
Equipment Cost	\$1,836.15	Equipment Tax @	7.75%	\$142.30					\$1,978.45
Subcontractors	\$1,400.00								\$1,400.00
DIRECT COST SUBTOTALS	\$6,705			\$167				DIRECT COST SUBTOTALS	\$6,871
Additional Pay Item Notes :									
Assumed the process of removing and disposing of basin#6 (manually operated 18" slide gate and stop logs) is done in around 1 day by crew formed of foreman, journeymen, steelworkers. We dispose metal with 1 trucks per day for each crew. Assumed contains petroleum products 10% of the total lbs, 28 miles from Iron Gate to Yreka transfer recycling. Based on the current production rate, only 1 trips a day would be necessary.									

4.137 Remove and Dispose of Basin #6

PAY ITEM NUMBER	:	4.137	Project	:	KRRP - Iron Gate			
Description	:	Remove and Dispose of Basin #6	Group	:	#N/A			
Quantity	:	1,440.00 LBS						
Daily Production	:	1,800.00 LBS per	10	hour shift	Project #	:	4	
Work Days	:	0.8 Days			Estimator	:	Mihaela Tomulescu	
Unit Price	:	\$4.77 per LBS					LBS per	Total Cost
Total Cost	:	\$6,871			Probable Low Cost Parameter		2070	\$5,841
					Probable High Cost Parameter		1440	\$8,246
								Unit Price Per LBS
								\$4.63
								\$6.54

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.8	10	8.00	L	\$53.10	incl. in rate	incl. in rate	\$424.78
Steelworker	Active	2.00	0.8	10	16.00	L	\$72.07	incl. in rate	incl. in rate	\$1,153.15
Crawler Crane (90tn)	Active	1.00	0.8	10	8.00	E	\$208.09	incl. in rate	incl. in rate	\$1,664.72
Equipment Operator (crane)	Active	1.00	0.8	10	8.00	L	\$75.25	incl. in rate	incl. in rate	\$602.01
Welder	Active	2.00	0.8	10	16.00	E	\$7.84	incl. in rate	incl. in rate	\$125.40
Gas Welding Machine	Active	2.00	0.8	10	16.00	E	\$2.88	incl. in rate	incl. in rate	\$46.03
Electrician	Active	1.00	0.8	10	8.00	L	\$49.75	incl. in rate	incl. in rate	\$398.02
Carpenters, Journeyman	Active	1.00	0.8	10	8.00	L	\$71.91	incl. in rate	incl. in rate	\$575.26
Labor Hours					48	TOTAL LABOR				\$3,153.22
Equipment Hours					40	TOTAL EQUIPMENT				\$1,836.15

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$315.32	\$315.32
TOTAL MATERIAL						\$315.32

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Stop log lifter - Rent per day	1.00	day	1.000	1.00	\$1,000.00
Hauling to Yreka Transfer 40 Miles	1.00	Load	20 tons per load		\$400.00
TOTAL SUBCONTRACTS					\$1,400.00

Labor Cost	\$3,153.22	Labor Burden @	0.0%	\$0.00		\$3,153.22
Material Cost	\$315.32	Material Tax @	7.75%	\$24.44		\$339.76
Equipment Cost	\$1,836.15	Equipment Tax @	7.75%	\$142.30		\$1,978.45
Subcontractors	\$1,400.00					\$1,400.00
DIRECT COST SUBTOTALS	\$6,705			\$167	DIRECT COST SUBTOTALS	\$6,871

Assumed the process of removing and disposing of basin#6 (manually operated 18" slide gate and stop logs) is done in around 1 day by crew formed of foreman, journeymen, steelworkers. We dispose metal with 1 trucks per day for each crew. Assumed contains petroleum products 10% of the total lbs, 28 miles from Iron Gate to Yreka transfer recycling. Based on the current production rate, only 1 trips a day would be necessary.

PAY ITEM COST DETAIL WORKSHEET

4.138 Remove and Dispose of Holding Tank

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.138	Project	:	KRRP - Iron Gate				
Description	:	Remove and Dispose of Holding Tank	Group	:	D07				
Quantity	:	7,400.00 LBS							
Daily Production	:	9,250.00 LBS per	10	hour shift	Project #	:	4		
Work Days	:	0.8 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$1.25 per LBS			Probable Low Cost Parameter			10637.5	\$7,889
Total Cost	:	\$9,281			Probable High Cost Parameter			7400	\$11,137
								Unit Price Per LBS	\$1.22
									\$1.72

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.8	10	8.00	L	\$53.10	incl. in rate	incl. in rate	\$424.78
Steelworker	Active	4.00	0.8	10	32.00	L	\$72.07	incl. in rate	incl. in rate	\$2,306.30
Crawler Crane (90tn)	Active	1.00	0.8	10	8.00	E	\$208.09	incl. in rate	incl. in rate	\$1,664.72
Equipment Operator (crane)	Active	1.00	0.8	10	8.00	L	\$75.25	incl. in rate	incl. in rate	\$602.01
Welder	Active	2.00	0.8	10	16.00	E	\$7.84	incl. in rate	incl. in rate	\$125.40
Gas Welding Machine	Active	2.00	0.8	10	16.00	E	\$2.88	incl. in rate	incl. in rate	\$46.03
Electrician	Active	1.00	0.8	10	8.00	L	\$49.75	incl. in rate	incl. in rate	\$398.02
Carpenters, Journeyman	Active	4.00	0.8	10	32.00	L	\$71.91	incl. in rate	incl. in rate	\$2,301.02
Labor Hours					88	TOTAL LABOR				\$6,032.14
Equipment Hours					40	TOTAL EQUIPMENT				\$1,836.15

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$603.21	\$603.21
TOTAL MATERIAL						\$603.21

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	0.37	ton	1.000	0.37	\$595.00
Hauling to Yreka Transfer 40 Miles	1.00	Load	20 tons per load		\$400.00
TOTAL SUBCONTRACTS					\$620.15

SUMMARY OF COSTS									
Labor Cost	\$6,032.14	Labor Burden @	0.0%	\$0.00				\$6,032.14	
Material Cost	\$603.21	Material Tax @	7.75%	\$46.75				\$649.96	
Equipment Cost	\$1,836.15	Equipment Tax @	7.75%	\$142.30				\$1,978.45	
Subcontractors	\$620.15							\$620.15	
DIRECT COST SUBTOTALS	\$9,092			\$189				DIRECT COST SUBTOTALS	\$9,281
Additional Pay Item Notes :									
Assumed the process of removing and disposing of holding tank (2 slide gates 42" x 72" with motor and recirculation pumps) is done in around 1 day by crew formed of foreman, journeymen, steelworkers. Assumed contains petroleum products 10% of the total lbs, 28 miles from Iron Gate to Yreka transfer recycling.									

4.14 Wanaka Springs - Concrete Total

PAY ITEM NUMBER	:	4.140	Project	:	KRRP - Iron Gate
Description	:	Wanaka Springs - Concrete Total	Group	:	D16
Quantity	:	28.00 CY			
Daily Production	:	187.50 CY per	10	hour shift	
Work Days	:	0.2 Days	Project #	:	4
Unit Price	:	\$274.07 per CY	Estimator	:	Mihaela Tomulescu
Total Cost	:	\$7,674	CY per	:	215.625
			Total Cost	:	\$6,523
			Unit Price Per CY	:	\$266
			Probable Low Cost Parameter	:	159.375
			Probable High Cost Parameter	:	\$8,825
				:	\$360

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	2.00	0.2	10	3.00	L	\$53.10	incl. in rate	incl. in rate	\$159.29
Equipment Operator (medium)	Active	8.00	0.2	10	12.00	L	\$72.91	incl. in rate	incl. in rate	\$874.90
Steelworker	Active	6.00	0.2	10	9.00	L	\$72.07	incl. in rate	incl. in rate	\$648.65
Electrician	Active	1.00	0.2	10	1.50	L	\$49.75	incl. in rate	incl. in rate	\$74.63
Vibratory Hammer & Extractor	Active	2.00	0.2	10	3.00	E	\$94.34	incl. in rate	incl. in rate	\$283.02
Hydraulic Excavator (6.0cy)	Active	3.00	0.2	10	4.50	E	\$322.48	incl. in rate	incl. in rate	\$1,451.16
Loader, FE Rubber Tire (8.6cy)	Active	3.00	0.2	10	4.50	E	\$221.50	incl. in rate	incl. in rate	\$996.75
Labor Hours					25.5	TOTAL LABOR				\$1,757.46
Equipment Hours					12	TOTAL EQUIPMENT				\$2,730.93

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price		Material Cost
						TOTAL MATERIAL	\$0.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Concrete Saw Cutting	1	EA	Cost per Mob	\$2,500.00	\$2,500.00
Hauling to Yreka Transfer 40 Miles	1.00	Load	20 tons per load	\$400.00	\$400.00
Disposal Fee	1.00	Ton		\$74.00	\$74.00
TOTAL SUBCONTRACTS					\$2,974.00

Labor Cost	\$1,757.46	Labor Burden @	49.7%	\$0.00		\$1,757.46
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00		\$0.00
Equipment Cost	\$2,730.93	Equipment Tax @	7.75%	\$211.65		\$2,942.58
Subcontractors	\$2,974.00					\$2,974.00
DIRECT COST SUBTOTALS	\$7,462			\$212	DIRECT COST SUBTOTALS	\$7,674

Based on RS.Means - "Selective concrete demolition, reinforcing 1% - 2% of cross-sectional area, break up into small pieces, excludes shoring, bracing, saw or torch cutting, loading, hauling, dumping, 650 CY - work done with crew B9" and "Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 30 miles, 50 MPH, excludes loading equipment Crew B34B".

Based on RS.Means - Selective concrete demolition; reinforcing 1% - 2% of cross-sectional area, break up into small pieces, excludes shoring, bracing, saw or torch cutting, loading, hauling, dumping, 650 CY work done with crew B9 and B34B - Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 30 miles, 50 MPH, excludes loading equipment

PAY ITEM INFORMATION					
Item No.	00000000	Description			
Unit	EA	Quantity	1	Rate	\$0.00
Total Price	\$0.00				

CREW COSTS

MATERIAL COSTS

SUBCONTRACT COSTS

SUMMARY OF COSTS

Additional Pay Item Notes :

Additional Pay Item Notes :

4.161

PAY ITEM COST DETAIL WORKSHEET

4.162 Camp Creek - Dump stations and approx. 2000 gal buried

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.162			Project	:	KRRP - Iron Gate		
Description	:	Camp Creek - Dump stations and approx. 2000 gal buried			Group	:	D16		
Quantity	:	1.00 EA							
Daily Production	:	1.88 EA per		10	hour shift	Project #	:	4	
Work Days	:	0.5 Days				Estimator	:	Mihaela Tomulescu	
Unit Price	:	\$3,027.37 per EA					EA per	2.15625	Total Cost
Total Cost	:	\$3,027				Probable Low Cost Parameter		\$2,573	Unit Price Per EA
						Probable High Cost Parameter		1.5	\$3,633
								\$4,150.16	

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.5	10	5.00	L	\$53.10	\$0.00		\$265.49
Vibratory Hammer & Extractor	Active	1.00	0.5	10	5.00	E	\$94.34	\$94.34		\$471.70
Backhoe Loader (91hp)	Active	1.00	0.5	10	5.00	E	\$40.35	\$40.35		\$201.75
Equipment Operator (medium)	Active	2.00	0.5	10	10.00	L	\$72.91	\$0.00		\$729.08
Labor Hours					15	TOTAL LABOR				\$994.57
Equipment Hours					10	TOTAL EQUIPMENT				\$673.45

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$99.46	\$99.46
TOTAL MATERIAL						\$99.46

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal Cost	3.00	Loads		\$400.00	\$1,200.00
					TOTAL SUBCONTRACTS
					\$1,200.00

SUMMARY OF COSTS									
Labor Cost	\$994.57	Labor Burden @	0.0%	\$0.00				\$994.57	
Material Cost	\$99.46	Material Tax @	7.75%	\$7.71				\$107.16	
Equipment Cost	\$673.45	Equipment Tax @	7.75%	\$52.19				\$725.64	
Subcontractors	\$1,200.00							\$1,200.00	
DIRECT COST SUBTOTALS	\$2,967			\$60		DIRECT COST SUBTOTALS		\$3,027	
Additional Pay Item Notes :									

4.163 Camp Creek - Power poles and lines

SUMMARY OF COSTS						
Labor Cost	\$3,203.51	Labor Burden @	0.0%	\$0.00	\$3,203.51	
Material Cost	\$174.40	Material Tax @	7.75%	\$13.52	\$187.91	
Equipment Cost	\$2,875.92	Equipment Tax @	7.75%	\$222.88	\$3,098.80	
Subcontractors	\$1,200.00				\$1,200.00	
DIRECT COST SUBTOTALS		\$7,454	\$236		DIRECT COST SUBTOTALS	\$7,690
Additional Pay Item Notes :						
Production is based off of RSMS using Crew R3 (1 Forman and 1 Electrician,1 Crane). Considered 2 laborer and 1 Vibratory Hammer for demolish the pole foundation and helping placing poles in a designated place and loading them in the truck for disposal. This process includes filling in pole locations with gravel, clean fill and topsoil.						

PAY ITEM INFORMATION					
Item No.	00000000	Description			
Unit	EA	Quantity	1	Rate	\$0.00
Total Price	\$0.00				
Tax					
Net Total	\$0.00				

CREW COSTS

MATERIAL COSTS

SUBCONTRACT COSTS

SUMMARY OF COSTS

Additional Pay Item Notes :

Based on RSMeans - "Selective concrete demolition, reinforcing 1% - 2% of cross-sectional area, break up into small pieces, excludes shoring, bracing, saw or torch cutting, loading, hauling, dumping, 650 CY - work done with crew B9" and "Cycle hauling(wait, load, travel, unload or dump & return) time per cycle, excavated or borrow, loose cubic yards, 15 min load/wait/unload, 12 C.Y. truck, cycle 30 miles, 50 MPH, excludes loading equipment Crew B34B"

PAY ITEM COST DETAIL WORKSHEET

4.173 Mirror Cove - 10'x16' Toilet Vault

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	4.173			Project	:	KRRP - Iron Gate		
Description	:	Mirror Cove - 10'x16' Toilet Vault			Group	:	D16		
Quantity	:	160.00 SF							
Daily Production	:	1,125.00 SF per			10	hour shift	Project #	:	4
Work Days	:	0.1 Days			Estimator	:	Mihaela Tomulescu	SF per	Total Cost
Unit Price	:	\$14.08 per SF			Probable Low Cost Parameter		1237.5	\$2,027	\$14
Total Cost	:	\$2,253			Probable High Cost Parameter		1012.5	\$2,478	\$18

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.1	10	1.40	L	\$53.10	incl. in rate	incl. in rate	\$74.34
Laborer	Active	4.00	0.1	10	5.60	L	\$50.38	incl. in rate	incl. in rate	\$282.13
Equipment Operator (medium)	Active	2.00	0.1	10	2.80	L	\$72.91	incl. in rate	incl. in rate	\$204.14
Hydraulic Excavator (2.5cy)	Active	1.00	0.1	10	1.40	E	\$203.63	incl. in rate	incl. in rate	\$285.08
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.1	10	1.40	E	\$64.23	incl. in rate	incl. in rate	\$89.92
					Labor Hours	9.8	TOTAL LABOR			\$560.61
					Equipment Hours	2.8	TOTAL EQUIPMENT			\$375.00

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
						TOTAL MATERIAL
						\$0.00

SUBCONTRACT COSTS						
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount	
Dump Fee Coverson (SFXH*.33/27)	23	CY			\$0.00	
Conversion CY to Tons (2 tons per CY)	12.00	tons	Klamath County LandFill	\$74.00	\$888.00	
Hauling cost to landfill	2.00	Loads	18 CY per load	\$200.00	\$400.00	
						TOTAL SUBCONTRACTS
						\$1,288.00

SUMMARY OF COSTS									
Labor Cost	\$560.61	Labor Burden @	0.0%	\$0.00				\$560.61	
Material Cost	\$0.00	Material Tax @	7.75%	\$0.00				\$0.00	
Equipment Cost	\$375.00	Equipment Tax @	7.75%	\$29.06				\$404.07	
Subcontractors	\$1,288.00							\$1,288.00	
DIRECT COST SUBTOTALS		\$2,224		\$29		DIRECT COST SUBTOTALS		\$2,253	
Additional Pay Item Notes :									

PAY ITEM COST DETAIL WORKSHEET

5.025 Remove Distribution Poles near Iron Gate Hydro Plant

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	5.025	Project	:	KRRP - Iron Gate				
Description	:	Remove Distribution Poles near Iron Gate Hydro Plant	Group	:	D05				
Quantity	:	5.00 EA							
Daily Production	:	3.13 EA per	10	hour shift	Project #	:	4		
Work Days	:	1.6	Days		Estimator	:	Mihaela Tomulescu	EA per	Total Cost
Unit Price	:	\$1,731.75	per EA		Probable Low Cost Parameter			3.59375	\$7,360
Total Cost	:	\$8,659			Probable High Cost Parameter			2.5	\$10,390
									Unit Price Per EA
									\$1,682
									\$2,374

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.6	10	16.00	L	\$53.10	incl. in rate	incl. in rate	\$849.55
Electrician	Active	1.00	1.6	10	16.00	L	\$49.75	incl. in rate	incl. in rate	\$796.05
Hydraulic Crane (17tn)	Active	1.00	1.6	10	16.00	E	\$81.52	incl. in rate	incl. in rate	\$1,304.32
Laborer	Active	2.00	1.6	10	32.00	L	\$50.38	incl. in rate	incl. in rate	\$1,612.16
Truck, Flatbed (4x4, 10,000 gvw)	Active	1.00	1.6	10	16.00	E	\$31.90	incl. in rate	incl. in rate	\$510.40
Vibratory Hammer & Extractor	Active	1.00	1.6	10	16.00	E	\$94.34	incl. in rate	incl. in rate	\$1,509.44
Truck Driver (heavy)	Active	1.00	1.6	10	16.00	L	\$63.35	incl. in rate	incl. in rate	\$1,013.58
Truck, Utility, with Man-Basket	Active	1.00	1.6	10	16.00	E	\$31.90	incl. in rate	incl. in rate	\$510.40
					Labor Hours	80			TOTAL LABOR	\$4,271.34
					Equipment Hours	64			TOTAL EQUIPMENT	\$3,834.56

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$213.57	\$213.57
Topsoil placement and grading, loam or topsoil, F.E. loader, 1-1/2 C.Y., remove and stockpile on site, spread from pile to rough finish grade	5.00	CY	1.000	5.00	\$4.74	\$23.70
						TOTAL MATERIAL
						\$237.27

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
					TOTAL SUBCONTRACTS
					\$0.00

SUMMARY OF COSTS						
Labor Cost	\$4,271.34	Labor Burden @	0.0%	\$0.00		\$4,271.34
Material Cost	\$237.27	Material Tax @	7.75%	\$18.39		\$255.66
Equipment Cost	\$3,834.56	Equipment Tax @	7.75%	\$297.18		\$4,131.74
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$8,343			\$316	DIRECT COST SUBTOTALS	\$8,659
Additional Pay Item Notes :						
Production is based off of RSMs using Crew R3 (1 Forman and 1 Electrician,1 Crane). Considered 2 laborer and 1 Vibratory Hammer for demolish the pole foundation and helping placing poles in a designated place and loading them in the truck for disposal. This process includes filling in pole locations with gravel, clean fill and topsoil.						

PAY ITEM COST DETAIL WORKSHEET

5.026 Remove 69kV/6.6kV Transformer @Substation

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	5.026			Project	:	KRRP - Iron Gate		
Description	:	Remove 69kV/6.6kV Transformer @Substation			Group	:	D06		
Quantity	:	1.00 EA							
Daily Production	:	3.13 EA per		10	hour shift	Project #	:	4	
Work Days	:	0.3 Days			Estimator	:	M Mihaela Tomulescu		
Unit Price	:	\$2,319.44 per EA			Probable Low Cost Parameter		EA per	Total Cost	Unit Price Per EA
Total Cost	:	\$2,319			Probable High Cost Parameter		2.34375	\$2,899	\$3,312
							3.59375	\$1,972	\$2,252

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	0.3	10	3.00	L	\$51.95	incl. in rate	incl. in rate	\$155.86
Electrician	Active	1.00	0.3	10	3.00	L	\$49.75	incl. in rate	incl. in rate	\$149.26
Loader, FE Rubber Tire (8.6cy)	Active	1.00	0.3	10	3.00	E	\$221.50	incl. in rate	incl. in rate	\$664.50
Truck Driver (light)	Active	1.00	0.3	10	3.00	L	\$61.92	incl. in rate	incl. in rate	\$185.76
Truck, Off-Road, Articulated Rear, 20cy	Active	1.00	0.3	10	3.00	E	\$111.64	incl. in rate	incl. in rate	\$334.92
Equipment Operator (light)	Active	1.00	0.3	10	3.00	L	\$71.39	incl. in rate	incl. in rate	\$214.17
Labor Hours					12	TOTAL LABOR				\$705.05
Equipment Hours					6	TOTAL EQUIPMENT				\$999.42

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$35.25	\$35.25
Topsoil placement and grading, loam or topsoil, F.E. loader, 1-1/2 C.Y., remove and stockpile on site, spread from pile to rough finish grade	5.00	CY	1.000	5.00	\$4.74	\$23.70
						TOTAL MATERIAL
						\$58.95

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling to Yreka Transfer 40 Miles	1.00	Load	20 tons per load	\$400.00	\$400.00
Disposal Fee	1.00	Ton		\$74.00	\$74.00
					TOTAL SUBCONTRACTS
					\$474.00

SUMMARY OF COSTS						
Labor Cost	\$705.05	Labor Burden @	0.0%	\$0.00		\$705.05
Material Cost	\$58.95	Material Tax @	7.75%	\$4.57		\$63.52
Equipment Cost	\$999.42	Equipment Tax @	7.75%	\$77.46		\$1,076.88
Subcontractors	\$474.00					\$474.00
DIRECT COST SUBTOTALS	\$2,237			\$82	DIRECT COST SUBTOTALS	\$2,319
Additional Pay Item Notes :						
Production is based off of RSMs using Crew Elec2 : 1 El. Forman and 1 Electrician,1 Loader and 1 truck for disposal.						

PAY ITEM NUMBER	:	5.028	Project	:	KRRP - Iron Gate
Description	:	Remove Generator @ Substation	Group	:	D06
Quantity	:	1.00 EA			
Daily Production	:	0.31 EA per		hour shift	
Work Days	:	3.2 Days	Project #	:	4
Unit Price	:	\$14,304.19 per EA	Estimator	:	M Mihaela Tomulescu
Total Cost	:	\$14,304	EA per	:	0.359375
			Total Cost	:	\$12,159
			Unit Price Per EA	:	\$13,890
			Probable Low Cost Parameter	:	0.234375
			Probable High Cost Parameter	:	\$17,880
				:	\$20,426

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	3.2	10	32.00	L	\$51.95	incl. in rate	incl. in rate	\$1,662.50
Electrician	Active	1.00	3.2	10	32.00	L	\$49.75	incl. in rate	incl. in rate	\$1,592.10
Hydraulic Crane (17tn)	Active	1.00	3.2	10	32.00	E	\$81.52	incl. in rate	incl. in rate	\$2,608.64
Truck, Off-Road, Articulated Rear, 20cy	Active	1.00	3.2	10	32.00	E	\$111.64	incl. in rate	incl. in rate	\$3,572.48
Truck Driver (light)	Active	1.00	3.2	10	32.00	L	\$61.92	incl. in rate	incl. in rate	\$1,981.41
Equipment Operator (crane)	Active	1.00	3.2	10	32.00	L	\$75.25	incl. in rate	incl. in rate	\$2,408.03
Labor Hours					128	TOTAL LABOR				\$7,644.03
Equipment Hours					64	TOTAL EQUIPMENT				\$6,181.12

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
						TOTAL MATERIAL \$0.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
TOTAL SUBCONTRACTS					\$0.00

Labor Cost	\$7,644.03	Labor Burden @	0.0%	\$0.00			\$7,644.03
Material Cost	\$0.00	Material Tax @	7.8%	\$0.00			\$0.00
Equipment Cost	\$6,181.12	Equipment Tax @	7.8%	\$479.04			\$6,660.16
Subcontractors	\$0.00						\$0.00
DIRECT COST SUBTOTALS	\$13,825			\$479		DIRECT COST SUBTOTALS	\$14,304

Production is based off of RSMS using Crew Elec2 : 1 El. Forman and 1 Electrician, 1 Crane , 1 Laborer and 1 truck for disposal.

Assumed 3 days of work to clean and the substation rights-of-way to be restored to the natural conditions. Production is based off of RSMs using Crew formed of 1 Foreman, 4 Electrician, 2 laborer, 1 Excavator & 1 crane for lift, position and load in the truck, 1 Hydraulic rock-splitting/rock-drilling equipment to break equipment foundations, 1 utility truck access poles, string conductor, modify structure arms, provide guard structures, etc. Crews may be working simultaneously along the project alignment and substations, hydro plant and switchyard.

JC BOYLE DAM REMOVAL

SUMMARY OF COSTS				
Labor Cost	\$7,637.52	Labor Burden @	0.0%	
Material Cost	\$127.00	Material Tax @	0.00%	\$0.00
Equipment Cost	\$14,168.78	Equipment Tax @	0.00%	\$0.00
Subcontractors	\$0.00			
DIRECT COST SUBTOTALS	\$21,933		\$0	DIRECT COST SUBTOTALS
				\$21,933
Additional Pay Item Notes :				
Crew markup is based on blasting from the down stream side to avoid using divers due to the safety risk from the high flow.				

SUMMARY OF COSTS					
Labor Cost	\$7,637.52	Labor Burden @	0.0%		\$7,637.52
Material Cost	\$127.00	Material Tax @	0.00%	\$0.00	\$127.00
Equipment Cost	\$14,168.78	Equipment Tax @	0.00%	\$0.00	\$14,168.78
Subcontractors	\$0.00				\$0.00
DIRECT COST SUBTOTALS	\$21,933		\$0	DIRECT COST SUBTOTALS	\$21,933
Additional Pay Item Notes :					
Crew markup is based on blasting from the down stream side to avoid using divers due to the safety risk from the high flow.					

1.004 Construct Embankment Cofferdam in Tailrace around Powerhouse
Details

High Cost Factors				Low Cost Factors			
Bad Weather	0%			No Bad Weather		0%	
Gas Price Increase	10%			Gas Price Decrease		10%	
Unforeseen Contaminated Mats/ Access Issues	10%			No Unforeseen Contaminated Mats/ Access Issues		0%	
	20%					10%	

Production Per Hour		Hours	Overall Production	
	33	8	264	
		20	660	

Haul Notes		Excavator Loading Production per shift	
CY	2,000.00	CY per Hour	35.17
Swell Factor	20%	CY Bucket Size	5.00
Bulk CY	2400	Buckets Per Hour	7
Haul Vehicle 85% Capacity (1.3 tons per CY)	10.2	# of Excavators	1.00
# of Haul Vehicles	1	CY per Hour (2.5 CY Bucket)	35
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	5	CY Per Hour Ideal Production Per 8 Hour Shift	95
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)	5	Efficient Compared to Ideal Production	37%
Haul Speed (Loaded MPH)	10	Inefficiencies Compared to Ideal Production	63%
Return Speed (Unloaded MPH)	10		
Haul Distance (Miles)	0.5		
Shift Length (Hours)	20		
Cycle Time			
Load Time (Load Time Minutes / 60mins)	0.08		
Haul Time (Haul Distance / Haul Speed)	0.05		
Dump Time (Dump Time Minutes / 60 Mins)	0.08		
Return Time (Haul Distance / Return Speed)	0.05		
Hours Per Cycle	0.26		
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	90%		
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.29		
Number of Cycles(Bulk CY/ (Haul Vehicle Cap X # of Haul Vehicles)	235		
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	68.15		
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	3.45		
Number of Haul Days	3.4075		

Other Notes
Material for cofferdam is expected to come from surrounding built up areas that were built up during the construction of the power house. This item is expected to be double shifted due to the Oregon in water wet work permit restrictions.

[illegible]

CREW COSTS

MATERIAL COSTS

SUBCONTRACT COSTS

SUMMARY OF COSTS

Additional Pay Item Notes :

[See Details Page](#)

1.005 Remove Spillway Concrete

Details

High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	10%	Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues	5%
	20%		15%

Production Per Hour	Hours	Overall Production	
	15	8	120
		20	300

Haul Notes	Excavator Loading Production per shift		
CY	2,100.00	CY per Hour	25.00
Swell Factor	60%	CY Bucket Size	2.50
Bulk CY	3360	Buckets Per Hour	10
Haul Vehicle 60% Capacity (2 tons per CY)	12	# of Excavators	1.00
# of Haul Vehicles	1	CY per Hour (2.5 CY Bucket)	25
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	5	CY Per Hour Ideal Production Per 8 Hour Shift	95
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) Minutes)	3	Efficient Compared to Ideal Production	26%
Haul Speed (Loaded MPH)	15	Inefficiencies Compared to Ideal Production	74%
Return Speed (Unloaded MPH)	20		
Haul Distance (Miles) Along Power Canal	3		
Shift Length (Hours)	20		
Cyce Time		Breaker Production per shift	
Load Time (Load Time Minutes / 60mins)	0.08		
Haul Time (Haul Distance / Haul Speed)	0.17	Hydraulic Hammer CY per Hour	15
Dump Time (Dump Time Minutes / 60 Mins)	0.05	# of Hammers	1.00
Return Time (Haul Distance / Return Speed)	0.13	CY per Hour	15
Hours Per Cycle	0.43	CY per Hour Back Check	15
Efficiency Factor (Night Work, Traffic Retrictions, Coffee Breaks, ECT)	90%	32CY per HR per 8hr shift (Ideal prod)	32
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.48	Efficient Compared to Ideal Production	47%
Number of Cycles(Bulk CY/ (Haul Vehicle Cap X # of Haul Vehicles)	280	Inefficiencies Compared to Ideal Production	53%
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	134.4		
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	2.08		
Number of Haul Days	6.72		
Speed Loaded			
	Max Weight lbs of loaded 725	103,707.00	
	Tons	52	
	20lbs/Ton Rolling weighth	3	
	Rolling Resitance (1% for each 20lbs/Ton)	3%	
	Slope Grade	8%	
	Total Resistance	11%	
	Max Gear per CAT Chart	4	
	Max MPH	15	
Speed Empty			
	Max Weight lbs of Empty 725	50,795.00	
	Tons Empty	25	
	20lbs/Ton Rolling weight Empty	1	
	Rolling Resitance (1% per 20lbs/Ton) Empty	1%	
	Average Slope Empty	8%	
	Total Resistance Empty	9%	
	Max Gear per CAT Chart Empty	6	
	Max MPH Empty	20	

Other Notes
Due to the amount of reinforcement in the concrete it is expected that demolition production will be inefficient when compared to ideal productions. It is expected that hauling will occur at night only due to the small amount of demolished material. All work has been double shifted to account for the Oregon wet work permit restrictions. The existing haul route along the power canal will be used to haul material to the scour hole.

PAY ITEM COST DETAIL WORKSHEET

1.006 Remove Monorail Structural Steel Components

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.006			Project	:	KRRP - JC Boyle		
Description	:	Remove Monorail Structural Steel Components			Group	:	D10		
Quantity	:	15,000.00 LBS							
Daily Production	:	23,125.00 LBS per			10	hour shift	Project #	:	1
Work Days	:	0.6 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.38 per LBS			Probable Low Cost Parameter		25,437.50	\$5,189	\$0.20
Total Cost	:	\$5,765			Probable High Cost Parameter		15,031.25	\$7,783	\$0.52

CREW COSTS											
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost	
Labor Foreman	Active	1.00	0.6	10	6.00	L	\$58.87	incl. in rate	incl. in rate	\$353.23	
Laborer	Active	3.00	0.6	10	18.00	L	\$51.07	incl. in rate	incl. in rate	\$919.31	
Steelworker	Active	2.00	0.6	10	12.00	L	\$78.10	incl. in rate	incl. in rate	\$937.20	
Equipment Operator (crane)	Active	1.00	0.6	10	6.00	L	\$81.60	incl. in rate	incl. in rate	\$489.59	
Equipment Operator (medium)	Active	1.00	0.6	10	6.00	L	\$72.34	incl. in rate	incl. in rate	\$434.02	
Crawler Crane (130tn)	Active	1.00	0.6	10	6.00	E	\$262.91	incl. in rate	incl. in rate	\$1,577.46	
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.6	10	6.00	E	\$63.11	incl. in rate	incl. in rate	\$378.66	
Acetylene Torches	Active	2.00	0.6	10	12.00	E	\$0.47	incl. in rate	incl. in rate	\$5.64	
					Labor Hours	48	TOTAL LABOR				\$3,133.35
					Equipment Hours	24	TOTAL EQUIPMENT				\$1,961.76

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 15% labor (saw blades, drill bits, torch gas, etc)	1.00	LS	1.000	1.00	\$470.00	\$470.00
TOTAL MATERIAL						\$470.00

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal Cost	1.00	Loads	20 tons a load	\$200.00	\$200.00
					TOTAL SUBCONTRACTS
					\$200.00

SUMMARY OF COSTS							
Labor Cost	\$3,133.35	Labor Burden @	49.7%	\$0.00			\$3,133.35
Material Cost	\$470.00	Material Tax @	0.0%	\$0.00			\$470.00
Equipment Cost	\$1,961.76	Equipment Tax @	0.0%	\$0.00			\$1,961.76
Subcontractors	\$200.00						\$200.00
DIRECT COST SUBTOTALS	\$5,765			\$0		DIRECT COST SUBTOTALS	\$5,765

Additional Pay Item Notes :

1.007 Details

1.008 Remove Gravity Dam Section Concrete Details			
High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	10%	Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues	5%
	20%		15%
Production Per Hour		Overall Production	
	Hours		
	13	8	104.00
		20	260.00
Haul Notes		Excavator Loading Production per shift	
CY	600.00	CY per Hour	44.44
Swell Factor	60%	CY Bucket Size	2.50
Bulk CY		960 Buckets Per Hour	9
Haul Vehicle 60% Capacity (2 tons per CY)		12 # of Excavators	0.50
# of Haul Vehicles	1	CY per Hour (2.5 CY Bucket)	44
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	5	CY Per Hour Ideal Production Per 8 Hour Shift	95
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)	3	Efficient Compared to Ideal Production	47%
Haul Speed (Loaded MPH)	15	Inefficiencies Compared to Ideal Production	53%
Return Speed (Unloaded MPH)	20		
Haul Distance (Miles) Along Power Canal	2.58		
Shift Length (Hours)	20		
Cyce Time		Breaker Production	
Load Time (Load Time Minutes / 60mins)	0.08	Hydraulic Hammer CY per Hour	13
Haul Time (Haul Distance / Haul Speed)	0.17	# of Hammers	1.00
Dump Time (Dump Time Minutes / 60 Mins)	0.05	CY per Hour	13
Return Time (Haul Distance / Return Speed)	0.13	CY per Hour Back Check	13
Hours Per Cycle	0.43	32CY per HR per 8hr shift (Ideal prod)	32
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	80%	Efficient Compared to Ideal Production	41%
Actual Hours Per Cycle (hours per Cycle / Efficiency Factor)	0.54	Inefficiencies Compared to Ideal Production	59%
Number of Cycles Bulk CY (Haul Vehicle Cap X # of Haul Vehicles)	90		
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	43.2		
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	1.85		
Number of Haul Days	2.16		
Speed Loaded			
	Max Weight lbs of loaded 725	103,707.00	
	Tons	52	
	20lbs/Ton Rolling weighth	3	
	Rolling Resitance (1% for each 20lbs/Ton)	3%	
	Average Slope	2%	
	Total Resistance	5%	
	Max Gear per CAT Chart	4	
	Max MPH	15	
Speed Empty			
	Max Weight lbs of Empty 725	50,795.00	
	Tons Empty	25	
	20lbs/Ton Rolling weight Empty	1	
	Rolling Resistance (1% per 20lbs/Ton) Empty	1%	
	Average Slope Empty	2%	
	Total Resistance Empty	3%	
	Max Gear per CAT Chart Empty	5	
	Max MPH Empty	20	

Other Notes
The production on the breaker is reduced due to the amount of reinforcement in the concrete. Excavator's loading production is low due to This item will be double shifted because it is considered as in channel work and has a restricted window due to the Oregon in water work permit.

SUMMARY OF COSTS					
Labor Cost	\$14,189.56	Labor Burden @	0.0%		\$14,189.56
Material Cost	\$0.00	Material Tax @	0.00%	\$0.00	\$0.00
Equipment Cost	\$5,448.00	Equipment Tax @	0.00%	\$0.00	\$5,448.00
Subcontractors	\$644.00				\$644.00
DIRECT COST SUBTOTALS	\$20,282		\$0	DIRECT COST SUBTOTALS	\$20,282
Additional Pay Item Notes :					

SUMMARY OF COSTS					
Labor Cost	\$40,783.60	Labor Burden @	0.0%		\$40,783.60
Material Cost	\$0.00	Material Tax @	0.00%	\$0.00	\$0.00
Equipment Cost	\$33,961.00	Equipment Tax @	0.00%	\$0.00	\$33,961.00
Subcontractors	\$63,492.00				\$63,492.00
DIRECT COST SUBTOTALS	\$138,237			\$0	DIRECT COST SUBTOTALS \$138,237
Additional Pay Item Notes :					
Demolition is to be done using excavators and a loader. Building Demolition will be hauled to Klamath County landfill					

PAY ITEM COST DETAIL WORKSHEET

1.013 Remove Fire System Control Bldg. on left abutment

PAY ITEM INFORMATION										
PAY ITEM NUMBER		1.013			Project		KRRP - JC Boyle			
Description		Remove Fire System Control Bldg. on left abutment			Group		D10			
Quantity	1.013	520.00	SF							
Daily Production	1.013	1,125.00	SF per	10	hour shift	Project #	1			
Work Days	1.013	0.5	Days			Estimator	Eric Jones	SF per	Total Cost	Unit Price Per SF
Unit Price	1.013	\$14.66	per SF			Probable Low Cost Parameter	1,181.25	\$7,242	\$6.13	
Total Cost	1.013	\$7,623				Probable High Cost Parameter	1,012.50	\$8,386	\$8.28	

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.5	10	5.00	L	\$58.87	incl. in rate	incl. in rate	\$294.36
Laborer	Active	4.00	0.5	10	20.00	L	\$51.07	incl. in rate	incl. in rate	\$1,021.46
Equipment Operator (medium)	Active	2.00	0.5	10	10.00	L	\$72.34	incl. in rate	incl. in rate	\$723.36
Hydraulic Excavator (5.0cy)	Active	1.00	0.5	10	5.00	E	\$276.50	incl. in rate	incl. in rate	\$1,382.50
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.5	10	5.00	E	\$63.11	incl. in rate	incl. in rate	\$315.55

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SUMMARY OF COSTS					
Labor Cost	\$1,490.46	Labor Burden @	0.0%		\$1,490.46
Material Cost	\$0.00	Material Tax @	0.00%	\$0.00	\$0.00
Equipment Cost	\$2,694.76	Equipment Tax @	0.00%	\$0.00	\$2,694.76
Subcontractors	\$0.00				\$0.00
DIRECT COST SUBTOTALS	\$4,185		\$0	DIRECT COST SUBTOTALS	\$4,185
Additional Pay Item Notes :					
.5 day to demolish and removal all concrete material, 1 excavator with breaker, 1 excavator loading materials in to dump truck, 2 laborers to direct trucks and assist equipment with demolition operation, 1 foreman to oversee operation.					

SUMMARY OF COSTS					
Labor Cost	\$747.62	Labor Burden @	0.0%		\$747.62
Material Cost	\$0.00	Material Tax @	0.00%	\$0.00	\$0.00
Equipment Cost	\$1,001.73	Equipment Tax @	0.00%	\$0.00	\$1,001.73
Subcontractors	\$0.00				\$0.00
DIRECT COST SUBTOTALS	\$1,749		\$0	DIRECT COST SUBTOTALS	\$1,749
Additional Pay Item Notes :					
3 hours to complete operation, using 1 excavator to demo and load material, laborer to support equipment, dump truck to haul material to scour haul, foreman to oversee operation.					

SUMMARY OF COSTS					
Labor Cost	\$1,631.34	Labor Burden @	0.0%		\$1,631.34
Material Cost	\$0.00	Material Tax @	0.00%	\$0.00	\$0.00
Equipment Cost	\$1,358.44	Equipment Tax @	0.00%	\$0.00	\$1,358.44
Subcontractors	\$348.00				\$348.00
DIRECT COST SUBTOTALS	\$3,338		\$0	DIRECT COST SUBTOTALS	\$3,338
Additional Pay Item Notes :					
<p>Operation will take 1/2 of a day to complete including mobilizing to area, excavator will be used to demolish and load material, truck will haul off material, to dump location, laborer to support equipment and truck coordination, foreman to oversee operation.</p>					

1.018 Downstream Riprap				
Details				
High Cost Factors			Low Cost Factors	
Bad Weather	0%		No Bad Weather	0%
Gas Price Increase	10%		Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	0%		No Unforeseen Contaminated Mats/ Access Issues	0%
	10%			10%
Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)	Overall Production	
	75	8	70%	420
		10	70%	525
Haul Notes		Excavator Loading Production per shift		
CY	2,200.00	CY per Hour		74
Swell Factor	30%	CY Bucket Size		5.00
Bulk CY	2,860.00	Buckets Per Hour		15
Haul Vehicle 85% Capacity (1.3 tons per CY)		# of Excavators		1.00
# of Haul Vehicles	27.5	CY per Hour (5 CY Bucket)		74
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)		CY Per Hour Ideal Production Per 8 Hour Shift		160
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)		Efficient Compared to Ideal Production		46%
Haul Speed (Loaded MPH)		Inefficiencies Compared to Ideal Production		54%
Return Speed (Unloaded MPH)	10			
Haul Distance (Miles)	0.50			
Shift Length (Hours)	10			
Cycle Time				
Load Time (Load Time Minutes / 60mins)	0.08			
Haul Time (Haul Distance / Haul Speed)	0.06			
Dump Time (Dump Time Minutes / 60 Mins)	0.07			
Return Time (Haul Distance / Return Speed)	0.05			
Hours Per Cycle	0.26			
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	70%			
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.37			
Number of Cycles (Bulk CY) (Haul Vehicle Cap X # of Haul Vehicles)	105			
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	38.85			
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	2.70			
Number of Haul Days	3.9			
Speed Loaded				
	Max Weight lbs of loaded 745	164,500.00		
	Tons	82.25		
	20lbs/Ton Rolling weighth	4		
	Rolling Resistance (1% for each 20lbs/Ton)	4%		
	Slope Grade	8%		
	Total Resistance	12%		
	Max Gear per CAT Chart	4		
	Max MPH	8.8		
Speed Empty				
	Max Weight lbs of Empty 745	74,100.00		
	Tons	37.05		
	20lbs/Ton Rolling weighth	2		
	Rolling Resistance (1% for each 20lbs/Ton)	2%		
	Slope Grade	8%		
	Total Resistance	10%		
	Max Gear per CAT Chart	6		
	Max MPH	10		
Other Notes				

PAY ITEM INFORMATION

PAY ITEM NUMBER	:	1.019	Project	:	KRRP - JC Boyle
Description	:	Upstream Riprap	Group	:	D08
Quantity	1.019	1,300.00 CY			
Daily Production	1.019	525.00 CY per	10	hour shift	
Work Days	1.019	2.5 Days	Project #	:	1
Unit Price	1.019	\$16.80 per CY	Estimator	:	Eric Jones
Total Cost	1.019	\$21,837	CY per		
			Probable Low Cost Parameter		577.50
			Probable High Cost Parameter		472.50
			Total Cost		\$19,653
			Unit Price Per CY		\$34.03
					\$50.84

CREW COSTS

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Hydraulic Excavator (5.0cy)	Active	1.00	2.5	10	25.00	E	\$276.50	incl. in rate	incl. in rate	\$6,912.50
Equipment Operator (medium)	Active	1.00	2.5	10	25.00	L	\$72.34	incl. in rate	incl. in rate	\$1,808.40
Labor Foreman	Active	1.00	2.5	10	25.00	L	\$58.87	incl. in rate	incl. in rate	\$1,471.80
Laborer	Active	2.00	2.5	10	50.00	L	\$51.07	incl. in rate	incl. in rate	\$2,553.65
Truck Driver (heavy)	Active	3.00	2.5	10	75.00	L	\$66.92	incl. in rate	incl. in rate	\$5,019.30
CAT 745 (32 CY) OFF ROAD TRUCK	Active	1.00	2.3	10	22.94	E	\$177.47	incl. in rate	incl. in rate	\$4,071.16
Labor Hours					175	TOTAL LABOR				\$10,853.15
Equipment Hours					47.94	TOTAL EQUIPMENT				\$10,983.66

MATERIAL COSTS

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
TOTAL MATERIAL						\$0.00

SUBCONTRACT COSTS

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
TOTAL SUBCONTRACTS					\$0.00

SUMMARY OF COSTS

Labor Cost	\$10,853.15	Labor Burden @	0.0%			\$10,853.15
Material Cost	\$0.00	Material Tax @	0.00%	\$0.00		\$0.00
Equipment Cost	\$10,983.66	Equipment Tax @	0.00%	\$0.00		\$10,983.66
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$21,837			\$0	DIRECT COST SUBTOTALS	\$21,837

Additional Pay Item Notes :

Based on using 2 excavators loading 5 trucks each truck is expected to get 10 loads a day,

1.019 Upstream Riprap				
Details				
High Cost Factors		Low Cost Factors		
Bad Weather	0%	No Bad Weather		0%
Gas Price Increase	10%	Gas Price Decrease		10%
Unforeseen Contaminated Mats/ Access Issues	0%	No Unforeseen Contaminated Mats/ Access Issues		0%
	10%			10%
Production Per Hour		Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)	Overall Production
		75	8	420
			10	525
Haul Notes		Excavator Loading Production per shift		
CY	1,300.00		CY per Hour	74
Swell Factor	30%		CY Bucket Size	5.00
Bulk CY	1,690.00		Buckets Per Hour	15
Haul Vehicle 85% Capacity (1.3 tons per CY)	27.2		# of Excavators	1.00
# of Haul Vehicles			CY per Hour (5 CY Bucket)	74
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	5		CY Per Hour Ideal Production Per 8 Hour Shift	160
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) Minutes)	4		Efficient Compared to Ideal Production	46%
Haul Speed (Loaded MPH)	9		Inefficiencies Compared to Ideal Production	54%
Return Speed (Unloaded MPH)	10			
Haul Distance (Miles)	0.50			
Shift Length (Hours)	10			
Cyce Time				
Load Time (Load Time Minutes / 60mins)	0.08			
Haul Time (Haul Distance / Haul Speed)	0.06			
Dump Time (Dump Time Minutes / 60 Mins)	0.07			
Return Time (Haul Distance / Return Speed)	0.05			
Hours Per Cycle	0.26			
Efficiency Factor (High Work, Traffic Retractions, Coffee Breaks, ECT)	70%			
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.37			
Number of Cycles (Bulk CY/ Haul Vehicle Cap X # of Haul Vehicles)	62			
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	22.94			
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	2.70			
Number of Haul Days	2.3			
Speed Loaded				
	Max Weight lbs of loaded 745	164,500.00		
	Tons	82.25		
	20lbs/Ton Rolling weighth	4		
	Rolling Resistance (1% for each 20lbs/Ton)	4%		
	Slope Grade	8%		
	Total Resistance	12%		
	Max Gear per CAT Chart	4		
	Max MPH	8.6		
Speed Empty				
	Max Weight lbs of Empty 745	74,100.00		
	Tons Empty	37.05		
	20lbs/Ton Rolling weight Empty	2		
	Rolling Resistance (1% per 20lbs/Ton) Empty	2%		
	Average Slope Empty	8%		
	Total Resistance Empty	10%		
	Max Gear per CAT Chart Empty	5		
	Max MPH Empty	10		
Other Notes				

1.020 Miscellaneous Excavation (Dam Earth Section)			
High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	10%	Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues	0%
	20%		10%
Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Etc)	Overall Production
	400	8	70%
		10	70%
			2240
			2800
Haul Notes		Excavator Loading Production per shift	
CY		132,500.00 CY per Hour	80
Swirl Factor		30% CY Bucket Size	5.00
Bulk CY		172,250.00 Buckets Per Hour	16
Haul Vehicle 85% Capacity (1.3 tons per CY)		27.3 # of Excavators	1.00
# of Haul Vehicles		5 CY per Hour (5 CY Bucket)	80
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)		5 CY Per Hour Ideal Production Per 8 Hour Shift	160
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)		3 Efficient Compared to Ideal Production	50%
Haul Speed (Loaded MPH)		3 Inefficiencies Compared to Ideal Production	50%
Return Speed (Unloaded MPH)		10	
Haul Distance (Miles)		0.50	
Shift Length (Hours)		10	
Cycle Time			
Load Time (Load Time Minutes / Editing)		0.08	
Haul Time (Haul Distance / Haul Speed)		0.06	
Dump Time (Dump Time Minutes / Edit Min)		0.05	
Return Time (Haul Distance / Return Speed)		0.05	
Hours Per Cycle		0.24	
Efficiency Factor (night Work, Traffic Restrictions, Cuffs Breaks, ECT)		70%	
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)		0.34	
Number of Cycles/Bulk CY (Haul Vehicle Cap X # of Haul Vehicles)		1,087	
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)		430.76	
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)		2.84	
Number of Haul Days		43.076	
Speed Loaded		164,500.00	
Max Weight Bcs of loaded 745			
Tons		82	
20lbs/Ton Rolling weight		4	
Rolling Resistance (1% for each 20lbs/Ton)		4%	
Slope Grade		8%	
Total Resistance		12%	
Max Gear per CAT Chart		4	
Max MPH		8.8	
Speed Empty		74,100.00	
Max Weight Bcs of Empty 745			
Tons Empty		37	
20lbs/Ton Rolling weight Empty		2	
Rolling Resistance (1% per 20lbs/Ton) Empty		2%	
Average Slope Empty		8%	
Total Resistance Empty		4%	
Max Gear per CAT Chart Empty N/A			
Max MPH Empty N/A			
Notes Due to weight and Grade Speed Calculation is not applicable			
Other Notes			
Overall efficiency is reduced to account for developing initial access for trucks, maintaining access as dam elevation lowers, and any down time. Disposal site is roughly 1/2 mile away from earth dam location trucks are expected to run slower loaded due to rolling resistance being high and driving up a slight incline to disposal site (Roughly a 7% Slope)			

1.021 Cutoff Wall Concrete Demolition

PAY ITEM NUMBER	:	1.021	Project	:	KRRP - JC Boyle
Description	:	Cutoff Wall Concrete Demolition	Group	:	D07
Quantity	1.021	70.00 CY			
Daily Production	1.021	80.00 CY per	10	hour shift	
Work Days	1.021	0.9 Days	Project #	:	1
Unit Price	1.021	\$126.12 per CY	Estimator	:	Eric Jones
Total Cost	1.021	\$8,829	CY per		Total Cost
			Probable Low Cost Parameter	84.00	\$99.85
			Probable High Cost Parameter	68.00	\$10,153
					Unit Price Per CY
					\$149.31

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Hydraulic Excavator (2.5cy)	Active	2.00	0.9	10	18.00	E	\$205.40	incl. in rate	incl. in rate	\$3,697.20
Truck, Off-Road, Articulated Rear, 20cy	Active	1.00	0.9	10	9.00	E	\$117.28	incl. in rate	incl. in rate	\$1,055.52
Truck, Pickup (4x4, 3/4tn)	Active	1.00	0.9	10	9.00	E	\$16.99	incl. in rate	incl. in rate	\$152.91
Hydraulic Impact Breaker Attachment (5k+ ft-lb)	Active	1.00	0.9	10	9.00	E	\$63.28	incl. in rate	incl. in rate	\$569.52
Labor Foreman	Active	1.00	0.9	10	9.00	L	\$58.87	incl. in rate	incl. in rate	\$529.85
Laborer	Active	2.00	0.9	10	18.00	L	\$51.07	incl. in rate	incl. in rate	\$919.31
Equipment Operator (medium)	Active	2.00	0.9	10	18.00	L	\$72.34	incl. in rate	incl. in rate	\$1,302.05
Truck Driver (heavy)	Active	1.00	0.9	10	9.00	L	\$66.92	incl. in rate	incl. in rate	\$602.32
Labor Hours					54	TOTAL LABOR				\$3,353.53
Equipment Hours					45	TOTAL EQUIPMENT				\$5,475.15

[illegible]

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
TOTAL SUBCONTRACTS					\$0.00

Labor Cost	\$3,353.53	Labor Burden @	0.0%		\$3,353.53
Material Cost	\$0.00	Material Tax @	0.00%	\$0.00	\$0.00
Equipment Cost	\$5,475.15	Equipment Tax @	0.00%	\$0.00	\$5,475.15
Subcontractors	\$0.00				\$0.00
DIRECT COST SUBTOTALS	\$8,829		\$0	DIRECT COST SUBTOTALS	\$8,829

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1.021 Cutoff Wall Concrete Demolition Details				
High Cost Factors		Low Cost Factors		
Bad Weather	0%	No Bad Weather		0%
Gas Price Increase	10%	Gas Price Decrease		0%
Unforeseen Contaminated Mats/ Access Issues	5%	No Unforeseen Contaminated Mats/ Access Issues		0%
	15%			5%
Production Per Hour		Overall Production		
	Hours			
	8	8	64	
		10	80	
Haul Notes		Excavator Loading Production per shift		
CY	70.00	CY per Hour		20.69
Swell Factor	60%	CY Bucket Size		2.50
Bulk CY	112	Buckets Per Hour		8
Haul Vehicle 60% Capacity (2 tons per CY)	12	# of Excavators		1.00
# of Haul Vehicles	1	CY per Hour (2.5 CY Bucket)		21
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	5	CY Per Hour Ideal Production Per 8 Hour Shift		95
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)	5	Efficient Compared to Ideal Production		22%
Haul Speed (Loaded MPH)	15	Inefficiencies Compared to Ideal Production		78%
Return Speed (Unloaded MPH)	20			
Haul Distance (Miles) Along Power Canal	2.58			
Shift Length (Hours)	10			
Cycle Time		Breaker Production		
Load Time (Load Time Minutes / 60mins)	0.08	Hydraulic Hammer CY per Hour		8
Haul Time (Haul Distance / Haul Speed)	0.17	# of Hammers		1.00
Dump Time (Dump Time Minutes / 60 Mins)	0.08	CY per Hour		8
Return Time (Haul Distance / Return Speed)	0.13	CY per Hour Back Check		8
Hours Per Cycle	0.46	32CY per HR per 8hr shift (Ideal prod)		32
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	80%	Efficient Compared to Ideal Production		25%
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.58	Inefficiencies Compared to Ideal Production		75%
Number of Cycles(Bulk CY/ Haul Vehicle Cap X # of Haul Vehicles)	9			
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	5.22			
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	1.72			
Number of Haul Days	0.522			
Speed Loaded				
	Max Weight lbs of loaded 725	103,707.00		
	Tons	52		
	20lbs/Ton Rolling weighth	3		
	Rolling Resistance (1% for each 20lbs/Ton)	3%		
	Average Slope	2%		
	Total Resistance	5%		
	Max Gear per CAT Chart	4		
	Max MPH	15		
Speed Empty				
	Max Weight lbs of Empty 725	50,795.00		
	Tons Empty	25		
	20lbs/Ton Rolling weight Empty	1		
	Rolling Resistance (1% per 20lbs/Ton) Empty	1%		
	Average Slope Empty	2%		
	Total Resistance Empty	3%		
	Max Gear per CAT Chart Empty	5		
	Max MPH Empty	20		
Other Notes				
Due to the low demolition quantity it is expected that the equipment will be less efficient when compared to ideal productions.				

SUMMARY OF COSTS									
Labor Cost	\$3,896.64	Labor Burden @	49.7%	\$0.00					\$3,896.64
Material Cost	\$584.50	Material Tax @	0.0%	\$0.00					\$584.50
Equipment Cost	\$640.50	Equipment Tax @	0.0%	\$0.00					\$640.50
Subcontractors	\$200.00								\$200.00
DIRECT COST SUBTOTALS	\$5,322			\$0				DIRECT COST SUBTOTALS	\$5,322
Additional Pay Item Notes :									

1.024 Remove & Dispose Spillway Radial Gates and Hoists

PAY ITEM NUMBER	:	1.024	Project	:	KRRP - JC Boyle
Description	:	Remove & Dispose Spillway Radial Gates and Hoists	Group	:	D03
Quantity	:	124,000.00 LBS			
Daily Production	:	25,000.00 LBS per	10	hour shift	
Work Days	:	5.0 Days	Estimator	:	Mihaela Tomulescu
Unit Price	:	\$0.42 per LBS	Probable Low Cost Parameter	:	LBS per 27,500.00
Total Cost	:	\$52,024	Probable High Cost Parameter	:	Total Cost \$46,821
					Unit Price Per LBS \$1.70
					\$4.32

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	5.0	10	50.00	L	\$58.87	incl. in rate	incl. in rate	\$2,943.60
Laborer	Active	2.00	5.0	10	100.00	L	\$51.07	incl. in rate	incl. in rate	\$5,107.30
Ironworkers	Active	2.00	5.0	10	100.00	L	\$78.16	incl. in rate	incl. in rate	\$7,815.50
Equipment Operator (crane)	Active	1.00	5.0	10	50.00	L	\$81.60	incl. in rate	incl. in rate	\$4,079.90
Equipment Operator (medium)	Active	1.00	5.0	10	50.00	L	\$72.34	incl. in rate	incl. in rate	\$3,616.80
Crawler Crane (130tn)	Active	1.00	5.0	10	50.00	E	\$262.91	incl. in rate	incl. in rate	\$13,145.50
Loader, FE Rubber Tire (3.5cy)	Active	1.00	5.0	10	50.00	E	\$63.11	incl. in rate	incl. in rate	\$3,155.50
Acetylene Torches	Active	2.00	5.0	10.00	100.00	E	\$0.47	incl. in rate	incl. in rate	\$47.00
Labor Hours					350	TOTAL LABOR				\$23,563.10
Equipment Hours					200	TOTAL EQUIPMENT				\$16,348.00

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 15% labor (saw blades, drill bits, torch gas, etc)	1.00	LS	1.000	1.00	\$3,534.47	\$3,534.47
TOTAL MATERIAL						\$3,534.47

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (20% of material)					
	12.40	ton	1,000	12.40	\$595.00
Hauling Disposal Cost 30 Miles to Klamath County	4.00	Loads	20 tons a load		\$300.00
TOTAL SUBCONTRACTS					\$8,578.00

Labor Cost	\$23,563.10	Labor Burden @	49.7%	\$0.00		\$23,563.10
Material Cost	\$3,534.47	Material Tax @	0.0%	\$0.00		\$3,534.47
Equipment Cost	\$16,348.00	Equipment Tax @	0.0%	\$0.00		\$16,348.00
Subcontractors	\$8,578.00					\$8,578.00
DIRECT COST SUBTOTALS	\$52,024			\$0		DIRECT COST SUBTOTALS \$52,024

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PAY ITEM INFORMATION

1.026 Remove & Dispose of 24" Slide Gate at Entrance to Fish Ladder Structure

SUMMARY OF COSTS					
Labor Cost	\$1,965.54	Labor Burden @	49.7%	\$0.00	\$1,965.54
Material Cost	\$294.83	Material Tax @	0.0%	\$0.00	\$294.83
Equipment Cost	\$1,632.30	Equipment Tax @	0.0%	\$0.00	\$1,632.30
Subcontractors	\$1,549.50				\$1,549.50
DIRECT COST SUBTOTALS	\$5,442		\$0	DIRECT COST SUBTOTALS	\$5,442
Additional Pay Item Notes :					

[illegible]

CREW COSTS

MATERIAL COSTS

SUBCONTRACT COSTS

SUMMARY OF COSTS

Additional Pay Item Notes :

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SUMMARY OF COSTS									
Labor Cost	\$2,601.68	Labor Burden @	49.7%	\$0.00					\$2,601.68
Material Cost	\$0.00	Material Tax @	0.0%	\$0.00					\$0.00
Equipment Cost	\$824.30	Equipment Tax @	0.0%	\$0.00					\$824.30
Subcontractors	\$300.00								\$300.00
DIRECT COST SUBTOTALS	\$3,726			\$0				DIRECT COST SUBTOTALS	\$3,726
Additional Pay Item Notes :									
Assumed that electrical crew formed of 1 Foreman and 1 Electricians will work two days to unconnected and remove the distribution panels. They are going to use same crane and a truck for disposal of spillway intake, trash rake and radial motor & control panel. Assumed weight:500 LBS									

1.029 Remove Powerhouse Concrete down to Elevation 3324.0				
Details				
High Cost Factors		Low Cost Factors		
Bad Weather	0%	No Bad Weather		0%
Gas Price Increase	10%	Gas Price Decrease		10%
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues		0%
	20%			10%
Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Etc)	Overall Production	
	30	8	35%	84.00
		10	35%	105.00
Haul Notes		Excavator Loading Production per shift		
CY	1,500.00	CY per Hour		22
Swell Factor		60% CY Bucket Size		2.50
Bulk CY	2400	Buckets Per Hour		9
Haul Vehicle 60% Capacity (2 tons per CY)		12 # of Excavators		1.00
# of Haul Vehicles		2 CY per Hour (5 CY Bucket)		22
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)		5 CY Per Hour Ideal Production Per 8 Hour Shift		95
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)		3 Efficient Compared to Ideal Production		23%
Haul Speed (Loaded MPH)	15.00	Inefficiencies Compared to Ideal Production		77%
Return Speed (Unloaded MPH)	20.00			
Haul Distance (Miles) Along Power Canal	2.58			
Shift Length (Hours)	10			
		Breaker Production		
Cycle Time		Hydraulic Hammer CY per Hour		1
Load Time (Load Time Minutes / 60mins)	0.08	# of Hammers		10.50
Haul Time (Haul Distance / Haul Speed)	0.17	CY per Hour		10.5
Dump Time (Dump Time Minutes / 60 Mins)	0.05	CY per Hour Back Check		32
Return Time (Haul Distance / Return Speed)	0.13	32CY per HR per 8hr shift (ideal prod)		0.328125
Hours Per Cycle	0.43	Efficient Compared to Ideal Production		67%
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	80%	Inefficiencies Compared to Ideal Production		0%
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.54			
Number of Cycles/ Bulk CY/ (Haul Vehicle Cap X # of Haul Vehicles)	100			
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	54	Drilling and Blasting Production per shift		
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	1.85	Drilling and Blasting CY per Hour		10.5
Number of Haul Days		5 # of Drills		1.00
		CY per Hour		10.5
		CY per Hour Back Check		10.5
		36CY per HR per 8hr shift (ideal prod)		38
Speed Loaded		Efficient Compared to Ideal Production		28%
		Inefficiencies Compared to Ideal Production		72%
	Max Weight lbs of loaded 725	103,707.00		
	Tons	52		
	20lbs/Ton Rolling weighth	3		
	Rolling Resistance (1% for each 20lbs/Ton)	3%		
	Slope Grade	7%		
	Total Resistance	9%		
	Max Gear per CAT Chart	4		
	Max MPH	15		
Speed Empty				
	Max Weight lbs of Empty 725	50,795.00		
	Tons Empty	25		
	20lbs/Ton Rolling weight Empty	1		
	Rolling Resistance (1% per 20lbs/Ton) Empty	1%		
	Average Slope Empty	7%		
	Total Resistance Empty	8%		
	Max Gear per CAT Chart Empty	5		
	Max MPH Empty	20		



Other Notes
This estimate presents that the power house concrete will be demolished by using a combination of blasting and concrete breakers/ Crushers. It is expected that the power house concrete will have dense reinforcement and other embedded items and the efficiency has been reduced to account for the time it will take for extra processing time. Steel cutting and a crane have been added for .25 of the time to account for removing the draft tube as the concrete demolition progresses.

PAY ITEM COST DETAIL WORKSHEET

1.030 Remove Structural Steel Item associated with Powerhouse

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.030	Project	:	KRRP - JC Boyle				
Description	:	Remove Structural Steel Item associated with Powerhouse	Group	:	D10				
Quantity	:	94,000.00 LBS	Project #	:	1				
Daily Production	:	19,000.00 LBS per	Estimator	:	Mihaela Tomulescu				
Work Days	:	4.9 Days	Probable Low Cost Parameter	:	20,900.00				
Unit Price	:	\$0.56 per LBS	Probable High Cost Parameter	:	16,150.00				
Total Cost	:	\$52,405				Total Cost	:	\$47,165	Unit Price Per LBS
								\$2.26	
								\$3.73	

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	4.9	10	49.00	L	\$58.87	incl. in rate	incl. in rate	\$2,884.73
Laborer	Active	3.00	4.9	10	147.00	L	\$51.07	incl. in rate	incl. in rate	\$7,507.73
Steelworker	Active	2.00	4.9	10	98.00	L	\$78.10	incl. in rate	incl. in rate	\$7,653.80
Equipment Operator (crane)	Active	1.00	4.9	10	49.00	L	\$81.60	incl. in rate	incl. in rate	\$3,998.30
Equipment Operator (medium)	Active	1.00	4.9	10	49.00	L	\$72.34	incl. in rate	incl. in rate	\$3,544.46
Crawler Crane (130tn)	Active	1.00	4.9	10	49.00	E	\$262.91	incl. in rate	incl. in rate	\$12,882.59
Loader, FE Rubber Tire (5.25cy)	Active	1.00	4.9	10	49.00	E	\$76.00	incl. in rate	incl. in rate	\$3,724.00
					Labor Hours	392	TOTAL LABOR			\$25,589.03
					Equipment Hours	98	TOTAL EQUIPMENT			\$16,606.59

MATERIAL COSTS							
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost	
Consumables 15% labor (saw blades, drill bits, torch gas, etc)	1.00	LS	1.000	1.00	\$3,838.35	\$3,838.35	
TOTAL MATERIAL							\$3,838.35

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (10%)	4.70	ton	1.000	4.70	\$595.00
Hauling Disposal Cost	3.00	Loads	20 tons a load		\$200.00
Selective demolition, torch cutting, steel, 1" thick plate (assumption)	3,500.00	LF	1.000	3,500.00	\$0.85
					\$2,796.50
					\$600.00
					\$2,975.00
					TOTAL SUBCONTRACTS
					\$6,371.50

SUMMARY OF COSTS									
Labor Cost	\$25,589.03	Labor Burden @	49.7%	\$0.00					\$25,589.03
Material Cost	\$3,838.35	Material Tax @	0.0%	\$0.00					\$3,838.35
Equipment Cost	\$16,606.59	Equipment Tax @	0.0%	\$0.00					\$16,606.59
Subcontractors	\$6,371.50								\$6,371.50
DIRECT COST SUBTOTALS	\$52,405			\$0			DIRECT COST SUBTOTALS		\$52,405
Additional Pay Item Notes :									

PAY ITEM COST DETAIL WORKSHEET

1.032 Remove & Dispose of 2 - Governor oil systems

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.032	Project	:	KRRP - JC Boyle				
Description	:	Remove & Dispose of 2 - Governor oil systems	Group	:	D03				
Quantity	:	52,500.00 LBS	Project #	:	1	LBS per	Total Cost	Unit Price Per LBS	
Daily Production	:	18,000.00 LBS per	Estimator	:	Mihaela Tomulescu	18,900.00	\$48,403	\$2.56	
Work Days	:	2.9 Days	Probable Low Cost Parameter	:		15,300.00	\$58,594	\$3.83	
Unit Price	:	\$0.97 per LBS	Probable High Cost Parameter	:					
Total Cost	:	\$50,951		:					

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	2.9	10	29.00	L	\$55.80	incl. in rate	incl. in rate	\$1,618.29
Electrician	Active	1.00	2.9	10	29.00	L	\$55.80	incl. in rate	incl. in rate	\$1,618.29
Ironworkers	Active	4.00	2.9	10	116.00	L	\$78.16	incl. in rate	incl. in rate	\$9,065.98
Hydraulic Excavator (5.0cy)	Active	1.00	2.9	10	29.00	E	\$276.50	incl. in rate	incl. in rate	\$8,018.50
Hydraulic Crane (80tn)	Active	1.00	2.9	10	29.00	E	\$197.66	incl. in rate	incl. in rate	\$5,732.14
Equipment Operator (medium)	Active	1.00	2.9	10	29.00	L	\$72.34	incl. in rate	incl. in rate	\$2,097.74
Equipment Operator (crane)	Active	1.00	2.9	10	29.00	L	\$81.60	incl. in rate	incl. in rate	\$2,366.34
Labor Hours					232	TOTAL LABOR				\$16,766.64
Equipment Hours					58	TOTAL EQUIPMENT				\$13,750.64

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 15% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$2,515.00	\$2,515.00
TOTAL MATERIAL						\$2,515.00

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	26.25	ton	1.000	26.25	\$595.00
Hauling Disposal Cost 30 Miles to Klamath County Landfill	2.00	Loads	20 tons a load		\$300.00
Selective demolition, torch cutting, steel, 1" thick plate (assumption)	2,000.00	LF	1.000	2,000.00	\$0.85
TOTAL SUBCONTRACTS					\$17,918.75

SUMMARY OF COSTS						
Labor Cost	\$16,766.64	Labor Burden @	49.7%	\$0.00		\$16,766.64
Material Cost	\$2,515.00	Material Tax @	0.0%	\$0.00		\$2,515.00
Equipment Cost	\$13,750.64	Equipment Tax @	0.0%	\$0.00		\$13,750.64
Subcontractors	\$17,918.75					\$17,918.75
DIRECT COST SUBTOTALS	\$50,951			\$0	DIRECT COST SUBTOTALS	\$50,951
Additional Pay Item Notes :						

PAY ITEM COST DETAIL WORKSHEET

1.033 Remove & Dispose of Cooling water and bearing oil systems

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.033			Project	:	KRRP - JC Boyle		
Description	:	Remove & Dispose of Cooling water and bearing oil systems			Group	:	D03		
Quantity	:	6,500.00 LBS							
Daily Production	:	14,000.00 LBS per			10	hour shift	Project #	:	1
Work Days	:	0.5 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$1.14 per LBS			Probable Low Cost Parameter	:	15,400.00	\$6,656	\$0.43
Total Cost	:	\$7,395			Probable High Cost Parameter	:	11,900.00	\$8,504	\$0.71

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.5	10	5.00	L	\$58.87	incl. in rate	incl. in rate	\$294.36
Laborer	Active	1.00	0.5	10	5.00	L	\$51.07	incl. in rate	incl. in rate	\$255.37
Steelworker	Active	1.00	0.5	10	5.00	L	\$78.10	incl. in rate	incl. in rate	\$390.50
Loader, FE Rubber Tire (8.6cy)	Active	1.00	0.5	10	5.00	E	\$225.40	incl. in rate	incl. in rate	\$1,127.00
Truck Driver (heavy)	Active	1.00	0.5	10	5.00	L	\$75.72	incl. in rate	incl. in rate	\$378.62
Truck, Off-Road, Articulated Rear, 20cy	Active	1.00	0.5	10	5.00	E	\$117.28	incl. in rate	incl. in rate	\$586.40
Equipment Operator (light)	Active	1.00	0.5	10	5.00	L	\$69.19	incl. in rate	incl. in rate	\$345.95
Labor Hours					25	TOTAL LABOR				\$1,664.80
Equipment Hours					10	TOTAL EQUIPMENT				\$1,713.40

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$83.24	\$83.24
						TOTAL MATERIAL
						\$83.24

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum					
Hauling Disposal Cost 30 Miles to Klamath County Landfill	3.25	ton	1.000	3.25	\$595.00
	1.00	Loads	20 tons a load		\$300.00
Selective demolition, torch cutting, steel, 1" thick plate (assumption)	2,000.00	LF	1.000	2,000.00	\$0.85
					TOTAL SUBCONTRACTS
					\$3,933.75

SUMMARY OF COSTS					
Labor Cost	\$1,664.80	Labor Burden @	49.7%	\$0.00	\$1,664.80
Material Cost	\$83.24	Material Tax @	0.0%	\$0.00	\$83.24
Equipment Cost	\$1,713.40	Equipment Tax @	0.0%	\$0.00	\$1,713.40
Subcontractors	\$3,933.75				\$3,933.75
DIRECT COST SUBTOTALS	\$7,395			\$0	DIRECT COST SUBTOTALS
					\$7,395

Additional Pay Item Notes :

Used RS Means : Assumed " Pipe, metal pipe, to 1-1/2" diam., selective demolition", 2390 LF of 1 1/2" oil pipes at 2.72 Lbs/LF. Used 1 Forman, 1 Steelworkers to cut the pipes and 1 Laborers to load the pipes in the truck. The cooling and lubrication systems for the Hydroelectric Barge turbine, speed increaser and generator will be a combination of water and oil. These systems will be isolated from the water passages so that no contamination of passing water will occur. The following is a list of hazardous materials, substances, chemicals, and wastes normally found at a hydropower facility that may require disposal actions if not recycled or reused for their intended purpose:

1. Polychlorinated Biphenyls (PCBs)
2. Asbestos
3. Paint/abrasive blast grit (red lead paint)
4. Oil
5. Mercury
6. Antifreeze
7. Halogenated and non-halogenated solvents
8. Greases
9. Pesticides (includes herbicides, insecticides, and wood preservatives)
10. Petroleum contaminated
11. Chlorinated fluorocarbons (CFCs) Freon/Halon
12. Gasoline/diesel (includes product and sludge in tanks)
13. Batteries (includes acid)
14. Water treatment sludge (septic tanks/wastewater treatment). Assumed hazardous waste 100% of the total lbs

PAY ITEM COST DETAIL WORKSHEET

1.034 Remove & Dispose of 2 - Francis Turbines

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.034		Project	:	KRRP - JC Boyle			
Description	:	Remove & Dispose of 2 - Francis Turbines		Group	:	D03			
Quantity	:	560,000.00 LBS							
Daily Production	:	28,000.00	LBS per	10	hour shift	Project #	:	1	
Work Days	:	20.0	Days			Estimator	:	Mihaela Tomulescu	
Unit Price	:	\$0.47	per LBS			Probable Low Cost Parameter	:	32,200.00	LBS per
Total Cost	:	\$261,076				Probable High Cost Parameter	:	21,000.00	Total Cost
								\$221,915	Unit Price Per LBS
								\$6.89	
								\$326,345	
								\$15.54	

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	20.0	10	200.00	L	\$58.87	incl. in rate	incl. in rate	\$11,774.40
Laborer	Active	3.00	20.0	10	600.00	L	\$51.07	incl. in rate	incl. in rate	\$30,643.80
Electrician Foreman	Active	1.00	20.0	10	200.00	L	\$55.80	incl. in rate	incl. in rate	\$11,160.60
Electrician	Active	2.00	20.0	10	400.00	L	\$55.80	incl. in rate	incl. in rate	\$22,321.20
Steelworker	Active	2.00	20.0	10	400.00	L	\$78.10	incl. in rate	incl. in rate	\$31,240.00
Millwright	Active	2.00	20.0	10	400.00	L	\$82.04	incl. in rate	incl. in rate	\$32,815.20
Equipment Operator (medium)	Active	1.00	20.0	10	200.00	L	\$72.34	incl. in rate	incl. in rate	\$14,467.20
Equipment Operator (crane)	Active	1.00	20.0	10	200.00	L	\$81.60	incl. in rate	incl. in rate	\$16,319.60
Hydraulic Crane (50tn)	Active	1.00	20.0	10	200.00	E	\$136.20	incl. in rate	incl. in rate	\$27,240.00
Loader, FE Rubber Tire (3.5cy)	Active	1.00	20.0	10	200.00	E	\$63.11	incl. in rate	incl. in rate	\$12,622.00
Acetylene Torches	Active	2.00	20.0	10.00	400.00	E	\$0.47	incl. in rate	incl. in rate	\$188.00
					Labor Hours	2600				TOTAL LABOR
					Equipment Hours	800				TOTAL EQUIPMENT
										\$170,742.00
										\$40,050.00

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$17,074.20	\$17,074.20
(assumption)	3,000.00	LF	1.000	3,000.00	\$0.85	\$2,550.00
TOTAL MATERIAL						\$19,624.20

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (10%)	28.00	ton	1.000	28.00	\$595.00
Hauling Disposal Cost 30 Miles to Klamath County Landfill (wide Load)	14.00	Loads	1.000	14.00	\$1,000.00
TOTAL SUBCONTRACTS					\$30,660.00

SUMMARY OF COSTS					
Labor Cost	\$170,742.00	Labor Burden @	49.7%	\$0.00	\$170,742.00
Material Cost	\$19,624.20	Material Tax @	0.0%	\$0.00	\$19,624.20
Equipment Cost	\$40,050.00	Equipment Tax @	0.0%	\$0.00	\$40,050.00
Subcontractors	\$30,660.00				\$30,660.00
DIRECT COST SUBTOTALS	\$261,076			\$0	DIRECT COST SUBTOTALS
					\$261,076

Additional Pay Item Notes :	
<p>The crew will open the engine side panels, and remove the nacelle access panels. Then they will disconnect the engine thermocouple leads at the terminal board. Before disconnecting any lines all fuel, oil, and hydraulic fluid valves are closed. All lines will be plug as they are disconnected to prevent entrance of foreign material. Remove the clamps securing the bleed-air ducts at the firewall. Then, disconnect the electrical connector plugs, engine breather and vent lines, and fuel, oil, and hydraulic lines. Disconnect the engine power lever and propeller control rods or cables. Remove the covers from the lift points, attach the sling, and remove slack from the cables using a suitable hoist. The sling must be adjusted to position. Remove the engine mount bolts then the engine is ready to be removed. Move the engine forward, out of the nacelle structure. Lower the engine into position on the stand, and secure it prior to removing the engine sling. The crew will cut into manageable pieces and the overhead crane with support of a crawler crane will load the turbines on to disposal trucks. Due to size of the loads it is expected to have extra hauling cost to account for lead cars and potential permits.</p>	

PAY ITEM COST DETAIL WORKSHEET

1.035 Remove & Dispose of 150 Ton crane

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.035	Project	:	KRRP - JC Boyle				
Description	:	Remove & Dispose of 150 Ton crane	Group	:	D10				
Quantity	:	240,000.00 LBS	Project #	:	1				
Daily Production	:	30,000.00 LBS per	Estimator	:	Mihaela Tomulescu				
Work Days	:	8.0 Days	Probable Low Cost Parameter	:	LBS per 34,500.00				
Unit Price	:	\$0.43 per LBS	Probable High Cost Parameter	:	24,000.00				
Total Cost	:	\$102,116		:	Total Cost \$86,799				
				:	Unit Price Per LBS \$2.52				
				:	\$5.11				

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	8.0	10	80.00	L	\$58.87	incl. in rate	incl. in rate	\$4,709.76
Laborer	Active	3.00	8.0	10	240.00	L	\$51.07	incl. in rate	incl. in rate	\$12,257.52
Ironworkers	Active	3.00	8.0	10	240.00	L	\$78.16	incl. in rate	incl. in rate	\$18,757.20
Equipment Operator (medium)	Active	1.00	8.0	10	80.00	L	\$72.34	incl. in rate	incl. in rate	\$5,786.88
Equipment Operator (crane)	Active	1.00	8.0	10	80.00	L	\$81.60	incl. in rate	incl. in rate	\$6,527.84
Crawler Crane (130tn)	Active	1.00	8.0	10	80.00	E	\$262.91	incl. in rate	incl. in rate	\$21,032.80
Hydraulic Excavator (2.5cy)	Active	1.00	8.0	10	80.00	E	\$205.40	incl. in rate	incl. in rate	\$16,432.00
					Labor Hours	720	TOTAL LABOR			\$48,039.20
					Equipment Hours	160	TOTAL EQUIPMENT			\$37,464.80

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$2,401.96	\$2,401.96
						TOTAL MATERIAL
						\$2,401.96

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (15% of total weight)	18.00	ton	1.000	18.00	\$595.00
Hauling Disposal Cost 30 Miles to Klamath County Landfill	6.00	Loads	20 tons a load		\$300.00
(assumption)	2,000.00	LF	1.000	2,000.00	\$0.85
					TOTAL SUBCONTRACTS
					\$14,210.00

SUMMARY OF COSTS						
Labor Cost	\$48,039.20	Labor Burden @	49.7%	\$0.00		\$48,039.20
Material Cost	\$2,401.96	Material Tax @	0.0%	\$0.00		\$2,401.96
Equipment Cost	\$37,464.80	Equipment Tax @	0.0%	\$0.00		\$37,464.80
Subcontractors	\$14,210.00					\$14,210.00
DIRECT COST SUBTOTALS	\$102,116			\$0	DIRECT COST SUBTOTALS	\$102,116
Additional Pay Item Notes :						

PAY ITEM COST DETAIL WORKSHEET

1.036 Remove & Dispose of Compressed Air systems

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.036			Project	:	KRRP - JC Boyle		
Description	:	Remove & Dispose of Compressed Air systems			Group	:	D03		
Quantity	:	1,100.00 LBS							
Daily Production	:	7,500.00	LBS per	10	hour shift	Project #	:	1	
Work Days	:	0.147	Days			Estimator	:	Mihaela Tomulescu	
Unit Price	:	\$0.88	per LBS			Probable Low Cost Parameter		8,250.00	\$868
Total Cost	:	\$965				Probable High Cost Parameter		5,625.00	\$1,206
									Unit Price Per LBS
									\$0.11
									\$0.21

CREW COSTS										
Description	Active Idle	# In crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Loader, FE Rubber Tire (5.25cy)	Active	1.00	0.1	10	1.47	E	\$76.00	incl. in rate	incl. in rate	\$111.47
Laborer	Active	3.00	0.1	10	4.40	L	\$51.07	incl. in rate	incl. in rate	\$224.72
Steelworker	Active	1.00	0.1	10	1.47	L	\$78.10	incl. in rate	incl. in rate	\$114.55
Equipment Operator (light)	Active	1.00	0.1	10	1.47	L	\$69.19	incl. in rate	incl. in rate	\$101.48
Labor Foreman	Active	1.00	0.1	10	1.47	L	\$58.87	incl. in rate	incl. in rate	\$86.35
					Labor Hours	8.8	TOTAL LABOR			\$527.09
					Equipment Hours	1.466666667	TOTAL EQUIPMENT			\$111.47

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$26.35	\$26.35
						TOTAL MATERIAL
						\$26.35

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal Cost 30 Miles to Klamath County Landfill	1.00	Loads	20 tons a load	\$300.00	\$300.00
					TOTAL SUBCONTRACTS
					\$300.00

SUMMARY OF COSTS									
Labor Cost	\$527.09	Labor Burden @	49.7%	\$0.00					\$527.09
Material Cost	\$26.35	Material Tax @	0.0%	\$0.00					\$26.35
Equipment Cost	\$111.47	Equipment Tax @	0.0%	\$0.00					\$111.47
Subcontractors	\$300.00								\$300.00
DIRECT COST SUBTOTALS		\$965		\$0				DIRECT COST SUBTOTALS	\$965
Additional Pay Item Notes :									
Used RS Means : Pipe, metal pipe, to 1-1/2" diam., selective demolition, 400 LF of 1 1/2" pipes at 2.72 Lbs/LF. Used 1 Steelworkers to cut the pipes and 3 Laborers for hauling.									

PAY ITEM COST DETAIL WORKSHEET

1.037 Remove & Dispose of 2 - CO2 systems

PAY ITEM INFORMATION										
PAY ITEM NUMBER	:	1.037			Project	:	KRRP - JC Boyle			
Description	:	Remove & Dispose of 2 - CO2 systems			Group	:	D03			
Quantity	:	6,600.00 LBS								
Daily Production	:	7,500.00 LBS per			10	hour shift	Project #	:	1	
Work Days	:	0.9 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost	Unit Price Per LBS
Unit Price	:	\$0.68 per LBS			Probable Low Cost Parameter			8,250.00	\$4,068	\$0.49
Total Cost	:	\$4,520			Probable High Cost Parameter			6,000.00	\$5,423	\$0.90

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.9	10	9.00	L	\$58.87	incl. in rate	incl. in rate	\$529.85
Laborer	Active	2.00	0.9	10	18.00	L	\$51.07	incl. in rate	incl. in rate	\$919.31
Steelworker	Active	2.00	0.9	10	18.00	L	\$78.10	incl. in rate	incl. in rate	\$1,405.80
Equipment Operator (light)	Active	1.00	0.9	10	9.00	L	\$69.19	incl. in rate	incl. in rate	\$622.71
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.9	10	9.00	E	\$63.11	incl. in rate	incl. in rate	\$567.99
Labor Hours					54	TOTAL LABOR				\$3,477.67
Equipment Hours					9	TOTAL EQUIPMENT				\$567.99

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$173.88	\$173.88
TOTAL MATERIAL						\$173.88

SUBCONTRACT COSTS						
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount	
Hauling Disposal Cost 30 Miles to Klamath County Landfill	1.00	Loads	20 tons a load	\$300.00	\$300.00	
TOTAL SUBCONTRACTS					\$300.00	

SUMMARY OF COSTS									
Labor Cost	\$3,477.67	Labor Burden @	49.7%	\$0.00					\$3,477.67
Material Cost	\$173.88	Material Tax @	0.0%	\$0.00					\$173.88
Equipment Cost	\$567.99	Equipment Tax @	0.0%	\$0.00					\$567.99
Subcontractors	\$300.00								\$300.00
DIRECT COST SUBTOTALS	\$4,520			\$0			DIRECT COST SUBTOTALS		\$4,520
Additional Pay Item Notes :									
Used RS Means : Pipe, metal pipe, to 1-1/2" diam., selective demolition, 2430 LF of 1 1/2" pipes at 2.72 Lbs. Used 1 Forman, 2 Steelworkers to cut the pipes and 2 Laborers to load the pipes in the truck.									

Used RS Means: Pipe, metal pipe, to 1-1/2" diam., selective demolition, 2390 LF of 1 1/2" fire protection pipes at 2.72 Lbs. Used 1 Forman, 2 Steelworkers to cut the pipes and 3 Laborers to load the pipes in the truck. Calculated 58.6 miles from JC Boyle to Yreka Transfer Recycling.

Each hydropower facility has at least 150,000 gallons to 250,000 gallons of oil currently in use. This oil would have to be properly disposed of in the event of decommissioning. Oil removed from the turbines and other equipment, including transformer oil, would be either a waste oil or used oil, depending on prior use and contaminants found in the oil. Containerized oil containing contaminants such as solvents are commonly encountered at hydropower facilities. Oil sludge are common in tanks. Oil disposal would likely be costly due to the large volumes found at hydropower facilities and the ease of contamination with other regulated hazardous wastes.

PAY ITEM COST DETAIL WORKSHEET

1.04 Remove & Dispose of Unwatering Piping

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.040			Project	:	KRRP - JC Boyle		
Description	:	Remove & Dispose of Unwatering Piping			Group	:	D05		
Quantity	:	33,000.00	LBS						
Daily Production	:	22,500.00	LBS per	10	hour shift	Project #	:	1	
Work Days	:	1.5	Days		Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.48	per LBS		Probable Low Cost Parameter		27,000.00	\$12,626	\$0.47
Total Cost	:	\$15,783			Probable High Cost Parameter		16,875.00	\$19,728	\$1.17

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.5	10	15.00	L	\$58.87	incl. in rate	incl. in rate	\$883.08
Electrician	Active	1.00	1.5	10	15.00	L	\$55.80	incl. in rate	incl. in rate	\$837.05
Steelworker	Active	4.00	1.5	10	60.00	L	\$78.10	incl. in rate	incl. in rate	\$4,686.00
Loader, FE Rubber Tire (8.6cy)	Active	1.00	1.5	10	15.00	E	\$225.40	incl. in rate	incl. in rate	\$3,381.00
Laborer	Active	2.00	1.5	10	30.00	L	\$51.07	incl. in rate	incl. in rate	\$1,532.19
Gas Welding Machine	Active	4.00	1.5	10	60.00	E	\$2.88	incl. in rate	incl. in rate	\$172.62
Equipment Operator (medium)	Active	1.00	1.5	10	15.00	L	\$72.34	incl. in rate	incl. in rate	\$1,085.04
Labor Hours					135	TOTAL LABOR				\$9,023.36
Equipment Hours					75	TOTAL EQUIPMENT				\$3,553.62

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$451.17	\$451.17
TOTAL MATERIAL						\$451.17

SUBCONTRACT COSTS						
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount	
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (25% from total weight)						
	4.13	ton	1.000	4.13	\$595.00	\$2,454.38
Hauling Disposal Cost 30 Miles to Klamath County Landfill						
	1.00	Loads	20 tons a load		\$300.00	\$300.00
TOTAL SUBCONTRACTS						\$2,754.38

SUMMARY OF COSTS									
Labor Cost	\$9,023.36	Labor Burden @	49.7%	\$0.00				\$9,023.36	
Material Cost	\$451.17	Material Tax @	0.0%	\$0.00				\$451.17	
Equipment Cost	\$3,553.62	Equipment Tax @	0.0%	\$0.00				\$3,553.62	
Subcontractors	\$2,754.38							\$2,754.38	
DIRECT COST SUBTOTALS	\$15,783			\$0		DIRECT COST SUBTOTALS		\$15,783	
Additional Pay Item Notes :									

[illegible]

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.0	10	10.00	L	\$58.87	incl. in rate	incl. in rate	\$588.72
Laborer	Active	1.00	1.0	10	10.00	L	\$51.07	incl. in rate	incl. in rate	\$510.73
Steelworker	Active	1.00	1.0	10	10.00	L	\$78.10	incl. in rate	incl. in rate	\$781.00
Loader, FE Rubber Tire (8.6cy)	Active	1.00	1.0	10	10.00	E	\$225.40	incl. in rate	incl. in rate	\$2,254.00
Equipment Operator (light)	Active	1.00	1.0	10	10.00	L	\$69.19	incl. in rate	incl. in rate	\$691.90
Labor Hours					40	TOTAL LABOR				\$2,572.35
Equipment Hours					10	TOTAL EQUIPMENT				\$2,254.00

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$128.62	\$128.62
TOTAL MATERIAL						\$128.62

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal Cost 30 Miles to Klamath County Landfill	1.00	Loads	20 tons a load	\$300.00	\$300.00
TOTAL SUBCONTRACTS					\$300.00

Labor Cost	\$2,572.35	Labor Burden @	49.7%	\$0.00			\$2,572.35
Material Cost	\$128.62	Material Tax @	0.0%	\$0.00			\$128.62
Equipment Cost	\$2,254.00	Equipment Tax @	0.0%	\$0.00			\$2,254.00
Subcontractors	\$300.00						\$300.00
DIRECT COST SUBTOTALS	\$5,255			\$0		DIRECT COST SUBTOTALS	\$5,255

2750 LF of 1 " drainage pipes at 3.66 Lbs. Used 1 Loader and 1 Forman, 1 Steelworkers to cut the pipes and 1 Laborers to load the pipes in the truck.

PAY ITEM NUMBER	:	1.042	Project	:	KRRP - JC Boyle			
Description	:	Remove & Dispose of 2-Oil Sump pumps	Group	:	D05			
Quantity	:	2,000.00 LBS						
Daily Production	:	7,500.00 LBS per	10	hour shift	Project #	:	1	
Work Days	:	0.3 Days			Estimator	:	Mihaela Tomulescu	
Unit Price	:	\$1.03 per LBS					LBS per	Total Cost
Total Cost	:	\$2.053			Probable Low Cost Parameter		8,250.00	\$1,848
					Probable High Cost Parameter		6,375.00	\$2,361
								Unit Price Per LBS
								\$0.22
								\$0.37

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.3	10	3.00	L	\$58.87	incl. in rate	incl. in rate	\$176.62
Electrician	Active	1.00	0.3	10	3.00	L	\$55.80	incl. in rate	incl. in rate	\$167.41
Laborer	Active	2.00	0.3	10	6.00	L	\$51.07	incl. in rate	incl. in rate	\$306.44
Hydraulic Crane (17tn)	Active	1.00	0.3	10	3.00	E	\$82.43	incl. in rate	incl. in rate	\$247.29
Equipment Operator (medium)	Active	1.00	0.3	10	3.00	L	\$72.34	incl. in rate	incl. in rate	\$217.01
Labor Hours					15	TOTAL LABOR				\$867.47
Equipment Hours					3	TOTAL EQUIPMENT				\$247.29

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$43.37	\$43.37
TOTAL MATERIAL						\$43.37

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (assumed weight)					
	1.00	ton	1.000	\$595.00	\$595.00
Hauling Disposal Cost 30 Miles to Klamath County Landfill	1.00	Loads	20 tons a load	\$300.00	\$300.00
TOTAL SUBCONTRACTS					\$895.00

Labor Cost	\$867.47	Labor Burden @	49.7%	\$0.00	\$867.47
Material Cost	\$43.37	Material Tax @	0.0%	\$0.00	\$43.37
Equipment Cost	\$247.29	Equipment Tax @	0.0%	\$0.00	\$247.29
Subcontractors	\$895.00				\$895.00
DIRECT COST SUBTOTALS	\$2,053			\$0	DIRECT COST SUBTOTALS \$2,053

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SUMMARY OF COSTS									
Labor Cost	\$10,849.84	Labor Burden @	49.7%	\$0.00					\$10,849.84
Material Cost	\$542.49	Material Tax @	0.0%	\$0.00					\$542.49
Equipment Cost	\$9,777.77	Equipment Tax @	0.0%	\$0.00					\$9,777.77
Subcontractors	\$2,533.75								\$2,533.75
DIRECT COST SUBTOTALS		\$23,704		\$0				DIRECT COST SUBTOTALS	\$23,704
Additional Pay Item Notes :									

1.043a Remove petroleum products from Mechanical Equipment

PAY ITEM NUMBER	:	1.043a	Project	:	KRRP - JC Boyle
Description	:	Remove petroleum products from Mechanical Equipment	Group	:	D09
Quantity	:	2,700.00 GAL			
Daily Production	:	687.50 GAL per	10	hour shift	
Work Days	:	3.9	Days	Project #	: 1
Unit Price	:	\$12.33 per GAL	Estimator	:	Mihaela Tomulescu
Total Cost	:	\$33,278	Probable Low Cost Parameter	GAL per	790.63
			Probable High Cost Parameter	Total Cost	\$28,286
				Unit Price Per GAL	\$35.78
					\$89.89

Description	Active Idle	# In crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	3.9	10	39.00	L	\$58.87	incl. in rate	incl. in rate	\$2,296.01
Electrician	Active	1.00	3.9	10	39.00	L	\$55.80	incl. in rate	incl. in rate	\$2,176.32
Laborer	Active	4.00	3.9	10	156.00	L	\$51.07	incl. in rate	incl. in rate	\$7,967.39
Pump, Centrifugal, 3"	Active	3.00	3.9	10	117.00	E	\$2.76	incl. in rate	incl. in rate	\$322.41
Truck Driver (heavy)	Active	1.00	3.9	10	39.00	L	\$75.72	incl. in rate	incl. in rate	\$2,953.24
Truck, Tractor (400hp)	Active	1.00	3.9	10	39.00	E	\$69.98	incl. in rate	incl. in rate	\$2,729.22
Equipment Operator (medium)	Active	1.00	3.9	10	39.00	L	\$72.34	incl. in rate	incl. in rate	\$2,821.10
Loader, FE Rubber Tire (3.5cy)	Active	1.00	3.9	10	39.00	E	\$63.11			\$2,461.29
			3.9	10	0.00	0	\$0.00			\$0.00
			3.9	10	0.00	0	\$0.00			\$0.00
			3.9	10	0.00	0	\$0.00			\$0.00
			3.9	10	0.00	0	\$0.00			\$0.00
Labor Hours					312	TOTAL LABOR				\$18,214.05
Equipment Hours					195	TOTAL EQUIPMENT				\$5,512.92

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (filters, pads, etc)	1.00	LS	1.000	1.00	\$910.70	\$910.70
TOTAL MATERIAL						\$910.70

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, liquid pickup, vacuum truck, stainless steel tank, 5000 gallons, minimum charge, 4 hours, 2 compartment	32.00	hour	RSM Means 028120101260	\$270.00	\$8,640.00
TOTAL SUBCONTRACTS					\$8,640.00

Labor Cost	\$18,214.05	Labor Burden @	49.7%	\$0.00		\$18,214.05
Material Cost	\$910.70	Material Tax @	0.0%	\$0.00		\$910.70
Equipment Cost	\$5,512.92	Equipment Tax @	0.0%	\$0.00		\$5,512.92
Subcontractors	\$8,640.00					\$8,640.00
DIRECT COST SUBTOTALS	\$33,278			\$0	DIRECT COST SUBTOTALS	\$33,278

The petroleum waste is saved in drums using the loader they are sent to recycling or disposal. Used a crew formed of 1 Forman, 4 Laborers to takeout the petroleum waste with a pump from the mech equipment, 1 Electrician to unplug the power and to assure the temporary power at the construction site.

PAY ITEM COST DETAIL WORKSHEET 1.044 Remove & Dispose of Outdoor Vertical AC Generator, Unit 1: 53 MVA

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.044	Project		: KRRP - JC Boyle				
Description	:	Remove & Dispose of Outdoor Vertical AC Generator, Unit 1: 53 MVA	Group		: D04				
Quantity	:	2.00 EA	Project #		: 1				
Daily Production	:	0.40 EA per	Estimator		: Mihaela Tomulescu				
Work Days	:	5.0 Days	Probable Low Cost Parameter		: 0.46				
Unit Price	:	\$52,105.28 per EA	Probable High Cost Parameter		: 0.34				
Total Cost	:	\$104,211	Total Cost		\$88,579				
			Unit Price Per EA		\$192,562.97				
					\$352,476.86				

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Crawler Crane (270tn)	Active	1.00	5.0	10	50.00	E	\$454.10	incl. in rate	incl. in rate	\$22,705.00
Electrician	Active	4.00	5.0	10	200.00	L	\$55.80	incl. in rate	incl. in rate	\$11,160.60
Equipment Operator (oiler)	Active	1.00	5.0	10	50.00	L	\$73.43	incl. in rate	incl. in rate	\$3,671.25
Equipment Operator (crane)	Active	1.00	5.0	10	50.00	L	\$81.60	incl. in rate	incl. in rate	\$4,079.90
Steelworker	Active	5.00	5.0	10	250.00	L	\$78.10	incl. in rate	incl. in rate	\$19,525.00
Loader, FE Rubber Tire (8.6cy)	Active	2.00	5.0	10	100.00	E	\$225.40	incl. in rate	incl. in rate	\$22,540.00
Labor Foreman	Active	1.00	5.0	10	50.00	L	\$58.87	incl. in rate	incl. in rate	\$2,943.60
Electrician Foreman	Active	1.00	5.0	10	50.00	L	\$55.80	incl. in rate	incl. in rate	\$2,790.15
Welder	Active	4.00	5.0	10	200.00	E	\$7.84	incl. in rate	incl. in rate	\$1,568.00
Labor Hours					650	TOTAL LABOR				\$44,170.50
Equipment Hours					350	TOTAL EQUIPMENT				\$46,813.00

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 10% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$4,417.05	\$4,417.05
TOTAL MATERIAL						\$4,417.05

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Disposal fee (for 115 tons)	115	tons	1.000	115.00	\$74.00
Hauling Disposal Cost 30 Miles to Klamath County Landfill	1.00	Loads	20 tons a load	\$300.00	\$300.00
TOTAL SUBCONTRACTS					\$8,810.00

SUMMARY OF COSTS					
Labor Cost	\$44,170.50	Labor Burden @	49.7%	\$0.00	\$44,170.50
Material Cost	\$4,417.05	Material Tax @	0.0%	\$0.00	\$4,417.05
Equipment Cost	\$46,813.00	Equipment Tax @	0.0%	\$0.00	\$46,813.00
Subcontractors	\$8,810.00				\$8,810.00
DIRECT COST SUBTOTALS	\$104,211			\$0	DIRECT COST SUBTOTALS \$104,211
Additional Pay Item Notes :					
Used RS Means, 4- R13 Crew formed of 1 Forman, 3 Electricians, 1 Oiler, 0 .25 Equipment Crane, 5 Steelworkers to cut adjacent appurtenances and 1 Welder to cut pipes. Calculated 85.6 miles from JC Boyle to Yreka Transfer Recycling (back and forth). Total Weight 650,000 LBS; Heaviest lift around: 300,000 LBS.					

PAY ITEM COST DETAIL WORKSHEET

1.045 Remove & Dispose of Excitation equipment for 53/50 MVA Generator

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.045			Project	:	KRRP - JC Boyle		
Description	:	Remove & Dispose of Excitation equipment for 53/50 MVA Generator			Group	:	D04		
Quantity	:	2.00 EA							
Daily Production	:	1.25 EA per			10	hour shift	Project #	:	1
Work Days	:	1.6 Days			Estimator	:	Mihaela Tomulescu	EA per	Total Cost
Unit Price	:	\$10,372.15 per EA			Probable Low Cost Parameter			1.38	\$18,670
Total Cost	:	\$20,744			Probable High Cost Parameter			1.13	\$22,819
								Unit Price Per EA	\$20,283.31

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	2.00	1.6	10	32.00	L	\$55.80	incl. in rate	incl. in rate	\$1,785.70
Electrician	Active	4.00	1.6	10	64.00	L	\$55.80	incl. in rate	incl. in rate	\$3,571.39
Laborer	Active	4.00	1.6	10	64.00	L	\$51.07	incl. in rate	incl. in rate	\$3,268.67
Loader, FE Rubber Tire (8.6cy)	Active	1.00	1.6	10	16.00	E	\$225.40	incl. in rate	incl. in rate	\$3,606.40
Hydraulic Crane (120tn)	Active	1.00	1.6	10	16.00	E	\$242.08	incl. in rate	incl. in rate	\$3,873.28
Welder	Active	1.00	1.6	10	16.00	E	\$7.84	incl. in rate	incl. in rate	\$125.44
Gas Welding Machine	Active	1.00	1.6	10	16.00	E	\$2.88	incl. in rate	incl. in rate	\$46.03
Equipment Operator (medium)	Active	1.00	1.6	10	16.00	L	\$72.34	incl. in rate	incl. in rate	\$1,157.38
Equipment Operator (crane)	Active	1.00	1.6	10	16.00	L	\$81.60	incl. in rate	incl. in rate	\$1,305.57
Labor Hours					192	TOTAL LABOR				\$11,088.70
Equipment Hours					64	TOTAL EQUIPMENT				\$7,651.15

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$554.44	\$554.44
Selective demolition, torch cutting, steel, 1" thick plate (assumed qty)	1,000.00	LF	1.000	1,000.00	\$0.85	\$850.00
						TOTAL MATERIAL
						\$1,404.44

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal Cost 30 Miles to Klamath County Landfill	2.00	Loads	20 tons a load	\$300.00	\$600.00
					TOTAL SUBCONTRACTS
					\$600.00

SUMMARY OF COSTS									
Labor Cost	\$11,088.70	Labor Burden @	49.7%	\$0.00					\$11,088.70
Material Cost	\$1,404.44	Material Tax @	0.0%	\$0.00					\$1,404.44
Equipment Cost	\$7,651.15	Equipment Tax @	0.0%	\$0.00					\$7,651.15
Subcontractors	\$600.00								\$600.00
DIRECT COST SUBTOTALS	\$20,744			\$0				DIRECT COST SUBTOTALS	\$20,744
Additional Pay Item Notes :									
2 sections, weight 1000LBS - Used 2 Crew of 1 Forman, 1 Electrician, 1 Welder to cut to remove the electrical equipment and 1 laborer to haul. Equipment used 1 Loader and 1 Crane for disposal.									

PAY ITEM COST DETAIL WORKSHEET

1.046 Remove & Dispose of Surge protection equip. for 53/50 MVA Generator

PAY ITEM INFORMATION										
PAY ITEM NUMBER	:	1.046			Project	:	KRRP - JC Boyle			
Description	:	Remove & Dispose of Surge protection equip. for 53/50 MVA Generator			Group	:	D04			
Quantity	:	2.00 EA								
Daily Production	:	1.25 EA per			10	hour shift	Project #	:	1	
Work Days	:	1.6			Days		Estimator	:	Mihaela Tomulescu	
Unit Price	:	\$5,718.83 per EA					Probable Low Cost Parameter	:	1.38	
Total Cost	:	\$11,438					Probable High Cost Parameter	:	1.13	
								Total Cost	:	\$10,294
								Unit Price Per EA	:	\$7,486.47
									:	\$11,183.49

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	2.00	1.6	10	32.00	L	\$55.80	incl. in rate	incl. in rate	\$1,785.70
Electrician	Active	2.00	1.6	10	32.00	L	\$55.80	incl. in rate	incl. in rate	\$1,785.70
Laborer	Active	2.00	1.6	10	32.00	L	\$51.07	incl. in rate	incl. in rate	\$1,634.34
Loader, FE Rubber Tire (8.6cy)	Active	1.00	1.6	10	16.00	E	\$225.40	incl. in rate	incl. in rate	\$3,606.40
Equipment Operator (medium)	Active	1.00	1.6	10	16.00	L	\$72.34	incl. in rate	incl. in rate	\$1,157.38
Labor Hours					112	TOTAL LABOR				\$6,363.10
Equipment Hours					16	TOTAL EQUIPMENT				\$3,606.40

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$318.16	\$318.16
Selective demolition, torch cutting, steel, 1" thick plate (assumed qty)	1,000.00	LF	1.000	1,000.00	\$0.85	\$850.00
						TOTAL MATERIAL
						\$1,168.16

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal Cost 30 Miles to Klamath County Landfill	1.00	Loads	20 tons a load	\$300.00	\$300.00
					TOTAL SUBCONTRACTS
					\$300.00

SUMMARY OF COSTS						
Labor Cost	\$6,363.10	Labor Burden @	49.7%	\$0.00		\$6,363.10
Material Cost	\$1,168.16	Material Tax @	0.0%	\$0.00		\$1,168.16
Equipment Cost	\$3,606.40	Equipment Tax @	0.0%	\$0.00		\$3,606.40
Subcontractors	\$300.00					\$300.00
DIRECT COST SUBTOTALS	\$11,438			\$0	DIRECT COST SUBTOTALS	\$11,438

Additional Pay Item Notes :		Used 1 Forman, 1 Electrician to remove the electrical equipment and 1 laborer to haul.
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SUMMARY OF COSTS				
Labor Cost	\$3,853.34	Labor Burden @	49.7%	\$0.00
Material Cost	\$192.67	Material Tax @	0.0%	\$0.00
Equipment Cost	\$171.47	Equipment Tax @	0.0%	\$0.00
Subcontractors	\$300.00			
DIRECT COST SUBTOTALS	\$4,517		\$0	DIRECT COST SUBTOTALS
Additional Pay Item Notes :				
Used 1 Forman, 1 Electrician, 1 Ironworker and 1 welder to cut rods, to remove the electrical equipment and 1 laborer to haul in the truck.				

Used 3 Crews (2 sections each) formed of 1 Forman, 3 Electrician, 2 laborer to haul with the crane in the truck. Assumed containing hazardous waste that will be disposed at 85.6 miles away from the construction site. In normal circumstances, decontaminated residual components could be accepted at landfill sites but Polychlorinated biphenyl, otherwise known as PCB, is a synthetic chemical that is widely used for industrial and commercial use as dielectric fluid in transformers and capacitors because of its high resistance to decomposition, low electrical conductivity, low flammability and high heat capacity. Transformer repair, reconditioning and retro-filling facilities are the major industry sectors that contributes to the spread of PCB contamination. Types of PCB Wastes:

PCB wastes are discarded materials that contain PCB or have been contaminated with PCBs and that are without any commercial, industrial, or economic use. For the purpose of this Code of Practice, PCBs wastes are classified as follows:

- o PCB-based dielectric fluids removed from transformers and other equipment
- o PCB-based heat transfer and hydraulic fluids
- o Metallic solid wastes
- o PCB equipment such as capacitors, transformers, switchgears, circuit breakers, heat transfer systems, etc.
- o Contaminated components removed from electrical equipment such as windings; PCB-contaminated containers and equipment such as metal drums, tanks, pumps, metal filters, etc.

Calculated 85.6 miles from JC Boyle to Yreka Transfer Recycling

PAY ITEM COST DETAIL WORKSHEET

1.049 Remove & Dispose of Station Service Switchgear, 600 volt - (5 sections)

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.049	Project	:	KRRP - JC Boyle				
Description	:	Remove & Dispose of Station Service Switchgear, 600 volt - (5 sections)	Group	:	D04				
Quantity	:	1.00 EA	Project #	:	1				
Daily Production	:	1.25 EA per	Estimator	:	Mihaela Tomulescu	EA per	Total Cost	Unit Price Per EA	
Work Days	:	0.8 Days	Probable Low Cost Parameter	:		1.38	\$7,014	\$5,101.41	
Unit Price	:	\$7,793.83 per EA	Probable High Cost Parameter	:			\$8,573	\$7,620.63	
Total Cost	:	\$7,794		:					

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	3.00	0.8	10	24.00	L	\$55.80	incl. in rate	incl. in rate	\$1,339.27
Electrician	Active	4.00	0.8	10	32.00	L	\$55.80	incl. in rate	incl. in rate	\$1,785.70
Laborer	Active	4.00	0.8	10	32.00	L	\$51.07	incl. in rate	incl. in rate	\$1,634.34
Loader, FE Rubber Tire (8.6cy)	Active	1.00	0.8	10	8.00	E	\$225.40	incl. in rate	incl. in rate	\$1,803.20
Equipment Operator (medium)	Active	1.00	0.8	10	8.00	L	\$72.34	incl. in rate	incl. in rate	\$578.69
Welder	Active	1.00	0.8	10	8.00	E	\$7.84	incl. in rate	incl. in rate	\$62.72
Gas Welding Machine	Active	1.00	0.8	10	8.00	E	\$2.88	incl. in rate	incl. in rate	\$23.02
Labor Hours					96	TOTAL LABOR				\$5,337.99
Equipment Hours					24	TOTAL EQUIPMENT				\$1,888.94

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, et	1.00	LS	1.000	1.00	\$266.90	\$266.90
TOTAL MATERIAL						\$266.90

SUBCONTRACT COSTS				
Description	Quantity	Units	Notes / Company	Contract or Quote Amount
Hauling Disposal Cost 30 Miles to Klamath County Landfill	1.00	Loads	20 tons a load	\$300.00
TOTAL SUBCONTRACTS				\$300.00

SUMMARY OF COSTS					
Labor Cost	\$5,337.99	Labor Burden @	49.7%	\$0.00	\$5,337.99
Material Cost	\$266.90	Material Tax @	0.0%	\$0.00	\$266.90
Equipment Cost	\$1,888.94	Equipment Tax @	0.0%	\$0.00	\$1,888.94
Subcontractors	\$300.00				\$300.00
DIRECT COST SUBTOTALS	\$7,794		\$0	DIRECT COST SUBTOTALS	\$7,794
Additional Pay Item Notes :					
Used 3 Crews (2 sections each) formed of 1 Foreman, 2 Electrician, 1welder to cut, 2 laborer to haul with the loader in the truck. Assumed containing hazardous waste that will be disposed . Calculated 85.6 miles from JC Boyle to Yreka Transfer Recycling					

1.05 Remove & Dispose of Unit and plant control switchboard

PAY ITEM NUMBER	:	1.050	Project	:	KRRP - JC Boyle
Description	:	Remove & Dispose of Unit and plant control switchboard	Group	:	D05
Quantity	:	1.00 EA			
Daily Production	:	1.25 EA per	10 hour shift	Project #	: 1
Work Days	:	0.8 Days	Estimator	:	Mihaela Tomulescu
Unit Price	:	\$4,117.06 per EA	EA per		Total Cost
Total Cost	:	\$4,117	Probable Low Cost Parameter	1.38	\$3,705
			Probable High Cost Parameter	1.13	\$4,529
					\$2,694.80
					\$4,025.57

Description	Active	# in	Days	Hours	Total	L/E	Hourly	Hrly oper.	Burden	Labor / Equipment
	Idle	crew	Worked	/day	Hours		Rate	Cost	Rate	Cost
Electrician Foreman	Active	1.00	0.8	10	8.00	L	\$55.80	incl. in rate	incl. in rate	\$446.42
Electrician	Active	2.00	0.8	10	16.00	L	\$55.80	incl. in rate	incl. in rate	\$892.85
Equipment Operator (medium)	Active	1.00	0.8	10	8.00	L	\$72.34	incl. in rate	incl. in rate	\$578.69
Loader, FE Rubber Tire (8.6cy)	Active	1.00	0.8	10	8.00	E	\$225.40	incl. in rate	incl. in rate	\$1,803.20
Labor Hours					32	TOTAL LABOR				\$1,917.96
Equipment Hours					8	TOTAL EQUIPMENT				\$1,803.20

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$95.90	\$95.90
TOTAL MATERIAL						\$95.90

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal Cost 30 Miles to Klamath County Landfill	1.00	Loads	20 tons a load	\$300.00	\$300.00
TOTAL SUBCONTRACTS					\$300.00

Labor Cost	\$1,917.96	Labor Burden @	49.7%	\$0.00	\$1,917.96
Material Cost	\$95.90	Material Tax @	0.0%	\$0.00	\$95.90
Equipment Cost	\$1,803.20	Equipment Tax @	0.0%	\$0.00	\$1,803.20
Subcontractors	\$300.00				\$300.00
DIRECT COST SUBTOTALS	\$4,117			\$0	DIRECT COST SUBTOTALS \$4,117

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PAY ITEM COST DETAIL WORKSHEET

1.052 Remove & Dispose of Raceways, Conduit and Cable

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.052			Project	:	KRRP - JC Boyle		
Description	:	Remove & Dispose of Raceways, Conduit and Cable			Group	:	D05		
Quantity	:	1.00 EA							
Daily Production	:	0.63 EA per			10	hour shift	Project #	:	1
Work Days	:	1.6			Days	Estimator	:	Mihaela Tomulescu	EA per
Unit Price	:	\$9,226.89 per EA			Probable Low Cost Parameter			0.69	Total Cost
Total Cost	:	\$9,227			Probable High Cost Parameter			0.56	Unit Price Per EA
								\$8,304	\$12,078.84
								\$10,150	\$18,043.69

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.6	10	16.00	L	\$58.87	incl. in rate	incl. in rate	\$941.95
Electrician	Active	1.00	1.6	10	16.00	L	\$55.80	incl. in rate	incl. in rate	\$892.85
Laborer	Active	2.00	1.6	10	32.00	L	\$51.07	incl. in rate	incl. in rate	\$1,634.34
Loader, FE Rubber Tire (8.6cy)	Active	1.00	1.6	10	16.00	E	\$225.40	incl. in rate	incl. in rate	\$3,606.40
Equipment Operator (medium)	Active	1.00	1.6	10	16.00	L	\$72.34	incl. in rate	incl. in rate	\$1,157.38
Labor Hours					80	TOTAL LABOR				\$4,626.51
Equipment Hours					16	TOTAL EQUIPMENT				\$3,606.40

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 15% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$693.98	\$693.98
						TOTAL MATERIAL
						\$693.98

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal Cost 30 Miles to Klamath County Landfill	1.00	Loads	20 tons a load	\$300.00	\$300.00
					TOTAL SUBCONTRACTS
					\$300.00

SUMMARY OF COSTS						
Labor Cost	\$4,626.51	Labor Burden @	49.7%	\$0.00		\$4,626.51
Material Cost	\$693.98	Material Tax @	0.0%	\$0.00		\$693.98
Equipment Cost	\$3,606.40	Equipment Tax @	0.0%	\$0.00		\$3,606.40
Subcontractors	\$300.00					\$300.00
DIRECT COST SUBTOTALS	\$9,227			\$0	DIRECT COST SUBTOTALS	\$9,227
Additional Pay Item Notes :						
Used 1 Forman, 2 Electrician, 1 Laborer hauling with the loader in the truck.						

PAY ITEM COST DETAIL WORKSHEET

1.053 Remove & Dispose of Misc. power & control boards

PAY ITEM INFORMATION													
PAY ITEM NUMBER	:	1.053			Project	:	KRRP - JC Boyle						
Description	:	Remove & Dispose of Misc. power & control boards			Group	:	D05						
Quantity	:	1.00 EA											
Daily Production	:	0.63 EA per			10	:	hour shift						
Work Days	:	1.6			Days	:							
Unit Price	:	\$8,287.15 per EA			Project #	:	1	Estimator	:	Mihaela Tomulescu	EA per	Total Cost	Unit Price Per EA
Total Cost	:	\$8,287			Probable Low Cost Parameter	:	0.69				\$7,458		\$10,848.63
					Probable High Cost Parameter	:	0.56				\$9,116		\$16,205.97

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.6	10	16.00	L	\$58.87	incl. in rate	incl. in rate	\$941.95
Electrician	Active	1.00	1.6	10	16.00	L	\$55.80	incl. in rate	incl. in rate	\$892.85
Laborer	Active	1.00	1.6	10	16.00	L	\$51.07	incl. in rate	incl. in rate	\$817.17
Loader, FE Rubber Tire (8.6cy)	Active	1.00	1.6	10	16.00	E	\$225.40	incl. in rate	incl. in rate	\$3,606.40
Equipment Operator (medium)	Active	1.00	1.6	10	16.00	L	\$72.34	incl. in rate	incl. in rate	\$1,157.38

SUMMARY OF COSTS									
Labor Cost	\$367.49	Labor Burden @	49.7%	\$0.00					\$367.49
Material Cost	\$18.37	Material Tax @	0.0%	\$0.00					\$18.37
Equipment Cost	\$164.86	Equipment Tax @	0.0%	\$0.00					\$164.86
Subcontractors	\$300.00								\$300.00
DIRECT COST SUBTOTALS		\$851		\$0				DIRECT COST SUBTOTALS	\$851
Additional Pay Item Notes :									
Assumed removal of hoist, hoist trolley, gantry: 2 Laborers to load the overhead crane motors in the truck using the crane.									

1.056 Remove & Dispose of Conduit and Cable

PAY ITEM NUMBER	:	1.056	Project	:	KRRP - JC Boyle			
Description	:	Remove & Dispose of Conduit and Cable		Group	:	D05		
Quantity	:	1.00	EA					
Daily Production	:	0.63	EA per	10	hour shift			
Work Days	:	1.6	Days	Project #	:	1		
Unit Price	:	\$5,957.11	per EA	Estimator	:	Mihaela Tomulescu	EA per	Total Cost
Total Cost	:	\$5.957		Probable Low Cost Parameter	:	0.69	\$5,361	Unit Price Per EA
				Probable High Cost Parameter	:	0.50	\$7,149	\$14,297.06

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Laborer	Active	4.00	1.6	10	64.00	L	\$51.07	\$0.00		\$3,268.67
Equipment Operator (medium)	Active	1.00	1.6	10	16.00	L	\$72.34	\$0.00		\$1,157.38
Loader, FE Rubber Tire (3.5cy)	Active	1.00	1.6	10	16.00	E	\$63.11	\$64.23		\$1,009.76
Labor Hours					80	TOTAL LABOR				\$4,426.05
Equipment Hours					16	TOTAL EQUIPMENT				\$1,009.76

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$221.30	\$221.30
TOTAL MATERIAL						\$221.30

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal Cost 30 Miles to Klamath County Landfill	1.00	Loads	20 tons a load	\$300.00	\$300.00
TOTAL SUBCONTRACTS					\$300.00

Labor Cost	\$4,426.05	Labor Burden @	49.7%	\$0.00		\$4,426.05
Material Cost	\$221.30	Material Tax @	0.0%	\$0.00		\$221.30
Equipment Cost	\$1,009.76	Equipment Tax @	0.0%	\$0.00		\$1,009.76
Subcontractors	\$300.00					\$300.00
DIRECT COST SUBTOTALS	\$5,957			\$0	DIRECT COST SUBTOTALS	\$5,957
Additional Pay Item Notes :						
Around 4000 LF of cable and conduit: 4 Laborers will load in the truck with the loader the overhead crane cable.						

PAY ITEM COST DETAIL WORKSHEET

PAY ITEM INFORMATION

[illegible]

CREW COSTS

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.8	10	8.00	L	\$58.87	incl. in rate	incl. in rate	\$470.98
Electrician	Active	1.00	0.8	10	8.00	L	\$55.80	incl. in rate	incl. in rate	\$446.42
Hydraulic Crane (17tn)	Active	1.00	0.8	10	8.00	E	\$82.43	incl. in rate	incl. in rate	\$659.44
Equipment Operator (medium)	Active	1.00	0.8	10	8.00	L	\$72.34	incl. in rate	incl. in rate	\$578.69
Laborer	Active	2.00	0.8	10	16.00	L	\$51.07	incl. in rate	incl. in rate	\$817.17
Hydraulic Excavator (1.5cy)	Active	1.00	0.8	10	8.00	E	\$140.73	incl. in rate	incl. in rate	\$1,125.84
Truck, Utility, with Man-Basket	Active	1.00	0.8	10	8.00	E	\$31.90	incl. in rate	incl. in rate	\$255.20
Labor Hours					40	TOTAL LABOR				\$2,313.26
Equipment Hours					24	TOTAL EQUIPMENT				\$2,040.48

MATERIAL COSTS

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$115.66	\$115.66
Topsoil placement and grading, loam or topsoil, F.E. loader, 1-1/2 C.Y., remove and stockpile on site, spread from pile to rough finish grade	6.00	CY	1.000	6.00	\$4.74	\$28.44
TOTAL MATERIAL						\$144.10

SUBCONTRACT COSTS

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
line work - Rent per day	0.80	days		\$3,000.00	\$2,400.00
Hauling Disposal Cost 30 Miles to Klamath County Landfill	1.00	Loads	20 tons a load	\$300.00	\$300.00
TOTAL SUBCONTRACTS					\$2,700.00

SUMMARY OF COSTS

Labor Cost	\$2,313.26	Labor Burden @	49.7%	\$0.00		\$2,313.26
Material Cost	\$144.10	Material Tax @	0.0%	\$0.00		\$144.10
Equipment Cost	\$2,040.48	Equipment Tax @	0.0%	\$0.00		\$2,040.48
Subcontractors	\$2,700.00					\$2,700.00
DIRECT COST SUBTOTALS	\$7,198			\$0	DIRECT COST SUBTOTALS	\$7,198

Additional Pay Item Notes :

6 Poles with lights, weight 1500 LBS. Production is based on RSMs using Crew R3 (1 Foreman and 1 Electrician, 1 Crane and 1 man-basket truck to help untie the line) for one day work. Considered 2 laborer and 1 Excavator for demolish the pole foundation, helping placing poles in a designated place and loading them in the truck for disposal. This process includes filling in pole locations with gravel, clean fill and topsoil.

SUMMARY OF COSTS						
Labor Cost	\$19,238.16	Labor Burden @	49.7%	\$0.00		\$19,238.16
Material Cost	\$1,108.85	Material Tax @	0.0%	\$0.00		\$1,108.85
Equipment Cost	\$16,263.51	Equipment Tax @	0.0%	\$0.00		\$16,263.51
Subcontractors	\$8,580.00					\$8,580.00
DIRECT COST SUBTOTALS	\$45,191			\$0	DIRECT COST SUBTOTALS	\$45,191

When a transmission line is decommissioned and is not converted to another use, the decommissioning typically includes the removal of all infrastructure if it is no longer required, or has reached end-of-life conditions. Removed parts will be re-used, recycled or disposed. Production is based off of RSMs using Crew B-1C and B-3 (1 Foreman, 2 laborer, 1 Excavator & 1 crane for lift, position and load in the truck, 1 Hydraulic rock-splitting/rock-drilling equipment to break equipment foundations and concrete for demo :2 Electrician,, 1 utility truck to access poles, string conductor, modify structure arms, provide guard structures, etc. Crews may be working simultaneously along the project alignment and substations, hydro plant and switchyard. Transmission line poles or structures are commonly between 60 and 140 feet tall. There are several different kinds of transmission structures. Transmission structures can be constructed of metal or wood. They can be single-poled or multi-poled. They can be single-circuited, carrying one set of transmission lines or double-circuited with two sets of lines. Assumed based on RSMs we have "Communications transmission tower, radio towers self-supporting, wind load 70 mph basic wind speed, 120' high" (33811310). Pole height and load capacity limitations determine the distance between poles (span length) either on the basis of ground clearance or ability to support heavy wind and ice loads. Assumed average span between structures to be 275 feet so for 1.66 miles of overhead transmission we will have approximately 31 structures. In areas where single-pole structures are preferred, weak or wet soils may require concrete foundations for support. Where a transmission line must cross a street or slightly change direction, larger angle structures or guy wires may be required. Poles with guy wires impact a much larger area. Angle structures are usually more than double the diameter of other steel poles. They are made of steel, usually five to six feet in diameter, and have a large concrete base. The base may be buried ten or more feet below the ground surface. The diameter of the pole and the depth the base is buried depends on the condition of the soils and the voltage of the line. Assumed the structures are disposed to Yreka recycling, 85.6 miles away. This estimate is made as the best AECOM assumption, as actual pricing would occur during the detailed engineering and construction bid process.

PAY ITEM COST DETAIL WORKSHEET

1.059 Remove & Dispose of Transmission Line No. 98

PAY ITEM INFORMATION											
PAY ITEM NUMBER		1.059		Project		KRRP - JC Boyle					
Description		Remove & Dispose of Transmission Line No. 98		Group		D05					
Quantity		0.24 Mile									
Daily Production		0.63 Mile per		10		hour shift					
Work Days		0.4		Days		Project #		1			
Unit Price		\$21,480.84 per Mile		Estimator		Mihaela Tomulescu		Mile per		Total Cost	
Total Cost		\$5,155		Probable Low Cost Parameter		0.72		\$4,382		\$6,096.82	
				Probable High Cost Parameter		0.47		\$6,444		\$13,747.73	

CREW COSTS											
Description	Active Idle	# In crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost	
Electrician Foreman	Active	1.00	0.4	10	3.80	L	\$55.80	incl. in rate	incl. in rate		\$212.05
Electrician	Active	2.00	0.4	10	7.60	L	\$55.80	incl. in rate	incl. in rate		\$424.10
Truck, Utility, with Man-Basket	Active	2.00	0.4	10	7.60	E	\$31.90	incl. in rate	incl. in rate		\$242.44
Laborer	Active	2.00	0.4	10	7.60	L	\$51.07	incl. in rate	incl. in rate		\$388.15
Hydraulic Excavator (2.5cy)	Active	1.00	0.4	10	3.80	E	\$205.40	incl. in rate	incl. in rate		\$780.52
Hydraulic Crane (80tn)	Active	1.00	0.4	10	3.80	E	\$197.66	incl. in rate	incl. in rate		\$751.11
Equipment Operator (crane)	Active	1.00	0.4	10	3.80	L	\$81.60	incl. in rate	incl. in rate		\$310.07
Equipment Operator (light)	Active	1.00	0.4	10	3.80	L	\$69.19	incl. in rate	incl. in rate		\$262.92
Hydraulic Impact Breaker Attachment (5k+ ft-lb)	Active	1.00	0.4	10	3.80	E	\$63.28	incl. in rate	incl. in rate		\$240.46
Labor Hours					26.6	TOTAL LABOR				\$1,597.30	
Equipment Hours					19	TOTAL EQUIPMENT				\$2,014.53	

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$79.87	\$79.87
Topsoil placement and grading, loam or topsoil, F.E. loader, 1-1/2 C.Y., remove and stockpile on site, spread from pile to rough finish grade	5.00	CY	1.000	5.00	\$4.74	\$23.70
TOTAL MATERIAL						\$103.57

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Rent trailer with cable pulling rig, for high voltage line work - Rent per day	0.38	days		\$3,000.00	\$1,140.00
Hauling Disposal Cost 30 Miles to Klamath County Landfill	1.00	Loads		\$300.00	\$300.00
TOTAL SUBCONTRACTS					\$1,440.00

SUMMARY OF COSTS						
Labor Cost	\$1,597.30	Labor Burden @	49.7%	\$0.00		\$1,597.30
Material Cost	\$103.57	Material Tax @	0.0%	\$0.00		\$103.57
Equipment Cost	\$2,014.53	Equipment Tax @	0.0%	\$0.00		\$2,014.53
Subcontractors	\$1,440.00					\$1,440.00
DIRECT COST SUBTOTALS	\$5,155			\$0	DIRECT COST SUBTOTALS	\$5,155

Additional Pay Item Notes :

When a transmission line is decommissioned and is not converted to another use, the decommissioning typically includes the removal of all infrastructure if it is no longer required, or has reached end-of-life conditions. Removed parts will be re-used, recycled or disposed. Production is based off of RSMs using Crew B-1C and B-3 (1 Foreman, 2 laborer, 1 Excavator & 1 crane for lift, position and load in the truck, 1 Hydraulic rock-splitting/rock-drilling equipment to break equipment foundations and concrete for demo :2 Electrician,, 1 utility truck to access poles, string conductor, modify structure arms, provide guard structures, etc. Crews may be working simultaneously along the project alignment and substations, hydro plant and switchyard. Transmission line poles or structures are commonly between 60 and 140 feet tall. There are several different kinds of transmission structures. Transmission structures can be constructed of metal or wood, assumed we have wood. They can be single-poled or multi-poled. They can be single-circuited, carrying one set of transmission lines or double-circuited with two sets of lines. Assumed based on RSMs we have "Communications transmission tower, radio towers self-supporting, wind load 70 mph basic wind speed, 120' high" (33811310). Pole height and load capacity limitations determine the distance between poles (span length) either on the basis of ground clearance or ability to support heavy wind and ice loads. Assumed average span between structures to be 275 feet so for 0.24 miles of overhead transmission we will have approximately 5 structures. In areas where single-pole structures are preferred, weak or wet soils may require concrete foundations for support. Where a transmission line must cross a street or slightly change direction, larger angle structures or guy wires may be required. Poles with guy wires impact a much larger area. Angle structures are usually more than double the diameter of other steel poles. They are made of steel, usually five to six feet in diameter, and have a large concrete base. The base may be buried ten or more feet below the ground surface. The diameter of the pole and the depth the base is buried depends on the condition of the soils and the voltage of the line. Assumed the structures are disposed to Yreka recycling, 85.6 miles away. This estimate is made as the best AECOM assumption, as actual pricing would occur during the detailed engineering and construction bid process.

1.060 Remove & Dispose of Transmission Line No. 58

[illegible]

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	2.7	10	26.60	L	\$55.80	incl. in rate	incl. in rate	\$1,484.36
Electrician	Active	2.00	2.7	10	53.20	L	\$55.80	incl. in rate	incl. in rate	\$2,968.72
Truck, Utility, with Man-Basket	Active	2.00	2.7	10	53.20	E	\$31.90	incl. in rate	incl. in rate	\$1,697.08
Laborer	Active	2.00	2.7	10	53.20	L	\$51.07	incl. in rate	incl. in rate	\$2,717.08
Hydraulic Excavator (2.5cy)	Active	1.00	2.7	10	26.60	E	\$205.40	incl. in rate	incl. in rate	\$5,463.64
Hydraulic Crane (80tn)	Active	1.00	2.7	10	26.60	E	\$197.66	incl. in rate	incl. in rate	\$5,257.76
Equipment Operator (crane)	Active	1.00	2.7	10	26.60	L	\$81.60	incl. in rate	incl. in rate	\$2,170.51
Equipment Operator (light)	Active	1.00	2.7	10	26.60	L	\$69.19	incl. in rate	incl. in rate	\$1,840.45
Hydraulic Impact Breaker Attachment (5k+ ft-lb)	Active	1.00	2.7	10	26.60	E	\$63.28	incl. in rate	incl. in rate	\$1,683.25
Labor Hours					186.2	TOTAL LABOR				\$11,181.12
Equipment Hours					133	TOTAL EQUIPMENT				\$14,101.72

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$559.06	\$559.06
Topsoil placement and grading, loam or topsoil, F.E. loader, 1-1/2 C.Y., remove and stockpile on site, spread from pile to rough finish grade	31.00	CY	1.000	31.00	\$4.74	\$146.94
TOTAL MATERIAL						\$706.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Rent trailer with cable pulling rig, for high voltage line work - Rent per day	2.66	days		\$3,000.00	\$7,980.00
Hauling Disposal Cost 30 Miles to Klamath County Landfill	1.00	Loads		\$300.00	\$300.00
TOTAL SUBCONTRACTS					\$8,280.00

Labor Cost	\$11,181.12	Labor Burden @	49.7%	\$0.00		\$11,181.12
Material Cost	\$706.00	Material Tax @	0.0%	\$0.00		\$706.00
Equipment Cost	\$14,101.72	Equipment Tax @	0.0%	\$0.00		\$14,101.72
Subcontractors	\$8,280.00					\$8,280.00
DIRECT COST SUBTOTALS	\$34,269			\$0		\$34,269

When a transmission line is decommissioned and is not carried out another use, the decommissioning typically includes the removal of all infrastructure if it is no longer required, or has reached end-of-life conditions. Removed parts will be re-used, recycled or disposed. Production is based off of RSMs using Crew B-1C and B-3 (1 Foreman, 2 laborer, 1 Excavator & 1 crane for lift, position and load in the truck, 1 Hydraulic rock-splitting/rock-drilling equipment to break equipment foundations and concrete for demo; 2 Electrician, 1 utility truck to access poles, string conductor, modify structure arms, provide guard structures, etc. Crews may be working simultaneously along the project alignment and substations, hydro plant and switchyard. Transmission line poles or structures are commonly between 60 and 140 feet tall. There are several different kinds of transmission structures. Transmission structures can be constructed of metal or wood. They can be single-pole or multi-poled. They can be single-circuited, carrying one set of transmission lines or double-circuited with two sets of lines. Assumed based on RSMs we have "Communications transmission tower, radio towers self-supporting, wind load 70 mph basic wind speed, 120' high" (33811310). Pole height and load capacity limitations determine the distance between poles (span length) either on a single pole or double pole structure. In areas where single pole structures are preferred, wet or wet soils may require concrete foundations for support. Where a transmission line must cross a street or slightly change direction, larger angle structures or guy wires may be required. Poles with guy wires impact a much larger area. Angle structures are usually more than double the diameter of other steel poles. They are made of steel, usually five to six feet in diameter, and have a large concrete base. The base may be buried ten or more feet below the ground surface. The diameter of the pole and the depth the base is buried depends on the condition of the soils and the voltage of the line. Assumed the structures are disposed to Yreka recycling, 85 miles away. This estimate is made as the best AECOM assumption, as actual pricing would occur during the detailed engineering and construction bid process.

PAY ITEM COST DETAIL WORKSHEET

1.061 Remove Intake Structure Concrete

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.061			Project	:	KRRP - JC Boyle		
Description	:	Remove Intake Structure Concrete			Group	:	D07		
Quantity	1.061	1,610.00	CY		Project # : 1				
Daily Production	1.061	150.00	CY per	20					
Work Days	1.061	10.7	Days		Estimator	:	Eric Jones	CY per	Total Cost
Unit Price	1.061	\$169.42	per CY		Probable Low Cost Parameter		165.00	\$245,495	\$1,487.85
Total Cost	1.061	\$272,772			Probable High Cost Parameter		120.00	\$327,327	\$2,727.72

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	10.7	20	214.00	L	\$58.87	incl. in rate	incl. in rate	\$12,598.61
Laborer	Active	4.00	10.7	20	856.00	L	\$51.07	incl. in rate	incl. in rate	\$43,718.49
Equipment Operator (medium)	Active	2.00	10.7	20	428.00	L	\$72.34	incl. in rate	incl. in rate	\$30,959.81
Truck Driver (heavy)	Active	1.00	8.4	20	167.80	L	\$66.92	incl. in rate	incl. in rate	\$11,229.85
Truck, Off-Road, Articulated Rear, 20cy	Active	1.00	8.4	20	167.80	E	\$117.28	incl. in rate	incl. in rate	\$19,679.58
Air Compressor 900 cfm	Active	1.00	10.7	20	214.00	E	\$38.87	incl. in rate	incl. in rate	\$8,317.95
Air Tool, Chipping Hammer	Active	4.00	10.7	20	856.00	E	\$1.64	incl. in rate	incl. in rate	\$1,403.01
Generator, Small Generator, 10 - 15 kW	Active	2.00	10.7	20	428.00	E	\$7.04	incl. in rate	incl. in rate	\$3,013.12
Hydraulic Excavator (5.0cy)	Active	1.00	10.7	20	214.00	E	\$276.50	incl. in rate	incl. in rate	\$59,171.00
Hydraulic Impact Breaker Attachment (5k+ ft-lb)	Active	1.00	10.7	20	214.00	E	\$63.28	incl. in rate	incl. in rate	\$13,541.92
Hydraulic Thumbs/Shear Attachment	Active	1.00	10.7	20	214.00	E	\$24.92	incl. in rate	incl. in rate	\$5,332.88
Hydraulic Excavator (2.5cy)	Active	1.00	10.7	20	214.00	E	\$205.40	incl. in rate	incl. in rate	\$43,955.60
					Labor Hours	1665.8	TOTAL LABOR		\$98,506.75	
					Equipment Hours	2521.8	TOTAL EQUIPMENT		\$154,415.07	

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables (10% labor)	1.00	LS	1.000	1.00	\$9,850.68	\$9,850.68
						TOTAL MATERIAL
						\$9,850.68

SUBCONTRACT COSTS				
Description	Quantity	Units	Notes / Company	Unit Price
Concrete Saw Cutting	2	EA	Cost Per Mob	\$5,000.00
				Contract or Quote Amount
				\$10,000.00
				TOTAL SUBCONTRACTS
				\$10,000.00

SUMMARY OF COSTS					
Labor Cost	\$98,506.75	Labor Burden @	0.0%		\$98,506.75
Material Cost	\$9,850.68	Material Tax @	0.00%	\$0.00	\$9,850.68
Equipment Cost	\$154,415.07	Equipment Tax @	0.00%	\$0.00	\$154,415.07
Subcontractors	\$10,000.00				\$10,000.00
DIRECT COST SUBTOTALS	\$272,772		\$0	DIRECT COST SUBTOTALS	\$272,772
Additional Pay Item Notes :					
The work is done by two 6-men crew (foreman, 4 laborers, and 2 equipment operators), one crew will be working a 10 hour day shift and one crew will be working a 10 hour night shift sharing the same equipment. Concrete demo is to be hauled to scour hole. Demolition is done using hydraulic chipping hammers and excavator mounted claw. Production is based on getting 125 CY demolished each shift. Over the 11 days dump trucks would haul 3 loads per shift. It is expected that material will fall into channel and will be scooped out with excavator. This item is scheduled to be double shifted 5 days a week with 2 each 10 hours shifts to complete the activity with in the time restrictions established by the Oregon In Water Work Permit. (Note that if this was single shifted it would take 21 days).					

Other Notes
Expected work sequence is to have excavator with breaker start demolition and have the excavator with bucket support the operation. Once enough material is ready to haul trucks will then be loaded and material will be dumped at the scour hole. Excavator is anticipated to be at demo location entire time to support breaker and ground crew. Concrete breakers are expected to run inefficient due to extra processing to remove reinforcement. Loading excavators are expected to run inefficient due to situating demo'd material, supporting ground crews, and separating reinforcement from concrete. (Ideal productions are based on equipment being used in best working conditions).

PAY ITEM INFORMATION

CREW COSTS

MATERIAL COSTS

SUBCONTRACT COSTS

SUMMARY OF COSTS

Additional Pay Item Notes :

1.062

PAY ITEM COST DETAIL WORKSHEET

1.063 Remove 24" Steel Fish Discahrge Pipe

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.063	Project	:	KRRP - JC Boyle				
Description	:	Remove 24" Steel Fish Discahrge Pipe	Group	:	D03				
Quantity	:	37,978.00 LBS							
Daily Production	:	62,500.00 LBS per	20	hour shift	Project #	:	1		
Work Days	:	0.6 Days			Estimator	:	Mihaela Tomulescu	LBS per	
Unit Price	:	\$0.23 per LBS			Probable Low Cost Parameter			71,875.00	Total Cost
Total Cost	:	\$8,563			Probable High Cost Parameter			46,875.00	\$10,704
									Unit Price Per LBS
									\$0.10
									\$0.23

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.6	20	12.00	L	\$58.87	incl. in rate	incl. in rate	\$706.46
Laborer	Active	1.00	0.6	20	12.00	L	\$51.07	incl. in rate	incl. in rate	\$612.88
Steelworker	Active	1.00	0.6	20	12.00	L	\$78.10	incl. in rate	incl. in rate	\$937.20
Loader, FE Rubber Tire (8.6cy)	Active	1.00	0.6	20	12.00	E	\$225.40	incl. in rate	incl. in rate	\$2,704.80
Equipment Operator (light)	Active	1.00	0.6	20	12.00	L	\$69.19	incl. in rate	incl. in rate	\$830.28
Hydraulic Crane (17tn)	Active	1.00	0.6	20	12.00	E	\$82.43	incl. in rate	incl. in rate	\$989.16
Equipment Operator (crane)	Active	1.00	0.6	20	12.00	L	\$81.60	incl. in rate	incl. in rate	\$979.18
					Labor Hours	60	TOTAL LABOR			\$4,066.00
					Equipment Hours	24	TOTAL EQUIPMENT			\$3,693.96

MATERIAL COSTS						
Description	Item	Order	Conversion	Order	Order	Material
	Quantity	Unit	Factor / Waste	Quantity	Price	Cost
Consumables 5% labor (saw blades, drill bits, et	1.00	LS	1.000	1.00	\$203.30	\$203.30
TOTAL MATERIAL						\$203.30

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal Cost 30 Miles to Klamath County Landfill	2.00	Loads		\$300.00	\$600.00
TOTAL SUBCONTRACTS					\$600.00

SUMMARY OF COSTS						
Labor Cost	\$4,066.00	Labor Burden @	49.7%	\$0.00		\$4,066.00
Material Cost	\$203.30	Material Tax @	0.0%	\$0.00		\$203.30
Equipment Cost	\$3,693.96	Equipment Tax @	0.0%	\$0.00		\$3,693.96
Subcontractors	\$600.00					\$600.00
DIRECT COST SUBTOTALS	\$8,563			\$0	DIRECT COST SUBTOTALS	\$8,563
Additional Pay Item Notes :						
340 LF of 24" iron drainage pipes at 111.7Lbs/LF. Used 1 Loader and 1 Forman, 1 Steelworkers to cut the pipes and 1 Laborers to load the pipes in the truck.						

SUMMARY OF COSTS					
Labor Cost	\$37,174.58	Labor Burden @	0.0%		\$37,174.58
Material Cost	\$3,717.46	Material Tax @	0.00%	\$0.00	\$3,717.46
Equipment Cost	\$66,848.33	Equipment Tax @	0.00%	\$0.00	\$66,848.33
Subcontractors	\$15,000.00				\$15,000.00
DIRECT COST SUBTOTALS				\$0	DIRECT COST SUBTOTALS
					\$122,740
Additional Pay Item Notes :					

1.064 Remove Concrete Items associated with the 14-ft-diameter Steel Pipe				
Details				
High Cost Factors			Low Cost Factors	
Bad Weather	0%		No Bad Weather	0%
Gas Price Increase	10%		Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	5%		No Unforeseen Contaminated Mats/ Access Issues	5%
	15%			15%
CY Per Hour Demolished	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)	Overall Production	
	32	8	40%	102.40
		10	40%	128.00
Haul Notes		Excavator Loading Production per shift		
CY	1,100.00	CY per Hour		18.18
Swell Factor	60%	CY Bucket Size		2.50
Bulk CY	1760	Buckets Per Hour		7
Haul Vehicle 66% Capacity (2 tons per CY)	12	# of Excavators		1.00
# of Haul Vehicles		CY per Hour (2.5 CY Bucket)		18
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	3	CY Per Hour Ideal Production Per 8 Hour Shift		95
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)	3	Efficient Compared to Ideal Production		19%
Haul Speed (Loaded MPH)	10	Inefficiencies Compared to Ideal Production		81%
Return Speed (Unloaded MPH)	15			
Haul Distance (Miles) Along Power Canal	2			
Shift Length (Hours)	10			
Cycle Time		Breaker Production		
Load Time (Load Time Minutes / 60mins)	0.08	Hydraulic Hammer CY per Hour		12.8
Haul Time (Haul Distance / Haul Speed)	0.20	# of Hammers		1.00
Dump Time (Dump Time Minutes / 60 Mins)	0.05	CY per Hour		12.8
Return Time (Haul Distance / Return Speed)	0.13	CY per Hour Back Check		12.8
Hours Per Cycle	0.46	2CY per HR per 8hr shift (Ideal prod)		32
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	70%	Efficient Compared to Ideal Production		40%
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.66	Inefficiencies Compared to Ideal Production		60%
Number of Cycles(Bulk CY/ Haul Vehicle Cap X # of Haul Vehicles)	147			
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	97.02			
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	1.52			
Number of Haul Days	9.702			
CAT 725 Articulated Truck				
Speed Loaded				
	Max Weight lbs. of loaded 725	103,707.00		
	Tons	58		
	20lbs/Ton Rolling weight	3		
	Rolling Resistance (1% for each 20lbs/Ton)	3%		
	Average Slope	5%		
	Total Resistance	8%		
	Max Gear per CAT Chart	3		
	Max MPH	14		
Speed Empty				
	Max Weight lbs. of Empty 725	50,795.00		
	Tons Empty	25		
	20lbs/Ton Rolling weight Empty	1		
	Rolling Resistance (1% per 20lbs/Ton) Empty	1%		
	Average Slope Empty	5%		
	Total Resistance Empty	6%		
	Max Gear per CAT Chart Empty	4		
	Max MPH Empty	25		
Other Notes				
This activity is to demolish the concrete supports for the 14" penstock from the JCB dam to the Concrete Power Canal. Demolition is expected to be 40% efficient due to repositioning the equipment to demolish each item. The hauling operation is expected to be 70% efficient because it is intended to have a haul truck on stand by to haul material to ensure access is still achievable. The Haul operations is not expected to run the entire demolition duration and is reflected in the estimate. The Haul trucks max speed is listed for reference and has been reduced to account for working area. It is expected the 2.5 CY excavator will load trucks and support the demolition operation.				

1.065 Remove Open Concrete Flume

[illegible]

Description	Active Idle	# In crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	3.00	87.7	10	2,631.00	L	\$58.87	incl. in rate	incl. in rate	\$154,892.23
Laborer	Active	6.00	87.7	10	5,262.00	L	\$51.07	incl. in rate	incl. in rate	\$268,746.13
Equipment Operator (medium)	Active	7.00	87.7	10	6,139.00	L	\$72.34	incl. in rate	incl. in rate	\$444,070.70
Truck Driver (heavy)	Active	3.00	63.1	10	1,893.90	L	\$66.92	incl. in rate	incl. in rate	\$126,747.36
Air Compressor 600 cfm	Active	3.00	87.7	10	2,631.00	E	\$21.74	incl. in rate	incl. in rate	\$57,195.10
Air Tool, Chipping Hammer	Active	3.00	87.7	10	2,631.00	E	\$1.64	incl. in rate	incl. in rate	\$4,312.30
Generator, Small Generator, 10 - 15 kW	Active	3.00	87.7	10	2,631.00	E	\$7.04	incl. in rate	incl. in rate	\$18,522.24
Hydraulic Excavator (2.5cy)	Active	6.00	87.7	10	5,262.00	E	\$205.40	incl. in rate	incl. in rate	\$1,080,814.80
Hydraulic Impact Breaker Attachment (3k-4k ft-lb)	Active	3.00	87.7	10	2,631.00	E	\$36.81	incl. in rate	incl. in rate	\$96,847.11
Hydraulic Thumbs/Shear Attachment	Active	3.00	87.7	10	2,631.00	E	\$24.92	incl. in rate	incl. in rate	\$65,564.52
Loader, FE Rubber Tire (3.5cy)	Active	1.00	87.7	10	877.00	E	\$63.11	incl. in rate	incl. in rate	\$55,347.47
Truck, Off-Road, Articulated Rear, 20cy	Active	3.00	63.1	10	1,893.90	E	\$117.28	incl. in rate	incl. in rate	\$222,116.59
Labor Hours					15925.9	TOTAL LABOR				\$994,456.43
Equipment Hours					21187.9	TOTAL EQUIPMENT				\$1,600,720.13

[illegible]

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Concrete Saw Cutting	1	AL	Allowance	\$100,000.00	\$100,000.00
TOTAL SUBCONTRACTS					\$100,000.00

Labor Cost	\$994,456.43	Labor Burden @	0.0%		\$994,456.43
Material Cost	\$99,445.64	Material Tax @	0.00%	\$0.00	\$99,445.64
Equipment Cost	\$1,600,720.13	Equipment Tax @	0.00%	\$0.00	\$1,600,720.13
Subcontractors	\$100,000.00				\$100,000.00
DIRECT COST SUBTOTALS	\$2,794,622			\$0	DIRECT COST SUBTOTALS \$2,794,622

See Addition Notes for expected operation coordination

1.065 Remove Open Concrete Flume Details				
High Cost Factors		Low Cost Factors		
Bad Weather	0%	No Bad Weather		0%
Gas Price Increase	10%	Gas Price Decrease		10%
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues		0%
	20%			10%
Production Per Hour		Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Etc)		Overall Production
	Hours			
	60	8	50%	240.00
		10	50%	300.00
Haul Notes		Excavator Loading Production per shift		
CY	26,300.00	CY per Hour		22
Swell Factor	60%	CY Bucket Size		2.50
Bulk CY	42080	Buckets Per Hour		9
Haul Vehicle 60% Capacity (2 tons per CY)	12	# of Excavators		6.00
# of Haul Vehicles	3	CY per Hour (5 CY Bucket)		4
Load Time (Includes Spot Time, Maneuver Time at Load site) (Minutes)	3	CY Per Hour Ideal Production Per 8 Hour Shift		85
Dump Time (Includes Spot Time, Maneuver Time at Dump site) (Minutes)	3	Efficient Compared to Ideal Production		4%
Haul Speed (Loaded MPH)	10	Inefficiencies Compared to Ideal Production		96%
Return Speed (Unloaded MPH)	15			
Haul Distance (Miles) Along Power Canal	2			
Shift Length (Hours)	10			
Cyce Time		Breaker Production		
Load Time (Load Time Minutes / 60mins)	0.05	Hydraulic Hammer CY per Hour		30
Haul Time (Haul Distance / Haul Speed)	0.20	# of Hammers		3.00
Dump Time (Dump Time Minutes / 60 Mins)	0.05	CY per Hour		10
Return Time (Haul Distance / Return Speed)	0.13	CY per Hour Back Check		10
Hours Per Cycle	0.43	20CY per HR per 8hr shift (Ideal prod)		20
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	80%	Efficient Compared to Ideal Production		50%
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.54	Inefficiencies Compared to Ideal Production		50%
Number of Cycles (Bulk CY/Haul Vehicle Cap X # of Haul Vehicles)	1160			
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	631.26			
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	1.85			
Number of Haul Days	63			
Speed Loaded				
	Max Weight lbs of loaded 745	#N/A		
	Tons	52		
	20lbs/Ton Rolling weighth	3		
	Rolling Resistance (1% for each 20lbs/Ton)	3%		
	Slope Grade	2%		
	Total Resistance	5%		
	Max Gear per CAT Chart	6		
	Max MPH	12		
Speed Empty				
	Max Weight lbs of Empty 745	#N/A		
	Tons Empty	25		
	20lbs/Ton Rolling weight Empty	1		
	Rolling Resistance (1% per 20lbs/Ton) Empty	1%		
	Average Slope Empty	2%		
	Total Resistance Empty	3%		
	Max Gear per CAT Chart Empty	8		
	Max MPH Empty	20		

Other Notes
This pay item is for demolition of the power canal from the upstream penstock near the dam to the forebay. It is expected that 3 crews will be need to achieve the demolition operation using the productions provided. The demolition operation will be 50% efficient due to creating access to the demo areas, repositioning of equipment, rebar density, personnel breaks, and machine maintenance. The hauling operation is expected to occur roughly 1/4 of the time and is expected to be 80% efficient after accounting for personnel breaks, equipment maintenance, and Traffic Coordination. The max haul speeds are listed for informational use and the actual speeds have been adjusted to account for the intended speeds of the hauling equipment.

PAY ITEM COST DETAIL WORKSHEET

1.066 Remove Structural Steel items associated with Forebay Trash Rack Piers

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.066			Project	:	KRRP - JC Boyle		
Description	:	Remove Structural Steel items associated with Forebay Trash Rack Piers			Group	:	D10		
Quantity	:	11,500.00	LBS						
Daily Production	:	31,250.00	LBS per	10	hour shift	Project #	:	1	
Work Days	:	0.4	Days		Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.22	per LBS		Probable Low Cost Parameter	:	35,937.50	\$2,118	Unit Price Per LBS
Total Cost	:	\$2,492			Probable High Cost Parameter	:	23,437.50	\$3,115	\$0.13

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.4	10	4.00	L	\$58.87	incl. in rate	incl. in rate	\$235.49
Laborer	Active	2.00	0.4	10	8.00	L	\$51.07	incl. in rate	incl. in rate	\$408.58
Steelworker	Active	1.00	0.4	10	4.00	L	\$78.10	incl. in rate	incl. in rate	\$312.40
Crawler Crane (90tn)	Active	1.00	0.4	10	4.00	E	\$211.22	incl. in rate	incl. in rate	\$844.88
Equipment Operator (crane)	Active	1.00	0.4	10	4.00	L	\$81.60	incl. in rate	incl. in rate	\$326.39

SUMMARY OF COSTS									
Labor Cost Material Cost Equipment Cost Subcontractors	\$95,077.50	Labor Burden @ Material Tax @ Equipment Tax @	0.0%			\$95,077.50			
	\$9,507.75		0.00%	\$0.00		\$9,507.75			
	\$140,538.43		0.00%	\$0.00		\$140,538.43			
	\$20,000.00					\$20,000.00			
DIRECT COST SUBTOTALS		\$265,124			\$0	DIRECT COST SUBTOTALS	\$265,124		
Additional Pay Item Notes :									

1.067 Remove Forebay Concrete				
Details				
High Cost Factors			Low Cost Factors	
Bad Weather	0%		No Bad Weather	0%
Gas Price Increase	10%		Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	10%		No Unforeseen Contaminated Mats/ Access Issues	0%
	20%			10%
Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)		Overall Production
	20	8	50%	80.00
		10	50%	100.00
Haul Notes		Excavator Loading Production per shift		
CY	2,520.00		CY per Hour	52
Swell Factor	60%		CY Bucket Size	2.50
Bulk CY	4032		Buckets Per Hour	21
Haul Vehicle 60% Capacity (2 tons per CY)			# of Excavators	2.00
# of Haul Vehicles	12		CY per Hour (5 CY Bucket)	26
Load Time (Includes Spot Time, Maneuver Time at Load site) (Minutes)	5		CY Per Hour Ideal Production Per 8 Hour Shift	95
Dump Time (Includes Spot Time, Maneuver Time at Dump site) (Minutes)	5		Efficient Compared to Ideal Production	27%
Haul Speed (Loaded MPH)	15		Inefficiencies Compared to Ideal Production	73%
Return Speed (Unloaded MPH)	20			
Haul Distance (Miles) Along Power Canal	0.3			
Shift Length (Hours)	10			
		Breaker Production		
Cycle Time			Hydraulic Hammer CY per Hour	10
Load Time (Load Time Minutes / 60mins)	0.08		# of Hammers	1.00
Haul Time (Haul Distance / Haul Speed)	0.00		CY per Hour	10
Dump Time (Dump Time Minutes / 60 Mins)	0.08		CY per Hour Back Check	10
Return Time (Haul Distance / Return Speed)	0.00		30 CY per HR per 8hr shift (Ideal prod)	20
Hours Per Cycle	0.16		Efficient Compared to Ideal Production	50%
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	70%		Inefficiencies Compared to Ideal Production	50%
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.23			
Number of Cycles (Bulk CY/ (Haul Vehicle Cap X # of Haul Vehicles)	336			
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	77.28			
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	4.35			
Number of Haul Days	8			
Speed Loaded				
	Max Weight lbs of loaded 725	103,707.00		
	Tons	52		
	20lbs/Ton Rolling weigh	3		
	Rolling Resistance (1% for each 20lbs/Ton)	3%		
	Slope Grade	2%		
	Total Resistance	5%		
	Max Gear per CAT Chart	6		
	Max MPH	15		
Speed Empty				
	Max Weight lbs of Empty 745	50,795.00		
	Tons Empty	25		
	20lbs/Ton Rolling weights Empty	1		
	Rolling Resistance (1% per 20lbs/Ton) Empty	1%		
	Average Slope Empty	2%		
	Total Resistance Empty	3%		
	Max Gear per CAT Chart Empty	8		
	Max MPH Empty	20		

Other Notes
This pay item is to demolish the forebay area of the concrete flume. The demolition operation is expected to be 50% efficient and hauling is expected to 70% efficient.

PAY ITEM INFORMATION

CREW COSTS

MATERIAL COSTS

SUBCONTRACT COSTS

SUMMARY OF COSTS

Additional Pay Item Notes :

1.068

1.068 Place Concrete Plugs at Tunnel Portals
Details

High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	5%	Gas Price Decrease	5%
Unforeseen Contaminated Mats/ Access Issues	0%	No Unforeseen Contaminated Mats/ Access Issues	0%
5%		5%	

Production Per Hour	Hours	Overall Production	
	0.44	8	3.52
		10	4.4

Production & Sequence Notes
The Plugs are expected to be formed in two sections. The inner sections will be formed and braced off of the tunnel walls. After the inner form (set form) is installed the face form will be built similar to the set form by bracing off of the tunnel walls. To ensure consolidation a high slump small aggregate mix will be used and concrete vibrators will have access through the Bat opening blockout at the top. One 5 man crew will be used to construct the formwork, place the concrete, and strip the form work. One crew of 4 rodbusters will be used to tie and brace reinforcement. Expected duration is 1 week to form each plug (Total of 2 weeks), 1 Week to reinforce both plugs inbetween forming operation, 2 days to pour each plug, and 1 week to strip each plug. Crane will be used 1/2 of time to support crew by flying material close to plug location. A small pump will be used to install concrete. Please note the production is adjusted to account for the duration as listed above.

SUMMARY OF COSTS					
Labor Cost	\$60,101.26	Labor Burden @	0.0%		\$60,101.26
Material Cost	\$6,010.13	Material Tax @	0.00%	\$0.00	\$6,010.13
Equipment Cost	\$108,176.54	Equipment Tax @	0.00%	\$0.00	\$108,176.54
Subcontractors	\$15,000.00				\$15,000.00
DIRECT COST SUBTOTALS	\$189,288		\$0		DIRECT COST SUBTOTALS \$189,288
Additional Pay Item Notes :					

1.069 Remove Concrete Items associated with Penstocks D/S from Tunnel			
Details			
High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	10%	Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues	0%
	20%		10%
CY Per Hour Demolished	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Etc)	Overall Production
	32	8	102.40
		10	128.00
Haul Notes		Excavator Loading Production per shift	
CY	1,800.00	CY per Hour	19.67
Swell Factor	60%	CY Bucket Size	2.50
Bulk CY	2,880.00	Buckets Per Hour	8
Haul Vehicle 60% Capacity (2 tons per CY)	12	# of Excavators	1.00
# of Haul Vehicles	1	CY per Hour (2.5 CY Bucket)	20
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	5	CY Per Hour Ideal Production Per 8 Hour Shift	95
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)	3	Efficient Compared to Ideal Production	21%
Haul Speed (Loaded MPH)	10	Inefficiencies Compared to Ideal Production	79%
Return Speed (Unloaded MPH)	15		
Haul Distance (Miles) Down Slope and Along Power Canal	2		
Shift Length (Hours)	10		
Cycle Time		Breaker Production	
Load Time (Load Time Minutes / Efficiency)	0.08	Hydraulic Hammer CY per Hour	12.8
Haul Time (Haul Distance / Haul Speed)	0.20	# of Hammers	1.00
Dump Time (Dump Time Minutes / 60 Mins)	0.05	CY per Hour	12.8
Return Time (Haul Distance / Return Speed)	0.32	CY per Hour Back Check	12.8
Hours Per Cycle	0.46	10CY per HR per 8hr shift (ideal prod)	32
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	75%	Efficient Compared to Ideal Production	40%
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.61	Inefficiencies Compared to Ideal Production	60%
Number of Cycles/ Bulk CY/ (Haul Vehicle Cap X # of Haul Vehicles)	240		
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	146.4		
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	1.64		
Number of Haul Days	14.64		
CAT 725 Articulated Truck	0		
Speed Loaded (Down Hill)			
Max Weight lbs. of loaded 725	103,707.00		
Tons	52		
20lbs/Ton Rolling weight	3		
Rolling Resistance (1% for each 20lbs/Ton)	3%		
Average Slope	6%		
Total Resistance	9%		
Max Gear per CAT Chart	3		
Max MPH	14		
Speed Empty (Up Hill)			
Max Weight lbs. of Empty 725	50,795.00		
Tons Empty	25		
20lbs/Ton Rolling weight Empty	1		
Rolling Resistance (1% per 20lbs/Ton) Empty	1%		
Average Slope Empty	6%		
Total Resistance Empty	7%		
Max Gear per CAT Chart Empty	3		
Max MPH Empty	14		

Other Notes

This activity is for the demolition of the concrete supports for the 14" diameter penstock down stream from the surge tank. The supports are located at three different locations and it is expected that existing haul roads from when the supports were constructed will be used to gain access. The overall production of the activity is based on the demolition operation which is expected to only be 40% efficient due to repositioning equipment 3 different times, expectation of high density of reinforcement, and the restricted access for a stockpile area for the demolished material. The Hauling operation is expected to be 70% efficient due to the long sloped haul road, extra time for on ground spotters, and due to the limited access for maneuverability. The hauling is expected to start after the demolition has started and the duration of the haul truck and the truck driver reflect the expected haul duration.

PAY ITEM NUMBER	:	1.071	Project	:	KRRP - JC Boyle
Description	:	Remove Fore bay Spillway Gate House	Project	:	D10
Quantity	1.071	610.00 SF			
Daily Production	1.071	1,000.00 SF per	10	hour shift	
Work Days	1.071	0.6 Days	Project #	:	1
Unit Price	1.071	\$15.27 per SF	Estimator	:	Eric Jones
Total Cost	1.071	\$9,315	Probable Low Cost Parameter	:	1,100.00
			Probable High Cost Parameter	:	800.00
					\$8,383
					\$11,178
					\$7.62
					\$13.97

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.6	10	6.00	L	\$58.87	incl. in rate	incl. in rate	\$353.23
Laborer	Active	4.00	0.6	10	24.00	L	\$51.07	incl. in rate	incl. in rate	\$1,225.75
Equipment Operator (medium)	Active	2.00	0.6	10	12.00	L	\$72.34	incl. in rate	incl. in rate	\$868.03
Hydraulic Excavator (5.0cy)	Active	1.00	0.6	10	6.00	E	\$276.50	incl. in rate	incl. in rate	\$1,659.00
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.6	10	6.00	E	\$63.11	incl. in rate	incl. in rate	\$378.66
Labor Hours					42	TOTAL LABOR				\$2,447.02
Equipment Hours					12	TOTAL EQUIPMENT				\$2,037.66

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
TOTAL MATERIAL						\$0.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Dump Fee Coversion (SFXH*.33/27)	89	CY			\$0.00
Conversion CY to Tons (2 tons per CY)	45.00	tons	Klamath County LandFill	\$74.00	\$3,330.00
Hauling Disposal Cost 30 Miles to Klamath County Landfill	5.00	Loads	18 CY per load	\$300.00	\$1,500.00
					\$0.00
			TOTAL SUBCONTRACTS		\$4,830.00

Labor Cost	\$2,447.02	Labor Burden @	0.0%		\$2,447.02
Material Cost	\$0.00	Material Tax @	0.00%	\$0.00	\$0.00
Equipment Cost	\$2,037.66	Equipment Tax @	0.00%	\$0.00	\$2,037.66
Subcontractors	\$4,830.00				\$4,830.00
DIRECT COST SUBTOTALS	\$9,315			\$0	DIRECT COST SUBTOTALS \$9,315

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PAY ITEM COST DETAIL WORKSHEET

1.072 Remove Fore bay Control Building

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.072	Project	:	KRRP - JC Boyle				
Description	:	Remove Fore bay Control Building	Group	:	D10				
Quantity	1.072	560.00 SF	Project #	:	1	Estimator	:	Eric Jones	SF per
Daily Production	1.072	560.00 SF per	Probable Low Cost Parameter		616.00	Total Cost		\$10,874	Unit Price Per SF
Work Days	1.072	1.0 Days	Probable High Cost Parameter		448.00	\$14,499		\$32.36	
Unit Price	1.072	\$21.58 per SF							
Total Cost	1.072	\$12,082							

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.0	10	10.00	L	\$58.87	incl. in rate	incl. in rate	\$588.72
Laborer	Active	4.00	1.0	10	40.00	L	\$51.07	incl. in rate	incl. in rate	\$2,042.92
Equipment Operator (medium)	Active	2.00	1.0	10	20.00	L	\$72.34	incl. in rate	incl. in rate	\$1,446.72
Hydraulic Excavator (5.0cy)	Active	1.00	1.0	10	10.00	E	\$276.50	incl. in rate	incl. in rate	\$2,765.00
Loader, FE Rubber Tire (3.5cy)	Active	1.00	1.0	10	10.00	E	\$63.11	incl. in rate	incl. in rate	\$631.10

SUMMARY OF COSTS					
Labor Cost	\$407.84	Labor Burden @	0.0%		\$407.84
Material Cost	\$0.00	Material Tax @	0.00%	\$0.00	\$0.00
Equipment Cost	\$339.61	Equipment Tax @	0.00%	\$0.00	\$339.61
Subcontractors	\$818.00				\$818.00
DIRECT COST SUBTOTALS	\$1,565		\$0	DIRECT COST SUBTOTALS	\$1,565
Additional Pay Item Notes :					

PAY ITEM COST DETAIL WORKSHEET

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.075	Project	:	KRRP - JC Boyle				
Description	:	Remove Fixed Wheel Gate (Gate, Frame, and Hoist)	Group	:	D03				
Quantity	:	55,000.00 LBS							
Daily Production	:	37,500.00 LBS per	10	:	hour shift	Project #	:	1	
Work Days	:	1.5 Days	Estimator	:	Mihaela Tomulescu	LBS per	:		
Unit Price	:	\$0.37 per LBS	Probable Low Cost Parameter	:		\$16,087	:		\$0.36
Total Cost	:	\$20,109	Probable High Cost Parameter	:		\$25,137	:		\$0.89

CREW COSTS

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.5	10	15.00	L	\$58.87	incl. in rate	incl. in rate	\$883.08
Laborer	Active	2.00	1.5	10	30.00	L	\$51.07	incl. in rate	incl. in rate	\$1,532.19
Steelworker	Active	2.00	1.5	10	30.00	L	\$78.10	incl. in rate	incl. in rate	\$2,343.00
Loader, FE Rubber Tire (5.25cy)	Active	1.00	1.5	10	15.00	E	\$76.00	incl. in rate	incl. in rate	\$1,140.00
		0.00	1.5	10	0.00	0	\$0.00			\$0.00
Truck, Off-Road, Articulated Rear, 20cy	Active	1.00	1.5	10	15.00	E	\$117.28	incl. in rate	incl. in rate	\$1,759.20
Hydraulic Crane (120tn)	Active	1.00	1.5	10	15.00	E	\$242.08	incl. in rate	incl. in rate	\$3,631.20
Welder	Active	1.00	1.5	10	15.00	E	\$7.84	incl. in rate	incl. in rate	\$117.60
Gas Welding Machine	Active	1.00	1.5	10	15.00	E	\$2.88	incl. in rate	incl. in rate	\$43.15
Equipment Operator (medium)	Active	1.00	1.5	10	15.00	L	\$72.34	incl. in rate	incl. in rate	\$1,085.04
Equipment Operator (crane)	Active	1.00	1.5	10	15.00	L	\$81.60	incl. in rate	incl. in rate	\$1,223.97
Labor Hours					105	TOTAL LABOR				\$7,067.28
Equipment Hours					75	TOTAL EQUIPMENT				\$6,691.15

MATERIAL COSTS

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$353.36	\$353.36
Selective demolition, torch cutting, steel, 1" thick plate (assumed qty)	2,500.00	LF	1.000	2,500.00	\$0.85	\$2,125.00
TOTAL MATERIAL						\$2,478.36

SUBCONTRACT COSTS

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum	5.50	ton	1.000	5.50	\$595.00
Hauling Disposal Cost 30 Miles to Klamath County Landfill	2.00	Loads	20 tons a load		\$300.00
TOTAL SUBCONTRACTS					\$3,872.50

SUMMARY OF COSTS

Labor Cost	\$7,067.28	Labor Burden @	49.7%	\$0.00	\$7,067.28
Material Cost	\$2,478.36	Material Tax @	0.0%	\$0.00	\$2,478.36
Equipment Cost	\$6,691.15	Equipment Tax @	0.0%	\$0.00	\$6,691.15
Subcontractors	\$3,872.50				\$3,872.50
DIRECT COST SUBTOTALS	\$20,109			\$0	DIRECT COST SUBTOTALS \$20,109

Additional Pay Item Notes :

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PAY ITEM COST DETAIL WORKSHEET

1.076 Remove Trash rack and trash rake (steel)

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.076	Project	:	KRRP - JC Boyle				
Description	:	Remove Trash rack and trash rake (steel)	Group	:	D03				
Quantity	:	75,000.00 LBS							
Daily Production	:	25,000.00 LBS per	10	hour shift	Project #	:	1		
Work Days	:	3.0 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.47 per LBS			Probable Low Cost Parameter			30,000.00	\$28,431
Total Cost	:	\$35,538			Probable High Cost Parameter			18,750.00	\$44,423
									Unit Price Per LBS
									\$0.95
									\$2.37

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	3.0	10	30.00	L	\$58.87	incl. in rate	incl. in rate	\$1,766.16
Laborer	Active	1.00	3.0	10	30.00	L	\$51.07	incl. in rate	incl. in rate	\$1,532.19
Steelworker	Active	3.00	3.0	10	90.00	L	\$78.10	incl. in rate	incl. in rate	\$7,029.00
Equipment Operator (crane)	Active	1.00	3.0	10	30.00	L	\$81.60	incl. in rate	incl. in rate	\$2,447.94
Equipment Operator (medium)	Active	1.00	3.0	10	30.00	L	\$72.34	incl. in rate	incl. in rate	\$2,170.08
Loader, FE Rubber Tire (5.25cy)	Active	1.00	3.0	10	30.00	E	\$76.00	incl. in rate	incl. in rate	\$2,280.00
Hydraulic Crane (120tn)	Active	1.00	3.0	10	30.00	E	\$242.08	incl. in rate	incl. in rate	\$7,262.40
Acetylene Torches	Active	1.00	3.0	10	30.00	E	\$0.47	incl. in rate	incl. in rate	\$14.10
Air Compressor 600 cfm	Active	1.00	3.0	10	30.00	E	\$21.74	incl. in rate	incl. in rate	\$652.20
Generator, Small Generator, 10 - 15 kW	Active	1.00	3.0	10	30.00	E	\$7.04	incl. in rate	incl. in rate	\$211.20
Labor Hours					210	TOTAL LABOR				\$14,945.37
Equipment Hours					150	TOTAL EQUIPMENT				\$10,419.90

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 15% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$2,241.81	\$2,241.81
Selective demolition, torch cutting, steel, 1" thick plate (assumed qty)	6,000.00	LF	1.000	6,000.00	\$0.85	\$5,100.00
						TOTAL MATERIAL
						\$7,341.81

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (10%)	3.75	ton	1.000	\$595.00	\$2,231.25
Hauling Disposal Cost 30 Miles to Klamath County Landfill	2.00	Loads	20 tons a load	\$300.00	\$600.00
					TOTAL SUBCONTRACTS
					\$2,831.25

SUMMARY OF COSTS									
Labor Cost	\$14,945.37	Labor Burden @	49.7%	\$0.00					\$14,945.37
Material Cost	\$7,341.81	Material Tax @	0.0%	\$0.00					\$7,341.81
Equipment Cost	\$10,419.90	Equipment Tax @	0.0%	\$0.00					\$10,419.90
Subcontractors	\$2,831.25								\$2,831.25
DIRECT COST SUBTOTALS	\$35,538			\$0				DIRECT COST SUBTOTALS	\$35,538
Additional Pay Item Notes :									

PAY ITEM COST DETAIL WORKSHEET

1.077 Remove Stop Logs and Slots (steel)

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.077			Project	:	KRRP - JC Boyle		
Description	:	Remove Stop Logs and Slots (steel)			Group	:	D03		
Quantity	:	136,000.00 LBS							
Daily Production	:	54,000.00 LBS per		20	hour shift	Project #	:	1	
Work Days	:	2.5		Days	Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.42 per LBS			Probable Low Cost Parameter		59,400.00	\$51,948	\$0.87
Total Cost	:	\$57,720			Probable High Cost Parameter		40,500.00	\$72,150	\$1.78

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	2.5	20	50.00	L	\$58.87	incl. in rate	incl. in rate	\$2,943.60
Laborer	Active	4.00	2.5	20	200.00	L	\$51.07	incl. in rate	incl. in rate	\$10,214.60
Steelworker	Active	2.00	2.5	20	100.00	L	\$78.10	incl. in rate	incl. in rate	\$7,810.00
Equipment Operator (crane)	Active	1.00	2.5	20	50.00	L	\$81.60	incl. in rate	incl. in rate	\$4,079.90
Equipment Operator (medium)	Active	1.00	2.5	20	50.00	L	\$72.34	incl. in rate	incl. in rate	\$3,616.80
Hydraulic Crane (120tn)	Active	1.00	2.5	20	50.00	E	\$242.08	incl. in rate	incl. in rate	\$12,104.00
Loader, FE Rubber Tire (3.5cy)	Active	1.00	2.5	20	50.00	E	\$63.11	incl. in rate	incl. in rate	\$3,155.50
					Labor Hours	450	TOTAL LABOR			\$28,664.90
					Equipment Hours	100	TOTAL EQUIPMENT			\$15,259.50

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 15% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$4,299.74	\$4,299.74
Selective demolition, torch cutting, steel, 1" thick plate (assumed qty)	5,000.00	LF	1.000	5,000.00	\$0.85	\$4,250.00
						TOTAL MATERIAL
						\$8,549.74

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (10%)					
Hauling Disposal Cost 30 Miles to Klamath County Landfill	6.80	ton	1.000	6.80	\$595.00
	4.00	Loads	20 tons a load		\$300.00
					\$0.00
					\$0.00
					TOTAL SUBCONTRACTS
					\$5,246.00

SUMMARY OF COSTS						
Labor Cost	\$28,664.90	Labor Burden @	49.7%	\$0.00		\$28,664.90
Material Cost	\$8,549.74	Material Tax @	0.0%	\$0.00		\$8,549.74
Equipment Cost	\$15,259.50	Equipment Tax @	0.0%	\$0.00		\$15,259.50
Subcontractors	\$5,246.00					\$5,246.00
DIRECT COST SUBTOTALS	\$57,720			\$0	DIRECT COST SUBTOTALS	\$57,720

Additional Pay Item Notes :	
The process of removing stop logs is not manual, but done with hydraulic stop log lifters and hoists. The gate side guides and invert assumed having a minimum weight of 4 lbs./ft. for wall mounted and 3 lbs./ft. for embedded in concrete. The gate invert should contain a removable neoprene seal. Including stop log grooves, lifter, guide - weight around 136,000 lbs.	

1.078 Remove Traveling Water Screen

PAY ITEM NUMBER	:	1.078	Project	:	KRRP - JC Boyle			
Description	:	Remove Traveling Water Screen	Group	:	D03			
Quantity	:	124,000.00 LBS						
Daily Production	:	37,500.00 LBS per	10	hour shift	Project #	:	1	
Work Days	:	3.3	Days		Estimator	:	Mihaela Tomulescu	
Unit Price	:	\$0.39 per LBS			LBS per		Total Cost	
Total Cost	:	\$48,607			Probable Low Cost Parameter	41,250.00	\$43,747	
					Probable High Cost Parameter	28,125.00	\$60,759	
							Unit Price Per LBS	
							\$1.06	
							\$2.16	

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	2.00	3.3	10	66.00	L	\$58.87	incl. in rate	incl. in rate	\$3,885.55
Electrician	Active	1.00	3.3	10	33.00	L	\$55.80	incl. in rate	incl. in rate	\$1,841.50
Steelworker	Active	6.00	3.3	10	198.00	L	\$78.10	incl. in rate	incl. in rate	\$15,463.80
Loader, FE Rubber Tire (8.6cy)	Active	1.00	3.3	10	33.00	E	\$225.40	incl. in rate	incl. in rate	\$7,438.20
Hydraulic Crane (120tn)	Active	1.00	3.3	10	33.00	E	\$242.08	incl. in rate	incl. in rate	\$7,988.64
Welder	Active	2.00	3.3	10	66.00	E	\$7.84	incl. in rate	incl. in rate	\$517.44
Gas Welding Machine	Active	2.00	3.3	10	66.00	E	\$2.88	incl. in rate	incl. in rate	\$189.88
Equipment Operator (medium)	Active	1.00	3.3	10	33.00	L	\$72.34	incl. in rate	incl. in rate	\$2,387.09
Equipment Operator (crane)	Active	1.00	3.3	10	33.00	L	\$81.60	incl. in rate	incl. in rate	\$2,692.73
Labor Hours					363	TOTAL LABOR				\$26,270.67
Equipment Hours					198	TOTAL EQUIPMENT				\$16,134.16

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$1,313.53	\$1,313.53
TOTAL MATERIAL						\$1,313.53

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (10%)					
	6.20	ton	1.000	\$595.00	\$3,689.00
Hauling Disposal Cost 30 Miles to Klamath County Landfill	4.00	Loads	20 tons a load	\$300.00	\$1,200.00
TOTAL SUBCONTRACTS					\$4,889.00

Labor Cost	\$26,270.67	Labor Burden @	49.7%	\$0.00		\$26,270.67
Material Cost	\$1,313.53	Material Tax @	0.0%	\$0.00		\$1,313.53
Equipment Cost	\$16,134.16	Equipment Tax @	0.0%	\$0.00		\$16,134.16
Subcontractors	\$4,889.00					\$4,889.00
DIRECT COST SUBTOTALS	\$48,607			\$0		\$48,607

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PAY ITEM COST DETAIL WORKSHEET

1.080 Remove Gates and Hoists

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.080	Project	:	KRRP - JC Boyle				
Description	:	Remove Gates and Hoists	Group	:	D03				
Quantity	:	18,500.00 LBS							
Daily Production	:	31,250.00 LBS per	10	hour shift	Project #	:	1		
Work Days	:	0.6 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.34 per LBS			Probable Low Cost Parameter			35,937.50	\$5,342
Total Cost	:	\$6,285			Probable High Cost Parameter			21,875.00	\$8,170
									Unit Price Per LBS
									\$0.15
									\$0.37

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	0.6	10	6.00	L	\$55.80	incl. in rate	incl. in rate	\$334.82
Electrician	Active	1.00	0.6	10	6.00	L	\$55.80	incl. in rate	incl. in rate	\$334.82
Steelworker	Active	2.00	0.6	10	12.00	L	\$78.10	incl. in rate	incl. in rate	\$937.20
Loader, FE Rubber Tire (8.6cy)	Active	1.00	0.6	10	6.00	E	\$225.40	incl. in rate	incl. in rate	\$1,352.40
Crawler Crane (90tn)	Active	1.00	0.6	10	6.00	E	\$211.22	incl. in rate	incl. in rate	\$1,267.32
Welder	Active	1.00	0.6	10	6.00	E	\$7.84	incl. in rate	incl. in rate	\$47.04
Gas Welding Machine	Active	1.00	0.6	10	6.00	E	\$2.88	incl. in rate	incl. in rate	\$17.26
Equipment Operator (medium)	Active	1.00	0.6	10	6.00	L	\$72.34	incl. in rate	incl. in rate	\$434.02
Equipment Operator (crane)	Active	1.00	0.6	10	6.00	L	\$81.60	incl. in rate	incl. in rate	\$489.59
Laborer	Active	2.00	0.6	10	12.00	L	\$51.07	incl. in rate	incl. in rate	\$612.88
					Labor Hours	48	TOTAL LABOR			\$3,143.32
					Equipment Hours	24	TOTAL EQUIPMENT			\$2,684.02

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$157.17	\$157.17
						TOTAL MATERIAL
						\$157.17

SUBCONTRACT COSTS				
Description	Quantity	Units	Notes / Company	Unit Price
Hauling Disposal Cost 30 Miles to Klamath County Landfill	1.00	Loads	20 tons a load	\$300.00
				TOTAL SUBCONTRACTS
				\$300.00

SUMMARY OF COSTS									
Labor Cost	\$3,143.32	Labor Burden @	49.7%	\$0.00					\$3,143.32
Material Cost	\$157.17	Material Tax @	0.0%	\$0.00					\$157.17
Equipment Cost	\$2,684.02	Equipment Tax @	0.0%	\$0.00					\$2,684.02
Subcontractors	\$300.00								\$300.00
DIRECT COST SUBTOTALS	\$6,285			\$0				DIRECT COST SUBTOTALS	\$6,285
Additional Pay Item Notes :									
Production based on crew 1 Forman, 2 Steelworkers and 1 Welder to cut and attach hooks to 2 gates and 2 hoists for disposal, 2 Laborers to rigging wire rope slings, 1 Electrician to provide power for tools, 1 Truck for disposal to Yreka facility. Assuming 1/2 days of work;									

1.081 Remove Trash rack and trash rake (steel)

PAY ITEM NUMBER	:	1.081	Project	:	KRRP - JC Boyle
Description	:	Remove Trash rack and trash rake (steel)	Group	:	D03
Quantity	:	47,249.00 LBS			
Daily Production	:	23,100.00 LBS per	10	hour shift	
Work Days	:	2.0	Days		
Unit Price	:	\$0.45	per LBS		
Total Cost	:	\$21,336			
			Project #	:	1
			Estimator	:	Mihaela Tomulescu
			Probable Low Cost Parameter		LBS per 26,565.00
			Probable High Cost Parameter		\$18,136
					Unit Price Per LBS \$0.68
					\$27,737
					\$1.72

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	2.0	10	20.00	L	\$58.87	incl. in rate	incl. in rate	\$1,177.44
Laborer	Active	3.00	2.0	10	60.00	L	\$51.07	incl. in rate	incl. in rate	\$3,064.38
Steelworker	Active	2.00	2.0	10	40.00	L	\$78.10	incl. in rate	incl. in rate	\$3,124.00
Equipment Operator (crane)	Active	1.00	2.0	10	20.00	L	\$81.60	incl. in rate	incl. in rate	\$1,631.96
Equipment Operator (medium)	Active	1.00	2.0	10	20.00	L	\$72.34	incl. in rate	incl. in rate	\$1,446.72
Crawler Crane (130tn)	Active	1.00	2.0	10	20.00	E	\$262.91	incl. in rate	incl. in rate	\$5,258.20
Loader, FE Rubber Tire (5.25cy)	Active	1.00	2.0	10	20.00	E	\$76.00	incl. in rate	incl. in rate	\$1,520.00
Acetylene Torches	Active	2.00	2.0	10	40.00	E	\$0.47	incl. in rate	incl. in rate	\$18.80
Labor Hours					160	TOTAL LABOR				\$10,444.50
Equipment Hours					80	TOTAL EQUIPMENT				\$6,797.00

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 20% labor (saw blades, drill bits, electrodes, wrenches, hard hats, torch gas, etc)	1.00	LS	1.000	1.00	\$2,088.90	\$2,088.90
TOTAL MATERIAL						\$2,088.90

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (25%)					
	2.36	ton	1.000	\$595.00	\$1,405.66
Hauling Disposal Cost 30 Miles to Klamath County Landfill	2.00	Loads	20 tons a load	\$300.00	\$600.00
TOTAL SUBCONTRACTS					\$2,005.66

SUMMARY OF COSTS					
Labor Cost	\$10,444.50	Labor Burden @	49.7%	\$0.00	\$10,444.50
Material Cost	\$2,088.90	Material Tax @	0.0%	\$0.00	\$2,088.90
Equipment Cost	\$6,797.00	Equipment Tax @	0.0%	\$0.00	\$6,797.00
Subcontractors	\$2,005.66				\$2,005.66
DIRECT COST SUBTOTALS	\$21,336			\$0	\$21,336

This pay item is to remove trash rack steel by cutting lose with torches and loading on a contracted haul truck to recycle facility

PAY ITEM COST DETAIL WORKSHEET

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1,082	Project	:	KRRP - JC Boyle				
Description	:	Remove stop Logs and slots (steel)	Group	:	D03				
Quantity	:	37,069.00 LBS							
Daily Production	:	20,000.00 LBS per	10	:	hour shift	Project #	:	1	
Work Days	:	1.9 Days				Estimator	:	Mihaela Tomulescu	
Unit Price	:	\$0.56 per LBS				Probable Low Cost Parameter	:	23,000.00	Total Cost
Total Cost	:	\$20,925				Probable High Cost Parameter	:	14,000.00	Unit Price Per LBS
								\$17,786	\$0.77
								\$27,202	\$1.94

CREW COSTS

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.9	10	19.00	L	\$58.87	incl. in rate	incl. in rate	\$1,118.57
Laborer	Active	3.00	1.9	10	57.00	L	\$51.07	incl. in rate	incl. in rate	\$2,911.16
Steelworker	Active	2.00	1.9	10	38.00	L	\$78.10	incl. in rate	incl. in rate	\$2,967.80
Equipment Operator (crane)	Active	1.00	1.9	10	19.00	L	\$81.60	incl. in rate	incl. in rate	\$1,550.36
Equipment Operator (medium)	Active	1.00	1.9	10	19.00	L	\$72.34	incl. in rate	incl. in rate	\$1,374.38
Crawler Crane (130tn)	Active	1.00	1.9	10	19.00	E	\$262.91	incl. in rate	incl. in rate	\$4,995.29
Loader, FE Rubber Tire (5.25cy)	Active	1.00	1.9	10	19.00	E	\$76.00	incl. in rate	incl. in rate	\$1,444.00
Acetylene Torches	Active	2.00	1.9	10	38.00	E	\$0.47	incl. in rate	incl. in rate	\$17.86
Labor Hours					152	TOTAL LABOR				\$9,922.28
Equipment Hours					76	TOTAL EQUIPMENT				\$6,457.15

MATERIAL COSTS

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 15% labor (saw blades, drill bits, electrodes, wrenches, hard hats etc)	1.00	LS	1.000	1.00	\$1,488.34	\$1,488.34
TOTAL MATERIAL						\$1,488.34

SUBCONTRACT COSTS

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (10%)					
	4.63	ton	1.000	\$595.00	\$2,757.01
Hauling Disposal Cost 30 Miles to Klamath County Landfill	1.00	Loads	20 tons a load	\$300.00	\$300.00
TOTAL SUBCONTRACTS					\$3,057.01

SUMMARY OF COSTS

Labor Cost	\$9,922.28	Labor Burden @	49.7%	\$0.00	\$9,922.28
Material Cost	\$1,488.34	Material Tax @	0.0%	\$0.00	\$1,488.34
Equipment Cost	\$6,457.15	Equipment Tax @	0.0%	\$0.00	\$6,457.15
Subcontractors	\$3,057.01				\$3,057.01
DIRECT COST SUBTOTALS	\$20,925			\$0	DIRECT COST SUBTOTALS \$20,925

Additional Pay Item Notes :

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1.083 Remove & Dispose 14' Diversion Pipe			
Details			
High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	10%	Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues	5%
20%		15%	

Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)	Overall Production
5,050.00	8	60%	24240
4,000.00	10	60%	24000

Total Lbs	484,200.00		
Assumed Pipe Thickness is 3/4" thick	#N/A		
14' diameter pipe			
lbs per ft	#N/A	36000	#N/A
Total LF	600.00		
Each Piece at 36k length	#N/A		
Number of pieces	#N/A		

1.083.1 Remove & Dispose 9'-6" to 10'-6" Penstocks

[illegible]

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	31.5	10	315.00	L	\$58.87	incl. in rate	incl. in rate	\$18,544.68
Laborer	Active	4.00	31.5	10	1,260.00	L	\$51.07	incl. in rate	incl. in rate	\$64,351.98
Steelworker	Active	2.00	31.5	10	630.00	L	\$78.10	incl. in rate	incl. in rate	\$49,203.00
Equipment Operator (crane)	Active	2.00	31.5	10	630.00	L	\$81.60	incl. in rate	incl. in rate	\$51,406.74
Equipment Operator (medium)	Active	2.00	31.5	10	630.00	L	\$72.34	incl. in rate	incl. in rate	\$45,571.68
Crawler Crane (90tn)	Active	1.00	31.5	10	315.00	E	\$211.22	incl. in rate	incl. in rate	\$66,534.30
Crawler Crane (270tn)	Active	1.00	31.5	10	315.00	E	\$454.10	incl. in rate	incl. in rate	\$143,041.50
Loader, FE Rubber Tire (5.25cy)	Active	1.00	31.5	10	315.00	E	\$76.00	incl. in rate	incl. in rate	\$23,940.00
Hydraulic Excavator (5.0cy)	Active	1.00	31.5	10	315.00	E	\$276.50	incl. in rate	incl. in rate	\$87,097.50
Boomlift (JLG 60')	Active	2.00	31.5	10	630.00	E	\$52.87	incl. in rate	incl. in rate	\$33,308.10
Acetylene Torches	Active	4.00	31.5	10	1,260.00	E	\$0.47	incl. in rate	incl. in rate	\$592.20
Air Compressor 600 cfm	Active	2.00	31.5	10	630.00	E	\$21.74	incl. in rate	incl. in rate	\$13,696.20
Generator, Small Generator, 10 - 15 kW	Active	2.00	31.5	10	630.00	E	\$7.04	incl. in rate	incl. in rate	\$4,435.20
Hepa Vac System	Active	4.00	31.5	10	1,260.00	E	\$0.47	incl. in rate	incl. in rate	\$592.20
Labor Hours					3465	TOTAL LABOR				\$229,078.08
Equipment Hours					5670	TOTAL EQUIPMENT				\$373,237.20

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 20% labor (saw blades, drill bits, torch gas, etc)	1.00	LS	1.000	1.00	\$45,815.62	\$45,815.62
HEPA Vac Systems For Grinders	4.00	EA	1.000	4.00	\$1,000.00	\$4,000.00
Handheld Grinders	4.00	EA	1.000	4.00	\$250.00	\$1,000.00
TOTAL MATERIAL						\$50,815.62

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (10% of total)					
	47.66	ton		\$595.00	\$28,359.19
Hauling Disposal Cost 30 Miles to Klamath County Landfill	38.75	Loads		\$1,000.00	\$38,750.00
Shoring Allowance	1	AL		\$50,000.00	\$50,000.00
TOTAL SUBCONTRACTS					\$117,109.19

Labor Cost	\$229,078.08	Labor Burden @	49.7%	\$0.00		\$229,078.08
Material Cost	\$50,815.62	Material Tax @	0.0%	\$0.00		\$50,815.62
Equipment Cost	\$373,237.20	Equipment Tax @	0.0%	\$0.00		\$373,237.20
Subcontractors	\$117,109.19					\$117,109.19
DIRECT COST SUBTOTALS	\$770,240			\$0	DIRECT COST SUBTOTALS	\$770,240

This payitem is to demolish the 9'-6" to 10'-6" penstock and haul off site. This activity is expected to be 60% efficient to account for prepping sections of the pipe for cutting due to coating, staff breaks, equipment maintenance, temp shoring, equipment repositioning, and ect. A 90 ton crawler crane will be rigged to the cut section of pipe and once cut it will track near loading location. 130 ton crawler crane will be used as a support crane to load trucks and other misc requirements. A shoring allowance has been added for potential sag areas depending where the penstock is cut. Expecting 1 steel worker and 2 laborers to be on either side of the penstock section to prep and cut section.

High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	10%	Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues	5%
20%		15%	

Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)	Overall Production
5,050.00	8	60%	24240
5,050.00	10	60%	30300

Total Lbs	953,250.00
Wall Thickness 3/8" (Plan Sheet AA78164)	0.375
10'-8" AVG diameter pipe	0
lbs per ft pipe	512
Lbs per Ft Allowance for Connections & Flanges 20%	103
Total Lbs Per FT	615
Total LF	1,550
Length of Pipe Each Load	40 Length of Trailer 48'
Weight Per Load	24,600 Max Weight 36K Lbs
Number of Loads	39

1.084 Remove & Dispose Surge Tank (steel)

Additional Pay Item Notes :

This payitem is to remove the surge tank down stream from the concrete power canal. The cost to create access to the surge take is covered under the temp access road payitem. The activity production is expected to be 60% efficient to account for mobilizing equipment at the tank, equipment maintenance, employee breaks, and tank preparation for cutting. It is expected that tank will be demolished by cutting into 20K lb pieces and load on truck to haul to recycle plant.

PAY ITEM COST DETAIL WORKSHEET

1.085 Remove & Dispose 2 - 108" Butterfly valves

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.085	Project	:	KRRP - JC Boyle				
Description	:	Remove & Dispose 2 - 108" Butterfly valves	Group	:	D03				
Quantity	:	148,000.00 LBS							
Daily Production	:	28,800.00 LBS per	10	hour shift	Project #	:	1		
Work Days	:	5.1 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.53 per LBS			Probable Low Cost Parameter			31,680.00	\$70,691
Total Cost	:	\$78,546			Probable High Cost Parameter			20,160.00	\$102,110
									Unit Price Per LBS
									\$2.23
									\$5.06

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	5.1	10	51.00	L	\$58.87	incl. in rate	incl. in rate	\$3,002.47
Steelworker	Active	2.00	5.1	10	102.00	L	\$78.10	incl. in rate	incl. in rate	\$7,966.20
Laborer	Active	4.00	5.1	10	204.00	L	\$51.07	incl. in rate	incl. in rate	\$10,418.89
Equipment Operator (crane)	Active	1.00	5.1	10	51.00	L	\$81.60	incl. in rate	incl. in rate	\$4,161.50
Equipment Operator (medium)	Active	1.00	5.1	10	51.00	L	\$72.34	incl. in rate	incl. in rate	\$3,689.14
Crawler Crane (130tn)	Active	1.00	5.1	10	51.00	E	\$262.91	incl. in rate	incl. in rate	\$13,408.41
Loader, FE Rubber Tire (5.25cy)	Active	1.00	5.1	10	51.00	E	\$76.00	incl. in rate	incl. in rate	\$3,876.00
Acetylene Torches	Active	2.00	5.1	10	102.00	E	\$0.47	incl. in rate	incl. in rate	\$47.94
Air Compressor 600 cfm	Active	1.00	5.1	10	51.00	E	\$21.74	incl. in rate	incl. in rate	\$1,108.74
Generator, Small Generator, 10 - 15 kW	Active	2.00	5.1	10	102.00	E	\$7.04	incl. in rate	incl. in rate	\$718.08
Hepa Vac System	Active	2.00	5.1	10	102.00	E	\$0.47	incl. in rate	incl. in rate	\$47.94
Labor Hours					459	TOTAL LABOR				\$29,238.20
Equipment Hours					459	TOTAL EQUIPMENT				\$19,207.11

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 15% labor (saw blades, electrodes, drill bits, torch gas, etc)	1.00	LS	1.000	1.00	\$4,385.73	\$4,385.73
HEPA Vac Systems For Grinders	2.00	EA	1.000	2.00	\$1,000.00	\$2,000.00
Handheld Grinders	2.00	EA	1.000	2.00	\$250.00	\$500.00
						TOTAL MATERIAL
						\$6,885.73

SUBCONTRACT COSTS				
Description	Quantity	Units	Notes / Company	Unit Price
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (50%)	37.00	ton	1.000	\$595.00
Hauling Disposal Cost 30 Miles to Klamath County Landfill	4.00	Loads	20 tons a load	\$300.00
				TOTAL SUBCONTRACTS
				\$23,215.00

SUMMARY OF COSTS									
Labor Cost	\$29,238.20	Labor Burden @	49.7%	\$0.00					\$29,238.20
Material Cost	\$6,885.73	Material Tax @	0.0%	\$0.00					\$6,885.73
Equipment Cost	\$19,207.11	Equipment Tax @	0.0%	\$0.00					\$19,207.11
Subcontractors	\$23,215.00								\$23,215.00
DIRECT COST SUBTOTALS	\$78,546			\$0				DIRECT COST SUBTOTALS	\$78,546
Additional Pay Item Notes :									

PAY ITEM COST DETAIL WORKSHEET

1.086 Remove & Dispose Gate, Stem and Frame

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.086			Project	:	KRRP - JC Boyle		
Description	:	Remove & Dispose Gate, Stem and Frame			Group	:	D03		
Quantity	:	28,000.00 LBS							
Daily Production	:	13,875.00	LBS per	10	hour shift	Project #	:	1	
Work Days	:	2.0 Days			Estimator	:	Mihaela Tomulescu	LBS per	Total Cost
Unit Price	:	\$0.74 per LBS			Probable Low Cost Parameter	:	15,262.50	\$18,741	\$1.23
Total Cost	:	\$20,823			Probable High Cost Parameter	:	11,100.00	\$24,987	\$2.25

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	2.0	10	20.00	L	\$58.87	incl. in rate	incl. in rate	\$1,177.44
Laborer	Active	2.00	2.0	10	40.00	L	\$51.07	incl. in rate	incl. in rate	\$2,042.92
Steelworker	Active	1.00	2.0	10	20.00	L	\$78.10	incl. in rate	incl. in rate	\$1,562.00
Equipment Operator (crane)	Active	1.00	2.0	10	20.00	L	\$81.60	incl. in rate	incl. in rate	\$1,631.96
Equipment Operator (medium)	Active	1.00	2.0	10	20.00	L	\$72.34	incl. in rate	incl. in rate	\$1,446.72
Hydraulic Crane (80tn)	Active	1.00	2.0	10	20.00	E	\$197.66	incl. in rate	incl. in rate	\$3,953.20
Loader, FE Rubber Tire (5.25cy)	Active	1.00	2.0	10	20.00	E	\$76.00	incl. in rate	incl. in rate	\$1,520.00
Acetylene Torches	Active	1.00	2.0	10	20.00	E	\$0.47	incl. in rate	incl. in rate	\$9.40
Air Compressor 600 cfm	Active	1.00	2.0	10	20.00	E	\$21.74	incl. in rate	incl. in rate	\$434.80
Generator, Small Generator, 10 - 15 kW	Active	1.00	2.0	10	20.00	E	\$7.04	incl. in rate	incl. in rate	\$140.80
Hepa Vac System	Active	1.00	2.0	10	20.00	E	\$0.47	incl. in rate	incl. in rate	\$9.40
Labor Hours					120	TOTAL LABOR				\$7,861.04
Equipment Hours					120	TOTAL EQUIPMENT				\$6,067.60

MATERIAL COSTS						
Description	Item	Order	Conversion	Order	Order	Material
	Quantity	Unit	Factor / Waste	Quantity	Price	Cost
drill bits, torch gas, etc)	1.00	LS	1.000	1.00	\$1,179.16	\$1,179.16
HEPA Vac Systems For Grinders	1.00	EA	1.000	1.00	\$1,000.00	\$1,000.00
Handheld Grinders	1.00	EA	1.000	1.00	\$250.00	\$250.00
						TOTAL MATERIAL
						\$2,429.16

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (50%)					
Hauling Disposal Cost 30 Miles to Klamath County Landfill	7.00	ton	1.000	\$595.00	\$4,165.00
	1.00	Loads	20 tons a load	\$300.00	\$300.00
					TOTAL SUBCONTRACTS
					\$4,465.00

SUMMARY OF COSTS						
Labor Cost	\$7,861.04	Labor Burden @	49.7%	\$0.00		\$7,861.04
Material Cost	\$2,429.16	Material Tax @	0.0%	\$0.00		\$2,429.16
Equipment Cost	\$6,067.60	Equipment Tax @	0.0%	\$0.00		\$6,067.60
Subcontractors	\$4,465.00					\$4,465.00
DIRECT COST SUBTOTALS	\$20,823			\$0	DIRECT COST SUBTOTALS	\$20,823
Additional Pay Item Notes :						

PAY ITEM NUMBER	:	1.087	Project	:	KRRP - JC Boyle			
Description	:	Remove & Dispose of Steel Transition Manifolds on Upstream and Downstream	Group	:	D03			
Quantity	:	250,000.00 LBS						
Daily Production	:	37,500.00 LBS per	10	hour shift	Project #	:	1	
Work Days	:	6.7 Days			Estimator	:	Mihaela Tomulescu	
Unit Price	:	\$0.35 per LBS			LBS per		Total Cost	
Total Cost	:	\$87,446			Probable Low Cost Parameter	43,125.00	\$74,329	
					Probable High Cost Parameter	26,250.00	\$113,680	
							Unit Price Per LBS	
							\$1.72	
							\$4.33	

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	6.7	10	67.00	L	\$58.87	incl. in rate	incl. in rate	\$3,944.42
Millwright	Active	3.00	6.7	10	201.00	L	\$82.04	incl. in rate	incl. in rate	\$16,489.64
Equipment Operator (crane)	Active	1.00	6.7	10	67.00	L	\$81.60	incl. in rate	incl. in rate	\$5,467.07
Crawler Crane (130tn)	Active	1.00	6.7	10	67.00	E	\$262.91	incl. in rate	incl. in rate	\$17,614.97
Electrician	Active	1.00	6.7	10	67.00	L	\$55.80	incl. in rate	incl. in rate	\$3,738.80
Equipment Operator (medium)	Active	1.00	6.7	10	67.00	L	\$72.34	incl. in rate	incl. in rate	\$4,846.51
Hydraulic Excavator (5.0cy)	Active	1.00	6.7	10	67.00	E	\$276.50	incl. in rate	incl. in rate	\$18,525.50
Steelworker	Active	1.00	6.7	10	67.00	L	\$78.10	incl. in rate	incl. in rate	\$5,232.70
Acetylene Torches	Active	2.00	6.7	10	134.00	E	\$0.47	incl. in rate	incl. in rate	\$62.98
Labor Hours					536	TOTAL LABOR				\$39,719.14
Equipment Hours					268	TOTAL EQUIPMENT				\$36,203.45

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$1,985.96	\$1,985.96
TOTAL MATERIAL						\$1,985.96

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, solid pickup, bulk material, maximum (10%)					
	12.50	ton	1.000	\$595.00	\$7,437.50
Hauling Disposal Cost 30 Miles to Klamath County Landfill	7.00	Loads	20 tons a load	\$300.00	\$2,100.00
TOTAL SUBCONTRACTS					\$9,537.50

Labor Cost	\$39,719.14	Labor Burden @	49.7%	\$0.00		\$39,719.14
Material Cost	\$1,985.96	Material Tax @	0.0%	\$0.00		\$1,985.96
Equipment Cost	\$36,203.45	Equipment Tax @	0.0%	\$0.00		\$36,203.45
Subcontractors	\$9,537.50					\$9,537.50
DIRECT COST SUBTOTALS	\$87,446			\$0	DIRECT COST SUBTOTALS	\$87,446

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PAY ITEM COST DETAIL WORKSHEET

1.087a Remove petroleum products from Mechanical Equipment

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	1.087a			Project	:	KRRP - JC Boyle		
Description	:	Remove petroleum products from Mechanical Equipment			Group	:	D09		
Quantity	:	380.00 GAL							
Daily Production	:	437.50 GAL per		10	hour shift	Project #	:	1	
Work Days	:	0.9		Days	Estimator	:	Mihaela Tomulescu	GAL per	Total Cost
Unit Price	:	\$18.05 per GAL			Probable Low Cost Parameter		503.13	\$5,831	Unit Price Per GAL
Total Cost	:	\$6,860			Probable High Cost Parameter		306.25	\$8,918	\$29.12

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	0.9	10	9.00	L	\$58.87	incl. in rate	incl. in rate	\$529.85
Electrician	Active	1.00	0.9	10	9.00	L	\$55.80	incl. in rate	incl. in rate	\$502.23
Laborer	Active	5.00	0.9	10	45.00	L	\$51.07	incl. in rate	incl. in rate	\$2,298.29
Truck Driver (heavy)	Active	1.00	0.9	10	9.00	L	\$75.72	incl. in rate	incl. in rate	\$681.52
Truck, Flatbed (4x4, 10,000 gvw)	Active	2.00	0.9	10	18.00	E	\$27.09	incl. in rate	incl. in rate	\$487.62
Labor Hours					72	TOTAL LABOR				\$4,011.88
Equipment Hours					18	TOTAL EQUIPMENT				\$487.62

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$200.59	\$200.59
						TOTAL MATERIAL
						\$200.59

SUBCONTRACT COSTS					
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hazardous waste cleanup/pickup/disposal, liquid pickup, vacuum truck, stainless steel tank, 5000 gallons, minimum charge, 4 hours, 2 compartment	8.00	hour	1.000	\$270.00	\$2,160.00
					TOTAL SUBCONTRACTS
					\$2,160.00

SUMMARY OF COSTS						
Labor Cost	\$4,011.88	Labor Burden @	49.7%	\$0.00		\$4,011.88
Material Cost	\$200.59	Material Tax @	0.0%	\$0.00		\$200.59
Equipment Cost	\$487.62	Equipment Tax @	0.0%	\$0.00		\$487.62
Subcontractors	\$2,160.00					\$2,160.00
DIRECT COST SUBTOTALS	\$6,860			\$0	DIRECT COST SUBTOTALS	\$6,860

Additional Pay Item Notes :

Petroleum-based products, ranging from fuel oil and hydraulic fluid to lubricating greases and oils, are found throughout every type of power generating plant or system. Lubrication supports bearings and moving parts in all sorts of equipment: pumps, conveyors, feeders, scrubbers, cranes, turbines, and more. A good oil/water separation system will result in a flow of concentrated waste oil to a collection area and a flow of oil-free water ready for secondary processing or discharge. Once an oil layer has been separated from free water, it must be removed for recycling or disposal. Many plants use one or more of these oil removal methods, but each has costly limitations:

1. Absorbent materials. Absorbent mats or materials are frequently used to dam up and absorb excess oils and greases resulting from accidents or the routine operation of machinery. These materials are very effective for preventing the spread of a source leak and very efficient in terms of oil pickup. Yet, their use on large volumes of waste oil results in multiple, recurring costs that can make them impractical as an everyday solution:

- the costs of the materials themselves
- the labor costs for ordering, stocking, application, and removal
- the costs of used-media collection, disposal, or re-processing/recycling.

2. Manually operated "slotted pipes." Many separators feature a "slotted pipe," a pipe located near the top of the vessel that has a horizontal opening. Oil is removed by turning the horizontal opening downward until it meets the floating oil layer, which drains through the pipe to a collection receptacle. These pipes work well on thick layers of oil, but cannot drain off a sheen of oil without draining off a large amount of water as well. AECOM assumed the best is Vacuum truck removal method. Used a crew formed of 1 Foreman, 5 Laborers to takeout the petroleum waste, 1 Electrician to unplug the power and to assure the temporary power at the construction site. Vacuum-equipped tank trucks are used to remove waste oil from collection points at plants so that it can be transported to recycling or disposal locations. If the waste oil has been thoroughly separated, highly concentrated, and stored in an appropriate receptacle, this service can be used very efficiently. However, vacuum disposal units are often used to pump oil layers directly off of water. This results in the intake of a significant amount free water along with the waste oil – and a significantly higher cost.

SUMMARY OF COSTS									
Labor Cost	\$51,728.60	Labor Burden @	0.0%					\$51,728.60	
Material Cost	\$64,155.00	Material Tax @	0.00%	\$0.00				\$64,155.00	
Equipment Cost	\$47,251.00	Equipment Tax @	0.00%	\$0.00				\$47,251.00	
Subcontractors	\$4,900.00							\$4,900.00	
DIRECT COST SUBTOTALS	\$168,035			\$0			DIRECT COST SUBTOTALS	\$168,035	
Additional Pay Item Notes :									

1.103 Soil/ Rock Cover Relocation For Concrete Rubble at Scour Hole
Details

High Cost Factors		Low Cost Factors	
Bad Weather	0%	No Bad Weather	0%
Gas Price Increase	10%	Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	10%	No Unforeseen Contaminated Mats/ Access Issues	0%
	20%		10%

Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Etc.)	Overall Production
	90	8	50%
		10	50%
			360
			450

Haul Notes	
CY	13,000.00
Swell Factor	50%
Bulk CY	19,500.00
Haul Vehicle 85% Capacity (1.3 tons per CY)	17.00
# of Haul Vehicles	2.00
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	4.00
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) (Minutes)	4.00
Haul Speed (Loaded MPH)	5.00
Return Speed (Unloaded MPH)	5.00
Haul Distance (Miles)	0.25
Shift Length (Hours)	10.00
Cycle Time	
Load Time (Load Time Minutes / 60mins)	0.07
Haul Time (Haul Distance / Haul Speed)	0.05
Dump Time (Dump Time Minutes / 60 Mins)	0.07
Return Time (Haul Distance / Return Speed)	0.05
Hours Per Cycle	0.24
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	85%
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.28
Number of Cycles(Bulk CY/ (Haul Vehicle Cap X # of Haul Vehicles)	574
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	160.72
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	3.57
Number of Haul Days	16.072

Other Notes
This pay item is to account for moving existing material from bottom of scour hole to top of scour hole near the forebay. It is expected that the existing haul road will be restored and used to transport material from the bottom to the top. The efficiency of this operation is has been reduced to 50% to account for redevelopment of the existing haul road which will be done with a dozer and excavator. Due to the steep slopped road it is expected a dozer will need to be used to maintain a rideable surface for the articulated haul truck.

Other Notes
This Pay item is to account for placing covering material over the concrete rubble at the scour hole. It is expected that the material will be placed with a dozer with excavator assistance. The operation is expected to be 80% efficient.

1.107 Process Demolished Concrete for Scour Hole

CREW COSTS

Description	Active	# in	Days	Hours	Total	L/E	Hourly	Hrly oper.	Burden	Labor / Equipment
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MATERIAL COSTS

Description	Item	Order	Conversion	Order	Order	Material
	Quantity	Unit	Factor	Quantity	Unit	Quantity

SUBCONTRACT COSTS	
1	100
2	100
3	100
4	100
5	100
6	100
7	100
8	100
9	100
10	100
11	100
12	100
13	100
14	100
15	100
16	100
17	100
18	100
19	100
20	100
21	100
22	100
23	100
24	100
25	100
26	100
27	100
28	100
29	100
30	100
31	100
32	100
33	100
34	100
35	100
36	100
37	100
38	100
39	100
40	100
41	100
42	100
43	100
44	100
45	100
46	100
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67	100
68	100
69	100
70	100
71	100
72	100
73	100
74	100
75	100
76	100
77	100
78	100
79	100
80	100
81	100
82	100
83	100
84	100
85	100
86	100
87	100
88	100
89	100
90	100
91	100
92	100
93	100
94	100
95	100
96	100
97	100
98	100
99	100
100	100

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
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SUMMARY OF COSTS

Labor Cost	\$244,246.31	Labor Burden @	0.0%		\$244,246.31
Material Cost	22.22	Material Tax @	0.0%		22.22

Additional Pay Item Notes :

See Sequence notes for detailed explanation for placing material.

1.107 Process Demolished Concrete for Scour Hole Details				
High Cost Factors		Low Cost Factors		
Bad Weather	0%	No Bad Weather		0%
Gas Price Increase	10%	Gas Price Decrease		10%
Unforeseen Contaminated Mats/ Access Issues	0%	No Unforeseen Contaminated Mats/ Access Issues		0%
	10%			10%
Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Etc.)	Overall Production	
	100	8	70%	560
		16	78%	780
Track Crusher Production		Excavator Loading Production per shift		
CY per Hour	70.00	CY per Hour		70.00
Lbs per Hour (4050lbs per CF)	283,500.00	CY Bucket Size		2.50
Tons per Hour	142	Buckets Per Hour		28.00
# of Crushers	1.00	# of Excavators		1.00
Tons per hour	142	CY per Hour		70.00
Tons Per Hour Ideal Production Per 8 Hour Shift	300	Ideal Production		150.00
Efficient Compared to Ideal Production	47%	Efficient Compared to Ideal Production		47%
Inefficiencies Compared to Ideal Production	53%	Inefficiencies Compared to Ideal Production		53%
		Excavator Crusher Production		
		Hydraulic Hammer CY per Hour		70
		# of Hammers		1.00
		CY per Hour		70
		CY per Hour Back Check		70
		Ideal Production		150
		Efficient Compared to Ideal Production		47%
		Inefficiencies Compared to Ideal Production		53%

Other Notes
This pay item is to account for the processing of the demolished concrete related to the JCB facility. Estimate currently reflects using three pieces of equipment to support operation; a Kobelco excavator with a CP100 crusher/ Magnet attachment, a Terex Track Crusher with a magnetic over belt, rebar deflector, and a rip stop belt, and a 5CY excavator. The Kobelco with the CP100 crusher will break concrete into manageable pieces for the 5CY excavator to load into the Crusher. The CP100 crusher will have a magnet attachment to remove any loss reinforcement. The crusher production is expected to drive the operations duration and the overall operation is expected to be 70% efficient to account for equipment maintenance, staff breaks, equipment repositioning, etc.. Reinforcement haul off has been included in this activity. Rebar recycling credit has been included in this estimate based off of the national average recycling cost of \$.03 per lb. of rebar

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1.107.1 Haul Road Construction for Scour Hole Backfill Details				
High Cost Factors			Low Cost Factors	
Bad Weather	0%		No Bad Weather	0%
Gas Price Increase	10%		Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	0%		No Unforeseen Contaminated Mats/ Access Issues	0%
	10%			10%
Production Per Hour		Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)	Overall Production
		50	8	70%
			10	70%
				280
				350
Haul Notes			Excavator Loading Production per shift	
CY	10,000.00		CY per Hour	0.00
Swell Factor	60%		CY Bucket Size	2.50
Bulk CY	16,000.00		Buckets Per Hour	0.00
Haul Vehicle 60% Capacity (2 tons per CY)	12.00		# of Excavators	1.00
# of Haul Vehicles	0.00		CY per Hour (2.5 CY Bucket)	0.00
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	5.00		CY Per Hour Ideal Production Per 8 Hour Shift	95.00
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) Minutes)	3.00		Efficient Compared to Ideal Production	0%
Haul Speed (Loaded MPH)	5.00		Inefficiencies Compared to Ideal Production	100%
Return Speed (Unloaded MPH)	5.00			
Haul Distance (Miles)	0.50			
Shift Length (Hours)	10.00			
Cycle Time				

Cycle time was not calculated due to the truck need to be at the location the whole duration to avoid double handling dirt.

Other Notes
Overall cy used was calculated expecting an average of 40% to 50% Slope. The material is expected to be stockpiled near forebay area to be reused to restore the area. The cost to restore the area is accounted for in Pay Item 1.107.3

Project	: KRRP - JC Boyle			
Group	: D11			
Project #	: 1			
Estimator	: Eric Jones	CY per	Total Cost	Unit Price Per CY
Probable Low Cost Parameter		2,200.00	\$220,547	\$100.25
Probable High Cost Parameter		1,800.00	\$269,558	\$149.75

MATERIAL COSTS						
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
						TOTAL MATERIAL \$0.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
TOTAL SUBCONTRACTS					\$0.00

Labor Cost	\$118,632.36	Labor Burden @	0.0%		\$118,632.36
Material Cost	\$0.00	Material Tax @	0.00%	\$0.00	\$0.00
Equipment Cost	\$126,420.00	Equipment Tax @	0.00%	\$0.00	\$126,420.00
Subcontractors	\$0.00				\$0.00
DIRECT COST SUBTOTALS	\$245,052		\$0	DIRECT COST SUBTOTALS	\$245,052
Additional Pay Item Notes :					

1.107.2 Backfilling Scour Hole With Processed Concrete Details					
High Cost Factors			Low Cost Factors		
Bad Weather		0%	No Bad Weather		0%
Gas Price Increase		10%	Gas Price Decrease		10%
Unforeseen Contaminated Mats/ Access Issues		0%	No Unforeseen Contaminated Mats/ Access Issues		0%
10%			10%		

Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)	Overall Production
	250	8	1600
		10	2000

Dozer Pushing Production	
CY per Hour	200.00
# of Dozers	1.00
CY Per Hour Ideal Production Per 8 Hour Shift	300.00
Efficient Compared to Ideal Production	67%
Inefficiencies Compared to Ideal Production	33%

Other Notes
This pay item is to account for the placement of the processed concrete into the forebay scour hole. It is expected the material will be stock piled on newly cut haul road and a dozer will push the material over the edge until the material is high enough for the dozer to access the pile material. An excavator will supply material to the dozer from the processed material stock pile. A water tanker will be used to mitigate dust from the operation. The overall operation is expected to be 80% efficient after accounting for machine maintenance, employee breaks, and equipment repositioning. The soil covering activity will occur simultaneously to take advantage of the access road.

[illegible]

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Hydraulic Excavator (2.5cy)	Active	1.00	10.1	10	101.00	E	\$205.40	incl. in rate	incl. in rate	\$20,745.40
Dozer (235hp)(CATD7)	Active	1.00	10.1	10	101.00	E	\$171.07	incl. in rate	incl. in rate	\$17,278.07
Roller, Single Drum (steel wheel, 12.0 - 14.9 MTn)	Active	1.00	10.1	10	101.00	E	\$76.79	incl. in rate	incl. in rate	\$7,755.79
Labor Foreman	Active	2.00	10.1	10	202.00	L	\$58.87	incl. in rate	incl. in rate	\$11,892.14
Laborer	Active	2.00	10.1	10	202.00	L	\$51.07	incl. in rate	incl. in rate	\$10,316.75
Equipment Operator (medium)	Active	3.00	10.1	10	303.00	L	\$72.34	incl. in rate	incl. in rate	\$21,917.81
Truck Driver (heavy)	Active	1.00	10.1	10	101.00	L	\$66.92	incl. in rate	incl. in rate	\$6,759.32
CAT 745 (32 CY) OFF ROAD TRUCK	Active	1.00	10.1	10	101.00	E	\$177.47	incl. in rate	incl. in rate	\$17,924.47
Labor Hours					808	TOTAL LABOR				\$50,886.02
Equipment Hours					404	TOTAL EQUIPMENT				\$63,703.73

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
TOTAL MATERIAL						\$0.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
TOTAL SUBCONTRACTS					\$0.00

Labor Cost	\$50,886.02	Labor Burden @	0.0%			\$50,886.02
Material Cost	\$0.00	Material Tax @	0.00%	\$0.00		\$0.00
Equipment Cost	\$63,703.73	Equipment Tax @	0.00%	\$0.00		\$63,703.73
Subcontractors	\$0.00					\$0.00
DIRECT COST SUBTOTALS	\$114,590			\$0	DIRECT COST SUBTOTALS	\$114,590

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1.107.3 Scour Hole Backfill Haul Road Restoration
Details

High Cost Factors			Low Cost Factors		
Bad Weather	0%		No Bad Weather	0%	
Gas Price Increase	10%		Gas Price Decrease	10%	
Unforeseen Contaminated Mats/ Access Issues	0%		No Unforeseen Contaminated Mats/ Access Issues	0%	
Total	10%		Total	10%	
Production Per Hour			Overall Production		
	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)			
	50	8	70%	280	
		10	70%	350	

Haul Notes		Excavator Loading Production per shift	
CY	3,540.00	CY per Hour	0.00
Swell Factor	60%	CY Bucket Size	2.50
Bulk CY	5,664.00	Buckets Per Hour	0.00
Haul Vehicle 60% Capacity (2 tons per CY)	19.20	# of Excavators	1.00
# of Haul Vehicles	1.00	CY per Hour (2.5 CY Bucket)	0.00
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	5.00	CY Per Hour Ideal Production Per 8 Hour Shift	95.00
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) Minutes)	3.00	Efficient Compared to Ideal Production	0.00
Haul Speed (Loaded MPH)	5.00	Inefficiencies Compared to Ideal Production	1.00
Return Speed (Unloaded MPH)	5.00		
Haul Distance (Miles)	0.50		
Shift Length (Hours)	10.00		
Cycle Time			

Cycle time was not calculated due to the truck need to be at the location the whole duration to avoid double handling dirt.

Other Notes
This pay item is to account for restoring the excavated haul road that will be used to backfill the scour hole. It is expected that this will be backfilled using the previous excavated material (pay item 107.1) in compacted lifts.

Additional Pay Item Notes :	
Carpenters and laborers will be on ground disassembling the dock and rigging dock pieces to crane. Crane will load floating dock on to truck to haul off. Figured 3 trucks 1 load per truck.	

[illegible]

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Forklift, Rough Terrain (9,000 lb capacity)	Active	1.00	0.3	10	3.00	E	\$55.50	incl. in rate	incl. in rate	\$166.50
Truck, Flatbed (4x4, 10,000 gvw)	Active	1.00	0.3	10	3.00	E	\$27.09	incl. in rate	incl. in rate	\$81.27
Truck Driver (heavy)	Active	1.00	0.3	10	3.00	L	\$66.92	incl. in rate	incl. in rate	\$200.77
Equipment Operator (light)	Active	1.00	0.3	10	3.00	L	\$69.19	incl. in rate	incl. in rate	\$207.57
Labor Foreman	Active	1.00	0.3	10	3.00	L	\$58.87	incl. in rate	incl. in rate	\$176.62
Laborer	Active	2.00	0.3	10	6.00	L	\$51.07	incl. in rate	incl. in rate	\$306.44
Labor Hours					15	TOTAL LABOR				\$891.40
Equipment Hours					6	TOTAL EQUIPMENT				\$247.77

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price		Material Cost
TOTAL MATERIAL							\$0.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Dump Fee Allowance	2	Ton	Klamath Landfill	\$74.00	\$148.00
Haul Allowance	1	Load	Klamath Landfill	\$200.00	\$200.00
					\$0.00
					\$0.00
TOTAL SUBCONTRACTS					\$348.00

Labor Cost	\$891.40	Labor Burden @	0.0%			\$891.40
Material Cost	\$0.00	Material Tax @	0.00%	\$0.00		\$0.00
Equipment Cost	\$247.77	Equipment Tax @	0.00%	\$0.00		\$247.77
Subcontractors	\$348.00					\$348.00
DIRECT COST SUBTOTALS	\$1,487			\$0	DIRECT COST SUBTOTALS	\$1,487

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SUMMARY OF COSTS					
Labor Cost	\$1,273.09	Labor Burden @	0.0%		\$1,273.09
Material Cost	\$0.00	Material Tax @	0.00%	\$0.00	\$0.00
Equipment Cost	\$836.35	Equipment Tax @	0.00%	\$0.00	\$836.35
Subcontractors	\$0.00				\$0.00
DIRECT COST SUBTOTALS	\$2,109		\$0	DIRECT COST SUBTOTALS	\$2,109
Additional Pay Item Notes :					

PAY ITEM NUMBER	:	1.112	Project	:	KRRP - JC Boyle
Description	:	Pioneer Park - Picnic tables to be removed and hauled away	Group	:	D16
Quantity	1.112	12.00	EA		
Daily Production	1.112	30.00	EA per	10	hour shift
Work Days	1.112	0.4	Days	Project #	1
Unit Price	1.112	\$152.60	per EA	Estimator	: Eric Jones
Total Cost	1.112	\$1,831		Probable Low Cost Parameter	EA per 31.50
				Probable High Cost Parameter	Total Cost \$1,740
					Unit Price Per EA \$55.23
					\$67.46

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Loader, FE Rubber Tire (3.5cy)	Active	1.00	0.4	10	4.00	E	\$63.11	incl. in rate	incl. in rate	\$252.44
Truck, On-Highway Dump (6x4, 12cy)	Active	1.00	0.4	10	4.00	E	\$57.41	incl. in rate	incl. in rate	\$229.64
Equipment Operator (medium)	Active	1.00	0.4	10	4.00	L	\$72.34	incl. in rate	incl. in rate	\$289.34
Truck Driver (heavy)	Active	1.00	0.4	10	4.00	L	\$66.92	incl. in rate	incl. in rate	\$267.70
Labor Foreman	Active	1.00	0.4	10	4.00	L	\$58.87	incl. in rate	incl. in rate	\$235.49
Laborer	Active	2.00	0.4	10	8.00	L	\$51.07	incl. in rate	incl. in rate	\$408.58
Labor Hours					20	TOTAL LABOR				\$1,201.11
Equipment Hours					8	TOTAL EQUIPMENT				\$482.08

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price		Material Cost
TOTAL MATERIAL							\$0.00

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Dump Fee Allowance	2	Ton	Klamath Landfill	\$74.00	\$148.00
TOTAL SUBCONTRACTS					\$148.00

Labor Cost	\$1,201.11	Labor Burden @	0.0%		\$1,201.11
Material Cost	\$0.00	Material Tax @	0.00%	\$0.00	\$0.00
Equipment Cost	\$482.08	Equipment Tax @	0.00%	\$0.00	\$482.08
Subcontractors	\$148.00				\$148.00
DIRECT COST SUBTOTALS	\$1,831		\$0	DIRECT COST SUBTOTALS	\$1,831
Additional Pay Item Notes :					

SUMMARY OF COSTS									
Labor Cost	\$99.68	Labor Burden @	0.0%					\$99.68	
Material Cost	\$0.00	Material Tax @	0.00%	\$0.00				\$0.00	
Equipment Cost	\$36.08	Equipment Tax @	0.00%	\$0.00				\$36.08	
Subcontractors	\$74.00							\$74.00	
DIRECT COST SUBTOTALS		\$210		\$0		DIRECT COST SUBTOTALS		\$210	
Additional Pay Item Notes :									

SUMMARY OF COSTS									
Labor Cost	\$233.35	Labor Burden @	0.0%						\$233.35
Material Cost	\$0.00	Material Tax @	0.00%	\$0.00					\$0.00
Equipment Cost	\$80.10	Equipment Tax @	0.00%	\$0.00					\$80.10
Subcontractors	\$374.00								\$374.00
DIRECT COST SUBTOTALS	\$687			\$0			DIRECT COST SUBTOTALS		\$687
Additional Pay Item Notes :									

SUMMARY OF COSTS									
Labor Cost	\$300.28	Labor Burden @	0.0%						\$300.28
Material Cost	\$0.00	Material Tax @	0.00%	\$0.00					\$0.00
Equipment Cost	\$303.59	Equipment Tax @	0.00%	\$0.00					\$303.59
Subcontractors	\$522.00								\$522.00
DIRECT COST SUBTOTALS	\$1,126			\$0			DIRECT COST SUBTOTALS		\$1,126
Additional Pay Item Notes :									

5 Remove Frame dead end structures 60-80 ft high

PAY ITEM NUMBER	:	5.000	Project	:	KRRP - JC Boyle
Description	:	Remove Frame dead end structures 60-80 ft high	Group	:	D05
Quantity	:	2.00 EA			
Daily Production	:	1.25 EA per	10	hour shift	
Work Days	:	1.6	Days		
Unit Price	:	\$10,715.20 per EA	Project #	:	1
Total Cost	:	\$21,430	Estimator	:	Mihaela Tomulescu
			Probable Low Cost Parameter	:	EA per 1.38
			Probable High Cost Parameter	:	1.00
					Total Cost \$19,287
					Unit Price Per EA \$14,027.17
					\$25,716
					\$25,716.47

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Labor Foreman	Active	1.00	1.6	10	16.00	L	\$58.87	incl. in rate	incl. in rate	\$941.95
Electrician	Active	1.00	1.6	10	16.00	L	\$55.80	incl. in rate	incl. in rate	\$892.85
Hydraulic Excavator (2.5cy)	Active	1.00	1.6	10	16.00	E	\$205.40	incl. in rate	incl. in rate	\$3,286.40
Equipment Operator (medium)	Active	1.00	1.6	10	16.00	L	\$72.34	incl. in rate	incl. in rate	\$1,157.38
Water Tanker (5,000gal)	Active	1.00	1.6	10	16.00	E	\$75.03	incl. in rate	incl. in rate	\$1,200.48
Gas Welding Machine	Active	1.00	1.6	10	16.00	E	\$2.88	incl. in rate	incl. in rate	\$46.03
Laborer	Active	2.00	1.6	10	32.00	L	\$51.07	incl. in rate	incl. in rate	\$1,634.34
Vibratory Hammer & Extractor	Active	1.00	1.6	10	16.00	E	\$94.14	incl. in rate	incl. in rate	\$1,506.24
Hydraulic Crane (80tn)	Active	1.00	1.6	10	16.00	E	\$197.66	incl. in rate	incl. in rate	\$3,162.56
Equipment Operator (crane)	Active	1.00	1.6	10	16.00	L	\$81.60	incl. in rate	incl. in rate	\$1,305.57
Labor Hours					96	TOTAL LABOR				\$5,932.08
Equipment Hours					80	TOTAL EQUIPMENT				\$9,201.71

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$296.60	\$296.60
						\$0.00
						\$0.00
						\$0.00
						\$0.00
						\$0.00
TOTAL MATERIAL						\$296.60

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal Cost	20.00	Loads	20 tons a load	\$300.00	\$0.00
					\$6,000.00
					\$0.00
					\$0.00
TOTAL SUBCONTRACTS					\$6,000.00

Labor Cost	\$5,932.08	Labor Burden @	49.7%	\$0.00		\$5,932.08
Material Cost	\$296.60	Material Tax @	0.0%	\$0.00		\$296.60
Equipment Cost	\$9,201.71	Equipment Tax @	0.0%	\$0.00		\$9,201.71
Subcontractors	\$6,000.00					\$6,000.00
DIRECT COST SUBTOTALS	\$21,430			\$0	DIRECT COST SUBTOTALS	\$21,430

Production is based off of RSMs using Crew formed of 1 Forman, 1 Electrician, 1 Excavator, 1 Hammer. Considered one welder for cutting frame/ support of equipment, 2 laborer to load demolished equipment /materials in the truck for disposal.

PAY ITEM INFORMATION					
Item No.	00000000	Description			
Unit	EA	Quantity	1	Unit Price	\$0.00
Total Price	\$0.00				

PAY ITEM NUMBER	:	5.001	Project	:	KRRP - JC Boyle
Description	:	Remove (incl foundation) and Save Transformers 230KV	Group	:	D05
Quantity	:	2.00 EA			
Daily Production	:	2.24 EA per	10	hour shift	
Work Days	:	0.9	Days		
Unit Price	:	\$3,058.35	per EA		
Total Cost	:	\$6,117			
			Project #	:	1
			Estimator	:	Mihaela Tomulescu
			EA per	:	2.46
			Total Cost	:	\$5,505
			Unit Price Per EA	:	\$2,236.68
			Probable Low Cost Parameter	:	1.90
			Probable High Cost Parameter	:	\$7,034
				:	\$3,698.57

CREW COSTS

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	0.9	10	8.90	L	\$55.80	incl. in rate	incl. in rate	\$496.65
Electrician	Active	1.00	0.9	10	8.90	L	\$55.80	incl. in rate	incl. in rate	\$496.65
Hydraulic Crane (50tn)	Active	1.00	0.9	10	8.90	E	\$136.20	incl. in rate	incl. in rate	\$1,212.18
Equipment Operator (crane)	Active	1.00	0.9	10	8.90	L	\$81.60	incl. in rate	incl. in rate	\$726.22
Vibratory Hammer & Extractor	Active	1.00	0.9	10	8.90	E	\$94.14	incl. in rate	incl. in rate	\$837.85
Truck, Utility, with Man-Basket	Active	1.00	0.9	10	8.90	E	\$31.90	incl. in rate	incl. in rate	\$283.91
Laborer	Active	1.00	0.9	10	8.90	L	\$51.07	incl. in rate	incl. in rate	\$454.55
Labor Hours					35.6	TOTAL LABOR				\$2,174.07
Equipment Hours					26.7	TOTAL EQUIPMENT				\$2,333.94

MATERIAL COSTS

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$108.70	\$108.70
TOTAL MATERIAL						\$108.70

SUBCONTRACT COSTS

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal Cost	5.00	Loads	20 tons a load	\$300.00	\$1,500.00
TOTAL SUBCONTRACTS					\$1,500.00

SUMMARY OF COSTS

Labor Cost	\$2,174.07	Labor Burden @	49.7%	\$0.00		\$2,174.07
Material Cost	\$108.70	Material Tax @	0.0%	\$0.00		\$108.70
Equipment Cost	\$2,333.94	Equipment Tax @	0.0%	\$0.00		\$2,333.94
Subcontractors	\$1,500.00					\$1,500.00
DIRECT COST SUBTOTALS	\$6,117			\$0	DIRECT COST SUBTOTALS	\$6,117

Additional Pay Item Notes :

Production is based off of RSMS using Crew formed of 1 Forman, 1 Electrician, 1 Crane to load the transformer in the truck for disposal. In normal circumstances, decontaminated residual components could be accepted at landfill sites.

SUMMARY OF COSTS					
Labor Cost	\$3,809.34	Labor Burden @	49.7%	\$0.00	\$3,809.34
Material Cost	\$190.47	Material Tax @	0.0%	\$0.00	\$190.47
Equipment Cost	\$2,317.76	Equipment Tax @	0.0%	\$0.00	\$2,317.76
Subcontractors	\$1,500.00				\$1,500.00
DIRECT COST SUBTOTALS	\$7,818			\$0	DIRECT COST SUBTOTALS \$7,818
Additional Pay Item Notes :					
Production is based off of RSMs using Crew formed of 1 Foreman, 1 Electrician,1Crane. Considered 1 laborer to help loading circuit breakers in the truck for saving it in the designated place.					

5.003 Substation Tie Structure 230KV

PAY ITEM NUMBER	:	5.003	Project	:	KRRP - JC Boyle		
Description	:	Substation Tie Structure 230KV	Group	:	D06		
Quantity	:	1.00 EA					
Daily Production	:	0.32 EA per	10	hour shift	Project #	:	1
Work Days	:	3.2	Days		Estimator	:	Mihaela Tomulescu
Unit Price	:	\$36,827.74	per EA		Probable Low Cost Parameter	:	0.35
Total Cost	:	\$36,828			Probable High Cost Parameter	:	0.27
						Total Cost	\$33,145
						Unit Price Per EA	\$95,656.48
							\$158,177.05

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	2.00	3.2	10	64.00	L	\$55.80	incl. in rate	incl. in rate	\$3,571.39
Electrician	Active	4.00	3.2	10	128.00	L	\$55.80	incl. in rate	incl. in rate	\$7,142.78
Hydraulic Crane (35tn)	Active	2.00	3.2	10	64.00	E	\$117.77	incl. in rate	incl. in rate	\$7,537.28
Equipment Operator (medium)	Active	2.00	3.2	10	64.00	L	\$72.34	incl. in rate	incl. in rate	\$4,629.50
Truck, Utility, with Man-Basket	Active	2.00	3.2	10	64.00	E	\$31.90	incl. in rate	incl. in rate	\$2,041.60
Labor Hours					256	TOTAL LABOR				\$15,343.68
Equipment Hours					128	TOTAL EQUIPMENT				\$9,578.88

Description	Item	Order	Conversion	Order	Order	Material
	Quantity	Unit	Factor / Waste	Quantity	Price	Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$767.18	\$767.18
Ceramic Insulators	96.00	Bells	1.000	96.00	\$18.00	\$1,728.00
V-String Hardware	3.00	EA	1.000	3.00	\$230.00	\$690.00
Grounding	1.00	EA	1.000	1.00	\$150.00	\$150.00
TOTAL MATERIAL						\$3,335.18

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Rent trailer with cable tensioning rig, for high voltage line work - Rent per day	2.00	days		\$535.00	\$1,070.00
Rent trailer with cable pulling rig, for high voltage line work - Rent per day	2.00	days		\$3,000.00	\$6,000.00
Hauling Disposal Cost	5.00	Loads	20 tons a load	\$300.00	\$1,500.00
TOTAL SUBCONTRACTS					\$8,570.00

Summary of Costs					
Labor Cost	\$15,343.68	Labor Burden @	49.7%	\$0.00	\$15,343.68
Material Cost	\$3,335.18	Material Tax @	0.0%	\$0.00	\$3,335.18
Equipment Cost	\$9,578.88	Equipment Tax @	0.0%	\$0.00	\$9,578.88
Subcontractors	\$8,570.00				\$8,570.00
DIRECT COST SUBTOTALS	\$36,828		\$0		DIRECT COST SUBTOTALS \$36,828

Production is based off of RSMs using 2 Crew formed of 1 Forman, 1 Electrician, 1 Crane.

PAY ITEM COST DETAIL WORKSHEET

5.004 Remove Chain Link Fence

PAY ITEM INFORMATION									
PAY ITEM NUMBER	:	5.004	Project	:	KRRP - JC Boyle				
Description	:	Remove Chain Link Fence	Group	:	#N/A				
Quantity	:	601.00 LF							
Daily Production	:	375.00 LF per	10	hour shift	Project #	:	1		
Work Days	:	1.6 Days			Estimator	:	Mihaela Tomulescu	LF per	Total Cost
Unit Price	:	\$16.98 per LF			Probable Low Cost Parameter			412.50	\$9,186
Total Cost	:	\$10,206			Probable High Cost Parameter			337.50	\$11,227
									Unit Price Per LF
									\$22.27
									\$33.27

CREW COSTS										
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Laborer	Active	2.00	1.6	10	32.00	L	\$51.07	incl. in rate	incl. in rate	\$1,634.34
Truck Driver (light)	Active	1.00	1.6	10	16.00	L	\$65.82	incl. in rate	incl. in rate	\$1,053.18
Hydraulic Excavator (2.5cy)	Active	1.00	1.6	10	16.00	E	\$205.40	incl. in rate	incl. in rate	\$3,286.40
Equipment Operator (light)	Active	1.00	1.6	10	16.00	L	\$69.19	incl. in rate	incl. in rate	\$1,107.04
Truck, Flatbed (4x4, 10,000 gvw)	Active	2.00	1.6	10	32.00	E	\$27.09	incl. in rate	incl. in rate	\$866.88

5.005 Demolish overhead distribution 2.5 miles (30-45 poles)

PAY ITEM NUMBER :	5.005	Project :	KRRP - JC Boyle
Description :	Demolish overhead distribution 2.5 miles (30-45 poles)	Group :	D05
Quantity :	45.00 EA		
Daily Production :	3.08 EA per	10	hour shift
Work Days :	14.6	Days	
Unit Price :	\$1,763.91	per EA	
Total Cost :	\$79,376		
		Project # :	1
		Estimator :	Mihaela Tomulescu
		EA per	3.39
		Probable Low Cost Parameter	\$71,438
		Probable High Cost Parameter	\$95,251
		Unit Price Per EA	\$21,085.67
			\$38,657.06

Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost
Electrician Foreman	Active	1.00	14.6	10	146.00	L	\$55.80	incl. in rate	incl. in rate	\$8,147.24
Electrician	Active	1.00	14.6	10	146.00	L	\$55.80	incl. in rate	incl. in rate	\$8,147.24
Hydraulic Crane (80tn)	Active	1.00	14.6	10	146.00	E	\$197.66	incl. in rate	incl. in rate	\$28,858.36
Equipment Operator (crane)	Active	1.00	14.6	10	146.00	L	\$81.60	incl. in rate	incl. in rate	\$11,913.31
Laborer	Active	2.00	5.0	10	100.00	L	\$51.07	incl. in rate	incl. in rate	\$5,107.30
Vibratory Hammer & Extractor	Active	1.00	5.0	10	50.00	E	\$94.14	incl. in rate	incl. in rate	\$4,707.00
Truck, Utility, with Man-Basket	Active	1.00	5.0	10	50.00	E	\$31.90	incl. in rate	incl. in rate	\$1,595.00
Labor Hours					538	TOTAL LABOR				\$33,315.08
Equipment Hours					246	TOTAL EQUIPMENT				\$35,160.36

Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$1,665.75	\$1,665.75
Topsoil placement and grading, loam or topsoil, F.E. loader, 1-1/2 C.Y., remove and stockpile on site, spread from pile to rough finish grade	45.00	CY	1.100	49.50	\$4.74	\$234.63
TOTAL MATERIAL						\$1,900.38

Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount
Hauling Disposal Cost	45.00	Loads	20 tons a load	\$200.00	\$9,000.00
TOTAL SUBCONTRACTS					\$9,000.00

Labor Cost	\$33,315.08	Labor Burden @	49.7%	\$0.00		\$33,315.08
Material Cost	\$1,900.38	Material Tax @	0.0%	\$0.00		\$1,900.38
Equipment Cost	\$35,160.36	Equipment Tax @	0.0%	\$0.00		\$35,160.36
Subcontractors	\$9,000.00					\$9,000.00
DIRECT COST SUBTOTALS	\$79,376			\$0	DIRECT COST SUBTOTALS	\$79,376

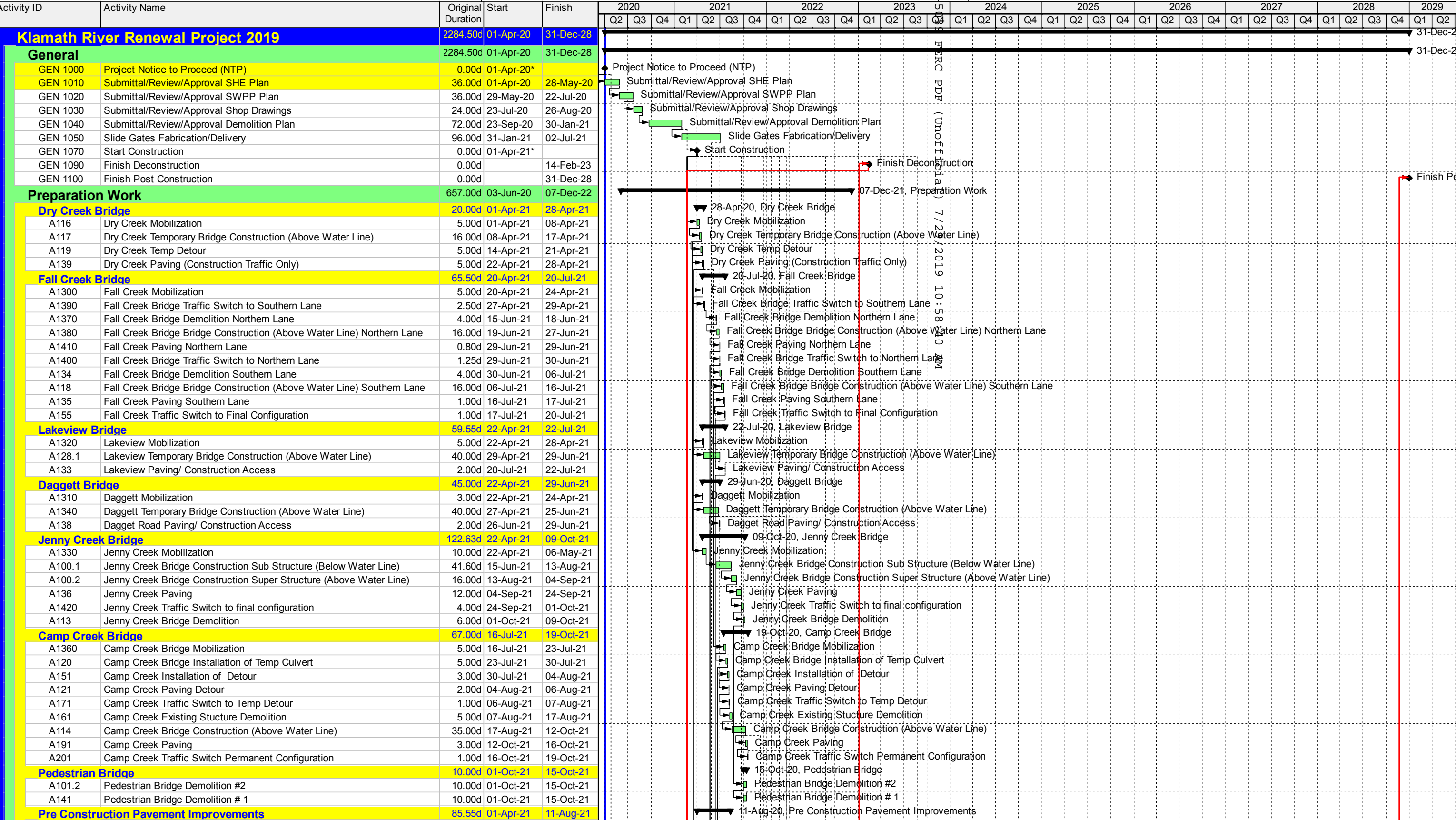
Production is based off of RSMs using Crew R3 (1 Foreman and 1 Electrician, 1 Crane and 1 man-basket truck to help untie the line). Considered 2 laborer and 1 Vibratory Hammer for demolish the pole foundation, helping placing poles in a designated place and loading them in the truck for disposal. This process includes filling in pole locations with gravel, clean fill and topsoil. Overall production accounts for reduced efficiency due to employee breaks, equipment maintenance, equipment repositioning, ect.

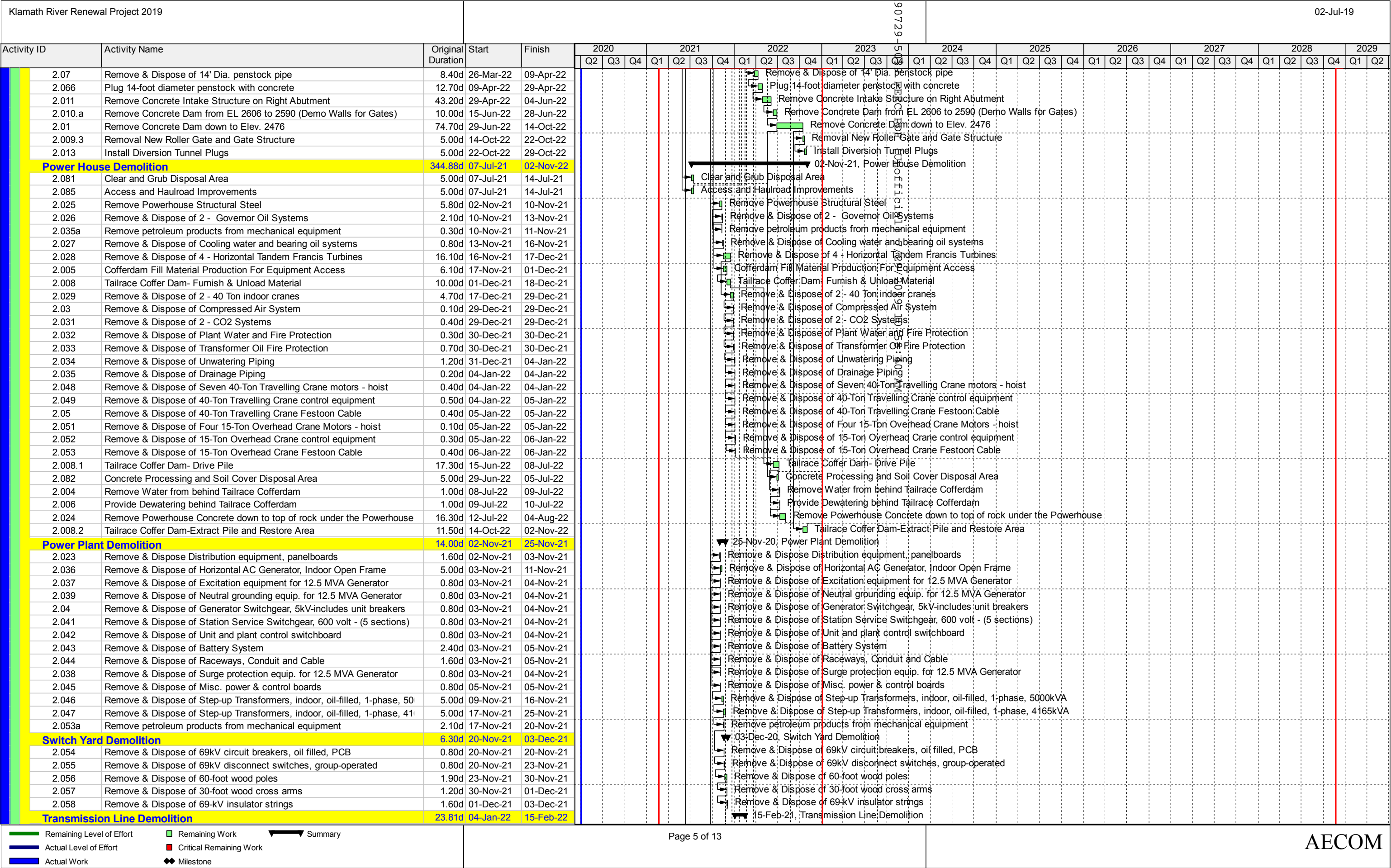
PAY ITEM COST DETAIL WORKSHEET											
5.032 Install 230kV strain transmission structures outside JC Boyle Substation											
PAY ITEM INFORMATION											
PAY ITEM NUMBER	:	5.032				Project	: KRRP - JC Boyle				
Description	:	Install 230kV strain transmission structures outside JC Boyle Substation				Group	: D06				
Quantity	:	2.00 EA									
Daily Production	:	0.13 EA per		10	hour shift	Project #	: 1				
Work Days	:	15.0		Days		Estimator	: Mihaela Tomulescu		EA per		
Unit Price	:	\$158,278.04 per EA				Probable Low Cost Parameter	0.15		Total Cost	\$284,900	
Total Cost	:	\$316,556				Probable High Cost Parameter	0.11		\$379,867	Unit Price Per EA \$1,947,371.67	
CREW COSTS											
Description	Active Idle	# in crew	Days Worked	Hours /day	Total Hours	L/E	Hourly Rate	Hrly oper. Cost	Burden Rate	Labor / Equipment Cost	
Labor Foreman	Active	1.00	15.0	10	150.00	L	\$58.87	incl. in rate	incl. in rate	\$8,830.80	
Electrician Foreman	Active	1.00	7.5	10	75.00	L	\$55.80	incl. in rate	incl. in rate	\$4,185.23	
Electrician	Active	2.00	7.5	10	150.00	L	\$55.80	incl. in rate	incl. in rate	\$8,370.45	
Steelworker	Active	4.00	7.5	10	300.00	L	\$78.10	incl. in rate	incl. in rate	\$23,430.00	
Equipment Operator (crane)	Active	1.00	7.5	10	75.00	L	\$81.60	incl. in rate	incl. in rate	\$6,119.85	
Equipment Operator (medium)	Active	1.00	15.0	10	150.00	L	\$72.34	incl. in rate	incl. in rate	\$10,850.40	
Truck Driver (heavy)	Active	1.00	15.0	10	150.00	L	\$75.72	incl. in rate	incl. in rate	\$11,358.60	
Truck, Utility, with Man-Basket	Active	1.00	7.5	10	75.00	E	\$31.90	incl. in rate	incl. in rate	\$2,392.50	
Truck, Tractor (400hp)	Active	1.00	15.0	10	150.00	E	\$69.98	incl. in rate	incl. in rate	\$10,497.00	
Hydraulic Crane (120tn)	Active	1.00	7.5	10	75.00	E	\$242.08	incl. in rate	incl. in rate	\$18,156.00	
Loader, FE Rubber Tire (5.25cy)	Active	1.00	15.0	10	150.00	E	\$76.00	incl. in rate	incl. in rate	\$11,400.00	
Laborer	Active	3.00	15.0	10	450.00	L	\$51.07	incl. in rate	incl. in rate	\$22,982.85	
	Active	0.00	15.0	10	0.00	0	\$0.00	incl. in rate	incl. in rate	\$0.00	
Labor Hours					1500	TOTAL LABOR				\$96,128.18	
Equipment Hours					450	TOTAL EQUIPMENT				\$42,445.50	
MATERIAL COSTS											
Description	Item Quantity	Order Unit	Conversion Factor / Waste	Order Quantity	Order Price	Material Cost					
Consumables 5% labor (saw blades, drill bits, etc)	1.00	LS	1.000	1.00	\$4,806.41	\$4,806.41					
Steel Tower - Large Angle	2.00	EA	1.000	2.00	\$25,500.00	\$51,000.00					
Foundation	48.00	CY	1.000	48.00	\$155.00	\$7,440.00					
Piles	8.00	EA	1.000	8.00	\$1,200.00	\$9,600.00					
Ceramic Insulators	192.00	Bells	1.000	192.00	\$18.00	\$3,456.00					
V-String Hardware	6.00	EA	1.000	6.00	\$230.00	\$1,380.00					
Grounding	2.00	EA	1.000	2.00	\$150.00	\$300.00					
TOTAL MATERIAL										\$77,982.41	
SUBCONTRACT COSTS											
Description	Quantity	Units	Notes / Company	Unit Price	Contract or Quote Amount						
Foundation Allowance	1	AL		\$100,000.00	\$100,000.00						
TOTAL SUBCONTRACTS										\$100,000.00	
SUMMARY OF COSTS											
Labor Cost	\$96,128.18	Labor Burden @	49.7%	\$0.00	\$96,128.18						
Material Cost	\$77,982.41	Material Tax @	0.0%	\$0.00	\$77,982.41						
Equipment Cost	\$42,445.50	Equipment Tax @	0.0%	\$0.00	\$42,445.50						
Subcontractors	\$100,000.00				\$100,000.00						
DIRECT COST SUBTOTALS				\$316,556	\$0	DIRECT COST SUBTOTALS				\$316,556	
Additional Pay Item Notes :											
This payitems is to install 2 each transmission towers just outside of JC Boyle. This cost estimate is for installation of the towers and foundations only. An allowance has been carried over for the foundations of the structure due to current design stage. It is expected it will take 3 weeks to install the two structures completely. 1 week for foundations, 1 week for tower one assembly and 1 week for tower two assembly. It is figured that majority of the work will be conducted by the structural steel crews and electricians. It is expected that foundations will be installed by subcontractor and there will be a GC crew to provide access and assistance during foundation installation.											

5.033 Upstream Cofferdam to be Removed in the Wet Details				
High Cost Factors			Low Cost Factors	
Bad Weather	0%		No Bad Weather	0%
Gas Price Increase	10%		Gas Price Decrease	10%
Unforeseen Contaminated Mats/ Access Issues	5%		No Unforeseen Contaminated Mats/ Access Issues	5%
	15%			15%
Production Per Hour	Hours	Efficiency Factor (Access, Activity, Qty, High Rebar Density, Breaks, Ect)	Overall Production	
	120	8	65%	624
	20	20	65%	1560
Haul Notes	Excavator Loading Production per shift			
CY	14,450.00	CY per Hour		57
Swell Factor	30%	CY Bucket Size		5
Bulk CY	18,785.00	Buckets Per Hour		11
Haul Vehicle 85% Capacity (1.3 tons per CY)	27.20	# of Excavators		1
# of Haul Vehicles	2.00	CY per Hour (5 CY Bucket)		57
Load Time (Includes Spot Time, Maneuver Time, & Loading) (Minutes)	5.00	CY Per Hour Ideal Production Per 8 Hour Shift		160
Dump Time (Includes Spot Time, Maneuver Time, & Unloading) Minutes)	3.00	Efficient Compared to Ideal Production		35%
Haul Speed (Loaded MPH)	8.80	Inefficiencies Compared to Ideal Production		65%
Return Speed (Unloaded MPH)	15.00			
Haul Distance (Miles)	1.00			
Shift Length (Hours)	20.00			
Cycle Time				
Load Time (Load Time Minutes / 60mins)	0.08			
Haul Time (Haul Distance / Haul Speed)	0.11			
Dump Time (Dump Time Minutes / 60 Mins)	0.05			
Return Time (Haul Distance / Return Speed)	0.07			
Hours Per Cycle	0.31			
Efficiency Factor (Night Work, Traffic Restrictions, Coffee Breaks, ECT)	65%			
Actual Hours Per Cycle (Hours per Cycle / Efficiency Factor)	0.48			
Number of Cycles Bulk CY (Haul Vehicle Cap X # of Haul Vehicles)	345			
Total Number of Haul Hours (Actual Cycle Hours X Number of Cycles)	165.6			
Loads Per Hour (Number of Cycles / Total Number of Haul Hours)	2.08			
Number of Haul Days	8.3			
Speed Loaded				
	Max Weight lbs of loaded 745	164,500.00		
	Tons	82.25		
	20lbs/Ton Rolling weight	4		
	Rolling Resistance (1% for each 20lbs/Ton)	4%		
	Slope Grade	8%		
	Total Resistance	12%		
	Max Gear per CAT Chart	4		
	Max MPH	8.8		
Speed Empty				
	Max Weight lbs of Empty 745	74,100.00		
	Tons Empty	37.05		
	20lbs/Ton Rolling weight Empty	2		
	Rolling Resistance (1% per 20lbs/Ton) Empty	2%		
	Average Slope Empty	8%		
	Total Resistance Empty	-6%		
	Max Gear per CAT Chart Empty	N/A		
	Max MPH Empty	N/A		
Other Notes				
This is for removal of Up stream coffer dam. Total CY is expected to be 28,900 and assumption is that 50% of that Quantity will be washed out when the coffer dam is breached. It is expected that the remaining 14,450 CY can be removed with excavators and haul trucks. The efficiency of this pay item is expected to be lower than other excavation items due to haul road maintenance or temp construction due to the material traveled on will be wet.				



Attachment C Construction Schedule





 Remaining Level of Effort
 Remaining Work
 Summary

 Actual Level of Effort
  Critical Remaining Work

 Actual Work
  Milestone

 Remaining Level of Effort
 Remaining Work
 Summary

 Actual Level of Effort
  Critical Remaining Work

 Actual Work
  Milestone

 Remaining Level of Effort
 Remaining Work
 Summary

 Actual Level of Effort
  Critical Remaining Work

 Actual Work
  Milestone

 Remaining Level of Effort
 Remaining Work
 Summary

 Actual Level of Effort
  Critical Remaining Work

 Actual Work
  Milestone

 Remaining Level of Effort Remaining Work Summary
 Actual Level of Effort  Critical Remaining Work
 Actual Work  Milestone

Activity ID	Activity Name	Original Duration	Start	Finish	2020			2021			2022			2023			2024			2025			2026			2027			2028			2029	
					Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
	4.129	Remove and Dispose of Piping- 8-in. Dia. x 0.25 Thickness x 30'	0.20d	06-Apr-22	06-Apr-22																												
	4.130	Remove and Dispose of Piping- 3-in. Dia. x STD x 30'	0.05d	06-Apr-22	06-Apr-22																												
	4.131	Remove and Dispose of Gate Valves	1.58d	06-Apr-22	07-Apr-22																												
	4.132	Remove and Dispose of Basin #1	0.20d	07-Apr-22	09-Apr-22																												
	4.133	Remove and Dispose of Basin #2	0.30d	09-Apr-22	09-Apr-22																												
	4.134	Remove and Dispose of Basin #3	0.80d	09-Apr-22	12-Apr-22																												
	4.135	Remove and Dispose of Basin #4	0.80d	12-Apr-22	13-Apr-22																												
	4.136	Remove and Dispose of Basin #5	0.80d	13-Apr-22	13-Apr-22																												
	4.137	Remove and Dispose of Basin #6	0.80d	13-Apr-22	15-Apr-22																												
	4.138	Remove and Dispose of Holding Tank	0.80d	15-Apr-22	16-Apr-22																												
4.139	Remove and Dispose of Misc.: Motors, control panels, cables, conduit	1.00d	16-Apr-22	19-Apr-22																													
Misc Building Demolition		2.06d	19-Apr-22	21-Apr-22																													
4.113	Remove Storage Shed near Aerator Structure	0.08d	19-Apr-22	19-Apr-22																													
4.101	Remove Building No. 2	0.71d	19-Apr-22	20-Apr-22																													
4.102	Remove Building No. 3	0.97d	20-Apr-22	21-Apr-22																													
4.112	Remove Restroom Building near Aerator Structure	0.30d	21-Apr-22	21-Apr-22																													
Penstock Demolition		62.50d	15-Jun-22	09-Sep-22																													
4.071	Remove Concrete in Penstock Intake Structure	3.10d	15-Jun-22	18-Jun-22																													
4.072	Remove Concrete in Penstock Encasement	4.70d	18-Jun-22	24-Jun-22																													
4.073	Remove Concrete in 3 Penstock Anchors and 7 Penstock Supports	20.70d	24-Jun-22	27-Jul-22																													
4.074	Remove Steel Footbridge to Intake Structure	0.88d	27-Jul-22	28-Jul-22																													
4.075	Remove Concrete in Intake Structure Footbridge Abutment	0.10d	28-Jul-22	28-Jul-22																													
4.076	Remove and Dispose of Intake Structure	4.20d	28-Jul-22	03-Aug-22																													
4.077	Remove and Dispose of Gate Hoist Stem - 6" Sch160x40'	1.00d	03-Aug-22	04-Aug-22																													
4.034	Remove and Dispose of Air Vent Pipe - 12" Dia. Sch 40 x560'	2.00d	04-Aug-22	06-Aug-22																													
4.032	Remove and Dispose of Air Vent Pipe - 8" Dia. Sch 40 x160'	1.00d	06-Aug-22	09-Aug-22																													
4.078	Remove and Dispose of Water Fill line- 12" Dia STD x 27'	1.00d	09-Aug-22	10-Aug-22																													
4.079	Remove and Dispose of Air Vent - 12" Dia STD x 32'	1.00d	10-Aug-22	11-Aug-22																													
4.080	Remove and Dispose of Gage Wells	1.00d	11-Aug-22	12-Aug-22																													
4.081	Remove and Dispose of Penstock Vent - 46" Dia, 0.25" Thick x 60'	0.20d	12-Aug-22	12-Aug-22																													
4.082	Remove and Dispose of Penstock - 12" Dia, 0.25" Thick x 698'	9.70d	12-Aug-22	27-Aug-22																													
4.083	Remove and Dispose of Bypass Outlet - 96" Dia, 0.25" Thick x 50'	0.30d	27-Aug-22	27-Aug-22																													
4.084	Remove and Dispose of Outlet Valve on bypass outlet - 66" Dia.	1.60d	27-Aug-22	31-Aug-22																													
4.085	Remove and Dispose Overhead trolley Crane Motor (4hp est) & Controls	1.00d	31-Aug-22	01-Sep-22																													
4.086	Remove and Dispose Distribution equipment, Junction Boxes	1.00d	01-Sep-22	02-Sep-22																													
4.087	Remove and Dispose Power Cable and Conduit	2.00d	02-Sep-22	07-Sep-22																													
4.038	Remove and Dispose of Power Cable and 4" Conduit from Penstock Struc	2.00d	07-Sep-22	09-Sep-22																													
Pipe Demolition		6.24d	04-Jan-22	14-Jan-22																													
4.012	Remove 18" plug valve and 7' of 18" drainage pipe	0.80d	04-Jan-22	04-Jan-22																													
4.049	Remove and Dispose of Exposed Piping Around the Plant	0.80d	04-Jan-22	05-Jan-22																													
4.050	Remove and Dispose of Unwatering Piping	0.80d	05-Jan-22	06-Jan-22																													
4.051	Remove and Dispose of Drainage Piping	0.40d	06-Jan-22	06-Jan-22																													
4.107	Remove Concrete Associated with 30" Dia. water supply line	0.40d	06-Jan-22	08-Jan-22																													
4.108	Remove Concrete in Aerator Structure	1.04d	08-Jan-22	11-Jan-22																													
4.109	Remove Wood in Aerator Structure	1.00d	11-Jan-22	12-Jan-22																													
4.110	Remove Structural Steel in Aerator Structure	1.00d	12-Jan-22	14-Jan-22																													
Power House Demolition		196.38d	04-Jan-22	05-Oct-22																													
4.047	Remove and Dispose of Oil Sump Pumps	0.10d	04-Jan-22	04-Jan-22																													
4.048	Remove and Dispose of Pumps	0.90d	04-Jan-22	04-Jan-22																													
4.036	Remove and Dispose of Hydraulic Pump Motor (10 HP est) & control panel	1.00d	05-Jan-22	05-Jan-22																													
4.044	Remove and Dispose of Bearing Oil System and Cooling Water System	0.40d	06-Jan-22	06-Jan-22																													
4.045	Remove and Dispose of CO2 Systems	0.10d	06-Jan-22	06-Jan-22																													
4.046	Remove and Dispose of Plant Water and Fire Protection System	0.40d	06-Jan-22	06-Jan-22																													
4.043	Remove and Dispose of Governor	0.80d	06-Jan-22	08-Jan-22																													
4.037	Remove and Dispose of Distribution Equipment, Junction Boxes	1.00d	08-Jan-22	11-Jan-22																													
4.042	Remove and Dispose of Crane	1.00d	11-Jan-22	12-Jan-22																													
4.007	Tailrace Coffor Dam- Furnish & Unload Material	4.00d	12-Jan-22	20-Jan-22																													
4.007.1	Tailrace Coffor Dam- Drive Pile	11.20d	15-Jun-22	30-Jun-22																													

Remaining Level of Effort

Actual Level of Effort

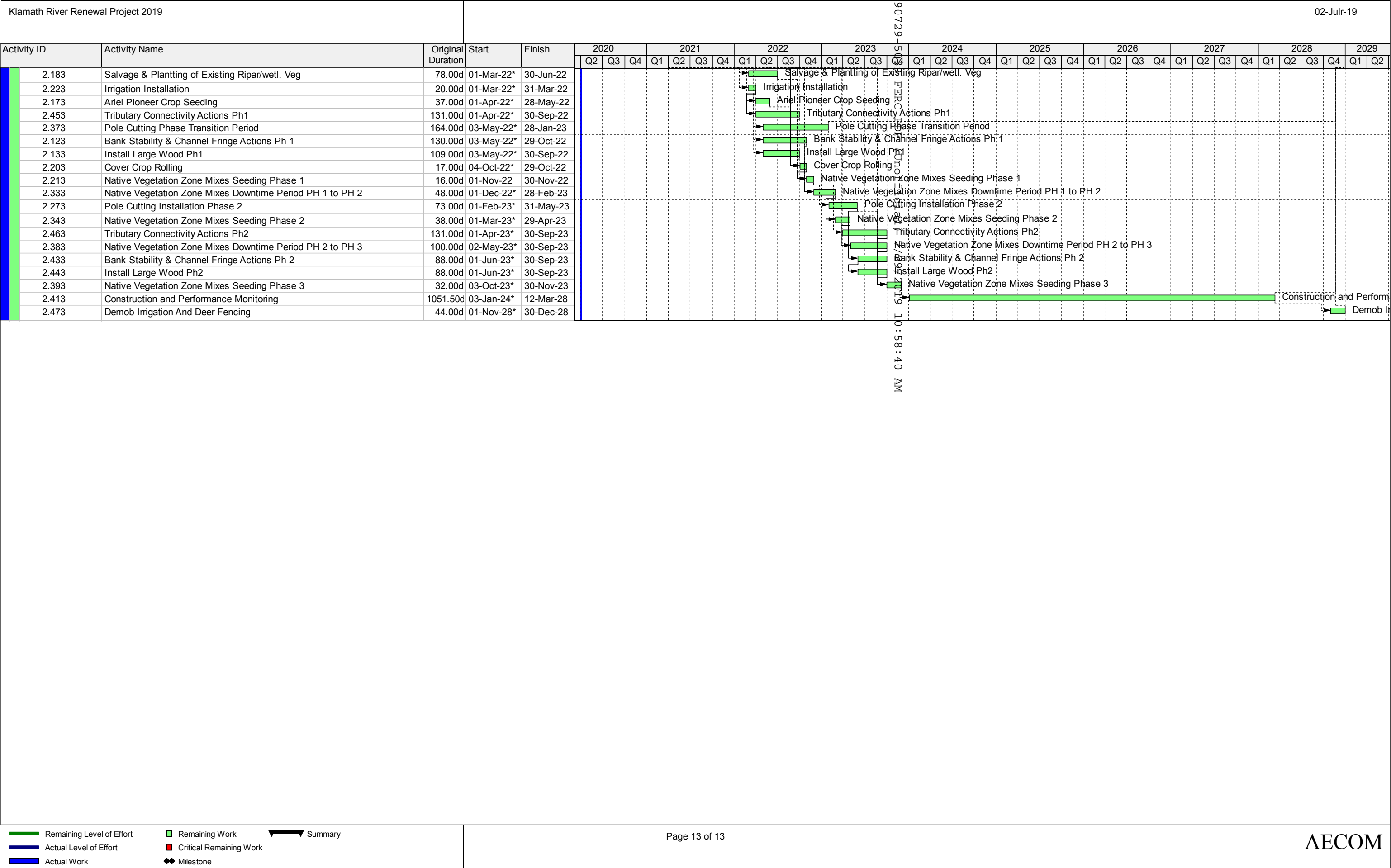
Actual Work

Remaining Work

Critical Remaining Work

Milestone

Summary



Definite Plan – Appendix P
Amended Estimate of Project Cost



Attachment D Risk Analysis Methodology

RISK ANALYSIS METHODOLOGY

Risk Analysis Model

For this risk assessment, the AECOM Risk Team identified a “risk set” comprised of cost estimate uncertainties and potential risk events via a risk workshop session and used it to perform quantitative risk analyses. The Risk Team utilized a stochastic risk model for these analyses that employs probabilistic methods to forecast project cost as a function of confidence level. To develop inputs for the risk model, risk workshop participants identified potential risk events and concurrent risk event impacts catalogued as ranges of dollars or days of delay that could result from each risk events.

The AECOM Risk Team constructed this risk model by creating a binomial distribution per risk that either happens (value of 1) or doesn't happen (value of 0) based on predetermined probabilities of occurrence. Both cost and schedule consequences are modeled using a Laplace distribution defined by two points: minimum and maximum.

The project's base cost estimate serves as the first building block of the risk analysis model. In order to turn this static cost estimate into a platform for the model, it is first necessary to capture the uncertainty within the general requirements / conditions line item of the estimate. Once the Risk Team quantifies this uncertainty (by setting a range over which it is expected to exist), it adds risk events identified during the workshop to the model.

Four types of correlations are considered in the risk model. Two of them are applicable to the components of cost exposure and are applied to risk events in the risk register. These two correlations are defined as Pearson Coefficients. They are assigned to risks in pairs and range between negative one (-1) and one (1). A coefficient of 1 represents a perfectly positively correlated pair of risks; a -1 represents a perfectly negatively correlated pair of risks; values between -1 and 1 represent various levels of correlation that allow for imperfections in the relationship between the risks; and zero (0) represents a pair of risks that are uncorrelated.

The first correlation is applied to the occurrence of pairs of risks. A positive correlation between the paired risks implies that if one risk happens in the simulated model the other must happen as well; a negatively correlated pair means that if one risk happens in the simulated model the other may not happen. These cases are important to consider when a model implies that a trigger that could activate another risk without the two risks occurring simultaneously.

A second correlation is applied to relationships between impacts of certain risk pairs that have cost and schedule consequences. A positive correlation between such a pair implies that when the selected risk happens and results in a high cost consequence, a high schedule consequence is also likely to result. Alternatively, a negative correlation between such a pair suggests that a high cost consequence from the selected risk would likely have a low schedule impact. This is a particularly useful model to suggest cases where the project may suffer from either a delay or an additional cost as a consequence of a risk and may thus incur costs to mitigate the delay.

The next two correlations considered in the model are used in the “cost estimate uncertainty” analysis, and affect the cost estimate uncertainty calculations. The first of these correlations is also represented with a Pearson Coefficient and is applied to a pair of cost components that may have a relationship. A positive correlation of this type of cost element implies that when the selected cost uncertainty trends upwards in one cost category, a related cost category may observe upward trends of cost growth as well. For example, if steel prices trend higher than was forecast, steel unit prices will be affected in all areas of the cost estimate where steel is applicable.

Conversely, a negative correlation between such related cost categories means they will trend in opposite directions. These types of correlations are particularly important for modeling the cost uncertainty of commodity prices, labor agreements and market conditions.

The last correlation applied in the cost uncertainty calculations is represented by cost elements that are calculated as a dependent of hard costs or other cost elements, a function typically applied to cost-per-day. For example, the cost of administrative staff is directly correlated to the duration of the project. Such elements in the cost uncertainty calculations have been linked to modeled costs and schedule, meaning that if one component of the project is significantly delayed, the administration cost of the management of the project will inevitably increase. Alternatively, uncorrelated cases fix those cost elements to the project's baseline estimates and so do not vary in value based on the simulation of the project.

Monte Carlo Simulations

Once the Risk Team incorporates variations within the base estimate and potential impacts of external risks into the risk model, a Monte Carlo simulation can be performed. Monte Carlo simulations turn static numbers into ranges by applying causal relationships to variables and using a random number generator to simulate what might happen in reality. They also allow for multi-faceted analysis of the simulation results.

The Risk Team uses a Monte Carlo simulation to forecast project results such as total project cost, potential total cost risk exposure, and other relevant statistics. This risk assessment's Monte Carlo simulation generated thousands of random scenarios of project performance variables related to cost and schedule. Utilizing all data collected, the simulation results in a single file that details wide ranges of cost impacts and schedule impacts.

The statistics generated by the Monte Carlo simulation comprise the quantitative part of this report, visualized as output curves which forecast cost as a function of confidence level. An 80% confidence level is the industry standard for the output of these analyses and is thus the value reported in this analysis. An 80% confidence level is considered a conservative value to compare the current allocations in cost and schedule contingency budgets and determine their appropriateness.

Schedule Modeling and Simulation

The schedule component is modeled in similar fashion to that of cost, and during the Monte Carlo simulation construction durations are modified based on the number of risks that are simulated to occur and their random consequences. Each simulation generates a number of delay days based on the duration of the project, and those are multiplied by a cost-per-day and added to the cost distribution. The distribution of end date for each contract is reported in that range and at the 80% confidence level.



Attachment E Cost Summary Presentation

High-Level Comparison

Definite Plan to July 2019

- Numerous BOC workshops/iterations
- Indicative pricing for Liability Transfer (LTC, Mitigation Fund & Insurance)
- One-year construction delay (with additional year of operations)
- PDB Agreement execution & preliminary services bid
- Actuals ~\$37M (8.5%) through June 2019 (included in numbers below)

Line Item / Cost Category	Estimate of Project Costs (Year of Construction Dollars)				P80 Delta (Vs. Definite Plan)
	Definite Plan (P80)	Full Removal (P80)	Full Removal (P90)	Full Removal (P99)	
Project Oversight (non PDB)	29,581,000	40,718,000	40,718,000	40,718,000	+ 11,137,000
Liability Transfer	-	35,530,000	35,530,000	35,530,000	35,530,000
Environmental Compliance (KRRC-Managed)	8,637,000	8,097,000	8,097,000	8,097,000	(540,000)
Technical Support	9,119,000	14,220,000	14,220,000	14,220,000	+ 5,101,000
Construction Management	10,617,000	13,167,000	13,167,000	13,167,000	+ 2,550,000
Progressive Design-Build Contract	234,493,000	237,612,000	237,612,000	237,612,000	+ 3,119,000
Mitigation Measures	18,407,000	17,141,000	17,141,000	17,141,000	(1,266,000)
Monitoring & Reporting (KRRC)	18,405,000	4,406,000	4,406,000	4,406,000	(13,999,000)
Subtotal	329,259,000	370,891,000	370,891,000	370,891,000	41,632,000
Contingency	147,441,000	62,757,000	67,063,000	81,454,000	(84,684,000)
TOTAL	476,700,000	433,648,000	437,954,000	452,345,000	(43,052,000)

High-Level Comparison

Definite Plan to July 2019

- Both the P80 and P90 are below the State Cost Cap
- The P99 is only ~\$2M over the State Cost Cap

Line Item / Cost Category	Estimate of Project Costs (Year of Construction Dollars)				P80 Delta (Vs. Definite Plan)
	Definite Plan (P80)	Full Removal (P80)	Full Removal (P90)	Full Removal (P99)	
Project Oversight (non PDB)	29,581,000	40,718,000	40,718,000	40,718,000	+ 11,137,000
Liability Transfer	-	35,530,000	35,530,000	35,530,000	35,530,000
Environmental Compliance (KRRC-Managed)	8,637,000	8,097,000	8,097,000	8,097,000	(540,000)
Technical Support	9,119,000	14,220,000	14,220,000	14,220,000	+ 5,101,000
Construction Management	10,617,000	13,167,000	13,167,000	13,167,000	+ 2,550,000
Progressive Design-Build Contract	234,493,000	237,612,000	237,612,000	237,612,000	+ 3,119,000
Mitigation Measures	18,407,000	17,141,000	17,141,000	17,141,000	(1,266,000)
Monitoring & Reporting (KRRC)	18,405,000	4,406,000	4,406,000	4,406,000	(13,999,000)
Subtotal	329,259,000	370,891,000	370,891,000	370,891,000	41,632,000
Contingency	147,441,000	62,757,000	67,063,000	81,454,000	(84,684,000)
TOTAL	476,700,000	433,648,000	437,954,000	452,345,000	(43,052,000)

Industry standard for planning,
creating \$16M Reserve (within Cap)

High-Level Comparison

Definite Plan to July 2019

Liability Transfer:

- +\$35.5M for LTC (Natural Resources) and Local Impact Mitigation Fund
- +\$7M for added insurance (higher premiums) – Within “PDB Contract” total

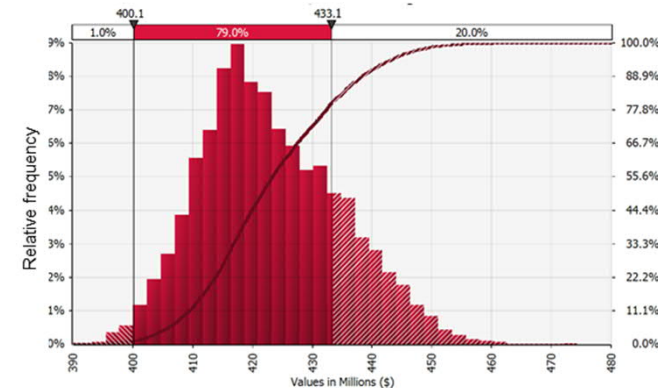
Line Item / Cost Category	Estimate of Project Costs (Year of Construction Dollars)				P80 Delta (Vs. Definite Plan)
	Definite Plan (P80)	Full Removal (P80)	Full Removal (P90)	Full Removal (P99)	
Project Oversight (non PDB)	29,581,000	40,718,000	40,718,000	40,718,000	+ 11,137,000
Liability Transfer	-	35,530,000	35,530,000	35,530,000	35,530,000
Environmental Compliance (KRRC-Managed)	8,637,000	8,097,000	8,097,000	8,097,000	(540,000)
Technical Support	9,119,000	14,220,000	14,220,000	14,220,000	+ 5,101,000
Construction Management	10,617,000	13,167,000	13,167,000	13,167,000	+ 2,550,000
Progressive Design-Build Contract	234,493,000	237,612,000	237,612,000	237,612,000	+ 3,119,000
Mitigation Measures	18,407,000	17,141,000	17,141,000	17,141,000	(1,266,000)
Monitoring & Reporting (KRRC)	18,405,000	4,406,000	4,406,000	4,406,000	(13,999,000)
Subtotal	329,259,000	370,891,000	370,891,000	370,891,000	41,632,000
Contingency	147,441,000	62,757,000	67,063,000	81,454,000	(84,684,000)
TOTAL	476,700,000	433,648,000	437,954,000	452,345,000	(43,052,000)

High-Level Comparison

Definite Plan to July 2019

Monte Carlo Risk Contingency P80/90 ~\$63-67M:

- Includes price uncertainty, pre- and post- GMP risks
- Involves construction start delays up to 2 years




Line Item / Cost Category	Estimate of Project Costs (Year of Construction Dollars)				P80 Delta (Vs. Definite Plan)
	Definite Plan (P80)	Full Removal (P80)	Full Removal (P90)	Full Removal (P99)	
Project Oversight (non PDB)	29,581,000	40,718,000	40,718,000	40,718,000	+ 11,137,000
Liability Transfer	-	35,530,000	35,530,000	35,530,000	35,530,000
Environmental Compliance (KRRC-Managed)	8,637,000	8,097,000	8,097,000	8,097,000	(540,000)
Technical Support	9,119,000	14,220,000	14,220,000	14,220,000	+ 5,101,000
Construction Management	10,617,000	13,167,000	13,167,000	13,167,000	+ 2,550,000
Progressive Design-Build Contract	234,493,000	237,612,000	237,612,000	237,612,000	+ 3,119,000
Mitigation Measures	18,407,000	17,141,000	17,141,000	17,141,000	(1,266,000)
Monitoring & Reporting (KRRC)	18,405,000	4,406,000	4,406,000	4,406,000	(13,999,000)
Subtotal	329,259,000	370,891,000	370,891,000	370,891,000	41,632,000
Contingency	147,441,000	62,757,000	67,063,000	81,454,000	(84,684,000)
Estimate Uncertainty		9,474,000	10,134,000	10,318,000	
Pre-GMP Contingency	147,441,000	18,208,000	19,435,000	24,020,000	
Post GMP Contingency		35,075,000	37,494,000	47,116,000	
TOTAL	476,700,000	433,648,000	437,954,000	452,345,000	(43,052,000)

High-Level Comparison

Definite Plan to July 2019

RES's expertise in compliance and mitigating impacts to natural resource results in significant savings (and includes indemnification)



Monte Carlo Risk Contingency reduced by ~\$85M due to:

- Higher price certainty
- Risks being retired over past year, or probability/impact being refined
- Risks transferred to insurance, LTC or Local Impact Mitigation Fund

Line Item / Cost Category	Estimate of Project Costs (Year of Construction Dollars)				P80 Delta (Vs. Definite Plan)
	Definite Plan (P80)	Full Removal (P80)	Full Removal (P90)	Full Removal (P99)	
Project Oversight (non PDB)	29,581,000	40,718,000	40,718,000	40,718,000	+ 11,137,000
Liability Transfer	-	35,530,000	35,530,000	35,530,000	35,530,000
Environmental Compliance (KRRC-Managed)	8,637,000	8,097,000	8,097,000	8,097,000	(540,000)
Technical Support	9,119,000	14,220,000	14,220,000	14,220,000	+ 5,101,000
Construction Management	10,617,000	13,167,000	13,167,000	13,167,000	+ 2,550,000
Progressive Design-Build Contract	234,493,000	237,612,000	237,612,000	237,612,000	+ 3,119,000
Mitigation Measures	18,407,000	17,141,000	17,141,000	17,141,000	(1,266,000)
Monitoring & Reporting (KRRC)	18,405,000	4,406,000	4,406,000	4,406,000	(13,999,000)
Subtotal	329,259,000	370,891,000	370,891,000	370,891,000	41,632,000
Contingency	147,441,000	62,757,000	67,063,000	81,454,000	(84,684,000)
Estimate Uncertainty		9,474,000	10,134,000	10,318,000	
Pre-GMP Contingency	147,441,000	18,208,000	19,435,000	24,020,000	
Post GMP Contingency		35,075,000	37,494,000	47,116,000	
TOTAL	476,700,000	433,648,000	437,954,000	452,345,000	(43,052,000)

High-Level Comparison

Definite Plan to July 2019

Contingency:

- By early 2020, estimate and design uncertainty will be resolved

Line Item / Cost Category	Estimate of Project Costs (Year of Construction Dollars)				P80 Delta (Vs. Definite Plan)
	Definite Plan (P80)	Full Removal (P80)	Full Removal (P90)	Full Removal (P99)	
Project Oversight (non PDB)	29,581,000	40,718,000	40,718,000	40,718,000	+ 11,137,000
Liability Transfer	-	35,530,000	35,530,000	35,530,000	35,530,000
Environmental Compliance (KRRC-Managed)	8,637,000	8,097,000	8,097,000	8,097,000	(540,000)
Technical Support	9,119,000	14,220,000	14,220,000	14,220,000	+ 5,101,000
Construction Management	10,617,000	13,167,000	13,167,000	13,167,000	+ 2,550,000
Progressive Design-Build Contract	234,493,000	237,612,000	237,612,000	237,612,000	+ 3,119,000
Mitigation Measures	18,407,000	17,141,000	17,141,000	17,141,000	(1,266,000)
Monitoring & Reporting (KRRC)	18,405,000	4,406,000	4,406,000	4,406,000	(13,999,000)
Subtotal	329,259,000	370,891,000	370,891,000	370,891,000	41,632,000
Contingency	147,441,000	62,757,000	67,063,000	81,454,000	(84,684,000)
Estimate Uncertainty		9,474,000	10,134,000	10,318,000	
Pre-GMP Contingency	147,441,000	18,208,000	19,435,000	24,020,000	
Post GMP Contingency		35,075,000	37,494,000	47,116,000	
TOTAL	476,700,000	433,648,000	437,954,000	452,345,000	(43,052,000)

High-Level Comparison

Definite Plan to July 2019

Management, Legal & Consulting Services:

- Have increased due to escalation, added year of operations, and additional technical support required for unforeseen conditions, FERC, CEQA & NEPA

Line Item / Cost Category	Estimate of Project Costs (Year of Construction Dollars)				P80 Delta (Vs. Definite Plan)
	Definite Plan (P80)	Full Removal (P80)	Full Removal (P90)	Full Removal (P99)	
Project Oversight (non PDB)	29,581,000	40,718,000	40,718,000	40,718,000	+ 11,137,000
Liability Transfer	-	35,530,000	35,530,000	35,530,000	35,530,000
Environmental Compliance (KRRC-Managed)	8,637,000	8,097,000	8,097,000	8,097,000	(540,000)
Technical Support	9,119,000	14,220,000	14,220,000	14,220,000	+ 5,101,000
Construction Management	10,617,000	13,167,000	13,167,000	13,167,000	+ 2,550,000
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Mitigation Measures	18,407,000	17,141,000	17,141,000	17,141,000	(1,266,000)
Monitoring & Reporting (KRRC)	18,405,000	4,406,000	4,406,000	4,406,000	(13,999,000)
Subtotal	329,259,000	370,891,000	370,891,000	370,891,000	41,632,000
Contingency	147,441,000	62,757,000	67,063,000	81,454,000	(84,684,000)
TOTAL	476,700,000	433,648,000	437,954,000	452,345,000	(43,052,000)

High-Level Comparison

Definite Plan to July 2019

Mitigation, Monitoring & Reporting:

- Majority of monitoring and portion of mitigation transferred to LTC and Local Impact Mitigation Fund

Line Item / Cost Category	Estimate of Project Costs (Year of Construction Dollars)				P80 Delta (Vs. Definite Plan)
	Definite Plan (P80)	Full Removal (P80)	Full Removal (P90)	Full Removal (P99)	
Project Oversight (non PDB)	29,581,000	40,718,000	40,718,000	40,718,000	+ 11,137,000
Liability Transfer	-	35,530,000	35,530,000	35,530,000	35,530,000
Environmental Compliance (KRRC-Managed)	8,637,000	8,097,000	8,097,000	8,097,000	(540,000)
Technical Support	9,119,000	14,220,000	14,220,000	14,220,000	+ 5,101,000
Construction Management	10,617,000	13,167,000	13,167,000	13,167,000	+ 2,550,000
Progressive Design-Build Contract	234,493,000	237,612,000	237,612,000	237,612,000	+ 3,119,000
Mitigation Measures	18,407,000	17,141,000	17,141,000	17,141,000	(1,266,000)
Monitoring & Reporting (KRRC)	18,405,000	4,406,000	4,406,000	4,406,000	(13,999,000)
Subtotal	329,259,000	370,891,000	370,891,000	370,891,000	41,632,000
Contingency	147,441,000	62,757,000	67,063,000	81,454,000	(84,684,000)
TOTAL	476,700,000	433,648,000	437,954,000	452,345,000	(43,052,000)



High-Level Comparison

Definite Plan to July 2019

PDB Contract:

- Design fees increased considerably (+\$15M)
- Specialty insurance increase (+\$7M)
- 1-year of escalation across all line items (+\$9M)
- Refined or new items - Yreka, Fire Management, Spawning Gravel (+\$10M)
- Dam removal fees went down due to BOC input (-\$9M)
- Vegetation monitoring, maintenance and reporting to LTC (-\$25M)
- Downstream flood control mitigation to Local Impact Mitigation Fund (-\$1.5M)

Line Item / Cost Category		Estimate of Project Costs (Year of Construction Dollars)				P80 Delta (Vs. Definite Plan)
		Definite Plan (P80)	Full Removal (P80)	Full Removal (P90)	Full Removal (P99)	
Progressive Design-Build Contract		234,493,000	237,612,000	237,612,000	237,612,000	+ 3,119,000
40	Final Design & Permitting Support (PDB)	6,513,000	21,799,000	21,799,000	21,799,000	+ 15,286,000
40A	Project Insurance	-	6,989,000	6,989,000	6,989,000	+ 6,989,000
41	Dam Removals	106,827,000	97,751,000	97,751,000	97,751,000	(9,076,000)
42	Reservoir Area Improvements	21,051,000	21,779,000	21,779,000	21,779,000	+ 728,000
43	Reservoir Area Restoration	57,957,000	32,821,000	32,821,000	32,821,000	(25,136,000)
44	Yreka Water Line Replacement	2,900,000	6,060,000	6,060,000	6,060,000	+ 3,160,000
45	Transportation Improvements	30,799,000	32,717,000	32,717,000	32,717,000	+ 1,918,000
46	Recreation Improvements	4,584,000	6,481,000	6,481,000	6,481,000	+ 1,897,000
47	Downstream Flood Control Improvemen	1,499,000	-	-	-	(1,499,000)
48	Public Health And Safety Fencing	2,363,000	2,665,000	2,665,000	2,665,000	+ 302,000
49	Fire Management Plan	-	3,006,000	3,006,000	3,006,000	+ 3,006,000
49A	Spawning Gravel Augmentation	-	5,544,000	5,544,000	5,544,000	+ 5,544,000

High-Level Comparison

Full versus Partial Removal

Partial Removal:

- Approximately \$18.5M lower for dam removal construction, and nearly \$23M lower overall

Line Item / Cost Category	Estimate of Project Costs (Year of Construction Dollars)		
	Definite Plan (P80)	Full Removal (P80)	Partial Removal (P80)
Project Oversight (non PDB)	29,581,000	40,718,000	40,718,000
Liability Transfer	-	35,530,000	35,530,000
Environmental Compliance (KRRRC-Managed)	8,637,000	8,097,000	8,097,000
Technical Support	9,119,000	14,220,000	14,220,000
Construction Management	10,617,000	13,167,000	13,167,000
Progressive Design-Build Contract	234,493,000	237,612,000	219,150,000
Mitigation Measures	18,407,000	17,141,000	17,141,000
Monitoring & Reporting (KRRRC)	18,405,000	4,406,000	4,406,000
Subtotal	329,259,000	370,891,000	352,429,000
Contingency	147,441,000	62,757,000	58,621,000
Estimate Uncertainty		9,474,000	8,687,000
Pre-GMP Contingency	147,441,000	18,208,000	17,209,000
Post GMP Contingency		35,075,000	32,725,000
TOTAL	476,700,000	433,648,000	411,050,000

www.klamathrenewal.org

Attachment L

Extensions of Funding Agreements

State of California Natural Resources Agency

AMENDMENT #2 TO GRANT AGREEMENT P11601-0

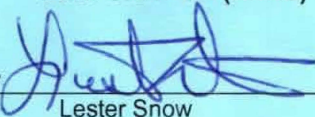
GRANTEE NAME: Klamath River Renewal Corporation (KRRC)
PROJECT TITLE: Restoring the Klamath River: Klamath River Dam Removal Project

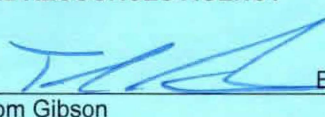
This amendment is hereby made and agreed upon by the State of California, acting through the Natural Resources Agency and by the Klamath River Renewal Corporation (KRRC) pursuant to the above identified program. The State and Grantee, in mutual consideration of the promises made herein and in the agreement, of which this is an amendment, agree to the following:

To extend the Performance Period from 7/1/2020 to 7/1/2025

Contingent upon the existing appropriation being extended in the Governor's 2019-2020 BUDGET, and subject to all existing terms and conditions of the originally executed grant agreement, the applicant agrees to complete the project as described in the project scope described in Exhibit A, and any subsequent amendments, and the State of California, acting through the Natural Resources Agency pursuant to Proposition 1, agrees to fund the project up to the total state grant amount indicated.

KLAMATH RIVER RENEWAL CORPORATION (KRRC)**STATE OF CALIFORNIA NATURAL RESOURCES AGENCY****STATE OF CALIFORNIA NATURAL RESOURCES AGENCY**

By 
 Lester Snow

By 
 Tom Gibson

By 
 Bryan Cash

Title President

Title General Counsel

Title Assistant Secretary,
Administration and Finance

Date 12/4/18

Date 12/5/18

Date 12/5/18

CERTIFICATION OF FUNDING

AMOUNT OF ESTIMATE FUNDING		AGREEMENT NUMBER		FUND			
\$249,500,000.00		P11601-0		6083 –Water Quality, Supply, and Infrastructure Improvement Act of 2014			
ADJ. INCREASING ENCUMBRANCE				FISCAL PO NUMBER			
\$							
ADJ. DECREASING ENCUMBRANCE		FUNCTION					
\$ 500,000.00		Dam Removal					
UNENCUMBERED BALANCE		REF NUM	FUND	ENACTMENT YEAR	ACCOUNT NUMBER	ALT ACCOUNT NUMBER	
\$		001	608300003	2016	5432000	0000000000	
PROGRAM	PCBU	PROJECT NUMBER	ACTIVITY	RPTG STRUCTURE	SRV LOC	AGENCY USE	BUDGET PERIOD
0320	0540	0540P01P116010	32102	05400001	32102	B5922	2017

I hereby certify upon my personal knowledge that budgeted funds are available for this encumbrance.

SIGNATURE OF ACCOUNTING OFFICER

DATE

12/14/18

STATE OF CALIFORNIA

GAVIN NEWSOM, Governor

PUBLIC UTILITIES COMMISSION

505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298



July 10, 2019

Laura Hazlett
Chief Financial Officer
Klamath River Renewal Corporation
2001 Addison St, Suite 317
Berkeley, CA 94704

Subject: Funding Agreement Extension Request

Dear Ms. Hazlett,

On June 12, 2019, the Klamath River Renewal Corporation ("KRRC") requested an extension of the expiration date of the Funding Agreement approved by the Commission in Decision ("D.") 17-11-019. KRRC included with its request a Certificate of Service confirming service on the Administrative Law Judge Division and all parties to Application ("A.") 10-03-015.

Siskiyou County and Siskiyou County Water Users Association raised objections to KRRC's extension request. I have reviewed the issues raised in the objections and find that the requested amendment will not impact customer rates. An extension of the expiration date for the Funding Agreement provides for an extension of time to meet conditions previously approved by the Commission.

Pursuant to Rule 16.6 of the Commission's Rules of Practice and Procedure, I grant KRRC's request to extend the expiration date of the Funding Agreement to December 31, 2024. The Funding Agreement is amended as follows: "This Agreement shall expire upon the earlier of ~~January 31, 2022~~, December 31, 2024, or the date the [Klamath Hydroelectric Settlement Agreement] KHSa terminates (the "Expiration Date")."

Sincerely,

A handwritten signature in black ink that reads "Alice Stebbins". The signature is written in a cursive, flowing style.

Alice Stebbins
Executive Director

Funding Agreement Number 7810225


AMENDMENT NUMBER 1 TO FUNDING AGREEMENT

This is amendment number 1 to the Funding Agreement (No. 7810225) between the State of Oregon, **Public Utility Commission of Oregon**, the "OPUC," and the **Klamath River Renewal Corporation**, a California nonprofit public benefit corporation, hereinafter referred to as the "KRRC."


1. This amendment shall become effective on the date this amendment has been fully executed by every party and, when required, approved by the Department of Justice.
 2. The Funding Agreement is hereby amended as follows: language to be deleted or replaced is struck through; new language is underlined and bold.
 2. **Effective Date and Expiration.** This Agreement shall become effective on the date this Agreement is fully executed. This Agreement shall expire upon the earlier of ~~January 31, 2022~~, **December 31, 2024**, or the date the KHSA terminates (the "Expiration Date").
 3. Except as expressly amended above, all other terms and conditions of the original Funding Agreement are hereby ratified and confirmed and remain in full force and effect.
- THE PARTIES**, by execution of this Amendment, hereby acknowledge that each Party has read this Amendment, understands it, and agrees to be bound by its terms and conditions.
4. Signatures.

SIGNATURE PAGE TO FOLLOW

Klamath River Renewal Corporation


By 
Name Laura Hazlett
(printed)
Title Chief Operations Officer
Date 5/21/19

STATE OF OREGON, acting by and through its
Public Utility Commission of Oregon

By 
Name: Michael Dougherty
(printed)
Title: Chief Operations Officer
Date 5/21/2019

APPROVED

(If required)

By 
KRRC's Legal Counsel
Date 5/21/19

Document Content(s)

Response to BOC Recommendations.PDF.....1-21

Attachment A.PDF.....22-80

Attachment B.PDF.....81-155

Attachment C.PDF.....156-164

Attachment D.PDF.....165-166

Attachment E.PDF.....167-620

Attachment F.PDF.....621-663

Attachment G.PDF.....664-669

Attachment H.PDF.....670-673

Attachment I.PDF.....674-681

Attachment J.PDF.....682-684

Attachment K.PDF.....685-1327

Attachment
L.PDF.....1328-1332