PACIFIC POWER
A DIVISION OF PACIFICORP

825 NE Multnomah, Suite 2000
Portland, Oregon 97232

November 17, 2021

VIA ELECTRONIC FILING

Public Utility Commission of Oregon
Attn: Filing Center
201 High Street, SE, Suite 100
Salem, Oregon 97301-3389

RE: UE 219 – Lower Klamath Hydroelectric Project Site Investigation Workplans for Oregon and California

PacifiCorp dba Pacific Power (PacifiCorp) submits the attached Site Investigation Work Plans for the Oregon and California aspects of the Lower Klamath Hydroelectric Project (Project). In Docket No. UE 219, Order No. 21-242, the Public Utility Commission of Oregon approved the Property Transfer Agreement for disposition of the Project assets including four hydroelectric dams. That order also included reporting conditions regarding the progression of work to address pre-existing environmental conditions. In partial satisfaction of the reporting conditions, PacifiCorp provides the Site Investigation Work Plans for the Oregon and California aspects of the Project.

It is respectfully requested that all data requests regarding this matter be addressed to:

By email (preferred): datarequest@pacificorp.com

By regular mail: Data Request Response Center
PacifiCorp
825 NE Multnomah, Suite 2000
Portland, OR 97232

All other inquiries may be directed to Cathie Allen, Regulatory Affairs Manager, at (503) 813-5934.

Sincerely,

Shelley McCoy
Director, Regulation

Enclosure

Lower Klamath Hydroelectric Project (FERC No. P-14803)

California Site Investigation Work Plan

Final

November 2021

Prepared by:

Jacobs

Prepared for:

PACIFICORP

Lower Klamath Hydroelectric Project
(FERC No. P-14803)

Project No:	D3493300.A.CS.EV.01.01
Document Title:	California Site Investigation Work Plan
Document No.:	PPS0512212051PDX
Revision:	Final
Date:	November 2021
Client Name:	PacifiCorp, Demian Ebert, Klamath Program Manager, 503-813-6625
Project Manager:	Emilio Candanoza, Jacobs, 541-768-3509

Jacobs Engineering Group Inc.

2020 SW Fourth Avenue, Suite 300
Portland, Oregon
United States
T +1.503.235.5000

www.jacobs.com

Executive Summary

Introduction

As part of the Lower Klamath Hydroelectric Project dam removal activities, PacifiCorp and the Klamath River Renewal Corporation have entered into a Property Transfer Agreement (Agreement). This legally-binding document defines 16 recognized environmental conditions (RECs) located in the State of California and 1 REC located in the State of Oregon that PacifiCorp is responsible for investigating, closing, and remediating, as necessary, in advance of the Agreement's closing date. Environmental sampling for closure of the REC in the State of Oregon is addressed in a separate work plan (Jacobs 2021).

The RECs were identified by AECOM Technical Services, Inc. (AECOM) as part of Phase I environmental site assessments (ESAs) performed between 2017 and 2018 (AECOM 2018) and in 2020 (AECOM 2020b). The results and conclusions from Phase II ESAs were used to evaluate and develop the sampling plans for the Iron Gate Hatchery Burn Pit (AECOM 2019c) and the Copco No. 2 Wood-Stave Penstock (AECOM 2020a). A Phase II ESA was also used to help develop the sampling plan for the Copco No. 2 Powerhouse Transformer Fire (Parametrix 2006), and an evaluation of the Iron Gate Hatchery Settling Ponds (Watercourse 2018) was used to develop recommendations for the REC.

This Site Investigation Work Plan (SIWP) describes the soil sampling activities that will be performed to confirm the presence or absence of constituents of potential concern (COPCs) greater than identified screening levels or to confirm the extent of COPCs previously identified at a REC. Groundwater samples will be collected if groundwater is encountered. The primary objective of the sampling activities described in this SIWP is to collect key environmental and waste management data that will support closure of 10 RECs located in California and identified in Exhibit C of the Agreement. PacifiCorp elected to include additional investigation of the Copco No. 2 Powerhouse Transformer Fire site, bringing the total number of sites addressed in this work plan to 11 (Figures ES-1 through ES-4). The 11 California RECs are as follows:

1) Copco No. 1 Dynamite Cave
2) Copco No. 1 Debris Piles/Scrap Yard (Parcel B REC 4)
3) Wood-Stave Penstock
4) Copco No. 2 Wood Pile (Parcel B REC 7)
5) Copco No. 2 Powerhouse Transformer Fire (not included in Exhibit C of the Agreement)
6) Copco No. 2 Former Mobile Oil Containment Building
7) Underground Storage Tanks (USTs)
8) Copco No. 2 Burn Pit (Parcel B REC 6)
9) Iron Gate Shooting Range (Parcel B REC 9)
10) Iron Gate Hatchery Burn Pit
11) Iron Gate Hatchery Settling Ponds

The remaining California RECs documented in Exhibit C (Section 1.1) are identified as unknown, inaccessible, or both, and will not be investigated under this SIWP. PacifiCorp will develop a separate work plan to address these RECs in a manner that will minimize disruption or delay of dam removal efforts.

PacifiCorp Dam Sites

As part of the Lower Klamath Hydroelectric Project, the J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate dams and supporting infrastructure will be removed and adjacent lands will be restored. The four dams were constructed between 1911 and 1962; Copco No. 1 is the oldest.

The dams and associated powerhouses have been and continue to be operated to generate and distribute electricity. Hazardous materials that have been used onsite include diesel fuel, leaded and unleaded gasoline, and governor, transformer, and motor oils. Battery banks and oils are stored within secondary containment systems.

As noted in the Phase I ESA conducted by AECOM, the powerhouses appeared to be in good operating condition, with proper housekeeping and hazardous materials management practices (AECOM 2018).

Findings and Discussion

This SIWP presents the planned sampling approach for each of the RECs identified above. The sampling approach is not meant to be rigid but rather dynamic and in line with the U.S. Environmental Protection Agency's (EPA's) Triad Approach, where sampling strategies are subject to change based on real-time consideration of field observations and conditions in an effort to streamline site characterization and better allow for more rapid site cleanup and closure (EPA 2001). The ultimate objective is to collect field and analytical data that meet the Investigative Standard described in this SIWP so that: 1) the RECs can be closed based on the field and analytical results of the site investigation; or 2) the nature and extent of discovered contaminants are defined and if necessary, a remedial action plan can be developed and implemented that ultimately leads to closure of each REC.

A Site Investigation Report will be prepared to document the site investigations performed at each REC. The Site Investigation Report will document field activities, summarize key field observations, and identify major deviations from this SIWP. The analytical results will be summarized in tables for each REC and compared to the screening levels identified in SIWP tables. The analytical results will also be evaluated against applicable regulatory requirements for each REC. The Site Investigation Report will additionally summarize the key findings for each REC and provide recommended next steps and conclusions for each REC. Recommended next steps could include; collection of additional environmental samples, remediation of the site, or a request for REC closure based on a remedial action or determination that no further action is required. If the analytical results of COPCs are less than screening levels established in the SIWP, PacifiCorp will request closure of the REC in accordance with the terms of the Agreement and a process to be developed with the Klamath River Renewal Corporation and the State of California. If COPC concentrations are greater than screening levels, PacifiCorp will either propose advancement of step-out borings to collect additional environmental samples according to the sampling plan established for a REC, or development of a remediation plan based on the field and analytical data already collected.

Contents

Appendices

Tables (located at the end of text)

Figures (located at the end of text)

Acronyms and Abbreviations

°F	degree(s) Fahrenheit
AECOM	AECOM Technical Services, Inc.
Agreement	Property Transfer Agreement entered into by PacifiCorp and Klamath River Renewal Corporation
bgs	below ground surface
BOD	biochemical oxygen demand
bp	before present
BTEX	benzene, toluene, ethylbenzene, xylenes
CCR	California Code of Regulations
COPC	constituent(s) of potential concern
DPT	direct-push technology
DTSC	Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
ESA	environmental site assessment
FERC	Federal Energy Regulatory Commission
GPR	ground-penetrating radar
GPS	Global Positioning System
Hatchery	Iron Gate Hatchery
Jacobs	Jacobs Engineering Group Inc.
KRRC	Klamath River Renewal Corporation
MCL	maximum contaminant level
mg/kg	milligram(s) per kilogram
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyls
PID	photoionization detector
ppmv	parts per million by volume
Project	Lower Klamath Hydroelectric Project
RCRA	Resource Conservation and Recovery Act
REC	recognized environmental condition
RM	river mile
RSL	regional screening level
SFRWQCB	San Francisco Regional Water Quality Control Board
SIWP	Site Investigation Work Plan

STLC	soluble threshold limit concentration
SVOC	semivolatile organic compound
TCLP	toxicity characteristic leaching procedure
TPH	total petroleum hydrocarbon
TTLC	total threshold limit concentration
UST	underground storage tank
VOC	volatile organic compound

1. Introduction

PacifiCorp retained Jacobs Engineering Group Inc. (Jacobs) to develop a Site Investigation Work Plan (SIWP) for the Lower Klamath Hydroelectric Project (Project). The purpose of the SIWP is to further investigate and evaluate 11 recognized environmental conditions (RECs) in California identified during Phase I environmental site assessments (Phase I ESAs) conducted by AECOM Technical Services, Inc. (AECOM) on behalf of the Klamath River Renewal Corporation (KRRC).

This SIWP does the following:

- Summarizes the findings from the previous Phase I ESAs.
- Establishes the data needs for the further evaluation of each REC.
- Identifies data quality objectives to determine the type and extent of potential contamination at each REC.
- Proposes a sampling approach for each REC, with figures showing sampling locations and tables showing media to be sampled, sample collection depths, and analyses to be performed.
- Describes how the data collected will be used for decision-making.
- Outlines general procedures and protocols for sample collection and handling in the Sampling and Analysis Plan (Appendix A).

1.1 Background

As part of the Lower Klamath Hydroelectric Project dam removal activities, PacifiCorp and the KRRC have entered into a Property Transfer Agreement (Agreement). As part of the Agreement, a list of 17 recognized environmental conditions (RECs) have been identified. The RECs are consolidated as Exhibit C to the Agreement. PacifiCorp is responsible for investigating, closing, or remediating the RECs, as necessary, in advance of the Agreement's closing date. The Agreement includes an additional REC in Oregon (J.C. Boyle Dispersed Recreation Area) that is addressed in a separate SIWP (Jacobs 2021). The complete list of the California RECs is as follows:

1) Iron Gate Shooting Range (Parcel B REC 9)
2) Copco No. 2 Burn Pit (Parcel B REC 6)
3) Wood-Stave Penstock
4) Copco No. 1 Dynamite Cave
5) Undiscovered Impacted Soil and Groundwater at the Four Powerhouses
6) Underground Storage Tanks (USTs)
7) Copco No. 2 Former Mobile Oil Containment Building
8) High-voltage Switchyards
9) Undiscovered Impacted Soil and Groundwater at the Four Dam Developments
10) Copco No. 1 Debris Piles/Scrap Yard (Parcel B REC 4)
11) Copco No. 2 Wood Pile (Parcel B REC 7)
12) Iron Gate Hatchery Burn Pit
13) Iron Gate Hatchery Settling Ponds
14) Inaccessible Areas
15) Retained Easement Areas
16) Undiscovered Impacted Soil and Groundwater Outside the Removal Work Zone

AECOM conducted six Phase I or II ESAs between 2018 and 2020 from which the list of pre-existing environmental conditions was generated. These specific Phase I and II ESAs are:

- Phase I ESAs for Copco No. 1 Dam, Copco No. 2 Dam, Iron Gate Dam, and Iron Gate Hatchery in California and the J.C. Boyle Dam in Oregon (AECOM 2018)
- City of Yreka Diversion Dam Phase I Environmental Site Assessment (AECOM 2019a)
- Fall Creek Hatchery Phase I Environmental Site Assessment (AECOM 2019b)
- Burn Pit at Iron Gate Hatchery Phase II Soil Investigation (AECOM 2019c)
- Draft Wood-Stave Penstock and Soil Investigation (AECOM 2020a)
- Draft Phase I Environmental Site Assessment of the Parcel B Lands (AECOM 2020b)

Of the 17 RECs identified by AECOM and documented in Exhibit C of the Agreement, PacifiCorp has elected to conduct site investigations for 10 of the RECs and for the Copco No. 2 Powerhouse Transformer Fire for a total of 11 RECs in California:

1) Copco No. 1 Dynamite Cave
2) Copco No. 1 Debris Piles/Scrap Yard (Parcel B REC 4)
3) Wood-Stave Penstock (herein referred to as Copco No. 2 Wood-Stave Penstock)
4) Copco No. 2 Wood Pile (Parcel B REC 7)
5) Copco No. 2 Powerhouse Transformer Fire[1]
6) Copco No. 2 Former Mobile Oil Containment Building
7) Underground Storage Tanks (USTs) (herein referred to as Copco No. 2 Underground Storage Tanks)
8) Copco No. 2 Burn Pit (Parcel B REC 6)
9) Iron Gate Shooting Range (Parcel B REC 9)
10) Iron Gate Hatchery Burn Pit
11) Iron Gate Hatchery Settling Ponds

The remaining six RECs identified in Exhibit C are unknown, inaccessible, or both:

- Condition 5 – Undiscovered Impacted Soil and Groundwater at the four Powerhouses
- Condition 8 – High voltage switchyards
- Condition 9 – Undiscovered Impacted Soil and Groundwater and the four dam developments
- Condition 15 – Inaccessible Areas
- Condition 16 – Retained Easement Areas
- Condition 17 – Undiscovered Impacted Soil and Groundwater outside the removal work zone

These conditions are not addressed in this SIWP. In accordance with Agreement Section 3.5(c), PacifiCorp will develop subsequent separate investigation plans that will allow for investigation, remediation, and closure, as appropriate, and in coordination with the overall dam removal project.

[1] KRRC Facility Phase I ESA identified the Copco No. 2 Powerhouse Transformer Fire and Oil Release as a REC that was not included in Exhibit C. Although Siskiyou County stated that no further site investigation was required (Siskiyou 2006), they also agreed to PacifiCorp's plan to assess soil conditions beneath the containment cells and characterize soil that would be removed for disposal (PacifiCorp 2006). During the Phase I ESA, no such documentation regarding the assessment or disposal of soil from beneath the transformers was found (AECOM 2018). Consequently, PacifiCorp has elected to conduct additional site investigation work to confirm whether COPCs are present at concentrations greater than the screening levels identified in Section 3.3 in soil beneath the transformers. Upon confirmation that COPCs are absent or less than screening levels identified in Section 3.3, the REC will be recommended for closure by PacifiCorp as described in Section 4 of this SIWP.

1.2 Objectives

The primary objective of the site investigations described in this SIWP is to facilitate collection of key environmental data that support closure of the RECs identified in Section 1.1. Because the RECs are situated in remote locations and because accessibility to the RECs is seasonal, the prescribed timeframe for data collection associated with each REC is relatively short. Consequently, a secondary objective of the SIWP is to outline a sampling approach to collect as much analytical and field observational data as are considered required for REC closure under a single mobilization; data collection is currently anticipated to occur in fall of 2021. The field and analytical data will be used to determine and delineate the vertical and horizontal extent of potentially impacted soil, groundwater, or both., as needed, for REC closure. Waste characterization data will also be collected to help in planning a remedial action at a site. These data will be used to determine onsite waste segregation and management requirements for hazardous and nonhazardous waste, and to determine offsite disposal requirements.

1.3 Program Organization

The intent of this section is to generally describe the primary stakeholders in the property transfer process, and the relationships among those stakeholders. Section 3.5(a) of the Agreement between PacifiCorp and the KRRC specifically enumerated RECs subject to the reasonable satisfaction of the KRRC in consultation with the states of Oregon and California. Section 3.5(b) of the Agreement obligates PacifiCorp to provide the KRRC written documentation containing a reasonably detailed description of:

i. Its efforts to assess the scope of the condition.

ii. The results of such efforts.

iii. Its proposed approach to resolving the condition.

iv. The legal and regulatory requirements applicable to the condition and the compliance of the proposed approach with such requirements, including any regulatory approvals required to be obtained.

v. Any obligations or limitations relating to such approach that would survive the proposed resolution, including monitoring or institutional controls, and any effect they would have on the design or implementation of the Definite Plan and on the prospective uses of the Real Property following Facilities Removal as anticipated by the Klamath Hydroelectric Settlement Agreement.

vi. PacifiCorp's proposed schedule for performing any work, making any required regulatory filings, and receiving any required regulatory approvals.

1.4 Program Timeline

Agreement Section 3.5(c) requires each REC (as identified in Agreement Exhibit C) to be resolved prior to the transfer of the license for the Lower Klamath Hydroelectric Project. PacifiCorp is responsible for providing written documentation of that resolution. Further, PacifiCorp is required to explain any REC that cannot be resolved prior to transfer and what work remains to be done to resolve those issues following transfer. Given these requirements, PacifiCorp is working to meet the following schedule for the overall program:

- The SIWP (this document) will be completed in November 2021.
- Site investigations as described in this work plan will occur through mid-2022 depending on weather and access conditions. Laboratory analysis of samples, laboratory data analysis, and report preparation will follow through fall of 2022.

- For those sites where no further work is required, PacifiCorp expects closure can be reached by early 2023.
- For sites where further investigation or remediation is necessary, site-specific investigation or remediation plans would be developed in late 2022 or early 2023.
- Investigation and remedial work would occur in the spring of 2023 as sites are accessible. Documentation of this work and site closure would follow investigation and remediation, as specified by the site-specific remedial plans.
  - The Iron Gate Shooting Range is an active shooting range that will be closed in approximately 2 years. A separate work plan to perform a more extensive investigation of the shooting range and address contamination will be prepared and implemented in line with closure of the shooting range.
  - Six RECs listed in Agreement Exhibit C are unknown or inaccessible (for example, possible contaminated areas are situated underneath dams or powerhouses). Additional work at these locations cannot occur until the KRRC proceeds with dam removal. Therefore, these RECs will not be subject to resolution prior to transfer and the RECs are not addressed in this work plan or schedule. In accordance with Agreement Section 3.5(c), PacifiCorp will develop subsequent investigation plans that allow for investigation, remediation, and closure, as appropriate, in coordination with the overall dam removal project.

1.5 Investigative Standard and Site Future Uses

The work performed for the SIWP will be carried out in accordance with the Investigative Standard described in this section.

The "Investigative Standard" means:

> The level and scope of diligence, investigation, fieldwork, analysis, review and follow-up that a prudent purchaser of property intended for conversion from utility operations to use as natural habit for passive recreation would undertake in order to assure that such work and any resulting determinations regarding the need for and scope of any remediation complies with:
>
> a) All applicable legal and regulatory requirements, standards, guidances, and advisories, including any regulatory standards or requirements expressly identified in this SIWP,
>
> b) The requirements of all permits and governmental approvals applicable to work conducted under this SIWP, and
>
> c) All applicable industry practices relating to environmental investigations and remediation.

The work carried out pursuant to this SIWP will give due consideration to all relevant available records and historical information, including but not limited to AECOM's Environmental Site Assessments, PacifiCorp internal records, and all other considerations appropriate to assure that the resulting investigations are sufficient for determinations regarding the need for and scope of any remediation to eliminate, to the extent practical, any residual risk of liability or regulatory burdens relating to the presence of hazardous substances, pollutants, and contaminants at the site or sites addressed in this SIWP.

Where a screening level or assessment is called for in investigating any condition it will be selected in light of the anticipated future use of the affected property for active recreation or passive recreation and natural habitat following dam removal. Where a sampling plan, approach, or strategy changes due to on-

site observations or for any other reason, the change and the basis for the change will be documented and timely reported to the States and KRRC.

The intended future uses of each REC and the exposure pathways have been identified and approved by KRRC and the State of California (Table 1-1). The exposure pathways were used to determine the screening levels developed in Section 3.3. The analytical results from the site investigations at each REC will be evaluated against these screening levels to determine if a REC can be closed or if further assessment, remediation, or both, are required.

Table 1-1. Site Future Uses and Exposure Pathways

Site/REC	Site Future Use(s)	Exposure Pathways
Copco No. 1 Dynamite Cave	Permanently sealed	Not applicable
Copco No. 1 Debris Pile/Scrap Yard	Passive recreation/natural habitat	Residential/Ecological/Leaching to Groundwater
Copco No. 2 Wood-Stave Penstock	Passive recreation/natural habitat	Residential/Ecological/Leaching to Groundwater
Copco No. 2 Wood Pile	Passive recreation/natural habitat	Residential/Ecological/Leaching to Groundwater
Copco No. 2 Powerhouse Transformer Fire	Active recreation	Residential/Leaching to Groundwater
Copco No. 2 Former Mobile Oil Containment Building	Active recreation	Residential/Leaching to Groundwater
Copco No. 2 Underground Storage Tanks	Active recreation	Residential/Leaching to Groundwater
Copco No. 2 Burn Pit	Passive recreation/natural habitat	Residential/Ecological/Leaching to Groundwater
Iron Gate Shooting Range	Passive recreation/natural habitat	Residential/Ecological/Leaching to Groundwater
Iron Gate Hatchery Burn Pit	Passive recreation/natural habitat	Residential/Ecological/Leaching to Groundwater
Iron Gate Hatchery Settling Ponds	Passive recreation/natural habitat	Residential/Ecological/Leaching to Groundwater

The Investigative Standard includes preparation of a Site Investigation Report, as described in Section 4. The Site Investigation Report will document the investigations performed at each REC, summarize key field observations, and provide figures and tables with analytical results compared to soil screening levels and waste characterization criteria. The Site Investigation Report will include recommended next steps for each REC and an appendix containing the analytical data for samples collected.

Except as may be otherwise expressly approved in writing by PacifiCorp, KRRC, the State of California, and the State of Oregon, the implementation of any work under this SIWP and any updates or follow-up will constitute Jacobs' representation to PacifiCorp, KRRC, the State of California, and the State of Oregon, that such work complies with the Investigative Standard.

1.6 Site Investigation Work Plan Organization

This SIWP contains the following sections and appendixes:

- **Section 1 – Introduction**: Describes the SIWP purpose, provides background information on the evolution of the RECs, and summarizes the investigation objectives, program organization and timeline, and investigative standards and future site uses.
- **Section 2 – Site Description and Characteristics**: Describes the dam development sites, surrounding lands, and historical practices. Includes a description of physical characteristics such as geology, hydrogeology, and hydrology, as well as a discussion of biological and cultural resources in the area.
- **Section 3 – Site Evaluation and Investigation**: Describes each REC and corresponding sampling objectives, data evaluation, and screening levels. Provides a sampling plan for each REC based on an evaluation of the available data. Summarizes findings from previous investigations to identify data gaps and to determine data quality objectives, so that the type and extent of COPCs at each REC can be evaluated and waste characterization for proper disposal offsite can be made, as needed. The sampling approach is prepared for each REC, with a figure depicting planned sampling locations and a table summarizing media to be sampled, sample collection depths, and analysis to be performed by the laboratory.
- **Section 4 – Closure Plan and Reporting**: Describes how data will be used for decision-making and how the results of the assessments will be documented, as well as next steps in the process to resolve the RECs per the Agreement.
- **Section 5 – References**. Provides a bibliographic listing of documents cited in the SIWP.
- **Appendix A – Sampling and Analysis Plan**: Describes quality assurance and quality control for field collection methods (sampling equipment, sample identification method, field data collected, sample containers and preservation, sample hold times, sampling shipping requirements), and laboratory methods (analytical methods, detection limits). Outlines health and safety procedures for the fieldwork and describes decontamination of field equipment and disposal of investigation-derived waste (soil, water, and personal protective equipment).
- **Appendix B –** Consolidated Comment Matrix: Contains consolidated review comments and responses from California, KRRC, and Oregon on previous draft documents submitted in July 2021 as well as supplemental comments received and discussed following the initial round of comments.

2. Site Description and Characteristics

This section generally describes the three dam developments in Siskiyou County, California, where the RECs have been identified and the site investigation work will take place. This information is summarized from the *J.C. Boyle Dam, Copco No. 1 Dam, Copco No. 2 Dam, Iron Gate Dam, and Iron Gate Fish Hatchery Phase I Environmental Site Assessments* (AECOM 2018) and *Draft Phase I Environmental Site Assessment of the Parcel B Lands* (AECOM 2020b).

2.1 Site Description

The Copco No. 1 Development includes the Copco No. 1 Dam and Powerhouse and the following RECs: the Copco No. 1 Dynamite Cave and the Copco No. 1 Debris Pile/Scrap Yard (Figure ES-2). The Copco No. 1 Development and original supporting structures were constructed between 1911 and 1922 along the Klamath River at about river mile (RM) 201.6. The concrete arch Copco No. 1 Dam impounds Copco Lake. Additional features include a gated spillway, intake structure, and powerhouse (AECOM 2018). Approximately 1,080 acres of additional undeveloped land (Parcel B Lands), including the approximately 972-acre Copco Lake, is located within and in the vicinity of the Copco No. 1 Development (AECOM 2018, 2020b).

The Copco No. 2 Development includes the Copco No. 2 Dam and Powerhouse and the following RECs: the Copco No. 2 Wood-Stave Penstock, the Copco No. 2 Wood Pile, the Copco No. 2 Powerhouse Transformer Fire, the Copco No. 2 Former Mobile Oil Containment Building, the Copco No. 2 Underground Storage Tanks, and the Copco No. 2 Burn Pit (Figure ES-3). The Copco No. 2 Development and original supporting structures were constructed in 1925 along the Klamath River between RM 199.7 and 201.3. The concrete diversion Copco No. 2 Dam creates the forebay for this development. Additional features include an embankment section, gated spillway, water conveyance system, and powerhouse (AECOM 2018). Approximately 1,251 acres of additional undeveloped land (Parcel B Lands), including the forebay, is located within and in the vicinity of the Copco No. 2 Development (AECOM 2020b).

The Iron Gate Development and Iron Gate Hatchery (Hatchery) include the Iron Gate Dam, Powerhouse, and Hatchery, and the following RECs: Iron Gate Shooting Range, Iron Gate Hatchery Burn Pit, and Iron Gate Hatchery Settling Ponds (Figure ES-4). The Iron Gate Development and original supporting structures were constructed in 1962 along the Klamath River between RM 192.9 and 199.7. The embankment Iron Gate Dam impounds Iron Gate Reservoir. Additional features include an ungated side-channel spillway, low-level outlet tunnel, intake structure, powerhouse, fish ladder, and fish holding and spawning facilities (AECOM 2018). Approximately 5,042 acres of additional undeveloped land (Parcel B Lands), including the approximately 942-acre Iron Gate Reservoir, is located within and in the vicinity of the Iron Gate Development (AECOM 2018, 2020b).

The Hatchery is located in Siskiyou County, California. The Hatchery was constructed in 1966 along the Klamath River between RM 192.5 and 192.7. Hatchery features include a fish hatchery building, fish ladder and trap, fish raceways, two settling ponds, an office and various outbuildings, and four residences. The Hatchery is owned by PacifiCorp and operated by the California Department of Fish and Wildlife.

Land use along the Klamath River and adjacent to the Copco No. 1, Copco No. 2, and Iron Gate Developments, the Iron Gate Hatchery, and the Parcel B Lands includes undeveloped land (timber production and federally managed property), with rural residential development, and recreational areas (AECOM 2018).

2.2 Historical Practices

The Copco No. 1, Copco No. 2, and Iron Gate powerhouses have continuously generated electricity. The powerhouses have used and stored hazardous materials throughout operations. These material include diesel fuel, leaded and unleaded gasoline, and non-polychlorinated biphenyls (PCBs) governor, transformer, and motor oils. Battery banks and oils are stored within secondary containment systems. When conducting the Phase I ESA, AECOM found the powerhouses to be in good operating condition, with proper housekeeping and hazardous materials waste management practices (AECOM 2018).

2.3 Physical Characteristics

2.3.1 Local Soils

Soils within the Copco No. 1, Copco No. 2, and Iron Gate Developments and Iron Gate Hatchery are generally classified as Lassen cobbly clay, Medford series, and Kuck soil series with rock outcrops and lava flows (AECOM 2018, 2020b). The Lassen series formed in residuum and colluvium derived from volcanic rocks and is moderately well drained. The Medford series formed in mixed alluvium and is moderately well drained. The Kuck series formed in material weathered from andesitic bedrock and is well drained.

2.3.2 Volcanic and Sedimentary Rocks

The Project area is located within an area of Cenozoic-era volcanic rocks in the southern portion of the Cascade Mountain Range (AECOM 2018). The Copco No. 1 and Copco No. 2 Developments are located in the High Cascades geologic province. Volcanic activities generally occurred between 5 million years before present (bp) to the present day (AECOM 2018). The Copco No. 1 and 2 developments are also surrounded with shield volcanoes. The hillsides surrounding Copco Lake are capped by low-gradient lava flows from the surrounding shield volcanoes. The Klamath River has carved through the High Cascades strata and exposed the underlying Western Cascades material on the slopes above Copco Lake (AECOM 2020b).

The Iron Gate Development and Hatchery are located in the Western Cascades geologic province. The Western Cascades strata is approximately 12,000 to 20,000 feet thick. Volcanic activities (i.e., gentle folding or tilting) generally occurred between 45 and 5 million years bp. The area around the Iron Gate Development and Hatchery contains various rock types and associated weathering products (AECOM 2020b).

A variety of sedimentary deposits also occur throughout the Project area. Glacial Lakes formed in the Project area during the Pleistocene. Historically, large volumes of water discharged from these lakes deposited coarse alluvium (i.e., river terrace) within the Klamath River (AECOM 2020b).

Landslides and volcanic eruptions within Parcel B Lands blocked rivers and streams, thereby forming ephemeral lakes and depositing lacustrine sediments (i.e., bedded silts, diatomites, and deltaic terraces of sand and gravel). Additional sedimentary lithologies include mass wasting materials (e.g., talus, colluvium, and landslide deposits) (AECOM 2020b).

2.3.3 Regional and Site-specific Climate

The Copco No. 1, Copco No. 2, and Iron Gate developments, as well as the Iron Gate Hatchery, are located between 6 and 12 miles northeast of Hornbrook, California. Hornbrook is classified as dry-summer subtropical (i.e., Mediterranean) climate, with relatively mild winters and very warm summers.

The average yearly temperatures in Hornbrook is approximately 53.7 degrees Fahrenheit (°F). In Hornbrook, July averages the warmest monthly temperature (approximately 89.5°F) and December averages the coolest monthly temperature (approximately 39.1°F) (Weatherbase 2021).

The average annual precipitation in Hornbrook is approximately 36.6 inches. In Hornbrook, January averages the most monthly precipitation (approximate 6.4 inches) and August averages the least monthly precipitation (approximately 0.2 inch) (Weatherbase 2021).

Hornbrook receives an average of approximately 80 days of precipitation annually. In Hornbrook, January averages the most precipitation days (approximately 10 days) and July averages the least precipitation days (approximately 2 days). Hornbrook receives an average of approximately 24.8 inches of snowfall annually. January averages the most snowfall for Hornbrook at approximately 10.0 inches (Weatherbase 2021).

2.3.4 Hydrogeology and Hydrology

Groundwater depths and flow directions are variable because of topography, stratigraphy, and bedrock surfaces. Groundwater is generally encountered in deeper fractured horizons and other low-permeability zones within the volcanic bedrock. Groundwater is generally encountered in shallow perched zones within the sedimentary deposits and tends to flow towards, or away from, the Klamath River, depending on seasonal rainfall totals. Natural springs are located on the valley slopes in the vicinity of Copco Lake and the Iron Gate Reservoir (AECOM 2020b).

2.4 Cultural and Biological Resources

Cultural and biological resources exist in the area of the three dam developments and surrounding lands. A cultural and biological assessment will be completed to review potential affects to historical, archaeological, and biological resources before removing debris and implementing the sampling plans. Available information on historical, archaeological, and biological resources will be reviewed to ensure that the assessments do not adversely affect a National Register of Historic Places-eligible archaeological or historic resource, as well as special-status species sensitive habitats. Where subsurface disturbances (e.g., soil or groundwater testing) are planned, archaeological and biological investigations will be performed, as necessary, to determine if there are buried precontact deposits and special-status species and sensitive habitats within the REC boundaries. Detailed recommendations for further archaeological and biological investigations and mitigation measures will be prepared during that assessment.

3. Site Investigation and Evaluation

This section evaluates each of the RECs identified in Section 1. The discussion for each REC is organized into subsections that address findings from previous investigations and present a sampling plan. For each REC, there is a figure depicting planned sampling locations, where applicable, and a table summarizing media to be sampled (soil or sediment, and groundwater, if encountered), sample collection depths, and analyses to be performed by the laboratory. Sample collection and investigation-derived waste management protocols are described in the Sampling and Analysis Plan (Appendix A).

3.1 Environmental Sampling

The primary objective of the sampling is to determine whether COPCs (specific to an individual site) are present at concentrations greater than the screening levels identified in Section 3.3 and to define the nature and extent of COPC exceedances. Environmental samples will be collected at the RECs, as described in the following subsections and in Appendix A, and will be analyzed for some or all of the following compounds via use of the laboratory methods identified here:

- Title 22 metals by U.S. Environmental Protection Agency (EPA) Method SW6010B (mercury by EPA Method SW7471A)
- Volatile organic compounds (VOCs) by EPA Method SW8260B
- Semivolatile organic compounds (SVOCs) by EPA Method SW8270C
- Dioxins and furans by EPA Method SW846 8290A
- Benzene, toluene, ethylbenzene, xylenes (BTEX) by EPA Method SW8260B
- Total petroleum hydrocarbons (TPH) as gasoline, diesel, and motor oil by EPA Method SW8015M
- Polynuclear aromatic hydrocarbons (PAH) by EPA Method SW8270C-SIM
- PCBs by EPA Method SW846 882A

This SIWP has been prepared using existing documents and office-based resources. Because of this methodology, sampling locations and depths may change based on field conditions and observations when sampling. Step-out borings may be advanced and deeper soil samples may be collected if soil is found to be stained, odorous, or have photoionization detector (PID) readings greater than 50 parts per million by volume (ppmv). Additionally, deeper (minimum of 6 feet bgs) soil samples will be collected for 20 percent of the boreholes associated with each of the RECs based on a State of California request and a September 9, 2021, agreement made between PacifiCorp and the State of California.

The planned sampling approach is meant to be dynamic and in line with EPA's Triad Approach, where sampling strategies are subject to change based on real-time consideration of field observations and conditions in an effort to streamline site characterization and better allow for more rapid site evaluation, cleanup, and closure (EPA 2001).

3.2 Waste Characterization Sampling

Concurrent with the collection of environmental samples will be the collection of waste characterization samples to assist in planning site-specific remedial actions, if required. These data will be used to determine onsite waste segregation and management requirements for hazardous and nonhazardous waste, and to determine offsite disposal requirements. One composite soil sample will be collected from each REC. Care will be taken to composite waste characterization samples such that each composite

sample is representative of the full depth range and lateral extent of the area from where the samples were collected.

Composite samples for waste characterization will be prepared from soil samples collected during sample collection at the following REC sites:

- Copco No. 1 Debris Pile/Scrap Yard
- Copco No. 2 Wood-Stave Penstock
- Copco No. 2 Wood Pile
- Copco No. 2 Powerhouse Transformer Fire
- Copco No. 2 Burn Pit
- Iron Gate Hatchery Burn Pit

Waste characterization samples will be analyzed for the total concentrations of contaminants and contaminant properties as follows:

- Title 22 metals by EPA Method SW6010B (mercury by EPA Method SW7471A)
- VOCs by EPA Method SW8260B (VOC samples will not be field composited – rather a single Terracore sample will be collected at the location with the highest likelihood of contamination based on visual observations or PID readings)
- SVOCs by EPA Method SW8270C
- TPH as diesel, gasoline, and motor oil by EPA Method SW8015M
- Ignitability (EPA Method SW1030), Reactivity (EPA Method SW846 CH7), and Corrosivity (EPA Method SW846 9045)
- pH (for aqueous samples only)

Additional procedures and analyses will be performed to determine if nonaqueous media (i.e., soil) are a Resource Conservation and Recovery Act (RCRA) or a non-RCRA (i.e., California only) hazardous waste, as follows:

- If the total concentration of a contaminant in nonaqueous environmental media is greater than 20 times the RCRA hazardous waste toxicity characteristic level in 22 CCR 66261.24(a)(1), the sample extract (extracted using the toxicity characteristic leaching procedure or TCLP using EPA Method SW1311) will be analyzed for the contaminant(s) to determine if the media are a RCRA hazardous waste. Note – if environmental media are determined to be a RCRA hazardous waste, additional evaluation for non-RCRA hazardous waste characteristics may not be required.
- If the total concentration of a contaminant in nonaqueous environmental media is less than the total threshold limit concentration (TTLC) but greater than 10 times the soluble threshold limit concentration (STLC) identified in 22 California Code of Regulations (CCR) 66261.24(a)(2), the Waste Extraction Test will be performed on that sample, and the Waste Extraction Test extract will be analyzed for the contaminant in question. Total analysis results and Waste Extraction Test results will be compared to the TTLC and STLC levels, respectively, in 22 CCR 66261.24(a)(2). If a TTLC or STLC is exceeded, the waste will be characterized as a non-RCRA hazardous waste.

If required, additional landfill-specific analyses will be performed for waste acceptance for disposal.

3.3 Data Evaluation and Screening Levels

Analytical data collected at each REC when implementing the SIWP will be managed as described in the Sampling and Analysis Plan (Appendix A). The analytical data provided by the analytical laboratory (accredited under the California Environmental Laboratory Accreditation Program) will undergo quality control checks for useability, then uploaded to a database for use in the analysis and reporting process. To evaluate COPCs at each REC, collected analytical data will be compared to published screening levels based on the future site uses described in Section 1.5.

3.3.1 Screening Levels for Soil without Ecological Receptors

For RECs that will be active recreation areas (for example, boat ramps and gravel parking areas), and that are not suitable habitat for ecological receptors, the exposure pathways are human health direct contact exposure and soil leaching to groundwater. The screening level for the COPCs in soils will be the lowest (most conservative) of the screening levels from the following pathways and sources:

- Human health direct contact exposure (for carcinogenic and noncarcinogenic constituents) for ingestion, dermal contact, and inhalation exposure pathways for a residential exposure scenario, priority of:
  1) Department of Toxic Substances Control (DTSC) Human Health Risk Assessment Note 3 value for residential soil (DTSC 2020, Table 1)
  2) EPA Regional Screening Level (RSL) for residential soil based on target cancer risk of 1 x 10-6 and target noncancer hazard of 1 (EPA 2021)
  3) For petroleum hydrocarbons, San Francisco Regional Water Quality Control Board (SFRWQCB) screening levels for residential land use (SFRWQCB 2019, Table S-1)

- Soil Leaching to Groundwater: SFRWQCB soil leaching screening levels for drinking water resource (SFRWQCB 2019, Table S-3)

For certain metals in soil, the screening level selected from the criteria provided above may be lower than naturally occurring levels of metals in local soils, so published regional background soil data were considered when developing screening levels. The 95 percent upper prediction level for the Cascade Range (ODEQ 2013) was used to represent background conditions at these RECs. In other words, if a regional background level is greater than a screening level defined from the sources above, the background level is the default screening level for that specific metal in soil.

Using these sources and the process outlined above, screening levels for the COPCs in soil at RECs without ecological receptors have been established and are provided in Table 3-1 in the column labeled "Sites with Human Health and Leaching to Groundwater."

3.3.2 Screening Levels for Soil with Ecological Receptors

For RECs that will be passive recreation and natural habitat areas, the exposure pathways are human health direct contact exposure, soil leaching to groundwater, and ecological receptors exposure. The screening level for the COPCs in soils will be the lowest (most conservative) of the screening levels from the pathways and sources listed in Section 3.3.1, and ecological receptors described as follows:

- Ecological: Most conservative across all receptor groups (terrestrial plants, soil invertebrates, birds, and mammals) between EPA Soil Screening Levels (EPA 2008) and Los Alamos National Laboratory (LANL 2017) No Effect Screening Levels. If neither source has a value, then use EPA Region 4 Soil Screening Levels (EPA 2018).

Like the screening levels for RECS without ecological receptors, the 95 percent upper prediction level for the Cascade Range (ODEQ 2013) was used to represent background conditions for metals at these RECs with ecological receptors. If a regional background level is greater than a screening level defined from the sources above, the background level is the default screening level for that specific metal in soil.

Using these sources and the process outlined above, screening levels for the COPCs in soil at RECs with ecological receptors have been established and are provided in Table 3-1 in the column labeled "Sites with Ecological Receptors."

3.3.3 Screening Levels for Groundwater

The screening level for the COPCs in groundwater for all the RECs will be the lowest (most conservative) of the screening levels from the following pathways and sources:

- Human Health: direct contact exposure (for carcinogenic and noncarcinogenic constituents) for ingestion, dermal contact, and inhalation exposure pathways for tap water, priority of
  1) DTSC Human Health Risk Assessment Note 3 value for tap water (DTSC 2020, Table 2)
  2) EPA RSL for tap water based on target cancer risk of 1 x 10-6 and target noncancer hazard of 1 (EPA 2021)
  3) For petroleum hydrocarbons, SFRWQCB screening levels for tap water (SFRWQCB 2019, Table GW-1)
- Human Health: California Maximum Contaminant Level (MCL) (DTSC 2020, Table 4)
- Human Health: EPA MCL (EPA 2021)

Using these sources, the screening levels for the COPCs in groundwater has been compiled (Table 3-2).

3.4 Copco No. 1 Dynamite Cave

3.4.1 Findings from Previous Investigations

A former Copco No. 1 Dynamite Cave (cave) is located along the access road to the top of Copco No. 1 dam approximately 50 feet west the dam crest itself (Figures ES-2 and 3-1). The cave was not accessed as part of the Phase I ESA and had not been accessed by PacifiCorp in many years (AECOM 2018). Soil within the cave is generally classified as rock outcrop (USDA 2021). During the AECOM investigation, PacifiCorp noted that dynamite had likely all been removed from the cave but because AECOM could not confirm an absence of explosives or explosive remnants within the cave, the cave is considered to be an Exhibit C REC.

In May 2021, PacifiCorp viewed the interior of the cave from the barrier, collected photographs (Photographs 3-1 and 3-2), and determined the following from a gap on the right side of the covered entryway:

- The entrance to the cave is approximately 7 feet above the road elevation. One can climb up to the entrance but safely working on the ledge in front of the cave may require support and a larger work area (Photograph 3-1).
- The cover for the cave entrance is oriented strand board that is nailed and screwed to vertical boards behind it.
- The opening to the cave is approximately 4 feet wide and 5.5 feet high.
- The cave itself is empty and approximately 9.5 feet deep (Photograph 3-2).

- There is a wood floor in the cave that is presumably built over the cave's rock floor. Because the inside of the cave was not accessed, available space below the flooring or the presence of anything below flooring is not known.
- The gap at the right side of the covered entryway is adequate to allow access for air quality monitoring, cameras, etc., without having to remove the cover.

Photograph 3-1: Dynamite Cave Entrance (PacifiCorp 2021)

Photograph 3-2: Dynamite Cave Interior (PacifiCorp 2021)

3.4.2 Sampling Plan

This section describes the activities that will be performed to confirm an absence of dynamite and other explosives within the cave (Figure 3-1). If dynamite and other explosives are confirmed to be absent from the cave, no further fieldwork will be performed. In the Site Investigation Report, the REC will be recommended for closure by PacifiCorp per the terms of the Agreement and a process to be developed with the KRRC and the State of California.

3.4.2.1 Determine Air Quality

Field staff will perform an onsite assessment by first visually inspecting and documenting the conditions just outside the cave entrance. Air quality parameters (i.e. percent oxygen, methane, hydrogen sulfide) will then be assessed from the gap between the cave wall and entryway.

3.4.2.2 Access the Cave

A Confined Space Entry Plan will be developed before entry to this space is allowed. Assuming that the previous step discovers no hazardous conditions, field staff will remove the wood panels from the entryway to the cave and ensure that there is adequate ventilation for entry. If ventilation is inadequate, there may be a pause for air exchange from outside the cave and the use of self-contained breathing apparatus may be necessary.

Upon entry, field staff will visually inspect the cave for explosives and other materials that may be stored beneath the wood floor or out of sight of the entryway. General observations will be documented and photographs of the interior of the cave will be collected. If explosives or residual explosives are observed and determined to be present beneath the floor of the cave or in some area that is not visible from the entryway, field staff will stop all work and notify PacifiCorp. An Explosives Removal Safety Plan will then be developed and implemented.

3.4.2.3 Test for Residual Explosives

If explosives are not present but it is visually determined that there is a potential for residual explosives to be present based on observation of fine-grained material on the floor of the cave, then field staff will determine if residual explosives are present through the use of Expray, an aerosol-based field test kit that provides a positive or negative assessment as to whether residual explosives are present. Use of Expray involves the following test reagents and protocols:

a) Expray #1 for qualitatively determining the presence of Group A explosives (TNT, Tetryl, TNB, DNT, picric acid and its salts)

b) Expray #2 for qualitatively determining the presence of Group B explosives (dynamite, nitroglycerine, RDX, PETN, SEMTEX, C4, nitrocellulose, and smokeless powder)

c) Expray #3 for qualitatively determining the presence of improvised explosives containing nitrate compounds (nonorganic nitrates, black powder, flash powder, gun powder, potassium chlorate and nitrate, sulfur [powder], and ammonium nitrate [both fertilizer and aluminum]).

Expray is chemically cumulative and will be used by first wiping any suspect surface with collection paper that will be taken outside of the cave for further testing. Use of the collection paper may be omitted for testing of stained, light-colored objects. The collection paper or light-colored object will first be sprayed with Expray #1. If a dark violet to brown color reaction is observed on the collection paper, then Group A explosives will be considered present. The collection paper or light-colored object will then be sprayed with Expray #2. If a pink color reaction is observed on the collection paper, then Group B explosives will be considered present. Lastly, the collection paper or light-colored object will be sprayed with Expray #3. If a crimson-pink color reaction is observed, then nitrate-containing compounds will be considered present. Expray #1, #2, and #3 sprays will all be utilized regardless of whether a positive reaction is observed.

If a color change is observed, indicating a positive result for any of the groups of explosives described above, then samples of the potentially explosive rock or soil will be collected for analysis of explosives (EPA Method 8330A) as summarized in Table 3-3.

3.4.2.4 Secure the Cave

Upon determining the presence or absence of explosives or the potential for explosive residues on the cave floor, the cave will be secured as it was prior to entry. If dynamite and other explosives are confirmed to be absent from the cave, no further fieldwork will be performed. In the Site Investigation Report, the REC will be recommended for closure by PacifiCorp per the terms of the Agreement and a process to be developed with the KRRC and the State of California.

3.5 Copco No. 1 Debris Pile/Scrap Yard

3.5.1 Findings from Previous Investigations

Approximately one-quarter mile south of Copco Road and one-quarter mile northwest of the Copco No. 1 Dam, the *Draft Phase I Environmental Site Assessment of the Parcel B Lands* (AECOM 2020b) describes a

scrap material laydown yard observed on a cinder borrow area (Figures ES-2, 3-2, 3-3, and 3-4). Soil within the scrap material laydown yard is generally classified as Lava flows-Xerorthents complex (USDA 2021). A burn pit with materials piled up to be burned was observed near the center of the graded area (Photograph 3-3). A scrap material storage area located along the southern edge of the graded area consisted of floating docks, walkways, corrugated metal culverts, and used building materials. East of this material, woody debris (some burned), and metal debris was strewn over a large area (Photograph 3-4). A pile of concrete footings, a small broken concrete box, and wood planks (some of which may be treated wood) were located on the downslope of the southern edge of the graded area. Piles of broken ceramic toilet bowls and seats with bullet holes were located on the hillside north of the graded area. A small pile of ceramic electrical insulators was observed on the west edge of the graded area. An embankment of gravel/soil potentially used for grading and/or fill elsewhere was observed in the southwest corner of the graded area.

The areas with ceramic electrical insulators, scrap dock materials, building materials, and the pile of borrow gravel/soil are not known dumping areas and are not anticipated to have impacted site soils. Sample collection is not planned in these areas. However, the field team will inspect these areas to evaluate whether there are observable signs of potential contamination and if observed, samples will be collected.

3.5.2 Sampling Plan

Prior to collecting samples, field staff will measure and delineate the extent of observed debris piles using Global Positioning System (GPS) technology. Field staff will also note topography and drainage in the area, and adjust planned sample locations if necessary, to bias towards areas where runoff may have collected. All sample locations will be marked, and utility clearance will be obtained prior to beginning sampling.

Soil samples will be collected in the area with ceramic toilet bowls and toilet seats (Area 1, Figure 3-3), the burn pit (Area 2, Figure 3-3), the area of strewn burned material (Area 3, Figure 3-4), and the pile of concrete and wood planks (Area 4, Figure 3-4), to delineate potential COPCs in the underlying soil and to characterize the soil for disposal. Because of the variety of features, samples will be analyzed for Title 22 metals, VOCs, SVOCs, dioxins, and furans according to Table 3-4.

To define the vertical extent, borings will be installed to a depth of 2.5 feet below ground surface (bgs) and samples collected in 6-inch intervals every foot beginning at the surface at each of the features (Table 3-4). One direct-push technology (DPT) boring in each of Areas 1, 2, and 4 and two DPT borings in Area 3 will be advanced to a depth of 6 feet bgs for the collection of soil samples at the following intervals: 0.0-0.5 foot, 1.0-1.5 feet, 3.0-3.5 feet, and 5.5-6.0 feet bgs. Borings will be extended if visual observations or field instruments indicate COPCs are deeper. If groundwater is encountered in any of the borings, groundwater samples will be collected and analyzed for the same set of analytes as the soil samples.

No sampling of the debris itself is planned; the debris will be removed by PacifiCorp and managed as construction debris or scrap.

Photograph 3-3: Copco No. 1 Debris Pile/Scrap Yard looking Southeast at Burn Pit (Jacobs 2021)

Photograph 3-4: Copco No. 1 Debris Pile/Scrap Yard looking East at Area of Strewn Burned Material (Jacobs 2021)

3.6 Copco No. 2 Wood-Stave Penstock

3.6.1 Findings from Previous Investigations

The Copco No. 2 Wood-Stave Penstock (penstock) (Figure ES-3) is part of the water conveyance system which transports water from the Copco No. 2 Dam to the Copco No. 2 Powerhouse. The 1,313-foot-long, 16-foot-diameter penstock is composed of narrow beveled wood-staves banded with steel hoops (Photograph 3-5). Soil within the penstock is generally classified as Lassen-Kuck complex, stony (USDA 2021). The penstock was identified as a REC based on the results of a Phase II ESA (AECOM 2020).

As part of the Phase II ESA, three soil samples and one field duplicate sample (SOIL 1, SOIL 2, SOIL 3, and FD 1) were collected with a hand trowel. The soil samples were collected from three locations along the western 600 feet of the penstock (Figure 3-5). The soil samples were analyzed for metals and SVOCs, including creosote. Wood from the penstock was additionally sampled for waste characterization purposes. Further assessment of the wood is not included in this SIWP because removal of the penstock will be performed by others.

Based on the analytical results of the four soil samples (AECOM 2020), metals did not exceed background concentrations for the Cascade Range (ODEQ 2013), except for arsenic which was detected in sample SOIL 2 at a concentration of 36 milligrams per kilogram (mg/kg), above the background concentration of 19 mg/kg, and above the maximum range of background concentrations (0.273 to 29.50 mg/kg). Lead was

detected at the background concentration of 36 mg/kg but below the maximum range of background concentrations (1.360 to 130.0 mg/kg). Various SVOCs (anthracene, benzo[a]anthracene, benzo[b]fluoranthene, carbazole, chrysene. Creosote, fluoranthene, indeno[1,2,3-cd]pyrene, pentachlorophenol, phenanthrene) were detected in the soil samples, indicating that chemicals from the treated wood have leached into soil beneath the penstock.

Photograph 3-5: Copco No. 2 Wood-Stave Penstock (Jacobs 2021)

3.6.2 Sampling Plan

Sampling of the penstock itself is not planned because the Phase II ESA indicated the presence of metals, creosote, and other SVOCs, confirming that the wood had been treated, and because the penstock will be removed by KRRC as part of the dam removal and managed as a treated wood waste per DTSC regulations. Water draining from the penstock will also not be sampled given the penstock will be dismantled and given the large volumes of water that have flushed out of the penstock daily over the past decades. If water from the penstock is observed in deep soil borings with moist to wet soil below unsaturated soil and without surface or near surface water draining into them, then the accumulated water from the penstock will be sampled for the same compounds as the soil samples described below.

Because arsenic above background was detected with creosote and other SVOCs in soil beneath the penstock, the scope of work for this REC includes surface and subsurface soil sampling along the entire length of the penstock. Field staff will first walk the length of the penstock in order to observe topography and drainage patterns, note any visible signs of contamination, and document the planned sample

locations with a GPS device (Figure 3-5). All sample locations will be cleared for utilities prior to hand augering or drilling.

The soil samples will be collected primarily on the northern downhill side of the penstock and as close as possible to the penstock itself. At all sample locations, shallow soil samples will be collected at from surface grade to 0.5 feet bgs and from 1.0 to 1.5 feet bgs (Table 3-5). At deep sample locations, a DPT rig will be used to advance borings to 6 feet bgs for the collection of soil samples at the following intervals: 0.0-0.5 foot, 1.0-1.5 feet, 3.0-3.5 feet, and 5.5-6.0 feet bgs. The deep soil sample locations will generally be located near the penstock and away from surface drainages and culverts.

The soil samples, and any collected water samples, will be analyzed for Title 22 metals and SVOCs. The soil samples will be collected with hand trowels. Water from deeper soil sample locations will be grab samples collected with a disposable bailer within 24 hours of determination that a water sample should be collected.

3.7 Copco No. 2 Wood Pile

3.7.1 Findings from Previous Investigations

Three piles of utility poles located approximately three-quarters of a mile northeast of the intersection of Copco Road and Daggett Road were documented in the *Draft Phase I Environmental Site Assessment of the Parcel B Lands* (AECOM 2020b) (Figures ES-3 and 3-6). Photographs of the poles indicated that some appeared to be treated (Photograph 3-6). No other features were observed in this area, whose soil is generally classified as Lassen-Kuck complex, stony (USDA 2021).

PacifiCorp has used this area to stockpile utility poles that have been removed from service. In June 2021, PacifiCorp marked the corners of the three piles of poles for georeferencing during sampling, because the poles have been removed for disposal offsite.

3.7.2 Sampling Plan

Prior to collecting samples, field staff will measure and delineate the extent of wood piles according to the stakes installed by PacifiCorp using GPS. Field staff will also note topography and drainage in the area, and adjust the planned sample locations, if necessary, to bias towards areas where runoff may have collected. All sample locations will be marked, and utility clearance will be obtained prior to beginning sampling.

Photograph 3-6: Copco No. 2 Large Wood Pile Looking South (PacifiCorp 2021)

The major wood preservatives used to treat utility poles are pentachlorophenol, creosote, chromated arsenicals (containing chromium, copper, and arsenic), and copper naphthenate. Samples will be collected from the soil where the poles were stored and analyzed for Title 22 metals, VOCs, and SVOCs (Table 3-6).

In general, wood preservative chemicals are expected to have migrated only a few feet into the soil column because the utility poles were in service for many years, the chemicals are not generally highly mobile in soils, and annual rainfall in the area averages 12 to 14 inches. Borings will be installed to a depth of 5 feet bgs and samples collected at intervals to that depth with a bias toward the shallower and likely more contaminated soils. One DPT boring at each of the three wood piles will be advanced to a depth of 6 feet bgs for the collection of soil samples at the following intervals: 0.0-0.5 foot, 1.0-1.5 feet, 3.0-3.5 feet, and 5.5-6.0 feet bgs (Table 3-6). Borings will be extended if visual observations or field instruments indicate contamination is deeper. A step-out boring may be added in drainage ways if observed. While considered unlikely, if groundwater is encountered in any of the borings, groundwater samples will be collected and analyzed.

Based on the estimated size of the wood piles, two borings will be installed in the soil where the two smaller wood piles were, and three borings installed in the soil where the larger wood pile was located (Figure 3-6).

No sampling of the wood waste will occur. PacifiCorp has removed and managed disposal of the utility pools as a treated wood waste per DTSC regulations.

3.8 Copco No. 2 Powerhouse Transformer Fire

3.8.1 Findings from Previous Investigations

In May 2006, the aboveground Transformer C located in front of the south side of the Copco No. 2 Powerhouse (Figure ES-3 and Photograph 3-7) caught fire, resulting in a release of transformer oil to the gravel catch basins, the concrete-lined pipe chase behind the transformers and catch basin, and the asphalt parking area which drains to the hillside approximately 20 feet above the area directly below the powerhouse tailrace. Transformer C initially contained 3,680 gallons of oil; 2,965 gallons of oil were pumped out of the transformer after the incident. The total volume of oil lost (spilled or combusted) during the fire is estimated to be 715 gallons (Parametrix 2006).

Photograph 3-7: Former Transformer C Location (removed) (Parametrix 2006)

In July 2006, Parametrix advanced six DPT borings (Copco-01 to Copco-06) and two hand auger borings (Copco-07 and Copco-08) for collection of soil samples at depths ranging from 1 to 25 feet bgs. Soil within the Copco No. 2 Powerhouse Transformer Fire REC is generally classified as Medford clay loam, cool (USDA 2021). The soil samples were analyzed for diesel range and heavy oil range TPHs. At boring Copco-06, the soil samples were also analyzed for PCBs. The highest TPH concentrations were detected in the top 3 feet of soil and above a layer of concrete. Detected diesel range organics concentrations ranged from 7.4 to 650 mg/kg, and oil range organics concentrations ranged from 6.8 to 250 mg/kg. At boring Copco-06, located near the footprint of Transformer C, PCBs were not detected (above the method detection limit of 0.0670 mg/kg) in any of the soil samples. PCBs were not analyzed at any other boring location.

The soil sampling results were submitted to the Siskiyou County Department of Public Health by PacifiCorp (PacifiCorp 2006). The Siskiyou County Department of Public Health stated in a follow-up letter to PacifiCorp on September 21, 2006, that:

- "An underlying concrete slab approximately 3 feet bgs was encountered in soil borings 01 through 06. It is apparent that the underlying concrete slab material serves as a subsurface barrier to vertical migrations. No further site investigation is required."
- "This Department concurs with your remediation plan to remove and characterize the site soils for proper disposal as needed during the dismantling of the old transformers scheduled during 2007" (Siskiyou 2006).

3.8.2 Sampling Plan

Because there are no records confirming removal of TPH-impacted soil when the transformers were dismantled, shallow soil to a depth of 3 feet, or refusal, will be collected from five borings advanced within the footprint of the former transformers (Figure 3-7) to confirm that remediation occurred as planned in 2007. Soil samples will be collected at depths of 0.5 to 1, 1.5 to 2, and 2.5 to 3 feet bgs. The sample intervals will be adjusted in the field if soil is observed to be stained, odorous, or have PID readings greater than 50 ppmv. The borings will be advanced via hand auger, DPT rig, or both, and will be analyzed for BTEX, TPH, PAHs, and PCBs (Table 3-7). All sample locations will be marked and cleared for subsurface utilities prior to augering or drilling.

3.9 Copco No. 2 Former Mobile Oil Containment Building

3.9.1 Findings from Previous Investigations

The Maintenance Building west of the Copco No. 2 Powerhouse (Photograph 3-8) is approximately 20 years old and is situated within the footprint of the former Mobile Oil Containment Building. Soil within the Copco No. 2 Former Mobile Oil Containment Building REC is generally classified as Medford clay loam, cool (USDA 2021). A "Shop" was also located southwest of the Mobile Oil Containment Building (Figures ES-3 and 3-8). There was no observable evidence of the former structures during the Phase I ESA, and there were no records documenting facility demolition and potential soil removal activities due to spills or leaks of petroleum hydrocarbons at these former buildings (AECOM 2018). These former buildings were consequently included in Exhibit C because of the potential for undocumented petroleum hydrocarbon releases to the environment.

3.9.2 Sampling Plan

Because the potential for petroleum hydrocarbon release cannot be excluded at these former facilities, seven initial DPT borings will be advanced within or near the footprint of the former facilities (Figure 3-8). The DPT borings will be advanced for collection of continuous soil cores to a depth of 10 feet bgs. If the continuous soil core is determined to not be impacted by TPHs (no staining, odor, or PID readings greater than 50 ppmv), then soil samples will not be collected and assessment of the area in the vicinity of the soil boring will be considered complete.

If the soil within continuous cores is determined to be impacted by TPHs (staining, odor, or PID readings greater than 50 ppmv), then soil samples will be collected and analyzed for TPHs, PAHs, and VOCs. Soil sample collection depths will vary and be biased to depths where soil is most impacted. Soil samples will also be collected upon reaching the vertical extent of impacted soil and from depths at least 1 and 5 feet below the impacted soil (Table 3-8). Step-out soil borings will be advanced approximately 10 feet north, south, east, or west of an initial soil boring that shows evidence of TPH contamination. Step-out directions and distances will ultimately be based on access, site conditions, and the degree of petroleum hydrocarbon contamination observed within the soil cores.

Photograph 3-8: Existing Maintenance Building (Jacobs 2021)

Prior to collecting advancing a step-out boring, field staff will note topography and drainage in the area to bias towards areas where runoff may have collected. All sample locations will be marked (including potential step-out locations) and cleared for utilities prior to drilling.

3.10 Copco No. 2 Underground Storage Tanks

3.10.1 Findings from Previous Investigations

Seven USTs were identified within the Copco No. 1, Copco No. 2, J.C. Boyle and Iron Gate developments and Iron Gate Hatchery (AECOM 2018). Two USTs (one 1,000-gallon regular leaded gasoline UST and one 1,000-gallon unleaded gasoline UST) identified at 27734 Copco Road, Montague, California are located outside the removal work zone (AECOM 2018). Two USTs (one UST identified at the J.C. Boyle power plant and one UST identified at the Iron Gate Salmon and Steelhead located at Copco Star Route-Copco Road) are unmappable "orphan sites" (AECOM 2018).

Three sources of additional information were reviewed or considered for these four USTs: *EnviroStor* (DTSC 2021); *Draft Buried Structures Site Investigation,* April (KPC 2020); and *GeoTracker* (SWRCB 2021). No further information is available regarding the specific location of these four USTs or whether these four USTs have been removed. Additionally, these four USTs are not identified in Exhibit C of the Agreement and are therefore omitted from the SIWP. However, if the four USTs (or any other USTs for that matter) are discovered during dam removal activities, they will be removed under applicable regulations. The removal process would be included in the plan developed to address RECs 5, 9, or 13, as applicable (see Section 1.1).

Three USTs (one 1,000-gallon regular leaded gasoline UST, one 1,000-gallon unleaded gasoline UST, and one 9,000-gallon UST) were identified at 19305 Daggett Road, Hornbrook, California (AECOM 2018) and are in Exhibit C of the Agreement and are therefore included in the SIWP.

The two 1,000-gallon USTs were noted on a November 13, 1987, Siskiyou County UST Closure Application. During the site reconnaissance visit with AECOM during preparation of the Phase 1, PacifiCorp personnel indicated that these former USTs were likely located at the Beswick Ranch, which is also owned by PacifiCorp (AECOM 2018). Because the Beswick Ranch is located approximately 6 miles east of the Copco No. 1 Dam and outside the KRRC project area, the Beswick Ranch will not be investigated, and it is assumed these USTs were and are located at the Copco No. 2 address.

At the Copco No. 2 development, AECOM identified one 9,000-gallon UST located at 19305 Daggett Road, Hornbrook, California (Figures ES-3 and 3-9), as based on a June 27, 1996, letter from Marsh & McLennan to PacifiCorp. No further information was available with regards to the specific location of the UST or whether it has been removed. However, Hazmat Figure Sheet 8 from the Phase I ESA presumably depicts the former fuel pumps in an area east northeast of the Copco No. 2 Maintenance Building and just below Daggett Road (Photograph 3-9). Soil within the Copco No. 2 Underground Storage Tanks REC is generally classified as Medford clay loam, cool (USDA 2021).

Photograph 3-9: Approximate location of Copco No. 2 Underground Storage Tanks Looking Southeast (Jacobs 2021)

3.10.2 Sampling Plan

Prior to collecting samples, field staff will mark all planned sample locations using GPS, and utility clearance will be obtained prior to beginning sampling.

For the purposes of this site investigation, it is assumed that one or more of the three USTs may have been or still is located at the approximate location of the former fuel pumps and USTs shown on Figure 3-9. To first determine whether any USTs are still in this area, ground-penetrating radar (GPR) surveys will be

performed over a larger area around the Copco No. 2 Maintenance Building and east to Daggett Road (Figure 3-9). If USTs are located, the USTs will be removed in accordance with federal, state, and local regulations.

If the USTs are not located during the GPR surveys, nine initial DPT borings will be advanced in a general grid pattern within and around the approximate location of the former fuel pumps and USTs to determine whether any contamination remains in the area where the USTs are suspected to have been removed (Figure 3-9). Boring locations will be adjusted if anomalies are observed in the GPR surveys. The DPT borings will be advanced for collection of continuous soil cores to a depth of 20 feet bgs. If the continuous soil core is determined to not be impacted by TPHs (no staining, odor, or PID readings greater than 50 ppmv), then soil samples will not be collected and assessment of the area in the vicinity of the soil boring will be considered complete.

If the soil within continuous cores is determined to be impacted by TPHs (staining, odor, or PID readings greater than 50 ppmv), then soil samples will be collected and analyzed for VOCs, TPHs and PAHs. Soil sample collection depths will vary and be biased to depths where soil is most impacted. Soil samples will also be collected upon reaching the vertical extent of impacted soil and from depths at least 1 and 5 feet below the impacted soil (Table 3-9). Step-out soil borings will be advanced approximately 10 feet north, south, east, and/or west of an initial soil boring that shows evidence of TPH contamination. Step-out directions and distances will ultimately be based on access, site conditions, and the degree of petroleum hydrocarbon contamination observed within the soil cores.

3.11 Copco No. 2 Burn Pit

3.11.1 Findings from Previous Investigations

Approximately 1,600 feet south of the Copco No. 2 Powerhouse and up the hill from Copco 2 Village (Figures ES-3 and 3-10), a recently used burn pit was documented in the *Draft Phase I Environmental Site Assessment of the Parcel B Lands* (AECOM 2020b). The burn pit was approximately 10 feet by 10 feet and wood pallets, trees, and other debris was observed on the burn pile. Soil within the Copco No. 2 Burn Pit REC is generally classified as Lassen-Kuck complex, stony (USDA 2021). The burning of these materials may generate contaminants that can leach into the soil and groundwater underneath the pit. A pile of soil was located on the northwest edge of the burn pit and may be where burned ash and soil was periodically scraped. Additionally, an old drum and metal pipe was found nearby to the pit, indicating possibly more than only wood had been burned in the past. Additional features at this site (Photograph 3-10) include a backhoe, wood beams, a pile of broken concrete, and two areas of bare soil and stressed vegetation (Figure 3-10). Current PacifiCorp policy allows for burning of vegetation and untreated lumber when an open burn permit is acquired; however, it is not known what may have been disposed of in this area by historic burning practices.

3.11.2 Sampling Plan

Prior to collecting samples, field staff will measure and delineate the extent of observed stained soil using GPS. Field staff will also note topography and drainage in the area, and adjust the planned sample locations, if necessary, to bias towards areas where runoff may have collected. All planned sample locations will be marked, and utility clearance will be obtained prior to sampling.

Samples will be collected from the soil within the burn pit, near the edges, and in the burn pit soil pile. Additionally, samples will be collected from soil at each of the features described above (Figure 3-10). Because of the variety of features and expected constituents, samples will be analyzed for some or all of the following constituents: Title 22 metals, VOCs, SVOCs, TPHs, PAHs, dioxins, and furans (Table 3-10).

Photograph 3-10: Copco No. 2 Burn Pit, Backhoe, and Drum Looking Northeast (PacifiCorp 2021)

To define the vertical extent, borings will be installed to a depth of 2.5 feet and collected in 6-inch intervals every foot beginning at the surface at each of the features (Table 3-10). The boring at the burn pit soil pile will be installed to a depth of approximately 1 foot below the surface of the ground surrounding the soil pile. Two samples will be collected from within the soil pile and a third below the soil pile. The boring in the center of the burn pit will be advanced to a depth of 6 feet bgs for the collection of soil samples at the following intervals: 0.0-0.5 foot, 1.0-1.5 feet, 3.0-3.5 feet, and 5.5-6.0 feet bgs. Borings will be extended if visual observations or field instruments indicate contamination is deeper. If groundwater is encountered in any of the borings, groundwater samples will be collected and analyzed for the same set of analytes as the soil samples.

No sampling of the debris is planned (metal drum and pipe). PacifiCorp will remove and recycle or dispose of the debris per DTSC regulations.

3.12 Iron Gate Shooting Range

3.12.1 Findings from Previous Investigations

According to AECOM (2020b), a shooting range is located approximately 2,000 feet east of the Iron Gate Dam (Figures ES-4 and 3-11). Soil within the Iron Gate Shooting Range REC is generally classified as Lassen-Kuck complex, stony (USDA 2021). During a reconnaissance survey conducted by PacifiCorp and Jacobs on June 21, 2021, shell casings and clay targets were observed on the ground while walking the gun range. The gun range surface soils are turned over regularly using a bulldozer and worked soil piles are visible (Photograph 3-11). There was some evidence of cans being used for target practice down range of the shooting stations.

Photograph 3-11: Iron Gate Shooting Range Looking North-north-east at Shooting Bench, Short-Range and Long-Range Targets (Jacobs 2021)

3.12.2 Sampling Plan

The shooting range will remain open until the transfer of the Lower Klamath Hydroelectric Project license from PacifiCorp to the KRRC and the State of California. The COPCs at this site are lead and other metals associated with rifle, handgun, and shotgun ammunition and PAHs from bullet jackets and clay targets. This initial sampling event will be performed to identify the nature and extent of site COPCs and was designed based on the current understanding of how shooting activities were typically performed at the site. A more rigorous sampling and analysis plan will be developed for implementation in line with the scheduled closure of the shooting range.

Prior to collecting samples, field staff will mark key site features and the limits of the shooting range using GPS (Figure 3-11). Field staff will perform a thorough visual inspection of the shooting range and will identify and mark areas with shell jackets, bullets, shot, and clay targets. They will adjust planned sample locations as necessary to bias towards areas with higher concentrations of shooting range related debris and to adjust outer locations to unimpacted areas to define extent. They will note topography and

drainage in the area, and adjust planned sample locations, if necessary, to bias towards areas where runoff may have collected. All sample locations will be marked, and utility clearance will be obtained prior to sampling.

Samples will be collected from the gun range surface soils at designated site features, areas with shooting range related debris, and in down gradient ditches (to determine potential for impact to surface waters via surface water runoff/migration) (Figure 3-11). To define the horizontal extent of contamination, borings will be installed at the outer limits of the shooting range (Figure 3-11) and revised per the field inspection described above.

To define the vertical extent of possible contamination, borings will be installed to a depth of 1.5 feet and collected in 6-inch intervals every foot beginning at the surface at most locations except at the target berms that received direct impact from bullets where borings will be installed to a depth of 2.5 feet (Table 3-11). Six DPT borings will be advanced to a depth of 6 feet bgs for the collection of soil samples at the following intervals: 0.0-0.5 foot, 1.0-1.5 feet, 3.0-3.5 feet, and 5.5-6.0 feet bgs. The 6-foot borings will be advanced in areas where higher concentrations of shooting range related debris are observed. Borings will be extended if visual observations indicate contamination is deeper. If groundwater is encountered in any of the borings, groundwater samples will be collected and analyzed for the same set of analytes as the soil samples. Samples will be analyzed for Title 22 metals and PAHs. Surface samples collected from drainage areas will be evaluated for RCRA and non-RCRA hazardous waste criteria.

3.13 Iron Gate Hatchery Burn Pit

3.13.1 Findings from Previous Investigations

In February 2018, a soil investigation was conducted to assess the presence of potential contaminants that may have been introduced from the burning of wooden pallets and other waste at the Iron Gate Hatchery Burn Pit (AECOM 2019). The approximate 20- by 20-foot burn pit (Photograph 3-12) is located approximately 50 feet south of Bogus Creek and approximately 150 east of the Iron Gate Hatchery settling ponds (Figures ES-4 and 3-12). Soil within the Iron Gate Hatchery Burn Pit REC is generally classified as Lassen-Kuck complex, stony (USDA 2021). Three borings were advanced a depth of 1.5 feet bgs within the burn pit., and two soil samples were collected from each boring. The soil samples were analyzed for CAM 17 metals, mercury, TPH-G, TPH-D, TPH-MO (with and without silica gel clean up), VOCs, SVOCs, and PCBs.

In the samples collected by AECOM (2019), metals were not detected at concentrations greater than background concentrations for the Cascade Range (ODEQ 2013); VOCs, SVOCs, and PCBs were not detected. TPH-g, TPH-d, and TPH-MO were detected at concentrations that are less than the SFRWQCB 2019 environmental screening levels. Acetone, di-n-butyl phthalate, and bis[2-ethylhexyl] phthalate were also detected, but the detections were considered to be laboratory contaminants (AECOM 2019).

Photograph 3-12: Iron Gate Hatchery Burn Pit (Jacobs 2021)

3.13.2 Sampling Plan

Confirmation sampling at the burn pit is recommended because dioxins and furans were not analyzed under the Phase II performed by AECOM (2019) and because it cannot be definitively stated that the burn pit was not utilized after the Phase II was performed.

Prior to collecting samples, field staff will measure and delineate the extent of observed stained soil using GPS. Field staff will also note topography and drainage in the area, and adjust planned sample locations, if necessary, to bias towards areas where runoff may have collected. All sample locations will be marked, and utility clearance will be obtained prior to beginning sampling.

Hand auger or DPT borings will be advanced to collect soil samples from within the burning pit and from beneath portions of the burn pit that have the most visually impacted material. One four-point composite sample and one DPT boring is anticipated for the Iron Gate burn pit (Figure 3-12). The four-point composite sample with be representative of burn pit material. A DPT rig will be used to advance one boring to 6 feet bgs for the collection of soil samples at the following intervals: 0.0-0.5 foot, 1.0-1.5 feet, 3.0-3.5 feet, and 5.5-6.0 feet bgs.

Samples collected from within and beneath the burn pit will be analyzed for Title 22 metals, TPHs, VOCs, SVOCs, dioxins, and furans (Table 3-12). The deeper unimpacted soil sample may be held for analysis pending the analytical results for the shallower unimpacted soil sample.

3.14 Iron Gate Hatchery Settling Ponds

3.14.1 Findings from Previous Investigations

The Hatchery is located at 8638 Lakeview Road in Hornbrook, California about one-third mile downstream of Iron Gate Dam. The Hatchery is owned by PacifiCorp and operated by the California Department of Fish and Wildlife. Two settling ponds (Figures ES-4 and 3-13; Photograph 3-13) receive wastewater from the hatchery operations in the main building and from the raceways when they are being cleaned. Soil within the Iron Gate Hatchery Settling Ponds REC is generally classified as Lassen-Kuck complex, stony (USDA 2021).

The Hatchery is operated under North Coast Regional Water Quality Control Board (Water Board) Order No. R1-2000-17, National Pollutant Discharge Elimination System No. CA0006688 and Monitoring and Reporting Program Order R1-2000-17. Under these programs, the Water Board requires regulates three classes of pollutants potentially discharged by the Hatchery. These potential pollutants include: (1) conventional pollutants (i.e., total suspended solids, oil and grease, biochemical oxygen demand (BOD), fecal coliform organisms, and pH); (2) toxic pollutants (e.g., metals such as copper, lead, nickel, and zinc); and (3) nonconventional pollutants (e.g., contaminants of emerging concern, ammonia, formalin, and phosphorus). The most predominant of these pollutants are solids from fish feces and uneaten feed. Both of these types of solids are primarily composed of organic matter including BOD, organic nitrogen, and organic phosphorus.

Following removal of the Iron Gate Dam, the Hatchery will cease operations, which may require some form of settlement pond management as or after the ponds dry out. Sediment pond contents were evaluated as part an evaluation that was performed to determine the degree of sedimentation within the ponds and whether performance of the ponds could be improved via dredging, engineered baffles, or through other means (Watercourse 2018). The study, performed at Water Board request, determined that the majority of the nitrogen and phosphorus found in grab samples was in dissolved form and discharged from the ponds as effluent. Organic matter and BOD from the Hatchery will essentially cease upon termination of operations; organic matter, however, will continue to be broken down by organisms in the ponds.

Two sediment cores were collected in the deeper areas of each settling pond. All four cores were mechanically homogenized on shore, transferred to a sampling container, and placed on ice for analysis of metals, VOCs, SVOCs, pesticides, and PCBs. Metals were not detected at concentrations greater than background concentrations for the Cascade Range (ODEQ 2013); VOCs, SVOCs, pesticides, and PCBs were not detected.

3.14.2 Sampling Plan Not Recommended

Because metals were not detected above background concentrations; VOCs, SVOCs, pesticides, and PCBs were not detected; and the limited amount of sediment is not regulated federally or under the California Code of Regulations, additional sampling or assessment is not recommended for the settling ponds at this time (Figure 3-13).

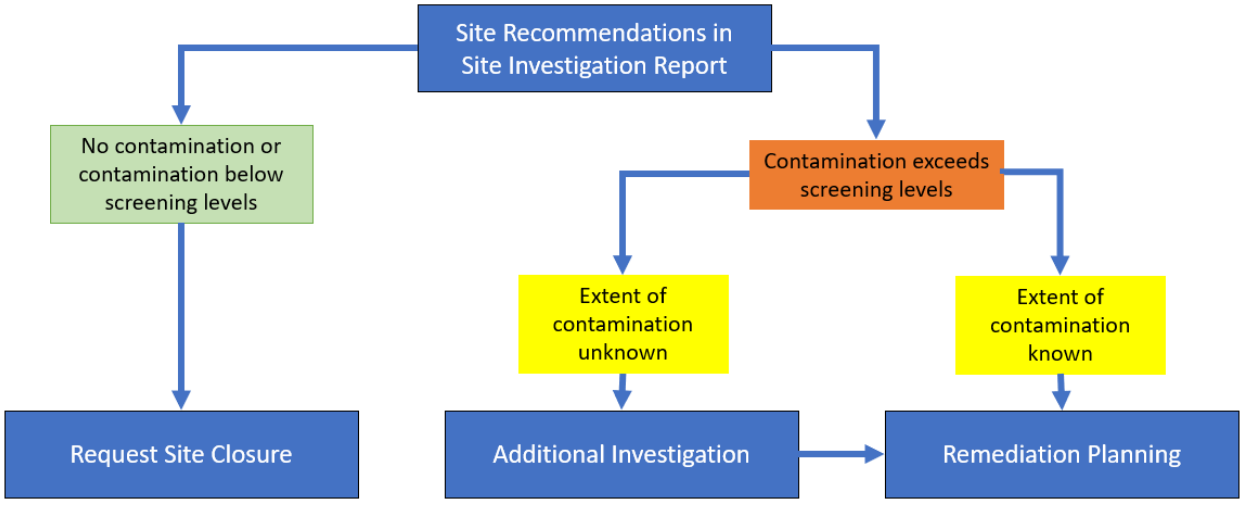
Photograph 3-13: Hatchery Settling Ponds (Jacobs 2021)

4. Site Closure and Reporting

The purpose for implementing the SIWP is to collect enough site-specific information such that any necessary follow-up actions can be planned and eventually, the 11 RECs identified in Section 1.1 can reach site closure in a manner consistent with the Agreement and with Section 1.5 (Investigative Standards and Future Site Uses). In the context of this SIWP, "site closure" means that a REC has been investigated adequately and that collected field and analytical data are sufficient to demonstrate an absence of COPCs greater than the screening levels identified in Sections 1.5 and 3.3 (Data Evaluation and Screening Levels). In such cases, the site investigation will be considered complete for the REC, allowing PacifiCorp to move forward with formal REC close-out per the terms of the Agreement and a process to be developed with the KRRC and the State of California. A REC will not be considered closed if COPCs are detected to be greater than the screening levels identified for the REC and if additional step-out sampling or remedial action are necessary.

As described previously (Sections 1 and 3), a Site Investigation Report will be prepared to document the investigations performed at each REC and to demonstrate the suitability for REC closure. The Site Investigation Report will document the field activities performed, summarize key field observations, and identify major deviations from this SIWP (if any). Laboratory analytical data for all samples collected will be provided and the analytical results will be summarized in tables and figures for each REC. The analytical results will be compared to the screening levels identified for the REC and will also be evaluated against applicable regulatory requirements for each REC. The Site Investigation Report will be submitted electronically to the state and KRRC.

Recommended next steps will be provided for each REC based on a comparison of the analytical data with screening levels. Recommended next steps may consist of a request for REC closure, collection of additional environmental samples, or site remediation (Flowchart 4-1). If analytical results of COPCs are less than the screening levels, PacifiCorp will request closure of the REC. If analytical results of COPCs are greater than screening levels, PacifiCorp will either propose advancement of step-out borings to collect additional samples according to the sampling plan established for the REC or develop a remediation plan based on the field and analytical data already collected.



Flowchart 4-1. Site Closure

Certified Unified Program Agency (CUPA) reporting will be provided as needed in compliance with California Health and Safety Code Section 25500, et. Seq. if hazardous wastes in quantities exceeding 500

pounds solids or 55 gallons of liquids are generated or if any other actions trigger CUPA reporting. In the event that threats to people, property, and the environment are identified, in accordance with the Siskiyou County CUPA requirements these threats will be assessed, and then remedial action procedures will be conducted under the supervision of a Registered Environmental Health Specialist.

5. References

AECOM Technical Services, Inc. (AECOM). 2018. J.C. Boyle Dam, Copco No. 1 Dam, Copco No. 2 Dam, Iron Gate Dam, and Iron Gate Fish Hatchery Phase I Environmental Site Assessments. Prepared for Klamath River Renewal Corporation. November.

AECOM Technical Services, Inc. (AECOM). 2019a. *City of Yreka Diversion Dam Phase I Environmental Site Assessment*. Prepared for Klamath River Renewal Corporation. July.

AECOM Technical Services, Inc. (AECOM). 2019b. *Fall Creek Hatchery Phase I Environmental Site Assessment*. Prepared for Klamath River Renewal Corporation. July.

AECOM Technical Services, Inc. (AECOM). 2019c. *Burn Pit at Iron Gate Hatchery Phase II Soil Investigation*. Prepared for Klamath River Renewal Corporation. September.

AECOM Technical Services, Inc. (AECOM). 2020a. *Draft Wood-Stave Penstock and Soil Investigation*. Prepared for Klamath River Renewal Corporation. January.

AECOM Technical Services, Inc. (AECOM). 2020b. *Draft Phase I Environmental Site Assessment of the Parcel B Lands*. Prepared for Klamath River Renewal Corporation. March.

Department of Toxic Substances Control (DTSC). 2020. *Human Health Risk Assessment*. Note Number 3, DTSC-modified Screening Levels (DTSC-SLs). June.

Department of Toxic Substances Control (DTSC). 2021. *EnviroStor*. https://www.envirostor.dtsc.ca.gov/public/.

Jacobs Engineering Group Inc. (Jacobs). 2021. *Lower Klamath Hydroelectric Project (FERC No. P-14803) Oregon Site Investigation Work Plan*. Prepared for PacifiCorp. November.

Knight Piesold Consulting (KPC). 2020. *Draft Buried Structures Site Investigation*. April.

Los Alamos National Laboratory (LANL). 2017. "Minimal No Effect Ecological Screening Levels." *EcoRisk Database* Release 4.1. LA-UR-17-26376.

North Coast Regional Water Quality Control Board (NCRWQCB). 2017. California Water Code Section 13267 Investigative Order R1-2017-0051 Directing PacifiCorp and the California Department of Fish and Wildlife To Submit Technical and Monitoring Reports Pertaining to Discharges from the Iron Gate Fish Hatchery, WDID No. 1A800520SIS, Hornbrook, Siskiyou County. September 29.

Oregon Department of Environmental Quality (ODEQ). 2001. *Guidance for Ecological Risk Assessment: levels I, II, III, IV*. Final 1998 and updated December 2001.

Oregon Department of Environmental Quality (ODEQ). 2010. *Risk-Based Concentrations for Individual Chemicals in Soil*.

Oregon Department of Environmental Quality (ODEQ). 2013. *Development of Oregon Background Metals Concentrations in Soil.* Technical Report. March. Accessed June 2021. https://www.oregon.gov/deq/FilterDocs/DebORbackgroundMetal.pdf.

PacifiCorp. 2006. *Copco No. 2 Powerhouse Phase II Environmental Site Assessment*. Letter to Siskiyou County Health Department. September 8.

Parametrix. 2006. *Technical Memorandum: Summary of Findings for Phase II ESA, Copco No. 2 Powerhouse*. August 29.

San Francisco Regional Water Quality Control Board (SFRWQCB). 2019. *Environmental Screening Levels*. https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.html.

Siskiyou County Department of Public Health (Siskiyou). 2006. *Transformer Fire Site Evaluation: Copco No. 2 Firehouse Phase II Environmental Site Assessment Report Review*. Letter to PacifiCorp. September 21.

State Water Resources Control Board (SWRCB). 2021. *Geotracker*. https://geotracker.waterboards.ca.gov/.

U.S. Department of Agriculture (USDA). 2021. *Natural Resources Conservation Services Web Soil Survey*. Accessed August 2021. https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx.

U.S. Environmental Protection Agency (EPA). 2001. *Current Perspectives in Site Remediation and Monitoring. Using the Triad Approach to Improve the Cost-effectiveness of Hazardous Waste Site Cleanups.* D. A. Crumbling, EPA Technology Innovation Office. EPA 542-R-01-016. October.

U.S. Environmental Protection Agency (EPA). 2008. *Ecological Soil Screening Levels (EcoSSLs)*. OSWER Directive 9285.7-55 as updated from 2003-2008 https://www.epa.gov/risk/ecological-soil-screening-level-eco-ssl-guidance-and-documents

U.S. Environmental Protection Agency (EPA). 2018. *Supplemental Guidance to ERAGS: Region 4, Ecological Risk Assessment*. March 2018 Update. Scientific Support Section Superfund Division.

U.S. Environmental Protection Agency (EPA). 2019. *Regional Screening Level for Industrial Soil*.

U.S. Environmental Protection Agency (EPA). 2021. *Regional Screening Levels (RSLs) – Generic Tables*. May. Accessed June 2021. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables.

Watercourse Engineering, Inc. (Watercourse). 2018. *Iron Gate Fish Hatchery Settling Ponds Evaluation, 2018*. Prepared for PacifiCorp by Watercourse Engineering, Inc. September.

Weatherbase. 2021. *Hornbrook, California*. Accessed June 2021. https://www.weatherbase.com/weather/weather-summary.php3?s=789340&cityname=Hornbrook%2C+California%2C+United+States+of+America&units=.

Tables

Table 3-1. Soil Screening Levels for California RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analyte Group Analyte	CAS Number	Sites with Human Health and Leaching to Groundwater		Sites with Ecological Receptors	
		Soil SL (mg/kg)	Soil SL Source	Soil SL (mg/kg)	Soil SL Source
TPH					
Gasoline	GRO	4.3E+02	2019 SFRWQCB HH ESL, Residential Soil	4.3E+02	2019 SFRWQCB HH ESL, Residential Soil
Diesel	DRO	2.6E+02	2019 SFRWQCB HH ESL, Residential Soil	2.6E+02	2019 SFRWQCB HH ESL, Residential Soil
Motor oil	MRO	1.2E+04	2019 SFRWQCB HH ESL, Residential Soil	1.2E+04	2019 SFRWQCB HH ESL, Residential Soil
Metal					
Antimony	7440-36-0	3.1E+01	2021 USEPA RSL, Residential Soil	6.7E-01	Background Concentration
Arsenic	7440-38-2	1.9E+01	Background Concentration	1.9E+01	Background Concentration
Barium	7440-39-3	1.5E+04	2021 USEPA RSL, Residential Soil	6.3E+02	Background Concentration
Beryllium	7440-41-7	1.6E+01	2020 DTSC Note 3 Value, Residential Soil	2.5E+00	Ecological SL
Boron	7440-42-8	1.6E+04	2021 USEPA RSL, Residential Soil	2.0E+00	Ecological SL
Cadmium	7440-43-9	7.1E+01	2021 USEPA RSL, Residential Soil	5.4E-01	Background Concentration
Chromium	7440-47-3	1.2E+05	Surrogate (RSL for Chromium III)	2.0E+02	Background Concentration
Cobalt	7440-48-4	2.3E+01	2021 USEPA RSL, Residential Soil	1.3E+01	Ecological SL
Copper	7440-50-8	3.1E+03	2021 USEPA RSL, Residential Soil	7.3E+01	Background Concentration
Iron	7439-89-6	5.5E+04	2021 USEPA RSL, Residential Soil	5.5E+04	2021 USEPA RSL, Residential Soil
Lead	7439-92-1	8.0E+01	2020 DTSC Note 3 Value, Residential Soil	3.4E+01	Background Concentration
Manganese	7439-96-5	2.1E+03	Background Concentration	2.1E+03	Background Concentration
Molybdenum	7439-98-7	3.9E+02	2021 USEPA RSL, Residential Soil	2.0E+00	Ecological SL
Nickel	7440-02-0	8.2E+02	2020 DTSC Note 3 Value, Residential Soil	1.1E+02	Background Concentration
Selenium	7782-49-2	3.9E+02	2021 USEPA RSL, Residential Soil	5.2E-01	Background Concentration
Silver	7440-22-4	3.9E+02	2021 USEPA RSL, Residential Soil	4.2E+00	Ecological SL
Thallium	7440-28-0	2.8E+00	Background Concentration	2.8E+00	Background Concentration
Vanadium	7440-62-2	3.9E+02	2021 USEPA RSL, Residential Soil	2.8E+02	Background Concentration
Zinc	7440-66-6	2.3E+04	2021 USEPA RSL, Residential Soil	1.7E+02	Background Concentration
Mercury	7439-97-6	1.0E+00	2020 DTSC Note 3 Value, Residential Soil	2.4E-01	Background Concentration
VOC					
1,1,1,2-Tetrachloroethane	630-20-6	1.7E-02	2019 SFRWQCB Soil Leaching ESL	1.7E-02	2019 SFRWQCB Soil Leaching ESL
1,1,1-Trichloroethane	71-55-6	7.0E+00	2019 SFRWQCB Soil Leaching ESL	7.0E+00	2019 SFRWQCB Soil Leaching ESL
1,1,2,2-Tetrachloroethane	79-34-5	1.8E-02	2019 SFRWQCB Soil Leaching ESL	1.8E-02	2019 SFRWQCB Soil Leaching ESL

Table 3-1. Soil Screening Levels for California RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analyte Group Analyte	CAS Number	Sites with Human Health and Leaching to Groundwater		Sites with Ecological Receptors	
		Soil SL (mg/kg)	Soil SL Source	Soil SL (mg/kg)	Soil SL Source
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	6.7E+03	2021 USEPA RSL, Residential Soil	6.7E+03	2021 USEPA RSL, Residential Soil
1,1,2-Trichloroethane	79-00-5	7.6E-02	2019 SFRWQCB Soil Leaching ESL	7.6E-02	2019 SFRWQCB Soil Leaching ESL
1,1-Dichloroethane	75-34-3	2.0E-01	2019 SFRWQCB Soil Leaching ESL	2.0E-01	2019 SFRWQCB Soil Leaching ESL
1,1-Dichloroethene	75-35-4	5.4E-01	2019 SFRWQCB Soil Leaching ESL	5.4E-01	2019 SFRWQCB Soil Leaching ESL
1,1-Dichloropropene	563-58-6	1.8E+00	Surrogate (RSL for 1,3-Dichloropropene)	1.8E+00	Surrogate (RSL for 1,3-Dichloropropene)
1,2,3-Trichlorobenzene	87-61-6	4.0E+01	2020 DTSC Note 3 Value, Residential Soil	2.0E+01	Ecological SL
1,2,3-Trichloropropane	96-18-4	1.1E-04	2019 SFRWQCB Soil Leaching ESL	1.1E-04	2019 SFRWQCB Soil Leaching ESL
1,2,4-Trichlorobenzene	120-82-1	1.2E+00	2019 SFRWQCB Soil Leaching ESL	2.7E-01	Ecological SL
1,2,4-Trimethylbenzene	95-63-6	3.0E+02	2021 USEPA RSL, Residential Soil	9.0E-02	Ecological SL
1,2-Dibromo-3-Chloropropane	96-12-8	5.9E-04	2019 SFRWQCB Soil Leaching ESL	5.9E-04	2019 SFRWQCB Soil Leaching ESL
1,2-Dibromoethane (EDB)	106-93-4	5.3E-04	2019 SFRWQCB Soil Leaching ESL	5.3E-04	2019 SFRWQCB Soil Leaching ESL
1,2-Dichlorobenzene	95-50-1	1.0E+00	2019 SFRWQCB Soil Leaching ESL	9.0E-02	Ecological SL
1,2-Dichloroethane	107-06-2	7.0E-03	2019 SFRWQCB Soil Leaching ESL	7.0E-03	2019 SFRWQCB Soil Leaching ESL
1,2-Dichloropropane	78-87-5	6.5E-02	2019 SFRWQCB Soil Leaching ESL	6.5E-02	2019 SFRWQCB Soil Leaching ESL
1,3,5-Trimethylbenzene	108-67-8	2.7E+02	2021 USEPA RSL, Residential Soil	7.0E-02	Ecological SL
1,3-Dichlorobenzene	541-73-1	7.4E+00	2019 SFRWQCB Soil Leaching ESL	8.0E-02	Ecological SL
1,3-Dichloropropane	142-28-9	4.1E+02	2020 DTSC Note 3 Value, Residential Soil	4.1E+02	2020 DTSC Note 3 Value, Residential Soil
1,4-Dichlorobenzene	106-46-7	2.0E-01	2019 SFRWQCB Soil Leaching ESL	2.0E-01	2019 SFRWQCB Soil Leaching ESL
2,2-Dichloropropane	594-20-7	2.5E+00	Surrogate (RSL for 1,2-Dichloropropane)	2.5E+00	Surrogate (RSL for 1,2-Dichloropropane)
2-Butanone (MEK)	78-93-3	6.1E+00	2019 SFRWQCB Soil Leaching ESL	6.1E+00	2019 SFRWQCB Soil Leaching ESL
2-Chlorotoluene	95-49-8	4.7E+02	2020 DTSC Note 3 Value, Residential Soil	4.7E+02	2020 DTSC Note 3 Value, Residential Soil
2-Hexanone	591-78-6	2.0E+02	2021 USEPA RSL, Residential Soil	3.6E-01	Ecological SL
4-Chlorotoluene	106-43-4	4.4E+02	2020 DTSC Note 3 Value, Residential Soil	4.4E+02	2020 DTSC Note 3 Value, Residential Soil
4-Methyl-2-pentanone (MIBK)	108-10-1	3.6E-01	2019 SFRWQCB Soil Leaching ESL	3.6E-01	2019 SFRWQCB Soil Leaching ESL
Acetone	67-64-1	9.2E-01	2019 SFRWQCB Soil Leaching ESL	9.2E-01	2019 SFRWQCB Soil Leaching ESL
Benzene	71-43-2	2.5E-02	2019 SFRWQCB Soil Leaching ESL	2.5E-02	2019 SFRWQCB Soil Leaching ESL
Bromobenzene	108-86-1	2.9E+02	2021 USEPA RSL, Residential Soil	2.9E+02	2021 USEPA RSL, Residential Soil
Bromochloromethane	74-97-5	1.5E+02	2021 USEPA RSL, Residential Soil	1.5E+02	2021 USEPA RSL, Residential Soil

Table 3-1. Soil Screening Levels for California RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analyte Group Analyte	CAS Number	Sites with Human Health and Leaching to Groundwater		Sites with Ecological Receptors	
		Soil SL (mg/kg)	Soil SL Source	Soil SL (mg/kg)	Soil SL Source
Bromodichloromethane	75-27-4	1.6E-02	2019 SFRWQCB Soil Leaching ESL	1.6E-02	2019 SFRWQCB Soil Leaching ESL
Bromoform	75-25-2	6.9E-01	2019 SFRWQCB Soil Leaching ESL	6.9E-01	2019 SFRWQCB Soil Leaching ESL
Bromomethane	74-83-9	3.6E-01	2019 SFRWQCB Soil Leaching ESL	3.6E-01	2019 SFRWQCB Soil Leaching ESL
Carbon disulfide	75-15-0	7.7E+02	2021 USEPA RSL, Residential Soil	8.1E-01	Ecological SL
Carbon tetrachloride	56-23-5	7.6E-02	2019 SFRWQCB Soil Leaching ESL	7.6E-02	2019 SFRWQCB Soil Leaching ESL
Chlorobenzene	108-90-7	1.4E+00	2019 SFRWQCB Soil Leaching ESL	1.4E+00	2019 SFRWQCB Soil Leaching ESL
Chloroethane	75-00-3	1.2E+00	2019 SFRWQCB Soil Leaching ESL	1.2E+00	2019 SFRWQCB Soil Leaching ESL
Chloroform	67-66-3	2.3E-02	2019 SFRWQCB Soil Leaching ESL	2.3E-02	2019 SFRWQCB Soil Leaching ESL
Chloromethane	74-87-3	1.1E+01	2019 SFRWQCB Soil Leaching ESL	1.1E+01	2019 SFRWQCB Soil Leaching ESL
cis-1,2-Dichloroethene	156-59-2	1.9E-01	2019 SFRWQCB Soil Leaching ESL	1.9E-01	2019 SFRWQCB Soil Leaching ESL
cis-1,3-Dichloropropene	10061-01-5	1.8E+00	Surrogate (RSL for 1,3-Dichloropropene)	1.8E+00	Surrogate (RSL for 1,3-Dichloropropene)
Dibromochloromethane	124-48-1	3.5E-01	2019 SFRWQCB Soil Leaching ESL	3.5E-01	2019 SFRWQCB Soil Leaching ESL
Dibromomethane	74-95-3	2.4E+01	2021 USEPA RSL, Residential Soil	2.4E+01	2021 USEPA RSL, Residential Soil
Dichlorodifluoromethane	75-71-8	8.7E+01	2021 USEPA RSL, Residential Soil	8.7E+01	2021 USEPA RSL, Residential Soil
Ethylbenzene	100-41-4	4.3E-01	2019 SFRWQCB Soil Leaching ESL	2.7E-01	Ecological SL
Hexachlorobutadiene	87-68-3	2.8E-02	2019 SFRWQCB Soil Leaching ESL	9.0E-03	Ecological SL
Isopropylbenzene	98-82-8	1.9E+03	2021 USEPA RSL, Residential Soil	1.9E+03	2021 USEPA RSL, Residential Soil
Methyl tert-butyl ether	1634-04-4	2.8E-02	2019 SFRWQCB Soil Leaching ESL	2.8E-02	2019 SFRWQCB Soil Leaching ESL
Methylene Chloride	75-09-2	1.2E-01	2019 SFRWQCB Soil Leaching ESL	1.2E-01	2019 SFRWQCB Soil Leaching ESL
m-Xylene & p-Xylene	179601-23-1	5.5E+02	2021 USEPA RSL, Residential Soil	1.4E+00	Ecological SL
Naphthalene	91-20-3	4.2E-02	2019 SFRWQCB Soil Leaching ESL	4.2E-02	2019 SFRWQCB Soil Leaching ESL
n-Butylbenzene	104-51-8	2.4E+03	2020 DTSC Note 3 Value, Residential Soil	2.4E+03	2020 DTSC Note 3 Value, Residential Soil
N-Propylbenzene	103-65-1	3.8E+03	2021 USEPA RSL, Residential Soil	3.8E+03	2021 USEPA RSL, Residential Soil
o-Xylene	95-47-6	6.5E+02	2021 USEPA RSL, Residential Soil	1.4E+00	Ecological SL
p-Isopropyltoluene	99-87-6	1.1E+03	Surrogate (DTSC Note 3 for Toluene)	1.1E+03	Surrogate (DTSC Note 3 for Toluene)
sec-Butylbenzene	135-98-8	2.2E+03	2020 DTSC Note 3 Value, Residential Soil	2.2E+03	2020 DTSC Note 3 Value, Residential Soil
Styrene	100-42-5	9.2E-01	2019 SFRWQCB Soil Leaching ESL	9.2E-01	2019 SFRWQCB Soil Leaching ESL
tert-Butylbenzene	98-06-6	2.2E+03	2020 DTSC Note 3 Value, Residential Soil	2.2E+03	2020 DTSC Note 3 Value, Residential Soil
Tetrachloroethene	127-18-4	8.0E-02	2019 SFRWQCB Soil Leaching ESL	8.0E-02	2019 SFRWQCB Soil Leaching ESL

Table 3-1. Soil Screening Levels for California RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analyte Group Analyte	CAS Number	Sites with Human Health and Leaching to Groundwater		Sites with Ecological Receptors	
		Soil SL (mg/kg)	Soil SL Source	Soil SL (mg/kg)	Soil SL Source
Toluene	108-88-3	3.2E+00	2019 SFRWQCB Soil Leaching ESL	3.2E+00	2019 SFRWQCB Soil Leaching ESL
trans-1,2-Dichloroethene	156-60-5	6.5E-01	2019 SFRWQCB Soil Leaching ESL	6.5E-01	2019 SFRWQCB Soil Leaching ESL
trans-1,3-Dichloropropene	10061-02-6	1.8E+00	Surrogate (RSL for 1,3-Dichloropropene)	1.8E+00	Surrogate (RSL for 1,3-Dichloropropene)
Trichloroethene	79-01-6	8.5E-02	2019 SFRWQCB Soil Leaching ESL	8.5E-02	2019 SFRWQCB Soil Leaching ESL
Trichlorofluoromethane	75-69-4	1.2E+03	2020 DTSC Note 3 Value, Residential Soil	5.2E+01	Ecological SL
Vinyl acetate	108-05-4	9.1E+02	2021 USEPA RSL, Residential Soil	9.1E+02	2021 USEPA RSL, Residential Soil
Vinyl chloride	75-01-4	1.5E-03	2019 SFRWQCB Soil Leaching ESL	1.5E-03	2019 SFRWQCB Soil Leaching ESL
Xylenes, Total	1330-20-7	2.1E+00	2019 SFRWQCB Soil Leaching ESL	1.4E+00	Ecological SL
SVOC					
Acenaphthene	83-32-9	1.2E+01	2019 SFRWQCB Soil Leaching ESL	2.5E-01	Ecological SL
Acenaphthylene	208-96-8	6.4E+00	2019 SFRWQCB Soil Leaching ESL	6.4E+00	2019 SFRWQCB Soil Leaching ESL
Anthracene	120-12-7	1.9E+00	2019 SFRWQCB Soil Leaching ESL	1.9E+00	2019 SFRWQCB Soil Leaching ESL
Azobenzene	103-33-3	5.6E+00	2021 USEPA RSL, Residential Soil	5.6E+00	2021 USEPA RSL, Residential Soil
Benzo[a]anthracene	56-55-3	1.1E+00	2021 USEPA RSL, Residential Soil	7.3E-01	Ecological SL
Benzo[b]fluoranthene	205-99-2	1.1E+00	2021 USEPA RSL, Residential Soil	1.1E+00	2021 USEPA RSL, Residential Soil
Benzo[k]fluoranthene	207-08-9	4.8E+00	2019 SFRWQCB Soil Leaching ESL	4.8E+00	2019 SFRWQCB Soil Leaching ESL
Benzo[g,h,i]perylene	191-24-2	2.7E+01	2019 SFRWQCB Soil Leaching ESL	2.5E+01	Ecological SL
Benzo[a]pyrene	50-32-8	1.1E-01	2021 USEPA RSL, Residential Soil	1.1E-01	2021 USEPA RSL, Residential Soil
Benzoic acid	65-85-0	2.5E+05	2021 USEPA RSL, Residential Soil	1.0E-02	Ecological SL
Benzyl alcohol	100-51-6	6.3E+03	2021 USEPA RSL, Residential Soil	2.0E-03	Ecological SL
Bis(2-chloroethoxy)methane	111-91-1	1.9E+02	2021 USEPA RSL, Residential Soil	1.9E+02	2021 USEPA RSL, Residential Soil
Bis(2-chloroethyl)ether	111-44-4	3.4E-05	2019 SFRWQCB Soil Leaching ESL	3.4E-05	2019 SFRWQCB Soil Leaching ESL
bis (2-chloroisopropyl) ether	108-60-1	5.1E-03	2019 SFRWQCB Soil Leaching ESL	5.1E-03	2019 SFRWQCB Soil Leaching ESL
Bis(2-ethylhexyl) phthalate	117-81-7	3.9E+01	2021 USEPA RSL, Residential Soil	2.0E-02	Ecological SL
4-Bromophenyl phenyl ether	101-55-3	--	--	--	--
Butyl benzyl phthalate	85-68-7	2.9E+02	2021 USEPA RSL, Residential Soil	9.0E+01	Ecological SL
4-Chloroaniline	106-47-8	6.7E-03	2019 SFRWQCB Soil Leaching ESL	6.7E-03	2019 SFRWQCB Soil Leaching ESL
4-Chloro-3-methylphenol	59-50-7	6.3E+03	2021 USEPA RSL, Residential Soil	6.3E+03	2021 USEPA RSL, Residential Soil
2-Chloronaphthalene	91-58-7	4.1E+03	2020 DTSC Note 3 Value, Residential Soil	4.1E+03	2020 DTSC Note 3 Value, Residential Soil

Table 3-1. Soil Screening Levels for California RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analyte Group Analyte	CAS Number	Sites with Human Health and Leaching to Groundwater		Sites with Ecological Receptors	
		Soil SL (mg/kg)	Soil SL Source	Soil SL (mg/kg)	Soil SL Source
2-Chlorophenol	95-57-8	1.2E-02	2019 SFRWQCB Soil Leaching ESL	1.2E-02	2019 SFRWQCB Soil Leaching ESL
4-Chlorophenyl phenyl ether	7005-72-3	--	--	--	--
Chrysene	218-01-9	2.2E+00	2019 SFRWQCB Soil Leaching ESL	2.2E+00	2019 SFRWQCB Soil Leaching ESL
Dibenz(a,h)anthracene	53-70-3	2.8E-02	2020 DTSC Note 3 Value, Residential Soil	2.8E-02	2020 DTSC Note 3 Value, Residential Soil
Dibenzofuran	132-64-9	6.6E+01	2020 DTSC Note 3 Value, Residential Soil	6.1E+00	Ecological SL
Di-n-butyl phthalate	84-74-2	6.3E+03	2021 USEPA RSL, Residential Soil	1.1E-02	Ecological SL
1,2-Dichlorobenzene	95-50-1	1.0E+00	2019 SFRWQCB Soil Leaching ESL	9.0E-02	Ecological SL
1,3-Dichlorobenzene	541-73-1	7.4E+00	2019 SFRWQCB Soil Leaching ESL	8.0E-02	Ecological SL
1,4-Dichlorobenzene	106-46-7	2.0E-01	2019 SFRWQCB Soil Leaching ESL	2.0E-01	2019 SFRWQCB Soil Leaching ESL
3,3'-Dichlorobenzidine	91-94-1	2.5E-02	2019 SFRWQCB Soil Leaching ESL	2.5E-02	2019 SFRWQCB Soil Leaching ESL
2,4-Dichlorophenol	120-83-2	7.5E-03	2019 SFRWQCB Soil Leaching ESL	7.5E-03	2019 SFRWQCB Soil Leaching ESL
Diethyl phthalate	84-66-2	2.5E-02	2019 SFRWQCB Soil Leaching ESL	2.5E-02	2019 SFRWQCB Soil Leaching ESL
2,4-Dimethylphenol	105-67-9	8.1E+00	2019 SFRWQCB Soil Leaching ESL	4.0E-02	Ecological SL
Dimethyl phthalate	131-11-3	3.5E-02	2019 SFRWQCB Soil Leaching ESL	3.5E-02	2019 SFRWQCB Soil Leaching ESL
4,6-Dinitro-2-methylphenol	534-52-1	5.1E+00	2021 USEPA RSL, Residential Soil	5.1E+00	2021 USEPA RSL, Residential Soil
2,4-Dinitrophenol	51-28-5	3.0E+00	2019 SFRWQCB Soil Leaching ESL	6.1E-02	Ecological SL
2,4-Dinitrotoluene	121-14-2	2.3E-02	2019 SFRWQCB Soil Leaching ESL	2.3E-02	2019 SFRWQCB Soil Leaching ESL
2,6-Dinitrotoluene	606-20-2	3.6E-01	2021 USEPA RSL, Residential Soil	3.6E-01	2021 USEPA RSL, Residential Soil
Di-n-octyl phthalate	117-84-0	6.3E+02	2021 USEPA RSL, Residential Soil	9.1E-01	Ecological SL
Fluoranthene	206-44-0	8.6E+01	2019 SFRWQCB Soil Leaching ESL	1.0E+01	Ecological SL
Fluorene	86-73-7	6.0E+00	2019 SFRWQCB Soil Leaching ESL	3.7E+00	Ecological SL
Hexachlorobenzene	118-74-1	8.0E-04	2019 SFRWQCB Soil Leaching ESL	8.0E-04	2019 SFRWQCB Soil Leaching ESL
Hexachlorobutadiene	87-68-3	2.8E-02	2019 SFRWQCB Soil Leaching ESL	9.0E-03	Ecological SL
Hexachlorocyclopentadiene	77-47-4	1.8E+00	2021 USEPA RSL, Residential Soil	1.0E-03	Ecological SL
Hexachloroethane	67-72-1	1.9E-02	2019 SFRWQCB Soil Leaching ESL	1.9E-02	2019 SFRWQCB Soil Leaching ESL
Indeno[1,2,3-cd] Pyrene	193-39-5	1.1E+00	2021 USEPA RSL, Residential Soil	1.1E+00	2021 USEPA RSL, Residential Soil
Isophorone	78-59-1	5.7E+02	2021 USEPA RSL, Residential Soil	5.7E+02	2021 USEPA RSL, Residential Soil
1-Methylnaphthalene	90-12-0	9.9E+00	2020 DTSC Note 3 Value, Residential Soil	9.9E+00	2020 DTSC Note 3 Value, Residential Soil
2-Methylnaphthalene	91-57-6	8.8E-01	2019 SFRWQCB Soil Leaching ESL	8.8E-01	2019 SFRWQCB Soil Leaching ESL

Table 3-1. Soil Screening Levels for California RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analyte Group Analyte	CAS Number	Sites with Human Health and Leaching to Groundwater		Sites with Ecological Receptors	
		Soil SL (mg/kg)	Soil SL Source	Soil SL (mg/kg)	Soil SL Source
2-Methylphenol	95-48-7	3.2E+03	2021 USEPA RSL, Residential Soil	6.7E-01	Ecological SL
3-Methylphenol & 4-Methylphenol	15831-10-4	1.9E+04	Surrogate (DTSC Note 3 SL for Phenol)	6.9E-01	Ecological SL
Naphthalene	91-20-3	4.2E-02	2019 SFRWQCB Soil Leaching ESL	4.2E-02	2019 SFRWQCB Soil Leaching ESL
2-Nitroaniline	88-74-4	6.3E+02	2021 USEPA RSL, Residential Soil	5.3E+00	Ecological SL
3-Nitroaniline	99-09-2	2.7E+01	Surrogate (DTSC Note 3 SL for 4-Nitroaniline)	2.6E+02	Surrogate (DTSC Note 3 SL for 4-Nitroaniline)
4-Nitroaniline	100-01-6	2.7E+01	2021 USEPA RSL, Residential Soil	2.7E+01	2021 USEPA RSL, Residential Soil
Nitrobenzene	98-95-3	5.1E+00	2021 USEPA RSL, Residential Soil	4.8E+00	Ecological SL
2-Nitrophenol	88-75-5	1.9E+04	Surrogate (DTSC Note 3 SL for Phenol)	1.9E+04	Surrogate (DTSC Note 3 SL for Phenol)
4-Nitrophenol	100-02-7	1.9E+04	Surrogate (DTSC Note 3 SL for Phenol)	1.9E+04	Surrogate (DTSC Note 3 SL for Phenol)
N-Nitrosodiphenylamine	86-30-6	1.1E+02	2021 USEPA RSL, Residential Soil	5.5E-01	Ecological SL
N-Nitrosodi-n-propylamine	621-64-7	7.8E-02	2021 USEPA RSL, Residential Soil	7.8E-02	2021 USEPA RSL, Residential Soil
Pentachlorophenol	87-86-5	9.8E-02	2019 SFRWQCB Soil Leaching ESL	9.8E-02	2019 SFRWQCB Soil Leaching ESL
Phenanthrene	85-01-8	1.1E+01	2019 SFRWQCB Soil Leaching ESL	5.5E+00	Ecological SL
Phenol	108-95-2	1.6E-01	2019 SFRWQCB Soil Leaching ESL	1.6E-01	2019 SFRWQCB Soil Leaching ESL
Pyrene	129-00-0	4.5E+01	2019 SFRWQCB Soil Leaching ESL	1.0E+01	Ecological SL
Pyridine	110-86-1	5.8E+01	2020 DTSC Note 3 Value, Residential Soil	5.8E+01	2020 DTSC Note 3 Value, Residential Soil
1,2,4-Trichlorobenzene	120-82-1	1.2E+00	2019 SFRWQCB Soil Leaching ESL	2.7E-01	Ecological SL
2,4,5-Trichlorophenol	95-95-4	2.9E+00	2019 SFRWQCB Soil Leaching ESL	2.9E+00	2019 SFRWQCB Soil Leaching ESL
2,4,6-Trichlorophenol	88-06-2	4.0E-02	2019 SFRWQCB Soil Leaching ESL	4.0E-02	2019 SFRWQCB Soil Leaching ESL
PAH					
Acenaphthene	83-32-9	1.2E+01	2019 SFRWQCB Soil Leaching ESL	2.5E-01	Ecological SL
Acenaphthylene	208-96-8	6.4E+00	2019 SFRWQCB Soil Leaching ESL	6.4E+00	2019 SFRWQCB Soil Leaching ESL
Anthracene	120-12-7	1.9E+00	2019 SFRWQCB Soil Leaching ESL	1.9E+00	2019 SFRWQCB Soil Leaching ESL
Benzo[a]anthracene	56-55-3	1.1E+00	2021 USEPA RSL, Residential Soil	7.3E-01	Ecological SL
Benzo[a]pyrene	50-32-8	1.1E-01	2021 USEPA RSL, Residential Soil	1.1E-01	2021 USEPA RSL, Residential Soil
Benzo[b]fluoranthene	205-99-2	1.1E+00	2021 USEPA RSL, Residential Soil	1.1E+00	2021 USEPA RSL, Residential Soil
Benzo[g,h,i]perylene	191-24-2	2.7E+01	2019 SFRWQCB Soil Leaching ESL	2.5E+01	Ecological SL
Benzo[k]fluoranthene	207-08-9	4.8E+00	2019 SFRWQCB Soil Leaching ESL	4.8E+00	2019 SFRWQCB Soil Leaching ESL

Table 3-1. Soil Screening Levels for California RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analyte Group Analyte	CAS Number	Sites with Human Health and Leaching to Groundwater		Sites with Ecological Receptors	
		Soil SL (mg/kg)	Soil SL Source	Soil SL (mg/kg)	Soil SL Source
Chrysene	218-01-9	2.2E+00	2019 SFRWQCB Soil Leaching ESL	2.2E+00	2019 SFRWQCB Soil Leaching ESL
Dibenz(a,h)anthracene	53-70-3	2.8E-02	2020 DTSC Note 3 Value, Residential Soil	2.8E-02	2020 DTSC Note 3 Value, Residential Soil
Fluoranthene	206-44-0	8.6E+01	2019 SFRWQCB Soil Leaching ESL	1.0E+01	Ecological SL
Fluorene	86-73-7	6.0E+00	2019 SFRWQCB Soil Leaching ESL	3.7E+00	Ecological SL
Indeno[1,2,3-cd] Pyrene	193-39-5	1.1E+00	2021 USEPA RSL, Residential Soil	1.1E+00	2021 USEPA RSL, Residential Soil
Naphthalene	91-20-3	4.2E-02	2019 SFRWQCB Soil Leaching ESL	4.2E-02	2019 SFRWQCB Soil Leaching ESL
Phenanthrene	85-01-8	1.1E+01	2019 SFRWQCB Soil Leaching ESL	5.5E+00	Ecological SL
Pyrene	129-00-0	4.5E+01	2019 SFRWQCB Soil Leaching ESL	1.0E+01	Ecological SL
Dioxin/Furan					
2,3,7,8-TCDD	1746-01-6	4.8E-06	2021 USEPA RSL, Residential Soil	2.9E-07	Ecological SL
2,3,7,8-TCDF	51207-31-9	4.8E-05	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)	4.8E-05	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)
1,2,3,7,8-PeCDD	40321-76-4	4.8E-06	2,3,7,8-TCDD TEF of 1 (DTSC Note 2)	4.8E-06	2,3,7,8-TCDD TEF of 1 (DTSC Note 2)
1,2,3,7,8-PeCDF	57117-41-6	1.6E-04	2,3,7,8-TCDD TEF of 0.03 (DTSC Note 2)	1.6E-04	2,3,7,8-TCDD TEF of 0.03 (DTSC Note 2)
2,3,4,7,8-PeCDF	57117-31-4	1.6E-05	2,3,7,8-TCDD TEF of 0.3 (DTSC Note 2)	1.6E-05	2,3,7,8-TCDD TEF of 0.3 (DTSC Note 2)
1,2,3,4,7,8-HxCDD	39227-28-6	4.8E-05	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)	4.8E-05	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)
1,2,3,6,7,8-HxCDD	57653-85-7	4.8E-05	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)	4.8E-05	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)
1,2,3,7,8,9-HxCDD	19408-74-3	4.8E-05	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)	4.8E-05	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)
1,2,3,4,7,8-HxCDF	70648-26-9	4.8E-05	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)	4.8E-05	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)
1,2,3,6,7,8-HxCDF	57117-44-9	4.8E-05	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)	4.8E-05	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)
1,2,3,7,8,9-HxCDF	72918-21-9	4.8E-05	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)	4.8E-05	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)
2,3,4,6,7,8-HxCDF	60851-34-5	4.8E-05	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)	4.8E-05	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)
1,2,3,4,6,7,8-HpCDD	35822-46-9	4.8E-04	2,3,7,8-TCDD TEF of 0.01 (DTSC Note 2)	4.8E-04	2,3,7,8-TCDD TEF of 0.01 (DTSC Note 2)
1,2,3,4,6,7,8-HpCDF	67562-39-4	4.8E-04	2,3,7,8-TCDD TEF of 0.01 (DTSC Note 2)	4.8E-04	2,3,7,8-TCDD TEF of 0.01 (DTSC Note 2)
1,2,3,4,7,8,9-HpCDF	55673-89-7	4.8E-04	2,3,7,8-TCDD TEF of 0.01 (DTSC Note 2)	4.8E-04	2,3,7,8-TCDD TEF of 0.01 (DTSC Note 2)
OCDD	3268-87-9	1.6E-02	2,3,7,8-TCDD TEF of 0.0003 (DTSC Note 2)	1.6E-02	2,3,7,8-TCDD TEF of 0.0003 (DTSC Note 2)
OCDF	39001-02-0	1.6E-02	2,3,7,8-TCDD TEF of 0.0003 (DTSC Note 2)	1.6E-02	2,3,7,8-TCDD TEF of 0.0003 (DTSC Note 2)
Pesticide					
4,4'-DDD	72-54-8	1.9E+00	2021 USEPA RSL, Residential Soil	6.3E-03	Ecological SL
4,4'-DDE	72-55-9	2.0E+00	2021 USEPA RSL, Residential Soil	1.1E-01	Ecological SL

Table 3-1. Soil Screening Levels for California RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analyte Group Analyte	CAS Number	Sites with Human Health and Leaching to Groundwater		Sites with Ecological Receptors	
		Soil SL (mg/kg)	Soil SL Source	Soil SL (mg/kg)	Soil SL Source
4,4'-DDT	50-29-3	1.9E+00	2021 USEPA RSL, Residential Soil	4.4E-02	Ecological SL
Aldrin	309-00-2	3.9E-02	2021 USEPA RSL, Residential Soil	3.7E-02	Ecological SL
Dieldrin	60-57-1	4.6E-04	2019 SFRWQCB Soil Leaching ESL	4.6E-04	2019 SFRWQCB Soil Leaching ESL
Endosulfan sulfate	1031-07-8	3.8E+02	2021 USEPA RSL, Residential Soil	6.5E-03	Ecological SL
Endrin	72-20-8	7.6E-03	2019 SFRWQCB Soil Leaching ESL	1.4E-03	Ecological SL
Endrin aldehyde	7421-93-4	1.9E+01	Surrogate (DTSC Note 3 SL for Endrin)	1.9E+01	Surrogate (DTSC Note 3 SL for Endrin)
Heptachlor	76-44-8	1.3E-01	2021 USEPA RSL, Residential Soil	1.3E-01	2021 USEPA RSL, Residential Soil
Heptachlor epoxide	1024-57-3	1.8E-04	2019 SFRWQCB Soil Leaching ESL	1.8E-04	2019 SFRWQCB Soil Leaching ESL
PCB					
PCB-1016	12674-11-2	4.0E+00	2020 DTSC Note 3 Value, Residential Soil	1.1E+00	Ecological SL
PCB-1221	11104-28-2	2.0E-01	2021 USEPA RSL, Residential Soil	2.0E-01	2021 USEPA RSL, Residential Soil
PCB-1232	11141-16-5	1.7E-01	2021 USEPA RSL, Residential Soil	1.7E-01	2021 USEPA RSL, Residential Soil
PCB-1242	53469-21-9	2.3E-01	2021 USEPA RSL, Residential Soil	4.1E-02	Ecological SL
PCB-1248	12672-29-6	2.3E-01	2021 USEPA RSL, Residential Soil	7.3E-03	Ecological SL
PCB-1254	11097-69-1	2.4E-01	2021 USEPA RSL, Residential Soil	4.1E-02	Ecological SL
PCB-1260	11096-82-5	2.4E-01	2021 USEPA RSL, Residential Soil	2.4E-01	2021 USEPA RSL, Residential Soil
PCB-1262	37324-23-5	2.4E-01	Surrogate (DTSC Note 3 SL for Aroclor 1260)	2.4E-01	Surrogate (DTSC Note 3 SL for Aroclor 1260)
PCB-1268	11100-14-4	2.4E-01	Surrogate (DTSC Note 3 SL for Aroclor 1260)	2.4E-01	Surrogate (DTSC Note 3 SL for Aroclor 1260)
Explosives					
1,3,5-Trinitrobenzene	99-35-4	2.2E+03	2021 USEPA RSL, Residential Soil	1.1E+02	Ecological SL
1,3-Dinitrobenzene	99-65-0	6.3E+00	2021 USEPA RSL, Residential Soil	7.2E-02	Ecological SL
2,4,6-Trinitrotoluene	118-96-7	2.1E+01	2021 USEPA RSL, Residential Soil	7.5E+00	Ecological SL
2,4-Dinitrotoluene	121-14-2	2.3E-02	2019 SFRWQCB Soil Leaching ESL	2.3E-02	2019 SFRWQCB Soil Leaching ESL
2,6-Dinitrotoluene	606-20-2	3.6E-01	2021 USEPA RSL, Residential Soil	3.6E-01	2021 USEPA RSL, Residential Soil
2-Amino-4,6-dinitrotoluene	35572-78-2	1.5E+02	2020 DTSC Note 3 Value, Residential Soil	1.6E+01	Ecological SL
4-Amino-2,6-dinitrotoluene	19406-51-0	1.5E+02	2020 DTSC Note 3 Value, Residential Soil	1.2E+01	Ecological SL
RDX	121-82-4	8.3E+00	2021 USEPA RSL, Residential Soil	2.3E+00	Ecological SL
3-Nitrotoluene	99-08-1	6.3E+00	2021 USEPA RSL, Residential Soil	1.3E-01	Ecological SL
Nitrobenzene	98-95-3	5.1E+00	2021 USEPA RSL, Residential Soil	4.8E+00	Ecological SL

Table 3-1. Soil Screening Levels for California RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analyte Group Analyte	CAS Number	Sites with Human Health and Leaching to Groundwater		Sites with Ecological Receptors	
		Soil SL (mg/kg)	Soil SL Source	Soil SL (mg/kg)	Soil SL Source
2-Nitrotoluene	88-72-2	2.2E+00	2020 DTSC Note 3 Value, Residential Soil	1.9E-01	Ecological SL
4-Nitrotoluene	99-99-0	3.4E+01	2021 USEPA RSL, Residential Soil	2.1E+01	Ecological SL
HMX	2691-41-0	3.9E+03	2021 USEPA RSL, Residential Soil	1.6E+01	Ecological SL
Tetryl	479-45-8	1.6E+02	2021 USEPA RSL, Residential Soil	1.8E-02	Ecological SL

Notes:

-- = No value available.

DTSC = Department of Toxic Substances Control

EPA = U.S. Environmental Protection Agency

ESL = environmental screening level

HH = human health

mg/kg = milligrams per kilogram

RSL = Regional Screening Level

SL = screening level

TEF = toxicity equivalency factor

Resources:

San Francisco Regional Water Quality Control Board (SFRWQCB). 2019. Environmental Screening Levels - Interim Final. January.

U.S. Environmental Protection Agency (EPA). 2021. Regional Screening Levels for Chemical Contaminants at Superfund Sites. May. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Department of Toxic Substances Control (DTSC). 2020. Human Health Risk Assessment Note 3 - DTSC Recommended Methodology for Use of U.S. EPA Regional Screening Levels (RSLs) in Human Health Risk Assessment Process at Hazardous Waste Sites and Permitted Facilities. California Department of Environmental Protection. June.

Table 3-2. Groundwater Screening Levels for California RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analytical Group Analyte	CAS Number	Groundwater Screening Level (µg/L)	Groundwater Screening Level Source
TPH			
Gasoline	GRO	7.6E+02	2019 SFRWQCB Human Health ESL
Diesel	DRO	2.0E+02	2019 SFRWQCB Human Health ESL
Motor oil	MRO	6.0E+04	Surrogate (RSL for TPH Aliphatic High)
Metals			
Antimony	7440-36-0	6.0E+00	EPA MCL
Arsenic	7440-38-2	8.2E-03	2020 DTSC Note 3 for Tapwater
Barium	7440-39-3	1.0E+03	CA MCL
Beryllium	7440-41-7	4.0E+00	2020 DTSC Note 3 for Tapwater
Boron	7440-42-8	4.0E+03	2021 EPA RSL for Tapwater
Cadmium	7440-43-9	5.0E+00	EPA MCL
Chromium	7440-47-3	1.0E+02	EPA MCL
Cobalt	7440-48-4	6.0E+00	2021 EPA RSL for Tapwater
Copper	7440-50-8	8.0E+02	2021 EPA RSL for Tapwater
Iron	7439-89-6	1.4E+04	2021 EPA RSL for Tapwater
Lead	7439-92-1	1.5E+01	2021 EPA RSL for Tapwater
Manganese	7439-96-5	4.3E+02	2021 EPA RSL for Tapwater
Molybdenum	7439-98-7	1.0E+02	2021 EPA RSL for Tapwater
Nickel	7440-02-0	1.0E+02	CA MCL
Selenium	7782-49-2	5.0E+01	EPA MCL
Silver	7440-22-4	9.4E+01	2021 EPA RSL for Tapwater
Thallium	7440-28-0	2.0E-01	2021 EPA RSL for Tapwater
Vanadium	7440-62-2	8.6E+01	2021 EPA RSL for Tapwater
Zinc	7440-66-6	6.0E+03	2021 EPA RSL for Tapwater
Mercury	7439-97-6	6.3E-02	2020 DTSC Note 3 for Tapwater
VOC			
1,1,1,2-Tetrachloroethane	630-20-6	5.7E-01	2020 DTSC Note 3 for Tapwater
1,1,1-Trichloroethane	71-55-6	2.0E+02	EPA MCL
1,1,2,2-Tetrachloroethane	79-34-5	7.6E-02	2020 DTSC Note 3 for Tapwater
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	1.2E+03	CA MCL
1,1,2-Trichloroethane	79-00-5	2.8E-01	2021 EPA RSL for Tapwater
1,1-Dichloroethane	75-34-3	2.8E+00	2020 DTSC Note 3 for Tapwater
1,1-Dichloroethene	75-35-4	6.0E+00	CA MCL
1,1-Dichloropropene	563-58-6	4.7E-01	Surrogate (RSL for 1,3-Dichloropropene)
1,2,3-Trichlorobenzene	87-61-6	3.4E+00	2020 DTSC Note 3 for Tapwater
1,2,3-Trichloropropane	96-18-4	2.0E-04	2020 DTSC Note 3 for Tapwater
1,2,4-Trichlorobenzene	120-82-1	4.6E-01	2020 DTSC Note 3 for Tapwater
1,2,4-Trimethylbenzene	95-63-6	5.6E+01	2021 EPA RSL for Tapwater
1,2-Dibromo-3-Chloropropane	96-12-8	3.0E-04	2020 DTSC Note 3 for Tapwater
1,2-Dibromoethane (EDB)	106-93-4	7.5E-03	2020 DTSC Note 3 for Tapwater
1,2-Dichlorobenzene	95-50-1	3.0E+02	2021 EPA RSL for Tapwater
1,2-Dichloroethane	107-06-2	1.7E-01	2021 EPA RSL for Tapwater

Table 3-2. Groundwater Screening Levels for California RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analytical Group Analyte	CAS Number	Groundwater Screening Level (µg/L)	Groundwater Screening Level Source
1,2-Dichloropropane	78-87-5	8.5E-01	2021 EPA RSL for Tapwater
1,3,5-Trimethylbenzene	108-67-8	6.0E+01	2021 EPA RSL for Tapwater
1,3-Dichlorobenzene	541-73-1	3.0E+02	Surrogate (RSL for 1,2-Dichlorobenzene)
1,3-Dichloropropane	142-28-9	1.1E+02	2020 DTSC Note 3 for Tapwater
1,4-Dichlorobenzene	106-46-7	4.8E-01	2021 EPA RSL for Tapwater
2,2-Dichloropropane	594-20-7	8.5E-01	Surrogate (RSL for 1,2-Dichloropropane)
2-Butanone (MEK)	78-93-3	5.6E+03	2021 EPA RSL for Tapwater
2-Chlorotoluene	95-49-8	9.8E+01	2020 DTSC Note 3 for Tapwater
2-Hexanone	591-78-6	3.8E+01	2021 EPA RSL for Tapwater
4-Chlorotoluene	106-43-4	1.0E+02	2020 DTSC Note 3 for Tapwater
4-Methyl-2-pentanone (MIBK)	108-10-1	6.3E+03	2021 EPA RSL for Tapwater
Acetone	67-64-1	1.4E+04	2021 EPA RSL for Tapwater
Benzene	71-43-2	1.5E-01	2020 DTSC Note 3 for Tapwater
Bromobenzene	108-86-1	6.2E+01	2021 EPA RSL for Tapwater
Bromochloromethane	74-97-5	8.3E+01	2021 EPA RSL for Tapwater
Bromodichloromethane	75-27-4	1.3E-01	2020 DTSC Note 3 for Tapwater
Bromoform	75-25-2	3.3E+00	2020 DTSC Note 3 for Tapwater
Bromomethane	74-83-9	7.5E+00	2021 EPA RSL for Tapwater
Carbon disulfide	75-15-0	8.1E+02	2021 EPA RSL for Tapwater
Carbon tetrachloride	56-23-5	4.5E-01	2020 DTSC Note 3 for Tapwater
Chlorobenzene	108-90-7	7.0E+01	CA MCL
Chloroethane	75-00-3	2.1E+04	2021 EPA RSL for Tapwater
Chloroform	67-66-3	2.2E-01	2021 EPA RSL for Tapwater
Chloromethane	74-87-3	1.9E+02	2021 EPA RSL for Tapwater
cis-1,2-Dichloroethene	156-59-2	6.0E+00	CA MCL
cis-1,3-Dichloropropene	10061-01-5	4.7E-01	Surrogate (RSL for 1,3-Dichloropropene)
Dibromochloromethane	124-48-1	2.0E-01	2020 DTSC Note 3 for Tapwater
Dibromomethane	74-95-3	8.3E+00	2021 EPA RSL for Tapwater
Dichlorodifluoromethane	75-71-8	2.0E+02	2021 EPA RSL for Tapwater
Ethylbenzene	100-41-4	1.5E+00	2021 EPA RSL for Tapwater
Hexachlorobutadiene	87-68-3	1.4E-01	2020 DTSC Note 3 for Tapwater
Isopropylbenzene	98-82-8	4.5E+02	2021 EPA RSL for Tapwater
Methyl tert-butyl ether	1634-04-4	1.3E+01	CA MCL
Methylene Chloride	75-09-2	1.7E+00	2020 DTSC Note 3 for Tapwater
m-Xylene & p-Xylene	179601-23-1	1.9E+02	2021 EPA RSL for Tapwater
Naphthalene	91-20-3	1.2E-01	2020 DTSC Note 3 for Tapwater
n-Butylbenzene	104-51-8	2.9E+02	2020 DTSC Note 3 for Tapwater
N-Propylbenzene	103-65-1	6.6E+02	2021 EPA RSL for Tapwater
o-Xylene	95-47-6	1.9E+02	2021 EPA RSL for Tapwater
p-Isopropyltoluene	99-87-6	4.1E+02	Surrogate (DTSC Note 3 for Toluene)
sec-Butylbenzene	135-98-8	5.9E+02	2020 DTSC Note 3 for Tapwater
Styrene	100-42-5	1.0E+02	EPA MCL

Table 3-2. Groundwater Screening Levels for California RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analytical Group Analyte	CAS Number	Groundwater Screening Level (µg/L)	Groundwater Screening Level Source
tert-Butylbenzene	98-06-6	3.8E+02	2020 DTSC Note 3 for Tapwater
Tetrachloroethene	127-18-4	8.4E-02	2020 DTSC Note 3 for Tapwater
Toluene	108-88-3	1.5E+02	CA MCL
trans-1,2-Dichloroethene	156-60-5	1.0E+01	CA MCL
trans-1,3-Dichloropropene	10061-02-6	4.7E-01	Surrogate (RSL for 1,3-Dichloropropene)
Trichloroethene	79-01-6	4.9E-01	2021 EPA RSL for Tapwater
Trichlorofluoromethane	75-69-4	1.5E+02	CA MCL
Vinyl acetate	108-05-4	4.1E+02	2021 EPA RSL for Tapwater
Vinyl chloride	75-01-4	9.8E-03	2020 DTSC Note 3 for Tapwater
Xylenes, Total	1330-20-7	1.9E+02	2021 EPA RSL for Tapwater
SVOC			
Acenaphthene	83-32-9	2.6E+02	2020 DTSC Note 3 for Tapwater
Acenaphthylene	208-96-8	8.1E+01	Surrogate (DTSC Note 3 for Pyrene)
Anthracene	120-12-7	1.0E+03	2020 DTSC Note 3 for Tapwater
Azobenzene	103-33-3	1.2E-01	2021 EPA RSL for Tapwater
Benzo[a]anthracene	56-55-3	1.7E-02	2020 DTSC Note 3 for Tapwater
Benzo[b]fluoranthene	205-99-2	2.5E-01	2021 EPA RSL for Tapwater
Benzo[k]fluoranthene	207-08-9	2.5E+00	2021 EPA RSL for Tapwater
Benzo[g,h,i]perylene	191-24-2	8.1E+01	Surrogate (DTSC Note 3 for Pyrene)
Benzo[a]pyrene	50-32-8	2.5E-02	2021 EPA RSL for Tapwater
Benzoic acid	65-85-0	7.5E+04	2021 EPA RSL for Tapwater
Benzyl alcohol	100-51-6	2.0E+03	2021 EPA RSL for Tapwater
Bis(2-chloroethoxy)methane	111-91-1	5.9E+01	2021 EPA RSL for Tapwater
Bis(2-chloroethyl)ether	111-44-4	6.3E-03	2020 DTSC Note 3 for Tapwater
bis (2-chloroisopropyl) ether	108-60-1	2.3E+02	2020 DTSC Note 3 for Tapwater
Bis(2-ethylhexyl) phthalate	117-81-7	4.0E+00	CA MCL
4-Bromophenyl phenyl ether	101-55-3	0.0E+00	--
Butyl benzyl phthalate	85-68-7	1.6E+01	2021 EPA RSL for Tapwater
4-Chloroaniline	106-47-8	3.7E-01	2021 EPA RSL for Tapwater
4-Chloro-3-methylphenol	59-50-7	1.4E+03	2021 EPA RSL for Tapwater
2-Chloronaphthalene	91-58-7	3.5E+02	2020 DTSC Note 3 for Tapwater
2-Chlorophenol	95-57-8	2.9E+01	2020 DTSC Note 3 for Tapwater
4-Chlorophenyl phenyl ether	7005-72-3	0.0E+00	--
Chrysene	218-01-9	2.5E+01	2021 EPA RSL for Tapwater
Dibenz(a,h)anthracene	53-70-3	6.1E-03	2020 DTSC Note 3 for Tapwater
Dibenzofuran	132-64-9	4.0E+00	2020 DTSC Note 3 for Tapwater
Di-n-butyl phthalate	84-74-2	9.0E+02	2021 EPA RSL for Tapwater
1,2-Dichlorobenzene	95-50-1	3.0E+02	2021 EPA RSL for Tapwater
1,3-Dichlorobenzene	541-73-1	3.0E+02	Surrogate (RSL for 1,2-Dichlorobenzene)
1,4-Dichlorobenzene	106-46-7	4.8E-01	2021 EPA RSL for Tapwater
3,3'-Dichlorobenzidine	91-94-1	4.7E-02	2020 DTSC Note 3 for Tapwater
2,4-Dichlorophenol	120-83-2	4.6E+01	2021 EPA RSL for Tapwater

Table 3-2. Groundwater Screening Levels for California RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analytical Group Analyte	CAS Number	Groundwater Screening Level (µg/L)	Groundwater Screening Level Source
Diethyl phthalate	84-66-2	1.5E+04	2021 EPA RSL for Tapwater
2,4-Dimethylphenol	105-67-9	3.6E+02	2021 EPA RSL for Tapwater
Dimethyl phthalate	131-11-3	0.0E+00	--
4,6-Dinitro-2-methylphenol	534-52-1	1.5E+00	2021 EPA RSL for Tapwater
2,4-Dinitrophenol	51-28-5	3.9E+01	2021 EPA RSL for Tapwater
2,4-Dinitrotoluene	121-14-2	2.4E-01	2021 EPA RSL for Tapwater
2,6-Dinitrotoluene	606-20-2	4.9E-02	2021 EPA RSL for Tapwater
Di-n-octyl phthalate	117-84-0	2.0E+02	2021 EPA RSL for Tapwater
Fluoranthene	206-44-0	8.0E+02	2021 EPA RSL for Tapwater
Fluorene	86-73-7	1.6E+02	2020 DTSC Note 3 for Tapwater
Hexachlorobenzene	118-74-1	8.8E-03	2020 DTSC Note 3 for Tapwater
Hexachlorobutadiene	87-68-3	1.4E-01	2020 DTSC Note 3 for Tapwater
Hexachlorocyclopentadiene	77-47-4	4.1E-01	2021 EPA RSL for Tapwater
Hexachloroethane	67-72-1	3.3E-01	2021 EPA RSL for Tapwater
Indeno[1,2,3-cd] Pyrene	193-39-5	2.5E-01	2021 EPA RSL for Tapwater
Isophorone	78-59-1	7.8E+01	2021 EPA RSL for Tapwater
1-Methylnaphthalene	90-12-0	4.6E-01	2020 DTSC Note 3 for Tapwater
2-Methylnaphthalene	91-57-6	1.7E+01	2020 DTSC Note 3 for Tapwater
2-Methylphenol	95-48-7	9.3E+02	2021 EPA RSL for Tapwater
3-Methylphenol & 4-Methylphenol	15831-10-4	5.8E+03	Surrogate (RSL for Phenol)
Naphthalene	91-20-3	1.2E-01	2020 DTSC Note 3 for Tapwater
2-Nitroaniline	88-74-4	1.9E+02	2021 EPA RSL for Tapwater
3-Nitroaniline	99-09-2	1.3E+01	Surrogate (RSL for Alinine)
4-Nitroaniline	100-01-6	3.8E+00	2021 EPA RSL for Tapwater
Nitrobenzene	98-95-3	1.4E-01	2021 EPA RSL for Tapwater
2-Nitrophenol	88-75-5	5.8E+03	Surrogate (RSL for Phenol)
4-Nitrophenol	100-02-7	5.8E+03	Surrogate (RSL for Phenol)
N-Nitrosodiphenylamine	86-30-6	1.2E+01	2021 EPA RSL for Tapwater
N-Nitrosodi-n-propylamine	621-64-7	1.1E-02	2021 EPA RSL for Tapwater
Pentachlorophenol	87-86-5	4.1E-02	2021 EPA RSL for Tapwater
Phenanthrene	85-01-8	8.1E+01	Surrogate (DTSC Note 3 for Pyrene)
Phenol	108-95-2	5.8E+03	2021 EPA RSL for Tapwater
Pyrene	129-00-0	8.1E+01	2020 DTSC Note 3 for Tapwater
Pyridine	110-86-1	5.9E+00	2020 DTSC Note 3 for Tapwater
1,2,4-Trichlorobenzene	120-82-1	4.6E-01	2020 DTSC Note 3 for Tapwater
2,4,5-Trichlorophenol	95-95-4	1.2E+03	2021 EPA RSL for Tapwater
2,4,6-Trichlorophenol	88-06-2	6.5E-01	2020 DTSC Note 3 for Tapwater
PAH			
Acenaphthene	83-32-9	2.6E+02	2020 DTSC Note 3 for Tapwater
Acenaphthylene	208-96-8	8.1E+01	Surrogate (DTSC Note 3 for Pyrene)
Anthracene	120-12-7	1.0E+03	2020 DTSC Note 3 for Tapwater
Benzo[a]anthracene	56-55-3	1.7E-02	2020 DTSC Note 3 for Tapwater

Table 3-2. Groundwater Screening Levels for California RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analytical Group **Analyte**	**CAS Number**	**Groundwater Screening Level (µg/L)**	**Groundwater Screening Level Source**
Benzo[a]pyrene	50-32-8	2.5E-02	2021 EPA RSL for Tapwater
Benzo[b]fluoranthene	205-99-2	2.5E-01	2021 EPA RSL for Tapwater
Benzo[g,h,i]perylene	191-24-2	8.1E+01	Surrogate (DTSC Note 3 for Pyrene)
Benzo[k]fluoranthene	207-08-9	2.5E+00	2021 EPA RSL for Tapwater
Chrysene	218-01-9	2.5E+01	2021 EPA RSL for Tapwater
Dibenz(a,h)anthracene	53-70-3	6.1E-03	2020 DTSC Note 3 for Tapwater
Fluoranthene	206-44-0	8.0E+02	2021 EPA RSL for Tapwater
Fluorene	86-73-7	1.6E+02	2020 DTSC Note 3 for Tapwater
Indeno[1,2,3-cd] Pyrene	193-39-5	2.5E-01	2021 EPA RSL for Tapwater
Naphthalene	91-20-3	1.2E-01	2020 DTSC Note 3 for Tapwater
Phenanthrene	85-01-8	8.1E+01	Surrogate (DTSC Note 3 for Pyrene)
Pyrene	129-00-0	8.1E+01	2020 DTSC Note 3 for Tapwater
Dioxin/Furan			
2,3,7,8-TCDD	1746-01-6	1.2E-07	2021 EPA RSL for Tapwater
2,3,7,8-TCDF	51207-31-9	1.2E-06	2,3,7,8-TCDD Toxicity Equivalency Factor of 0.1 (DTSC Note 2)
1,2,3,7,8-PeCDD	40321-76-4	1.2E-07	2,3,7,8-TCDD Toxicity Equivalency Factor of 1 (DTSC Note 2)
1,2,3,7,8-PeCDF	57117-41-6	4.0E-06	2,3,7,8-TCDD Toxicity Equivalency Factor of 0.03 (DTSC Note 2)
2,3,4,7,8-PeCDF	57117-31-4	4.0E-07	2,3,7,8-TCDD Toxicity Equivalency Factor of 0.3 (DTSC Note 2)
1,2,3,4,7,8-HxCDD	39227-28-6	1.2E-06	2,3,7,8-TCDD Toxicity Equivalency Factor of 0.1 (DTSC Note 2)
1,2,3,6,7,8-HxCDD	57653-85-7	1.2E-06	2,3,7,8-TCDD Toxicity Equivalency Factor of 0.1 (DTSC Note 2)
1,2,3,7,8,9-HxCDD	19408-74-3	1.2E-06	2,3,7,8-TCDD Toxicity Equivalency Factor of 0.1 (DTSC Note 2)
1,2,3,4,7,8-HxCDF	70648-26-9	1.2E-06	2,3,7,8-TCDD Toxicity Equivalency Factor of 0.1 (DTSC Note 2)
1,2,3,6,7,8-HxCDF	57117-44-9	1.2E-06	2,3,7,8-TCDD Toxicity Equivalency Factor of 0.1 (DTSC Note 2)
1,2,3,7,8,9-HxCDF	72918-21-9	1.2E-06	2,3,7,8-TCDD Toxicity Equivalency Factor of 0.1 (DTSC Note 2)
2,3,4,6,7,8-HxCDF	60851-34-5	1.2E-06	2,3,7,8-TCDD Toxicity Equivalency Factor of 0.1 (DTSC Note 2)
1,2,3,4,6,7,8-HpCDD	35822-46-9	1.2E-05	2,3,7,8-TCDD Toxicity Equivalency Factor of 0.01 (DTSC Note 2)
1,2,3,4,6,7,8-HpCDF	67562-39-4	1.2E-05	2,3,7,8-TCDD Toxicity Equivalency Factor of 0.01 (DTSC Note 2)
1,2,3,4,7,8,9-HpCDF	55673-89-7	1.2E-05	2,3,7,8-TCDD Toxicity Equivalency Factor of 0.01 (DTSC Note 2)

Table 3-2. Groundwater Screening Levels for California RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analytical Group Analyte	CAS Number	Groundwater Screening Level (µg/L)	Groundwater Screening Level Source
OCDD	3268-87-9	4.0E-04	2,3,7,8-TCDD Toxicity Equivalency Factor of 0.0003 (DTSC Note 2)
OCDF	39001-02-0	4.0E-04	2,3,7,8-TCDD Toxicity Equivalency Factor of 0.0003 (DTSC Note 2)
Pesticides			
4,4'-DDD	72-54-8	3.2E-02	2021 EPA RSL for Tapwater
4,4'-DDE	72-55-9	4.6E-02	2020 DTSC Note 3 for Tapwater
4,4'-DDT	50-29-3	2.3E-01	2021 EPA RSL for Tapwater
Aldrin	309-00-2	9.2E-04	2020 DTSC Note 3 for Tapwater
Dieldrin	60-57-1	6.6E-04	2020 DTSC Note 3 for Tapwater
Endosulfan sulfate	1031-07-8	1.1E+02	2021 EPA RSL for Tapwater
Endrin	72-20-8	2.0E+00	EPA MCL
Endrin aldehyde	7421-93-4	2.3E+00	Surrogate (RSL for Endrin)
Heptachlor	76-44-8	1.4E-03	2020 DTSC Note 3 for Tapwater
Heptachlor epoxide	1024-57-3	1.4E-03	2020 DTSC Note 3 for Tapwater
PCB			
PCB-1016	12674-11-2	2.2E-01	2020 DTSC Note 3 for Tapwater
PCB-1221	11104-28-2	4.7E-03	2021 EPA RSL for Tapwater
PCB-1232	11141-16-5	4.7E-03	2021 EPA RSL for Tapwater
PCB-1242	53469-21-9	7.8E-03	2021 EPA RSL for Tapwater
PCB-1248	12672-29-6	7.8E-03	2021 EPA RSL for Tapwater
PCB-1254	11097-69-1	7.9E-03	2020 DTSC Note 3 for Tapwater
PCB-1260	11096-82-5	7.8E-03	2021 EPA RSL for Tapwater
PCB-1262	37324-23-5	7.8E-03	Surrogate (RSL for PCB-1260)
PCB-1268	11100-14-4	7.8E-03	Surrogate (RSL for PCB-1260)

Notes:

µg/L = microgram(s) per liter

CA = California

CAS = Chemical Abstracts Service

DTSC = California Department of Toxic Substances Control

EPA = U.S. Environmental Protection Agency

MCL = maximum contaminant level

RSL = Regional Screening Level

SFRWQCB = San Francisco Regional Water Quality Control Board

Resources:

U.S. Environmental Protection Agency (EPA). 2021. Regional Screening Levels for Chemical Contaminants at Superfund Sites. May. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Department of Toxic Substances Control (DTSC). 2020. Human Health Risk Assessment Note 3 - DTSC Recommended Methodology for Use of U.S. EPA Regional Screening Levels (RSLs) in Human Health Risk Assessment Process at Hazardous Waste Sites and Permitted Facilities. California Department of Environmental Protection. June.

San Francisco Regional Water Quality Control Board (SFRWQCB). 2019. Environmental Screening Levels - Interim Final. January. Table GW-1,Human Health ESL.

Table 3-3. Proposed Sampling and Analysis Plan for Soil at Copco No. 1 Dynamite Cave

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Explosives (USEPA Method 8330A)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 1 Dynamite Cave	NA	C1DC-01-0.5-YYYYMMDD	0.0-0.5	X												

Notes:

* Hold extractions pending total results (TTLC)

ft bgs = feet below ground surface

X = Sample to analyzed

NA = not applicable

STLC = Soluble Threshold Limit Concentration

TCLP = Toxicity Characteristic Leaching Procedure

TTLC = Total Threshold Limit Concentration

USEPA = U.S. Environmental Protection Agency

Table 3-4. Proposed Sampling and Analysis Plan for Soil at Copco No. 1 Debris Pile/Scrap Yard

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 1 Debris Pile/Scrap Yard	C1DP-01	C1DP-01-0.5-YYYYMMDD	0.0-0.5	X									X	X	
		C1DP-01-1.5-YYYYMMDD	1.0-1.5	X									X	X	
		C1DP-01-2.5-YYYYMMDD	2.0-2.5	X									X	X	
	C1DP-02	C1DP-02-0.5-YYYYMMDD	0.0-0.5	X									X	X	
		C1DP-02-1.5-YYYYMMDD	1.0-1.5	X									X	X	
		C1DP-02-2.5-YYYYMMDD	2.0-2.5	X									X	X	
	C1DP-03	C1DP-03-0.5-YYYYMMDD	0.0-0.5	X									X	X	
		C1DP-03-1.5-YYYYMMDD	1.0-1.5	X									X	X	
		C1DP-03-3.5-YYYYMMDD	3.0-3.5	X									X	X	
		C1DP-03-6.0-YYYYMMDD	5.5-6.0	X									X	X	
	C1DP-04	C1DP-04-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		C1DP-04-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		C1DP-04-2.5-YYYYMMDD	2.0-2.5	X	X	X	X						X	X	
	C1DP-05	C1DP-05-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		C1DP-05-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		C1DP-05-2.5-YYYYMMDD	2.0-2.5	X	X	X	X						X	X	

Table 3-4. Proposed Sampling and Analysis Plan for Soil at Copco No. 1 Debris Pile/Scrap Yard

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 1 Debris Pile/Scrap Yard	C1DP-06	C1DP-06-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		C1DP-06-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		C1DP-06-3.5-YYYYMMDD	3.0-3.5	X	X	X	X						X	X	
		C1DP-06-6.0-YYYYMMDD	5.5-6.0	X	X	X	X						X	X	
	C1DP-07	C1DP-07-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		C1DP-07-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		C1DP-07-2.5-YYYYMMDD	2.0-2.5	X	X	X	X						X	X	
	C1DP-08	C1DP-08-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		C1DP-08-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		C1DP-08-2.5-YYYYMMDD	2.0-2.5	X	X	X	X						X	X	
	C1DP-09	C1DP-09-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		C1DP-09-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		C1DP-09-3.5-YYYYMMDD	3.0-3.5	X	X	X	X						X	X	
		C1DP-09-6.0-YYYYMMDD	5.5-6.0	X	X	X	X						X	X	
	C1DP-10	C1DP-10-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		C1DP-10-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		C1DP-10-2.5-YYYYMMDD	2.0-2.5	X	X	X	X						X	X	
	C1DP-11	C1DP-11-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		C1DP-11-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		C1DP-11-3.5-YYYYMMDD	3.0-3.5	X	X	X	X						X	X	
		C1DP-11-6.0-YYYYMMDD	5.5-6.0	X	X	X	X						X	X	

Table 3-4. Proposed Sampling and Analysis Plan for Soil at Copco No. 1 Debris Pile/Scrap Yard

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 1 Debris Pile/Scrap Yard	C1DP-12	C1DP-12-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		C1DP-12-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		C1DP-12-2.5-YYYYMMDD	2.0-2.5	X	X	X	X						X	X	
	C1DP-13	C1DP-13-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		C1DP-13-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		C1DP-13-2.5-YYYYMMDD	2.0-2.5	X	X	X	X						X	X	
	C1DP-14	C1DP-14-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		C1DP-14-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		C1DP-14-2.5-YYYYMMDD	2.0-2.5	X	X	X	X						X	X	
	C1DP-15	C1DP-15-0.5-YYYYMMDD	0.0-0.5	X	X	X							X	X	
		C1DP-15-1.5-YYYYMMDD	1.0-1.5	X	X	X							X	X	
		C1DP-15-2.5-YYYYMMDD	2.0-2.5	X	X	X							X	X	
	C1DP-16	C1DP-16-0.5-YYYYMMDD	0.0-0.5	X	X	X							X	X	
		C1DP-16-1.5-YYYYMMDD	1.0-1.5	X	X	X							X	X	
		C1DP-16-3.5-YYYYMMDD	3.0-3.5	X	X	X							X	X	
		C1DP-16-6.0-YYYYMMDD	5.5-6.0	X	X	X							X	X	
	C1DP-17	C1DP-17-0.5-YYYYMMDD	0.0-0.5	X	X	X							X	X	
		C1DP-17-1.5-YYYYMMDD	1.0-1.5	X	X	X							X	X	
		C1DP-17-2.5-YYYYMMDD	2.0-2.5	X	X	X							X	X	

Table 3-4. Proposed Sampling and Analysis Plan for Soil at Copco No. 1 Debris Pile/Scrap Yard

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 1 Debris Pile/Scrap Yard	C1DP 01, 02, 03	C1DP-WC1-YYYYMMDD	Composite	X	X	X			X	X			X	X	X
	C1DP 04, 05, 06	C1DP-WC2-YYYYMMDD	Composite	X	X	X			X	X			X	X	X
	C1DP 07, 08, 09, 10, 11, 12, 13, 145	C1DP-WC3-YYYYMMDD	Composite	X	X	X			X	X			X	X	X
	C1DP 15, 16 , 17	C1DP-WC4-YYYYMMDD	Composite	X	X	X			X	X			X	X	X

Notes:

* Hold extractions for metals, SVOCs, and dioxins/furans pending total results (TTLC)

ft bgs = feet below ground surface

X = Sample to analyzed

NA = not applicable

STLC = Soluble Threshold Limit Concentration

TCLP = Toxicity Characteristic Leaching Procedure

TTLC = Total Threshold Limit Concentration

USEPA = U.S. Environmental Protection Agency

Table 3-5. Proposed Sampling and Analysis Plan for Soil at Copco No. 2 Wood Stave Penstock

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 2 Wood Stave Penstock	C2WS-01	C2WS-01-0.5-YYYYMMDD	0.0-0.5	X		X							X	X	
		C2WS-01-1.5-YYYYMMDD	1.0-1.5	X		X							X	X	
		C2WS-01-3.5-YYYYMMDD	3.0-3.5	X		X							X	X	
		C2WS-01-6.0-YYYYMMDD	5.5-6.0	X		X							X	X	
	C2WS-02	C2WS-02-0.5-YYYYMMDD	0.0-0.5	X		X							X	X	
		C2WS-02-1.5-YYYYMMDD	1.0-1.5	X		X							X	X	
	C2WS-03	C2WS-03-0.5-YYYYMMDD	0.0-0.5	X		X							X	X	
		C2WS-03-1.5-YYYYMMDD	1.0-1.5	X		X							X	X	
		C2WS-03-3.5-YYYYMMDD	3.0-3.5	X		X							X	X	
		C2WS-03-6.0-YYYYMMDD	5.5-6.0	X		X							X	X	
	C2WS-04	C2WS-04-0.5-YYYYMMDD	0.0-0.5	X		X							X	X	
		C2WS-04-1.5-YYYYMMDD	1.0-1.5	X		X							X	X	
	C2WS-05	C2WS-05-0.5-YYYYMMDD	0.0-0.5	X		X							X	X	
		C2WS-05-1.5-YYYYMMDD	1.0-1.5	X		X							X	X	
	C2WS-06	C2WS-06-0.5-YYYYMMDD	0.0-0.5	X		X							X	X	
		C2WS-06-1.5-YYYYMMDD	1.0-1.5	X		X							X	X	
	C2WS-07	C2WS-07-0.5-YYYYMMDD	0.0-0.5	X		X							X	X	
		C2WS-07-1.5-YYYYMMDD	1.0-1.5	X		X							X	X	
		C2WS-07-3.5-YYYYMMDD	3.0-3.5	X		X							X	X	
		C2WS-07-6.0-YYYYMMDD	5.5-6.0	X		X							X	X	

Table 3-5. Proposed Sampling and Analysis Plan for Soil at Copco No. 2 Wood Stave Penstock

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 2 Wood Stave Penstock	C2WS-08	C2WS-08-0.5-YYYYMMDD	0.0-0.5	X		X							X	X	
		C2WS-08-1.5-YYYYMMDD	1.0-1.5	X		X							X	X	
	C2WS-09	C2WS-09-0.5-YYYYMMDD	0.0-0.5	X		X							X	X	
		C2WS-09-1.5-YYYYMMDD	1.0-1.5	X		X							X	X	
	C2WS-10	C2WS-10-0.5-YYYYMMDD	0.0-0.5	X		X							X	X	
		C2WS-10-1.5-YYYYMMDD	1.0-1.5	X		X							X	X	
		C2WS-10-3.5-YYYYMMDD	3.0-3.5	X		X							X	X	
		C2WS-10-6.0-YYYYMMDD	5.5-6.0	X		X							X	X	
	C2WS-11	C2WS-11-0.5-YYYYMMDD	0.0-0.5	X		X							X	X	
		C2WS-11-1.5-YYYYMMDD	1.0-1.5	X		X							X	X	
		C2WS-11-3.5-YYYYMMDD	3.0-3.5	X		X							X	X	
		C2WS-11-6.0-YYYYMMDD	5.5-6.0	X		X							X	X	
	C2WS-12	C2WS-12-0.5-YYYYMMDD	0.0-0.5	X		X							X	X	
		C2WS-12-1.5-YYYYMMDD	1.0-1.5	X		X							X	X	
		C2WS-12-3.5-YYYYMMDD	3.0-3.5	X		X							X	X	
		C2WS-12-6.0-YYYYMMDD	5.5-6.0	X		X							X	X	

Table 3-5. Proposed Sampling and Analysis Plan for Soil at Copco No. 2 Wood Stave Penstock

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 2 Wood Stave Penstock	C2WS-13	C2WS-13-0.5-YYYYMMDD	0.0-0.5	X		X							X	X	
		C2WS-13-1.5-YYYYMMDD	1.0-1.5	X		X							X	X	
	C2WS-14	C2WS-14-0.5-YYYYMMDD	0.0-0.5	X		X							X	X	
		C2WS-14-1.5-YYYYMMDD	1.0-1.5	X		X							X	X	
	C2WS-15	C2WS-15-0.5-YYYYMMDD	0.0-0.5	X		X							X	X	
		C2WS-15-1.5-YYYYMMDD	1.0-1.5	X		X							X	X	
	C2WS-16	C2WS-16-0.5-YYYYMMDD	0.0-0.5	X		X							X	X	
		C2WS-16-1.5-YYYYMMDD	1.0-1.5	X		X							X	X	
	ALL	C2WS-WC-YYYYMMDD	Composite	X	X	X			X	X			X	X	X

Notes:

* Hold extractions for metals and SVOCs pending total results (TTLC)

ft bgs = feet below ground surface

X = Sample to analyzed

NA = not applicable

STLC = Soluble Threshold Limit Concentration

TCLP = Toxicity Characteristic Leaching Procedure

TTLC = Total Threshold Limit Concentration

USEPA = U.S. Environmental Protection Agency

Table 3-6. Proposed Sampling and Analysis Plan for Soil at Copco No. 2 Wood Pile

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 2 Wood Pile	C2WP-01	C2WP-01-0.5-YYYYMMDD	0.0-0.5	X	X	X							X	X	
		C2WP-01-2.5-YYYYMMDD	2.0-2.5	X	X	X							X	X	
		C2WP-01-5.0-YYYYMMDD	4.5-5.0	X	X	X							X	X	
	C2WP-02	C2WP-02-0.5-YYYYMMDD	0.0-0.5	X	X	X							X	X	
		C2WP-02-1.5-YYYYMMDD	1.0-1.5	X	X	X							X	X	
		C2WP-02-3.5-YYYYMMDD	3.0-3.5	X	X	X							X	X	
		C2WP-02-6.0-YYYYMMDD	5.5-6.0	X	X	X							X	X	
	C2WP-03	C2WP-03-0.5-YYYYMMDD	0.0-0.5	X	X	X							X	X	
		C2WP-03-2.5-YYYYMMDD	2.0-2.5	X	X	X							X	X	
		C2WP-03-5.0-YYYYMMDD	4.5-5.0	X	X	X							X	X	
	C2WP-04	C2WP-04-0.5-YYYYMMDD	0.0-0.5	X	X	X							X	X	
		C2WP-04-1.5-YYYYMMDD	1.0-1.5	X	X	X							X	X	
		C2WP-04-3.5-YYYYMMDD	3.0-3.5	X	X	X							X	X	
		C2WP-04-6.0-YYYYMMDD	5.5-6.0	X	X	X							X	X	
	C2WP-05	C2WP-05-0.5-YYYYMMDD	0.0-0.5	X	X	X							X	X	
		C2WP-05-2.5-YYYYMMDD	2.0-2.5	X	X	X							X	X	
		C2WP-05-5.0-YYYYMMDD	4.5-5.0	X	X	X							X	X	
	C2WP-06	C2WP-06-0.5-YYYYMMDD	0.0-0.5	X	X	X							X	X	
		C2WP-06-1.5-YYYYMMDD	1.0-1.5	X	X	X							X	X	
		C2WP-06-3.5-YYYYMMDD	3.0-3.5	X	X	X							X	X	
		C2WP-06-6.0-YYYYMMDD	5.5-6.0	X	X	X							X	X	

Table 3-6. Proposed Sampling and Analysis Plan for Soil at Copco No. 2 Wood Pile

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 2 Wood Pile	C2WP-07	C2WP-07-0.5-YYYYMMDD	0.0-0.5	X	X	X							X	X	
		C2WP-07-2.5-YYYYMMDD	2.0-2.5	X	X	X							X	X	
		C2WP-07-5.0-YYYYMMDD	4.5-5.0	X	X	X							X	X	
	ALL	C2WP-WC-YYYYMMDD	Composite	X	X	X			X	X			X	X	X

Notes:

* Hold extractions pending metals and SVOC total results (TTLC)

ft bgs = feet below ground surface

X = Sample to analyzed

NA = not applicable

STLC = Soluble Threshold Limit Concentration

TCLP = Toxicity Characteristic Leaching Procedure

TTLC = Total Threshold Limit Concentration

USEPA = U.S. Environmental Protection Agency

Table 3-7. Proposed Sampling and Analysis Plan for Soil at Copco No. 2 Transformer Fire

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 2 Transformer Fire	C2TF-01	C2TF-01-1.0-YYYYMMDD	0.0-1.0					X		X	X	X			
		C2TF-01-2.0-YYYYMMDD	1.5-2.0					X		X	X	X			
		C2TF-01-3.0-YYYYMMDD	2.5-3.0					X		X	X	X			
	C2TF-02	C2TF-02-1.0-YYYYMMDD	0.0-1.0					X		X	X	X			
		C2TF-02-2.0-YYYYMMDD	1.5-2.0					X		X	X	X			
		C2TF-02-3.0-YYYYMMDD	2.5-3.0					X		X	X	X			
	C2TF-03	C2TF-03-1.0-YYYYMMDD	0.0-1.0					X		X	X	X			
		C2TF-03-2.0-YYYYMMDD	1.5-2.0					X		X	X	X			
		C2TF-03-3.0-YYYYMMDD	2.5-3.0					X		X	X	X			
	C2TF-04	C2TF-04-1.0-YYYYMMDD	0.0-1.0					X		X	X	X			
		C2TF-04-2.0-YYYYMMDD	1.5-2.0					X		X	X	X			
		C2TF-04-3.0-YYYYMMDD	2.5-3.0					X		X	X	X			
	C2TF-05	C2TF-05-1.0-YYYYMMDD	0.0-1.0					X		X	X	X			
		C2TF-05-2.0-YYYYMMDD	1.5-2.0					X		X	X	X			
		C2TF-05-3.0-YYYYMMDD	2.5-3.0					X		X	X	X			

Table 3-7. Proposed Sampling and Analysis Plan for Soil at Copco No. 2 Transformer Fire

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 2 Transformer Fire	ALL	C2TF-WC-YYYYMMDD	Composite	X	X	X			X	X			X	X	X

Notes:

* Hold extractions pending total results (TTLC)

ft bgs = feet below ground surface

X = Sample to analyzed

NA = not applicable

STLC = Soluble Threshold Limit Concentration

TCLP = Toxicity Characteristic Leaching Procedure

TTLC = Total Threshold Limit Concentration

USEPA = U.S. Environmental Protection Agency

Table 3-8. Proposed Sampling and Analysis Plan for Soil at Copco No. 2 Former Mobile Oil Containment Building

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 2 Former Mobile Oil Containment Building	C2CB-01	C2CB-01-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-01-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-01-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-01-X-YYYYMMDD	TBD		X				X	X	X				
	C2CB-02	C2CB-02-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-02-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-02-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-02-X-YYYYMMDD	TBD		X				X	X	X				
	C2CB-03	C2CB-03-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-03-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-03-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-03-X-YYYYMMDD	TBD		X				X	X	X				
	C2CB-04	C2CB-04-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-04-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-04-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-04-X-YYYYMMDD	TBD		X				X	X	X				
	C2CB-05	C2CB-05-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-05-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-05-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-05-X-YYYYMMDD	TBD		X				X	X	X				

Table 3-8. Proposed Sampling and Analysis Plan for Soil at Copco No. 2 Former Mobile Oil Containment Building

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 2 Former Mobile Oil Containment Building	C2CB-06	C2CB-06-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-06-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-06-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-06-X-YYYYMMDD	TBD		X				X	X	X				
	C2CB-07	C2CB-07-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-07-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-07-X-YYYYMMDD	TBD		X				X	X	X				
		C2CB-07-X-YYYYMMDD	TBD		X				X	X	X				

Notes:

Additional borings will be advanced if soil is stained, odorous, or has photoionization detector readings greater than 50 ppmv.

* Hold extractions pending total results (TTLC)

ft bgs = feet below ground surface

TBD = To be determined. The number of samples and the depth of samples to be collected will be based on field observations when advancing each boring.

X = Sample to analyzed

NA = not applicable

STLC = Soluble Threshold Limit Concentration

TCLP = Toxicity Characteristic Leaching Procedure

TTLC = Total Threshold Limit Concentration

USEPA = U.S. Environmental Protection Agency

Table 3-9. Proposed Sampling and Analysis Plan for Soil at Copco No. 2 Underground Storage Tanks

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 2 Underground Storage Tanks	C2UT-01	C2UT-01-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-01-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-01-X-YYYYMMDD	TBD		X				X	X	X				
	C2UT-02	C2UT-02-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-02-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-02-X-YYYYMMDD	TBD		X				X	X	X				
	C2UT-03	C2UT-03-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-03-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-03-X-YYYYMMDD	TBD		X				X	X	X				
	C2UT-04	C2UT-04-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-04-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-04-X-YYYYMMDD	TBD		X				X	X	X				
	C2UT-05	C2UT-05-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-05-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-05-X-YYYYMMDD	TBD		X				X	X	X				
	C2UT-06	C2UT-06-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-06-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-06-X-YYYYMMDD	TBD		X				X	X	X				

Table 3-9. Proposed Sampling and Analysis Plan for Soil at Copco No. 2 Underground Storage Tanks

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 2 Underground Storage Tanks	C2UT-07	C2UT-07-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-07-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-07-X-YYYYMMDD	TBD		X				X	X	X				
	C2UT-08	C2UT-08-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-08-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-08-X-YYYYMMDD	TBD		X				X	X	X				
	C2UT-09	C2UT-09-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-09-X-YYYYMMDD	TBD		X				X	X	X				
		C2UT-09-X-YYYYMMDD	TBD		X				X	X	X				

Notes:

Additional borings will be advanced if soil is stained, odorous, or has photoionization detector readings greater than 50 ppmv.

* Hold extractions pending total results (TTLC)

ft bgs = feet below ground surface

TBD = To be determined. The number of samples and the depth of samples to be collected will be based on field observations when advancing each boring.

X = Sample to analyzed

NA = not applicable

STLC = Soluble Threshold Limit Concentration

TCLP = Toxicity Characteristic Leaching Procedure

TTLC = Total Threshold Limit Concentration

USEPA = U.S. Environmental Protection Agency

Table 3-10. Proposed Sampling and Analysis Plan for Soil at Copco No. 2 Burn Pit

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 2 Burn Pit	C2BP-01	C2BP-01-0.5-YYYYMMDD	0.0-0.5	X	X	X							X	X	
		C2BP-01-1.5-YYYYMMDD	1.0-1.5	X	X	X							X	X	
		C2BP-01-2.5-YYYYMMDD	2.0-2.5	X	X	X							X	X	
	C2BP-02	C2BP-02-0.5-YYYYMMDD	0.0-0.5	X	X	X							X	X	
		C2BP-02-1.5-YYYYMMDD	1.0-1.5	X	X	X							X	X	
		C2BP-02-2.5-YYYYMMDD	2.0-2.5	X	X	X							X	X	
	C2BP-03	C2BP-03-0.5-YYYYMMDD	0.0-0.5	X	X	X							X	X	
		C2BP-03-1.5-YYYYMMDD	1.0-1.5	X	X	X							X	X	
		C2BP-03-2.5-YYYYMMDD	2.0-2.5	X	X	X							X	X	
	C2BP-04	C2BP-04-0.5-YYYYMMDD	0.0-0.5	X	X	X			X	X	X		X	X	
		C2BP-04-1.5-YYYYMMDD	1.0-1.5	X	X	X			X	X	X		X	X	
		C2BP-04-2.5-YYYYMMDD	2.0-2.5	X	X	X			X	X	X		X	X	
	C2BP-05	C2BP-05-0.5-YYYYMMDD	0.0-0.5	X	X	X			X	X	X		X	X	
		C2BP-05-1.5-YYYYMMDD	1.0-1.5	X	X	X			X	X	X		X	X	
		C2BP-05-2.5-YYYYMMDD	2.0-2.5	X	X	X			X	X	X		X	X	
	C2BP-06	C2BP-06-0.5-YYYYMMDD	0.0-0.5	X									X	X	
		C2BP-06-1.5-YYYYMMDD	1.0-1.5	X									X	X	
		C2BP-06-2.5-YYYYMMDD	2.0-2.5	X									X	X	
	C2BP-07	C2BP-07-0.5-YYYYMMDD	0.0-0.5	X	X	X			X	X	X		X	X	
		C2BP-07-1.5-YYYYMMDD	1.0-1.5	X	X	X			X	X	X		X	X	
		C2BP-07-2.5-YYYYMMDD	2.0-2.5	X	X	X			X	X	X		X	X	

Table 3-10. Proposed Sampling and Analysis Plan for Soil at Copco No. 2 Burn Pit

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Copco No. 2 Burn Pit	C2BP-08	C2BP-08-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		C2BP-08-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		C2BP-08-2.5-YYYYMMDD	2.0-2.5	X	X	X	X						X	X	
		C2BP-08-3.5-YYYYMMDD	3.0-3.5	X	X	X	X						X	X	
	C2BP-09	C2BP-09-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		C2BP-09-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		C2BP-09-2.5-YYYYMMDD	2.0-2.5	X	X	X	X						X	X	
		C2BP-09-3.5-YYYYMMDD	3.0-3.5	X	X	X	X						X	X	
	C2BP-10	C2BP-10-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		C2BP-10-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		C2BP-10-3.5-YYYYMMDD	3.0-3.5	X	X	X	X						X	X	
		C2BP-10-6.0-YYYYMMDD	5.5-6.0	X	X	X	X						X	X	
	C2BP-11	C2BP-11-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		C2BP-11-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		C2BP-11-2.5-YYYYMMDD	2.0-2.5	X	X	X	X						X	X	
		C2BP-11-3.5-YYYYMMDD	3.0-3.5	X	X	X	X						X	X	
	C2BP-12	C2BP-12-0.5-YYYYMMDD	0.0-0.5	X	X	X							X	X	
		C2BP-12-1.5-YYYYMMDD	1.0-1.5	X	X	X							X	X	
		C2BP-12-2.5-YYYYMMDD	2.0-2.5	X	X	X							X	X	

Table 3-10. Proposed Sampling and Analysis Plan for Soil at Copco No. 2 Burn Pit

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW-846 CH7), Corrosivity (SW-846 9045)
Copco No. 2 Burn Pit	C2BP 08, 09, 10, 11	C2BP-WC-YYYYMMDD	Composite	X	X	X			X	X			X	X	X

Notes:

* Hold extractions for metals, SVOCs, and/or dioxins/furans pending total results (TTLC)

ft bgs = feet below ground surface

X = Sample to analyzed

NA = not applicable

STLC = Soluble Threshold Limit Concentration

TCLP = Toxicity Characteristic Leaching Procedure

TTLC = Total Threshold Limit Concentration

USEPA = U.S. Environmental Protection Agency

Table 3-11. Proposed Sampling and Analysis Plan for Soil at Iron Gate Shooting Range

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Iron Gate Shooting Range	IGSR-01	IGSR-01-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-01-1.5-YYYYMMDD	1.0-1.5	X							X				
		IGSR-01-2.5-YYYYMMDD	2.0-2.5	X							X				
	IGSR-02	IGSR-02-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-02-1.5-YYYYMMDD	1.0-1.5	X							X				
		IGSR-02-3.5-YYYYMMDD	3.0-3.5	X							X				
		IGSR-02-6.0-YYYYMMDD	5.5-6.0	X							X				
	IGSR-03	IGSR-03-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-03-1.5-YYYYMMDD	1.0-1.5	X							X				
		IGSR-03-3.5-YYYYMMDD	3.0-3.5	X							X				
		IGSR-03-6.0-YYYYMMDD	5.5-6.0	X							X				
	IGSR-04	IGSR-04-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-04-1.5-YYYYMMDD	1.0-1.5	X							X				
		IGSR-04-2.5-YYYYMMDD	2.0-2.5	X							X				
	IGSR-05	IGSR-05-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-05-1.5-YYYYMMDD	1.0-1.5	X							X				
	IGSR-06	IGSR-06-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-06-1.5-YYYYMMDD	1.0-1.5	X							X				
	IGSR-07	IGSR-07-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-07-1.5-YYYYMMDD	1.0-1.5	X							X				
	IGSR-08	IGSR-08-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-08-1.5-YYYYMMDD	1.0-1.5	X							X				

Table 3-11. Proposed Sampling and Analysis Plan for Soil at Iron Gate Shooting Range

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Iron Gate Shooting Range	IGSR-09	IGSR-09-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-09-1.5-YYYYMMDD	1.0-1.5	X							X				
	IGSR-10	IGSR-10-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-10-1.5-YYYYMMDD	1.0-1.5	X							X				
		IGSR-10-3.5-YYYYMMDD	3.0-3.5	X							X				
		IGSR-10-6.0-YYYYMMDD	5.5-6.0	X							X				
	IGSR-11	IGSR-11-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-11-1.5-YYYYMMDD	1.0-1.5	X							X				
	IGSR-12	IGSR-12-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-12-1.5-YYYYMMDD	1.0-1.5	X							X				
	IGSR-13	IGSR-13-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-13-1.5-YYYYMMDD	1.0-1.5	X							X				
	IGSR-14	IGSR-14-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-14-1.5-YYYYMMDD	1.0-1.5	X							X				
	IGSR-15	IGSR-15-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-15-1.5-YYYYMMDD	1.0-1.5	X							X				
	IGSR-16	IGSR-16-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-16-1.5-YYYYMMDD	1.0-1.5	X							X				
	IGSR-17	IGSR-17-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-17-1.5-YYYYMMDD	1.0-1.5	X							X				
	IGSR-18	IGSR-18-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-18-1.5-YYYYMMDD	1.0-1.5	X							X				

Table 3-11. Proposed Sampling and Analysis Plan for Soil at Iron Gate Shooting Range

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Iron Gate Shooting Range	IGSR-19	IGSR-19-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-19-1.5-YYYYMMDD	1.0-1.5	X							X				
		IGSR-19-2.5-YYYYMMDD	2.0-2.5	X							X				
	IGSR-20	IGSR-20-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-20-1.5-YYYYMMDD	1.0-1.5	X							X				
		IGSR-20-3.5-YYYYMMDD	3.0-3.5	X							X				
		IGSR-20-6.0-YYYYMMDD	5.5-6.0	X							X				
	IGSR-21	IGSR-21-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-21-1.5-YYYYMMDD	1.0-1.5	X							X				
	IGSR-22	IGSR-22-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-22-1.5-YYYYMMDD	1.0-1.5	X							X				
	IGSR-23	IGSR-23-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-23-1.5-YYYYMMDD	1.0-1.5	X							X				
	IGSR-24	IGSR-24-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-24-1.5-YYYYMMDD	1.0-1.5	X							X				
	IGSR-25	IGSR-25-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-25-1.5-YYYYMMDD	1.0-1.5	X							X				
		IGSR-25-3.5-YYYYMMDD	3.0-3.5	X							X				
		IGSR-25-6.0-YYYYMMDD	5.5-6.0	X							X				
	IGSR-26	IGSR-26-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-26-1.5-YYYYMMDD	1.0-1.5	X							X				

Table 3-11. Proposed Sampling and Analysis Plan for Soil at Iron Gate Shooting Range

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Iron Gate Shooting Range	IGSR-27	IGSR-27-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-27-1.5-YYYYMMDD	1.0-1.5	X							X				
		IGSR-27-3.5-YYYYMMDD	3.0-3.5	X							X				
		IGSR-27-6.0-YYYYMMDD	5.5-6.0	X							X				
	IGSR-28	IGSR-28-0.5-YYYYMMDD	0.0-0.5	X							X				
		IGSR-28-1.5-YYYYMMDD	1.0-1.5	X							X				

Notes:

* Hold extractions pending total results (TTLC)

ft bgs = feet below ground surface

X = Sample to analyzed

NA = not applicable

STLC = Soluble Threshold Limit Concentration

TCLP = Toxicity Characteristic Leaching Procedure

TTLC = Total Threshold Limit Concentration

USEPA = U.S. Environmental Protection Agency

Table 3-12. Proposed Sampling and Analysis Plan for Soil at Iron Gate Hatchery Burn Pit

indicates it has not been modified since Tuesday.

Location Description	Boring Location	Sample ID	Depth (ft bgs)[a]	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (EPA Method SW8015M)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (EPA Method SW8015M)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
Iron Gate Hatchery Burn Pit	IGBP-C1[b]	IGBP-C1-0.5-YYYYMMDD	0.0-0.5	X	X	X	X		X	X	X		X	X	
	IGBP-01	IGBP-01-0.5-YYYYMMDD	0.0-0.5	X	X	X	X		X	X	X		X	X	
		IGBP-01-1.5-YYYYMMDD	1.0-1.5	X	X	X	X		X	X	X		X	X	
		IGBP-01-3.5-YYYYMMDD	3.0-3.5	X	X	X	X		X	X	X		X	X	
		IGBP-01-6.0-YYYYMMDD	5.5-6.0	X	X	X	X		X	X	X		X	X	
	ALL	IGBP-WC-YYYYMMDD	Composite	X	X	X			X	X			X	X	X

Notes:

[a]Sample depths will be adjusted in the field based on observed depths of burned and unimpacted material.

[b]Composite sample of burn material from 4 sample locations.

* Hold extractions for metals, SVOCs, and dioxins/furans pending total results (TTLC)

ft bgs = feet below ground surface

X = Sample to analyzed

NA = not applicable

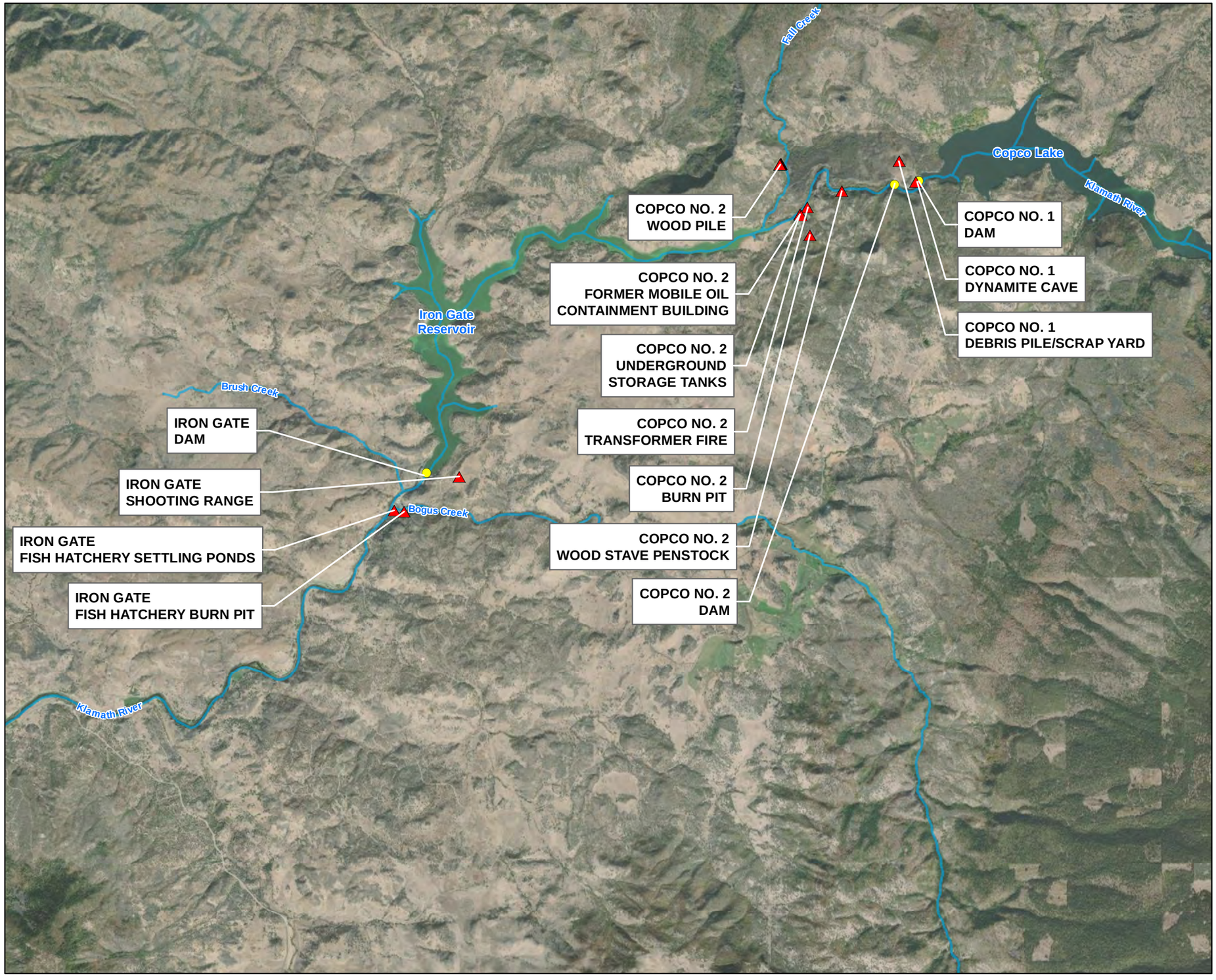
STLC = Soluble Threshold Limit Concentration

TCLP = Toxicity Characteristic Leaching Procedure

TTLC = Total Threshold Limit Concentration

USEPA = U.S. Environmental Protection Agency

Figures



VICINITY MAP

LEGEND

- Dam to be Removed
- Recognized Environmental Condition
- River/Creek

N

0 0.5 1
Miles

FIGURE ES-1
Site Investigation Work Plan
Recognized Environmental Conditions
Lower Klamath Hydroelectric Project

Jacobs

LEGEND

- Dam to be Removed
- Recognized Environmental Condition
- Powerhouse
- Klamath River

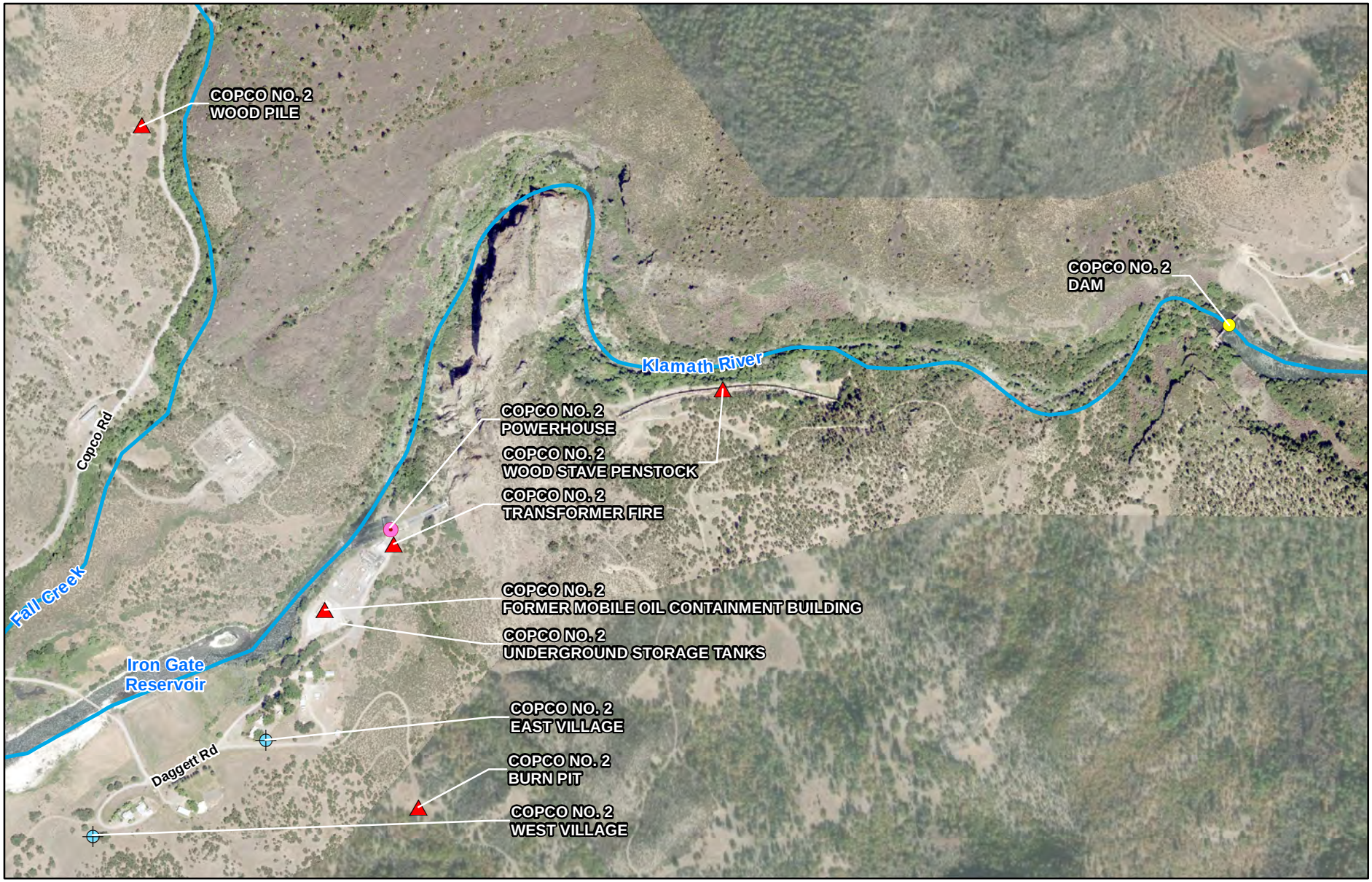
N

0 150 300

Feet

FIGURE ES-2
Copco No. 1 Dam
Recognized Environmental Conditions
Lower Klamath Hydroelectric Project

Jacobs



LEGEND

- Dam to be Removed
- Recognized Environmental Condition
- Powerhouse
- Village
- River/Creek

N

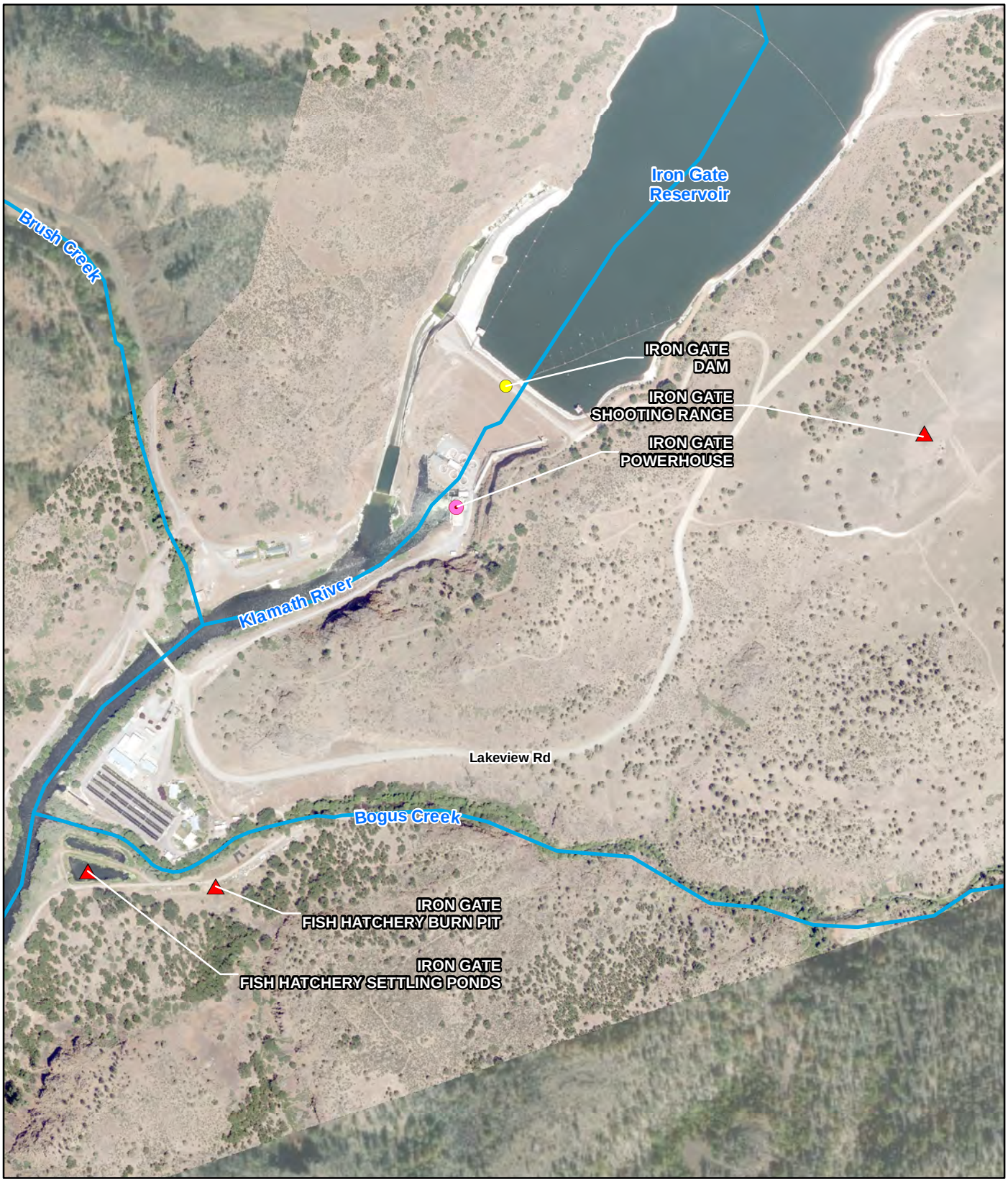
0 400 800

Feet

FIGURE ES-3
Copco No. 2 Dam
Recognized Environmental Conditions
Lower Klamath Hydroelectric Project

Jacobs

\\DC1VS01\GISPROJ\P\PACIFICORP\KLAMATH_DAM_REMOVAL_REMEDIATION\MAPFILES\WORKING\2021\CA\FIGES3_COPCONO2DAM.MXD ED035443 9/14/2021 4:24:57 PM



LEGEND

- Dam to be Removed
- Recognized Environmental Condition
- Powerhouse
- River/Creek

N

0 300 600

Feet

FIGURE ES-4
Iron Gate Dam
Recognized Environmental Conditions
Lower Klamath Hydroelectric Project

Jacobs

LEGEND

- SIWP REC Boundary
- Dam to be Removed
- Powerhouse
- Klamath River

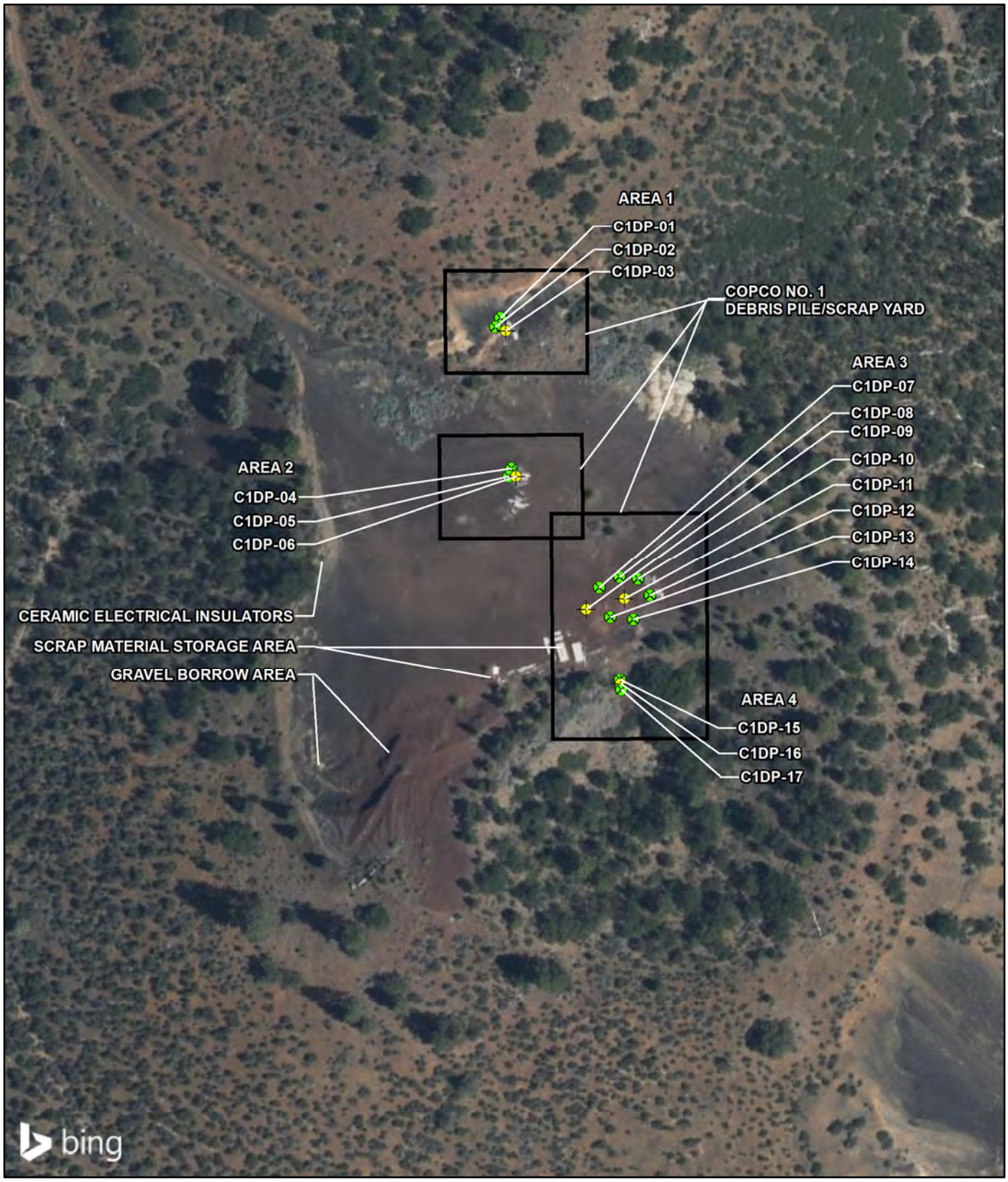
N

0 25 50

Feet

FIGURE 3-1
Copco No. 1 Dynamite Cave
Lower Klamath Hydroelectric Project

Jacobs



LEGEND

Limits of SIWP

Proposed Shallow Soil Boring Location

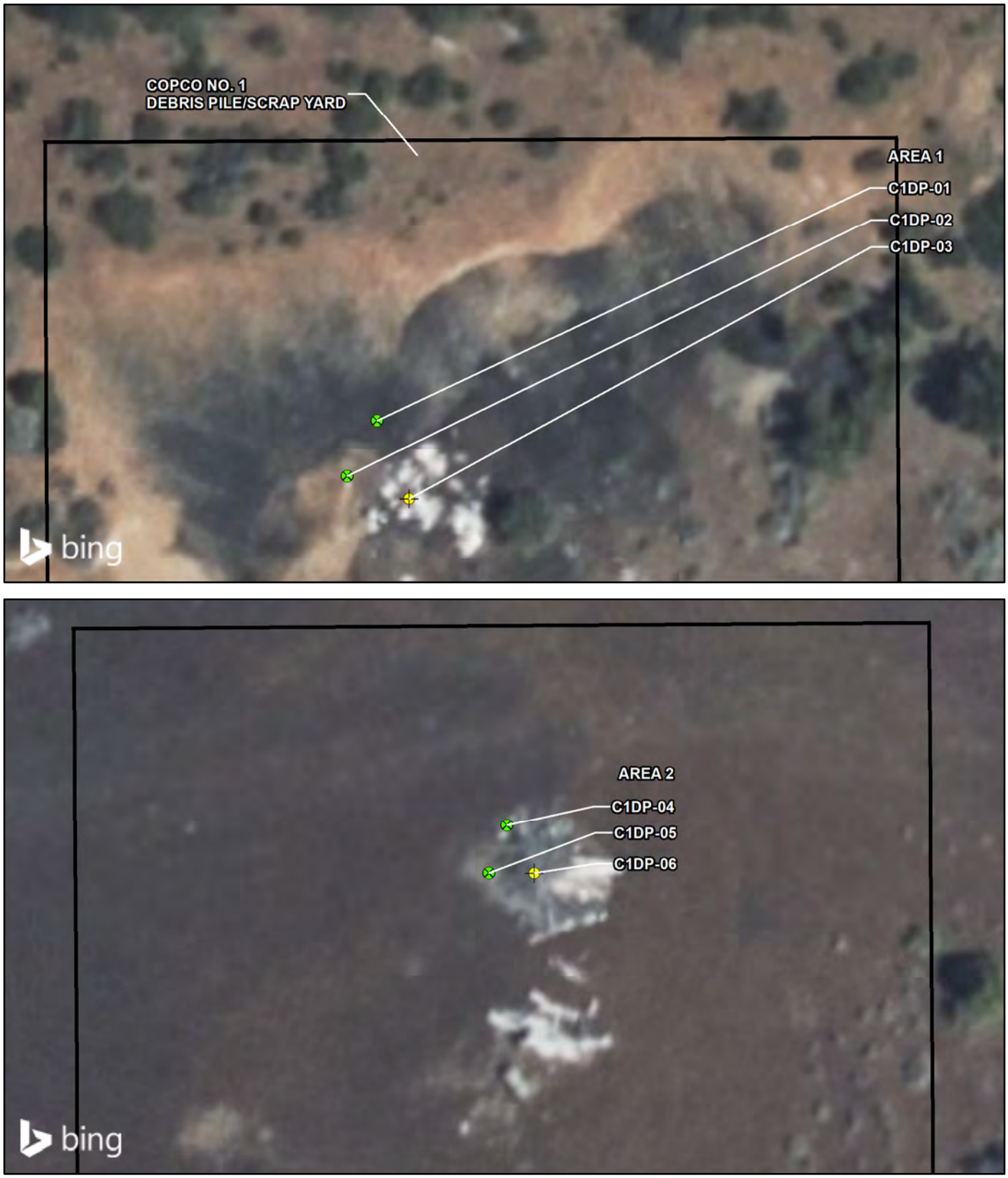
Proposed Deep Soil Boring Location

N

0 75 150

Feet

FIGURE 3-2
Copco No. 1 Debris Pile/Scrap Yard
Lower Klamath Hydroelectric Project



LEGEND

Limits of SIWP

Proposed Shallow Soil Boring Location

Proposed Deep Soil Boring Location

N

0 12.5 25

Feet

FIGURE 3-3
Copco No. 1 Debris Pile/Scrap Yard Area 1 and 2
Lower Klamath Hydroelectric Project

LEGEND

Limits of SIWP

Proposed Shallow Soil Boring Location

Proposed Deep Soil Boring Location

N

0 25 50

Feet

FIGURE 3-4
Copco No. 1 Debris Pile/Scrap Yard Area 3 and 4
Lower Klamath Hydroelectric Project

LEGEND

- Limits of SIWP
- Prior Soil Sample Location
- Proposed Shallow Soil Boring Location
- Proposed Deep Soil Boring Location
- Klamath River

N

0 75 150

Feet

FIGURE 3-5
Copco No. 2 Wood Stave Penstock
Lower Klamath Hydroelectric Project

Jacobs

\\DC1VS01\GISPROJ\P\PACIFICORP\KLAMATH_DAM_REMOVAL_REMEDIATION\MAPFILES\WORKING\2021\CA\FIG3_5_COPCONO2WOODSTAVEPENSTOCK.MXD ED035443 9/14/2021 4:43:58 PM

LEGEND

- Limits of SIWP
- Fall Creek
- Proposed Shallow Soil Boring Location
- Proposed Deep Soil Boring Location
- Overhead Power Line
- Overhead Telephone Line

N

0 25 50
Feet

Note:
Overhead power and telephone lines are depicted on the ground to show the clearance of the proposed direct push drill rig at the proposed soil boring locations.

FIGURE 3-6
Copco No. 2 Wood Pile
Lower Klamath Hydroelectric Project

Jacobs

LEGEND

- Limits of SIWP
- Former Transformer
- Prior Soil Sample Location
- Proposed Shallow Soil Boring Location
- Powerhouse
- Klamath River

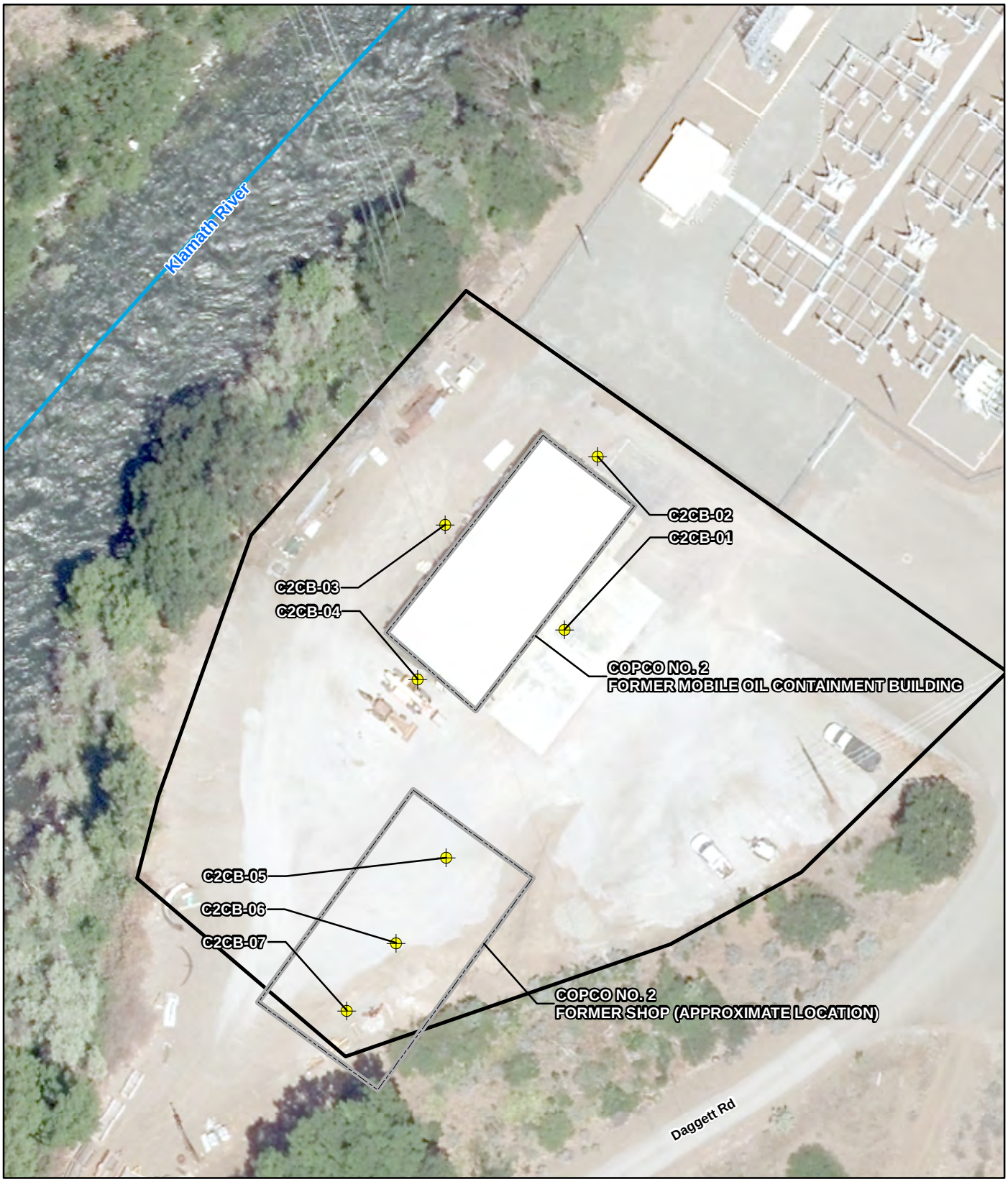
N

0 25 50

Feet

FIGURE 3-7
Copco No. 2 Transformer Fire
Lower Klamath Hydroelectric Project

Jacobs



LEGEND

- Limits of SIWP
- Former Building
- Proposed Deep Soil Boring Location
- Klamath River

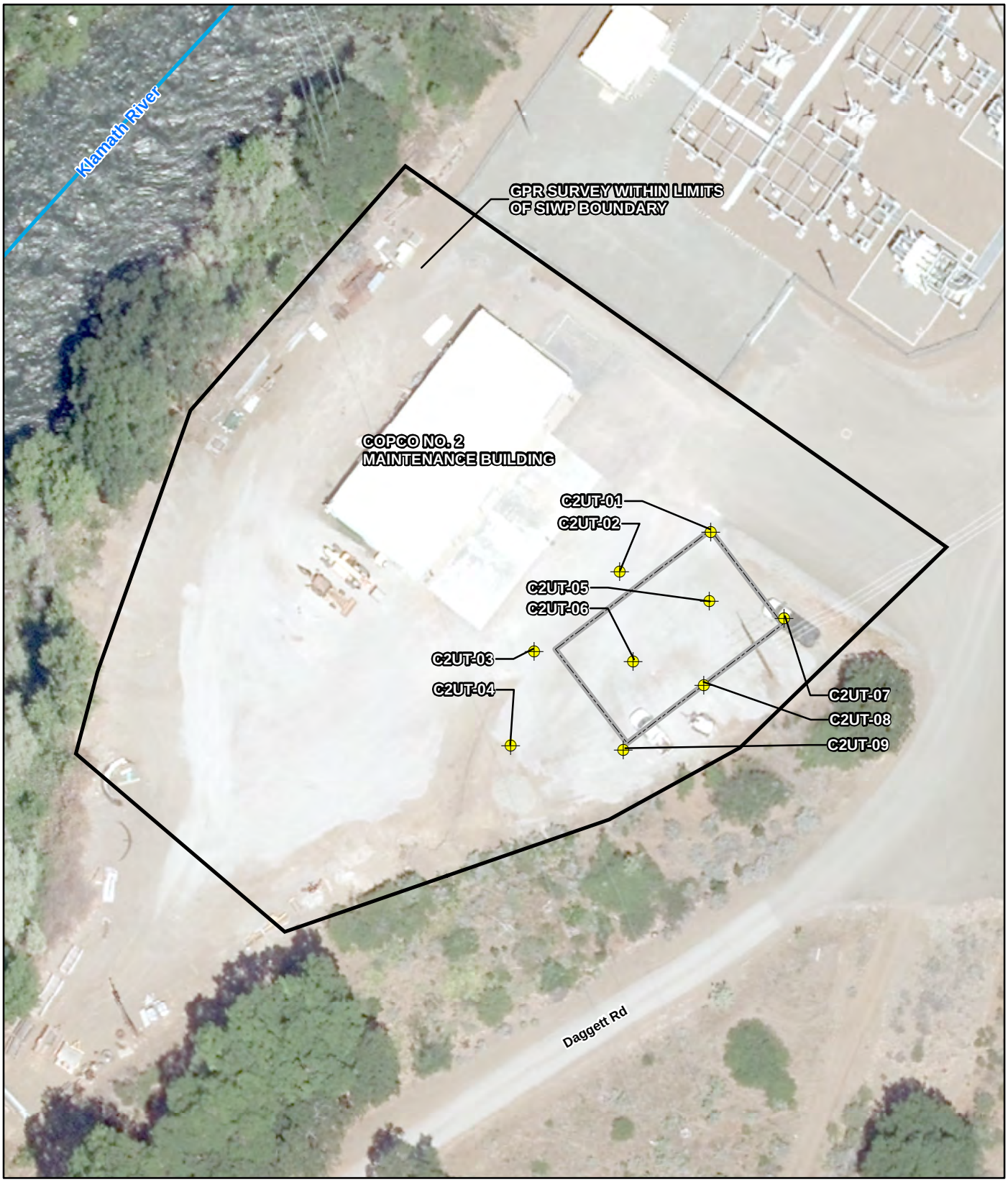
N

0 25 50

Feet

FIGURE 3-8
Copco No. 2 Former Mobile Oil Containment Building
Lower Klamath Hydroelectric Project

Jacobs



LEGEND

- Limits of SIWP
- Approximate Location of Fuel Pumps and USTs
- Proposed Deep Soil Boring Location
- Klamath River

GPR = Ground-Penetrating Radar

N

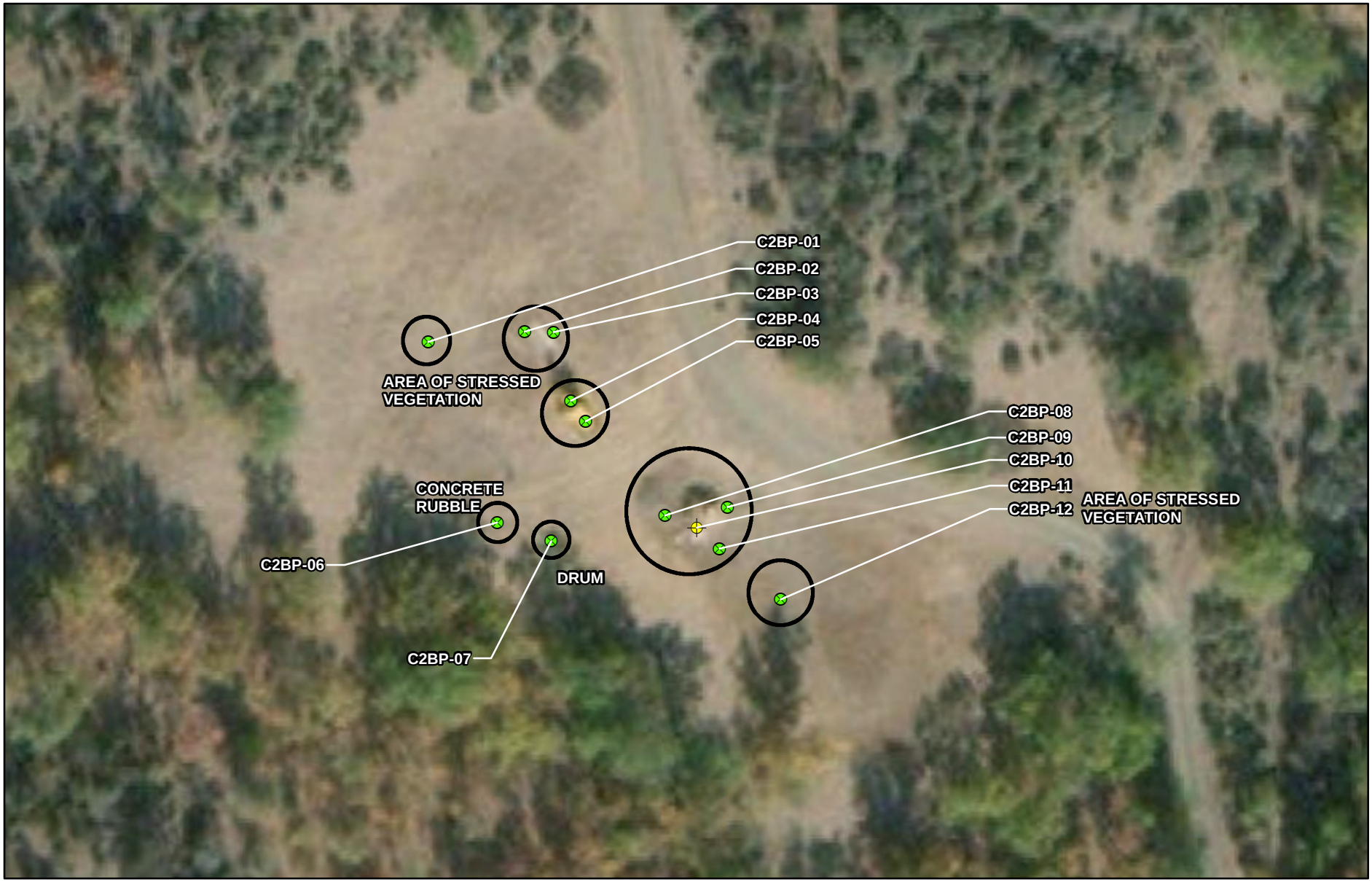
0 25 50

Feet

FIGURE 3-9
Copco No. 2
Underground Storage Tanks
Lower Klamath Hydroelectric Project

UNK \\DC1VS01\GISPROJ\P\PACIFICORP\KLAMATH_DAM_REMOVAL_REMEDIATION\MAPFILES\WORKING\2021\CA\FIG3_9_COPCONO2UNDERGROUNDSTORAGETANKS.MXD ED035443 9/15/2021 9:31:23 AM

Jacobs



LEGEND

Limits of SIWP

Proposed Shallow Soil Boring Location

Proposed Deep Soil Boring Location

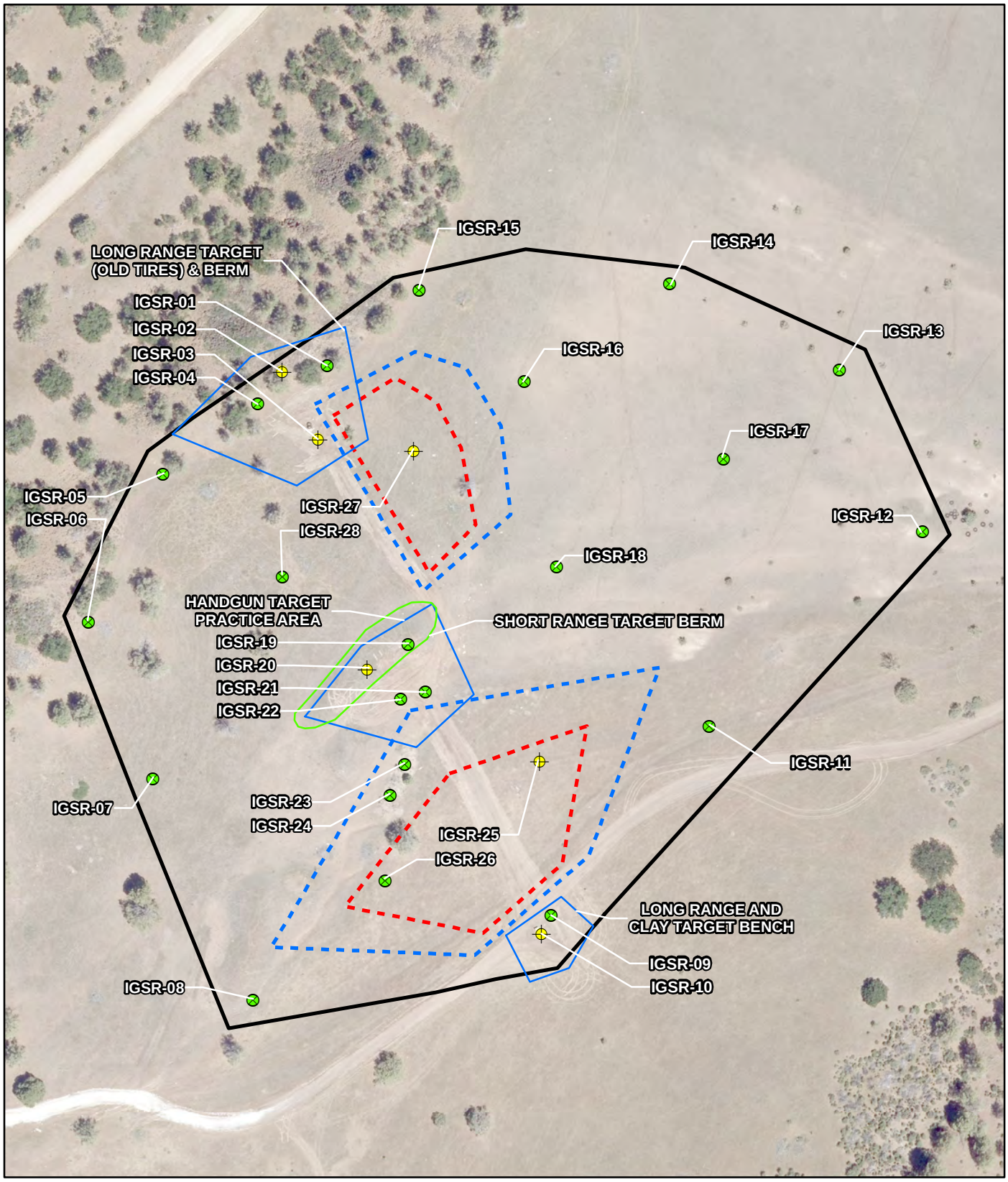
N

0 25 50

Feet

FIGURE 3-10
Copco No. 2 Burn Pit
Lower Klamath Hydroelectric Project

Jacobs



LEGEND

- Limits of SIWP
- Site Features
- Target Berm
- Clay Target Remnants
- Lead Shot Remnants
- Proposed Shallow Soil Boring Location
- Proposed Deep Soil Boring Location

N

0 75 150

Feet

FIGURE 3-11
Iron Gate Shooting Range
Lower Klamath Hydroelectric Project

Jacobs

LEGEND

Limits of SIWP

Proposed 4-Point Composite Sampling Location

Proposed Deep Soil Boring Location

Klamath River

Notes:

1. One 4-point composite grab sample of visually impacted material will be collected for every 1,000 cubic yards of visually impacted material observed.

N

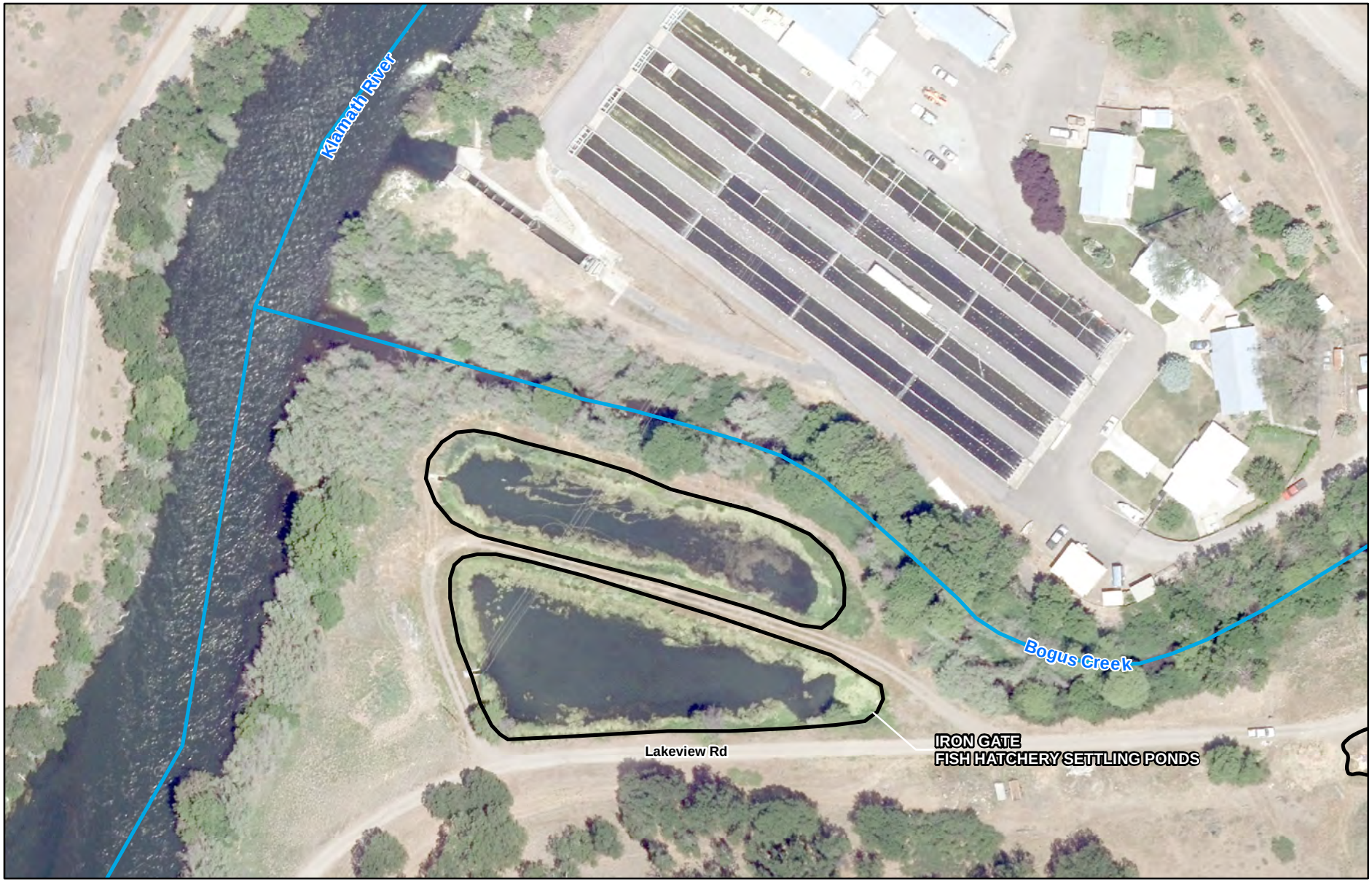
0 25 50

Feet

FIGURE 3-12

Iron Gate Fish Hatchery Burn Pit

Lower Klamath Hydroelectric Project



LEGEND

Limits of SIWP

River/Creek

N

0 50 100

Feet

FIGURE 3-13
Iron Gate Fish Hatchery Settling Ponds
Lower Klamath Hydroelectric Project

Appendix A
Sampling and Analysis Plan

Lower Klamath Hydroelectric Project (FERC No. P-14803)

California Sampling and Analysis Plan

Final

November 2021

Prepared by:

Jacobs

Prepared for:

PACIFICORP

Contents

Attachment

Tables

Tables (located at the end of text)

Acronyms and Abbreviations

°C	degrees Celsius
CoC	chain-of-custody
COPC	constituent of potential concern
ESA	environmental site assessment
FTL	Field Team Lead
GPS	global positioning system
HDPE	high-density polyethylene
HS&E	health, safety, and environment
HSM	Health and Safety Manager
HSP	Health and Safety Plan
ID	identification
IDW	investigation-derived waste
MDL	method detection limit
mL	milliliter
MS/MSD	matrix spike/matrix spike duplicate
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PM	project manager
PPE	personal protective equipment
Project	Klamath Hydroelectric Project
REC	recognized environmental condition
RL	reporting limit
SC	Safety Coordinator
SIWP	Site Investigation Work Plan
SVOC	semivolatile organic compound
TPH	total petroleum hydrocarbon
VOC	volatile organic compound

Sampling and Analysis Plan

This sampling and analysis plan provides the general procedures and protocols for soil, and groundwater sample collection, handling, and analysis associated with the 11 recognized environmental conditions (RECs) identified during Phase 1 environmental site assessments (Phase 1 ESAs) for the Klamath Hydroelectric Project (Project) in California.

Sample locations, samples to be collected, and analysis to be conducted on those samples are identified in Section 3 of the *Klamath Hydroelectric Project California Site Investigation Work Plan* (Site Investigation Work Plan [SIWP]) (Jacobs 2021).

1. Sample Collection and Handling

Sample locations were selected at the likely location of contamination and the anticipated boundaries of where contaminants could occur. Groundwater sampling will be performed if encountered at the RECs. Soil sample locations and sampling depths may change based on refusal, field conditions, and observations of soil when hand augering or advancing direct-push technology borings. Step-out borings may be advanced and deeper soil samples collected if soil is found to be stained, odorous, or has photoionization detector readings greater than 50 parts per million by volume.

The sampling approach at the Copco No. 1 Dynamite Cave is unique and different from the other RECs. The sampling methods for that site are described in Section 3.5 of the SIWP.

1.1 Sample Collection

Planned sample locations may be adjusted in the field, if necessary, based on site-specific access conditions and/or to address safety concerns; final sample locations will be documented with a handheld global positioning system (GPS) unit. A hand auger or direct-push technology drill rig will be used to advance soil borings for the collection of soil samples. Before sampling, surficial soil, gravel, and organic material, such as vegetation roots and debris, will be scraped away. Soil samples will be collected directly into sample jars supplied by the analytical laboratory or will be transferred into sample containers with a decontaminated hand trowel. A disposable bailer will be used to collect groundwater samples, if groundwater is encountered.

1.2 Sampling Equipment

To facilitate the collection of surface or subsurface soil samples, the sampling team will use equipment that includes, but is not limited to, the following items:

- Photoionization detector or flame-ionization detector
- Disposable bailers
- Clean high-density polyethylene (HDPE) or glass containers for collection of water from bailer
- Stainless steel trowel, scoop, spoon, bowls, and hand auger
- Stainless steel split spoon, split barrel, or continuous sampler
- Soil core samplers (En Core sampler, TerraCore, or equivalent)

- Decontamination equipment (e.g., buckets, brushes, and Liquinox detergent)
- Sample jars, labels, and coolers
- Chain-of-custody (CoC) forms

1.3 Sample Containers, Amounts, Preservatives, and Hold Times

Sample containers, amount of material to be sampled, preservatives, and hold times are based on the target analyte and analysis method (Tables A-1 and A-2).

Sample containers needed for the different constituents to be analyzed will be labeled before collecting samples. Sample containers will be labeled with the following information:

- Project name and number
- Sample identification (ID) to establish unique ID for each sample (see Tables 3-3 through 3-12 in the SIWP)
- Date and time (24-hour clock) of collection
- Field personnel initials
- Preservative in the sample container, if any
- Requested analysis

Each sample collected will be assigned a unique sample ID. The sample ID will be based on the REC and sample locations, and comprise the components presented in Section 3 of the SIWP. For example, at the Copco No. 2 Wood Pile, the sample IDs will use the abbreviation C2WP, followed by the sample location, the sample depth, and the date sampled, as follows: C2WP-01-0.5-YYYYMMDD.

A unique identifier will be added after the sample ID for quality assurance/quality control. The following designations will be used:

- Field duplicate sample: FD
- Equipment blank sample: EB
- Matrix spike/matrix spike duplicate (MS/MSD): MS/MSD

1.3.1 Field Duplicates

Where water samples are collected, field duplicates will be collected at a frequency of 1 duplicate for every 10 water samples or 1 duplicate for each REC if fewer than 10 water samples are collected. The quantity of water could potentially be limited, thus not allowing the collection of a duplicate.

For soil sampling, field duplicates will be collected at a frequency of 1 duplicate for every 10 soil samples or one duplicate for each REC if fewer than 10 soil samples are collected. Field duplicates will be collected at the same time as soil samples. Duplicates will be placed under identical circumstances and treated similarly throughout field activities and laboratory analysis. Analysis of duplicate samples provides a measure of the precision of sample collection, preservation, storage, and laboratory analysis.

1.3.2 Equipment Blanks

Equipment blanks will be collected from equipment used for sampling of soil. Equipment blanks will be collected from hand trowels or other excavation tools by pouring deionized water over the surface of decontaminated sampling equipment. Equipment blanks are used to monitor the effectiveness of the decontamination process. The rinse water is collected in sample bottles and analyzed for the same parameters as the corresponding sample. One soil equipment blank will be collected before sampling starts at a new REC and at least daily during soil sampling.

Disposable bailers will be used for collection of groundwater samples. Therefore, no equipment blanks will be required for water sampling.

1.3.3 Trip Blanks

Trip blanks are samples prepared by a laboratory prior to the sampling event in 40-milliliter (mL) volatile organic analyte sampling vials. These samples remain in the sample cooler in which sample containers are shipped. Trip blanks will be stored in the sample coolers with the investigation samples throughout soil sampling. One trip blank will be included in each cooler containing samples for volatile organic compound (VOC) analysis. Data from analysis of trip blanks are used to determine the presence of any VOC contaminants that may have accumulated during travel to and from the analytical laboratory.

1.3.4 Matrix Spike/Matrix Spike Duplicates

The MS/MSDs are duplicate samples that are collected to evaluate matrix interference and assess effects of the matrix on analyte concentrations. One soil MS/MSD will be collected as a field duplicate at each REC. One soil MS/MSD will be collected for every 20 regular soil samples at REC's where more than 20 regular soil samples are collected. One groundwater MS/MSD will be collected as a field duplicate at each REC where groundwater is encountered and if there is adequate sample volume to collect a native sample and an MS/MSD.

1.4 Field Documentation

Appropriate field activity records will be kept for documentation purposes. This section provides a summary-level description of the appropriate field activity records to be created during field activities.

1.4.1 Sample Identification Method

Samples will be labeled so that analytical data can be easily matched with location data as described above. Field documentation will include completion of all CoC documents, as sampling is completed at each REC. Cross-checking between the sampling plan and the sample IDs will be conducted by different individuals to ensure that all samples are collected, properly identified, and no information is missing.

1.4.2 Field Data Collected

Field notes, sketches of boring locations, GPS coordinates, and observations will be documented in dedicated, water-resistant field notebooks using permanent ink pens. Notes will be logged and include the following items, at a minimum:

- Project name, number, and location
- Date, daily start/lunch/end times, and field personnel
- General description of field activities
- Equipment calibration records
- Health and safety monitoring records
- Initials or signature at the bottom of each page

Each entry will be dated to show that notes are being taken daily. Unused portions of a page will have a line drawn through them to indicate the space is intentionally blank. Errors will be crossed out with a single line and initialed by the note taker. No erasure will occur and no correction fluid will be used.

Notes will also include sample locations; visual and olfactory characteristics and photoionization detector readings indicating evidence of contamination of the soil, water, or sediment sampled; time of sample collection; visual observations (such as weather conditions); and other relevant information. Any deviations from the SIWP will be noted, with an explanation for the deviation. Notes will be double-checked for completeness before the field personnel leaves the site or at the end of the work-day. Complete notes will be scanned and retained in the project file by the project name and number after the field activities are complete.

Photos will be taken throughout field activities to document RECs, investigation methods, and testing. A photo log will be kept that details the date, time, location, and features captured in the images.

1.5 Sample Handling, Packing, and Shipping

1.5.1 Sample Handling

Sample custody documentation allows sample possession to be traced from the time of sample collection until receipt of the samples at the laboratory. Samples will be placed in the custody of the field personnel responsible for collecting samples. Sample possession will be documented according to the CoC procedures.

The CoC form serves as a record of sample collection information, requested analysis, and sample tracking. The CoC forms will be obtained from the laboratory receiving the samples at the same time as the sample containers. The following information will be recorded on the CoC form at the time of sample collection:

- Project name and number
- Name of project manager (PM), field personnel, and laboratory
- Sample ID to establish unique ID for each sample
- Date and time (24-hour clock) of collection

- Number of containers for each sample
- Requested analysis and turnaround times

The CoCs are legal documents and must be filled out in pen with legible handwriting. If a mistake is made, the portion in error will be crossed out with a single line and the individual making the correction must initial the correction.

The CoC form will be prepared, sent electronically to the PM for review, and placed in a sealed plastic bag taped to the inside lid of a cooler once approved by the PM before any cooler leaves the site by means other than courier or field personnel. A custody seal will be signed and dated by the relinquishing field personnel and placed on the cooler so that the cooler cannot be opened without the custody seal being broken. The cooler will be shipped via overnight courier to the laboratory. Samples will remain in sight of field personnel or in a locked location until shipped to the laboratory to retain sample custody.

Upon transferring custody of the samples, the individuals relinquishing and receiving the samples will sign, date, and note the time of transfer on the CoC form(s). The method of shipment, courier name, and other pertinent information will be entered in the remarks section of the CoC form, as necessary. The samples will be inventoried to verify that sample labels and ID match the CoC form. Upon completion of analysis, the laboratory will send copies of the appropriate CoC forms with the analytical reports.

1.5.2 Sample Packing and Shipping

Sample containers will be wrapped, sealed in plastic bags, and placed on ice in a cooler to keep the temperature below 4 degrees Celsius (°C). Two large black plastic bags will be placed one within the other inside the cooler. Samples will be placed in the interior bag and surrounded with loose ice. This interior bag will then be sealed with a zip tie. The second bag will then be sealed with a zip tie. The purpose of the second bag is to contain any leakage from the interior bag. Inert packing materials will be used to fill void space within a cooler to prevent the movement and potential breakage of sample containers during transport. Trip blanks will be placed in sample coolers that contain VOC water and soil samples.

1.6 Roles and Responsibilities

1.6.1 Project Manager

The PM is responsible for providing adequate resources and ensuring that field staff have adequate experience and training for project-specific implementation of the health, safety, and environment (HS&E) management process. The PM and Health and Safety Manager (HSM) cooperatively have overall HS&E program responsibility; however, specific tasks may be delegated to other project staff. The PM retains ultimate HS&E responsibility for the project. The PM will solicit the appropriate technical expertise to adequately identify the best drilling and sampling technology for the job given the current understanding of the site lithology.

1.6.2 Health and Safety Manager

The HSM is responsible for site-specific HS&E and overall compliance with project HS&E requirements. The HSM conducts personal protective equipment (PPE) evaluations, selects the appropriate PPE for the project, lists the requirements in the Health and Safety Plan (HSP), coordinates with the Field Team Lead (FTL), Safety Coordinator (SC), or both, to complete and certify the PPE program, and conducts project audits on the effectiveness of the HS&E program.

1.6.3 Safety Coordinator

The role of SC is sometimes designated to the FTL by the PM, to assist in implementing the project HSP. The SC assists the FTL and HSM with the HS&E program, implements the PPE requirements described in the project HSP, and receives input from project staff that the assigned PPE requirements and ongoing HS&E procedures are effective.

1.6.4 Field Team Lead

The FTL, in conjunction with the SC, is responsible for overall compliance with this SAP. The FTL is responsible for following these procedures or delegating field sampling tasks to team members. The FTL should verify that subcontractors adequately comply with this SAP and the HSP.

2. Laboratory Analytical Methods and Detection Limits

2.1 Analytical Methods

Samples will be analyzed at an approved laboratory with standard turnaround times. The laboratory will provide the proper sampling containers and will comply with the analytical, holding time, sample receipt, and error correction requirements as specified and described in the analytical methods (Tables A-1 and A-2). Any out-of-control events must be explained in the narrative. Out-of-control events must be shown to be back in control prior to sample analysis.

All analyses will result in quantitative data, unless specified differently. Electronic data deliverables are required. Any reporting limits (RLs) that are not met will be identified. The laboratory can propose a different method of analysis as an alternative, but such proposals are subject to approval by the PM before that analysis occurs.

The laboratory will comply with the calibration acceptance criteria for all analyses and analyze quality control samples at the frequency specified in the methods. The laboratory will complete extractions, analyses, reextractions, reanalyses, and dilutions within the holding times based on time of sample collection for each parameter. The laboratory will send notification if any sample-specific quality control requirement is not met or if the sample volume received by the laboratory is insufficient to conduct analyses.

The laboratory will also perform the following tasks:

- Inspect shipping containers, custody seals, and samples, and document their condition.

- Check the temperature within the coolers upon receipt and record that temperature on the CoC form.
- Record the condition of the samples in a signed, dated, and bound logbook and on the CoC form; sign and date the entries in the logbook and the CoC form.
- Check the hydrogen (ion) concentration (pH) of preserved samples upon receipt and record on the CoC form.
- Note any breakage, discrepancy, or improper preservation as an out-of-control event and record the event and the corrective action on an out-of-control form, which will be signed and dated by the laboratory personnel and any other personnel responsible for the corrective action.

The laboratory personnel will send notification of discrepancies in shipments to the PM within 24 hours. Any instructions must be received by the laboratory in writing prior to the processing of samples.

The laboratory will provide the following deliverables:

- The CoC for samples collected and submitted for analyses will be emailed on the date of sample receipt.
- The laboratory will submit a complete report within 24 calendar days of sampling. The analytical report will be submitted electronically. The deliverable for each sample will not be considered complete until electronic data have been received. Files with errors will be returned for corrective action.
- The laboratory will provide a Level 2 data package that contains sample receipt information, analysis performed, analytical results, and associated quality control. The project chemist will perform validation of data reports as they are released by the laboratory.

Analytical reports from the laboratory will be reviewed for accuracy and completeness. If required, data quality and quality assurance information from the laboratory will be reviewed to verify discrepancies in the analytical data. Qualified personnel will review and tabulate laboratory confirmation data and field sampling results.

2.2 Detection Limits

Laboratory data will be collected in accordance with analytical methods capable of measurement at prespecified RLs. Reporting limits and method detection limits (MDLs) are developed by the laboratories used for the specific analysis methods employed (Tables A-3 and A-4). Tables A-3 and A-4 include the California screening levels determined in Section 3.3 of the SIWP. The selected laboratory will use the best available technologies and associated MDLs.

Nondetect values for constituents of potential concern (COPCs) on the target analyte list will be appropriately qualified in accordance with standard laboratory practice utilizing accepted data qualifiers for nondetects, estimated values, and verified detections. Application of data qualifiers to the final sample result will be based on laboratory MDLs and RLs. Nondetect values for COPCs

will be reported at the RL but qualified as estimated down to the MDL. These values are nonzero values.

The final sample result is flagged by the laboratory with a J-qualifier in instances where the actual sample concentration lies between the RL and the MDL. This flag indicates an estimated concentration. Laboratory analysis results flagged with a J-qualifier will be used if all other acceptance criteria are met. Sample results that are less than the MDL will be reported at the MDL and flagged by the laboratory with a U-qualifier.

3. Health and Safety

A Health and Safety Plan (HSP, as defined above) will be prepared to detail health and safety protocols for field investigations. The HSP will include required elements from PacifiCorp's Hydro Resources Contractor Orientation (revision 1.8.3, December 2013) for the work being performed. A health and safety meeting will be conducted at the start of each day to cover the daily scope of work and known hazards. This briefing will be repeated if work locations, methods, or other conditions (e.g., weather) change during the day. Any new people arriving onsite after the daily briefing will be briefed by the site manager. Personnel PPE will be worn in accordance with PacifiCorp health and safety requirements appropriate for the work being conducted.

Field personnel will contact the PM and PacifiCorp immediately if any problems or health and safety incidents occur, or as necessary if questions or problems arise. Daily field records and detailed soil sampling records will be provided to the PM after the completion of a field event. Field personnel will provide the PM and PacifiCorp with a daily project status update and notify the PM if any visitors are onsite or of any challenges encountered.

4. Equipment Decontamination

For water sampling, disposable bailers and sample bottles will be used for sample collection; therefore, no decontamination will be required as water sampling will be discrete. A hand trowel or other excavation tool will be used for soil sample collection at each soil sample location. Soil sampling equipment will be washed with a cleaning detergent and hot water prior to and after each use to remove any particulate matter or surface film. Soil sampling equipment will be rinsed thoroughly with tap water, followed by deionized or organic-free water. The substitution of higher-purity water is permitted during cleaning and decontamination and does not have to be noted as a variation from the sampling plan. Sampling equipment will be wrapped in aluminum foil, with dull side in, to prevent contamination during storage or transport to the field.

Field measurement equipment will be kept clean to ensure accurate performance and to reduce the potential for cross-contamination. Sampling probes immersed in sample media will be triple-rinsed in distilled water prior to use at each new sample location. The probes will be cleaned daily and calibrated and stored in accordance with the manufacturer's recommended procedures.

Direct-push technology will be used during field activities. Excavation tools will be washed with a cleaning detergent to remove oil, grease, and hydraulic fluid from the exterior of the unit before mobilizing to the site. The cleaning detergent does not have to be laboratory detergent and will not be a degreaser. The excavation tools will be decontaminated prior to each new soil boring location. Decontamination will include hot-water pressure washing to remove all visible evidence of soil, encrustations, or films. Excavation tools will be rinsed with deionized water after pressure washing and prior to use. Cleaning will occur over or on a decontamination trailer to collect wastewater. Decontamination water will be captured, drummed, and stored onsite until sample results are obtained to determine disposal requirements.

5. Waste Management and Disposal

Investigation-derived waste (IDW) will be managed in accordance with USEPA guidance. Wastes potentially generated during field activities include PPE, disposable hand trowels or other excavation tools, soil cuttings, and water produced during decontamination. Standard PPE and other disposable items will be placed in plastic bags and disposed of properly in a trash receptacle. Soil generated during field activities will be contained in drums labeled on the top and side with a description of the contents and accumulation date. Space will be left between the drums during temporary staging so field personnel can use a wrench to remove the drum lids without having to move the drums. A log will be kept of the contents of each drum. Drums will be stored in an area approved by PacifiCorp.

Soil and aqueous IDW will be characterized in accordance with 40 *Code of Federal Regulations* 261 Subpart C – Characteristics of Hazardous Wastes rule. Soil IDW will be sampled at a frequency of one composite per drum. One sample of aqueous IDW will be collected per drum. IDW samples will be submitted to a laboratory for the COPCs associated with the REC.

Soil IDW is anticipated to be nonhazardous and will be managed onsite, consistent with USEPA guidance. Aqueous IDW that is confirmed to be nonhazardous, will be disposed of in a PacifiCorp-designated upland location away from streams and wetlands following testing, review, and acceptance by PacifiCorp. IDW disposal will be coordinated with the PacifiCorp representatives and that coordination will be documented prior to disposal.

Attachment Tables

Table A-1. Soil Sample Containers, Preservation, and Holding Times

Lower Klamath Hydroelectric Project California Sampling and Analysis Plan

Analyte	Method	Container and Minimum Quantity Soil/Sediment	Preservation	Holding Time
Purgeable TPH (Gasoline)	SW8015B	4 EnCore samplers (or equivalent)	Chill to 4°C (±2°C)	48 hours by EnCore or equivalent sampler unless extruded and preserved with 48 hours 14 days if solid samples preserved by the following methods: • 4°C/frozen in 48 hours • Frozen onsite • Sodium bisulfate • Methanol
Extractable TPH (as diesel/as motor oil)	SW8015B	8-oz/G or T	Chill to 4°C (±2°C)	14 days to extraction (soil); 40 days to analysis
Title 22 Metals	SW6010B/SW7471A	8-oz/G or T	Chill to 4°C (±2°C)	180 days to analysis; 28 days to analysis (mercury)
VOCs	SW8260B	4 EnCore samplers (or equivalent)	Chill to 4°C (±2°C)	48 hours by EnCore or equivalent sampler unless extruded and preserved with 48 hours 14 days if solid samples preserved by the following methods: • 4°C/frozen in 48 hours • Frozen onsite • Sodium bisulfate • Methanol
SVOCs	SW8270C	8-oz G or T	Chill to 4°C (±2°C)	14 days to extraction; 40 days to analysis
PAHs	SW8270C-SIM	8-oz G or T	Chill to 4°C (±2°C)	14 days to extraction; 40 days to analysis
Pest/PCBs	SW8081/8082	8-oz G or T	Chill to 4°C (±2°C)	14 days to extraction; 40 days to analysis
Dioxins/Furans	SW8290A	8-oz G or T	Chill to 4°C (±2°C)	30 days to extraction; 45 days to analysis
Explosives	SW8330A	8-oz G or T	Chill to 4°C (±2°C)	14 days to extraction; 40 days to analysis
Reactivity:				
Reactive Cyanide	S.7.3 SW-846	8-oz wide-mouth glass jar	Chill to 4°C (±2°C)	As soon as possible
Reactive Sulfide	S.7.3 SW-846	Share with Reactive Cyanide	Chill to 4°C (±2°C)	As soon as possible
Ignitibility	EPA 1020	4-oz wide-mouth glass jar	Chill to 4°C (±2°C)	14 days

Table A-1. Soil Sample Containers, Preservation, and Holding Times

Lower Klamath Hydroelectric Project California Sampling and Analysis Plan

Analyte	Method	Container and Minimum Quantity Soil/Sediment	Preservation	Holding Time
Corrosivity	EPA 9045C	4-oz wide-mouth glass jar	Chill to 4°C (±2°C)	As soon as possible
TCLP/STLC Metals	EPA 1311 (extraction), followed by SW6010B/ SW7471A	Share with 8-oz Total Jar above	Chill to 4°C (±2°C)	EPA 1311 - 180/28 days from collection to TCLP extraction: 28 days after EPA 1311 to analysis for mercury; 180 days for all others
TCLP/STLC VOCs	EPA 1311 (extraction), SW8260B	25-gram EnCore-type device	Chill to 4°C (±2°C)	EPA 1311 - 14 days from collection to TCLP extraction: 14 days for analysis if preserved
TCLP/STLC SVOCs	EPA 1311 (extraction), followed by 8270D	Share with 8-oz Total Jar above	Chill to 4°C (±2°C)	EPA 1311-14 days from collection to TCLP extraction 7 days after EPA 1311 to preparative extraction 40 days for analysis
TCLP/SLTC Organochlorine Pesticides	EPA 1311 (extraction), followed by 8081	Share with 8-oz Total Jar above	Chill to 4°C (±2°C)	EPA 1311-14 days from collection to TCLP extraction 7 days after 1311 to preparative extraction 40 days for analysis
TCLP/STLC Chlorinated Herbicides	EPA 1311 (extraction), followed by 8151A	8-oz G or T	Chill to 4°C (±2°C)	EPA 1311-14 days from collection to TCLP extraction 7 days after 1311 to preparative extraction 40 days for analysis
Percent Moisture/Percent Solids	Moisture	Share	Chill to 4°C (±2°C)	Not applicable

Notes:

°C = degree(s) Celsius
EPA = U.S. Environmental Protection Agency
G = glass
oz = ounce
SVOC = semivolatile organic compound
T = brass sleeves in the sample barrel (sometimes called California brass)
TCLP = toxicity characteristic leaching procedure
TPH = total petroleum hydrocarbon
VOC = volatile organic compound

Table A-2. Water Sample Containers, Preservation, and Holding Times

Lower Klamath Hydroelectric Project California Sampling and Analysis Plan

Analyte	Method	Container and Minimum Quantity	Preservation	Prep/Analysis Holding Time
Purgeable TPH (Gasoline)	SW8015B	3-Glass VOA Vial, Tef Cap 40-mL	Cool to <6°C; HCl to pH <2	14 days
Extractable TPH (as diesel/as motor oil)	SW8015B	2-Glass Amber Liter, Tef Cap 1-L	Cool to <6°C	7 days to extraction; 40 days to analysis
Title 22 Metals	SW6010B/ SW7471A	HDPE, 250-mL	Cool to <6°C; HNO_3 to pH <2	6 months
VOCs	SW8260B	3-Glass VOA Vial, Tef Cap 40-mL	Cool to <6°C; HCl to pH <2	14 days
SVOCs	SW8270C	2-Glass Amber Liter, Tef Cap 1-L	Chill to 4°C (±2°C)	7 days to extraction; 40 days to analysis
PAHs	SW8270C-SIM	2-Glass Amber Liter, Tef Cap 1-L	Chill to 4°C (±2°C)	7 days to extraction; 40 days to analysis
Pest/PCBs	SW8081/8082	2-Glass Amber Liter, Tef Cap 1-L	Chill to 4°C (±2°C)	7 days to extraction; 40 days to analysis
Dioxins/Furans	SW8290A	2-Glass Amber Liter, Tef Cap 1-L	Chill to 4°C (±2°C)	30 days to extraction; 45 days to analysis

Notes:

°C = degrees Celsius
G = glass
L = liter
mL = milliliter
oz = ounce
SVOC = semivolatile organic compound
T = brass sleeves in the sample barrel (sometimes called California brass)
TPH = total petroleum hydrocarbon
VOC = volatile organic compound

Table A-3. Soil Reporting Limits and California Screening Levels

Lower Klamath Hydroelectric Project California Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Soil Screening Level for Sites with Human Health and Leaching to Groundwater (mg/kg)	Soil Screening Level for Sites with Ecological Receptors (mg/kg)	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)
TPH: SW8015B-P					
Gasoline	GRO	4.3E+02	4.3E+02	5.0E-01	5.0E-02
TPH: SW8015B-E					
Diesel	DRO	2.6E+02	2.6E+02	1.0E+00	5.0E-01
Motor oil	MRO	1.2E+04	1.2E+04	5.0E+00	3.8E+00
Metal: SW6010B					
Antimony	7440-36-0	3.1E+01	6.7E-01	2.0E+00	9.4E-01
Arsenic	7440-38-2	1.9E+01	1.9E+01	2.0E+00	1.3E+00
Barium	7440-39-3	1.5E+04	6.3E+02	1.0E+00	1.2E-01
Beryllium	7440-41-7	1.6E+01	2.5E+00	2.0E-01	3.0E-02
Boron	7440-42-8	1.6E+04	2.0E+00	1.0E+01	1.3E+00
Cadmium	7440-43-9	7.1E+01	5.4E-01	2.0E-01	3.0E-02
Chromium	7440-47-3	1.2E+05	2.0E+02	5.0E-01	1.4E-01
Cobalt	7440-48-4	2.3E+01	1.3E+01	5.0E-01	2.5E-01
Copper	7440-50-8	3.1E+03	7.3E+01	1.5E+00	2.2E-01
Iron	7439-89-6	5.5E+04	5.5E+04	1.0E+01	1.1E+00
Lead	7439-92-1	8.0E+01	3.4E+01	1.0E+00	2.6E-01
Manganese	7439-96-5	2.1E+03	2.1E+03	5.0E-01	2.5E-01
Molybdenum	7439-98-7	3.9E+02	2.0E+00	2.0E+00	7.5E-01
Nickel	7440-02-0	8.2E+02	1.1E+02	1.0E+00	2.4E-01
Selenium	7782-49-2	3.9E+02	5.2E-01	2.0E+00	1.4E+00
Silver	7440-22-4	3.9E+02	4.2E+00	5.0E-01	9.0E-02
Thallium	7440-28-0	2.8E+00	2.8E+00	2.0E+00	8.4E-01
Vanadium	7440-62-2	3.9E+02	2.8E+02	5.0E-01	1.9E-01
Zinc	7440-66-6	2.3E+04	1.7E+02	2.0E+00	1.9E-01
Mercury	7439-97-6	1.0E+00	2.4E-01	4.0E-02	8.6E-03
VOC: SW8260B					
1,1,1,2-Tetrachloroethane	630-20-6	1.7E-02	1.7E-02	5.0E-03	4.1E-04
1,1,1-Trichloroethane	71-55-6	7.0E+00	7.0E+00	5.0E-03	3.6E-04
1,1,2,2-Tetrachloroethane	79-34-5	1.8E-02	1.8E-02	5.0E-03	6.8E-04
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	6.7E+03	6.7E+03	1.0E-02	8.3E-04
1,1,2-Trichloroethane	79-00-5	7.6E-02	7.6E-02	5.0E-03	4.4E-04
1,1-Dichloroethane	75-34-3	2.0E-01	2.0E-01	5.0E-03	2.9E-04
1,1-Dichloroethene	75-35-4	5.4E-01	5.4E-01	5.0E-03	2.6E-04
1,1-Dichloropropene	563-58-6	1.8E+00	1.8E+00	5.0E-03	3.7E-04
1,2,3-Trichlorobenzene	87-61-6	4.0E+01	2.0E+01	5.0E-03	7.5E-04
1,2,3-Trichloropropane	96-18-4	1.1E-04	1.1E-04	5.0E-03	7.6E-04
1,2,4-Trichlorobenzene	120-82-1	1.2E+00	2.7E-01	5.0E-03	7.5E-04
1,2,4-Trimethylbenzene	95-63-6	3.0E+02	9.0E-02	5.0E-03	5.1E-04
1,2-Dibromo-3-Chloropropane	96-12-8	5.9E-04	5.9E-04	1.0E-02	8.8E-04
1,2-Dibromoethane (EDB)	106-93-4	5.3E-04	5.3E-04	1.0E-02	2.7E-04

Table A-3. Soil Reporting Limits and California Screening Levels

Lower Klamath Hydroelectric Project California Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Soil Screening Level for Sites with Human Health and Leaching to Groundwater (mg/kg)	Soil Screening Level for Sites with Ecological Receptors (mg/kg)	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)
1,2-Dichlorobenzene	95-50-1	1.0E+00	9.0E-02	5.0E-03	6.4E-04
1,2-Dichloroethane	107-06-2	7.0E-03	7.0E-03	5.0E-03	7.3E-04
1,2-Dichloropropane	78-87-5	6.5E-02	6.5E-02	5.0E-03	6.0E-04
1,3,5-Trimethylbenzene	108-67-8	2.7E+02	7.0E-02	5.0E-03	3.5E-04
1,3-Dichlorobenzene	541-73-1	7.4E+00	8.0E-02	5.0E-03	3.0E-04
1,3-Dichloropropane	142-28-9	4.1E+02	4.1E+02	5.0E-03	5.7E-04
1,4-Dichlorobenzene	106-46-7	2.0E-01	2.0E-01	5.0E-03	7.8E-04
2,2-Dichloropropane	594-20-7	2.5E+00	2.5E+00	5.0E-03	3.8E-04
2-Butanone (MEK)	78-93-3	6.1E+00	6.1E+00	1.0E-02	1.4E-03
2-Chlorotoluene	95-49-8	4.7E+02	4.7E+02	5.0E-03	6.2E-04
2-Hexanone	591-78-6	2.0E+02	3.6E-01	1.0E-02	7.4E-04
4-Chlorotoluene	106-43-4	4.4E+02	4.4E+02	5.0E-03	8.6E-04
4-Methyl-2-pentanone (MIBK)	108-10-1	3.6E-01	3.6E-01	1.0E-02	9.2E-04
Acetone	67-64-1	9.2E-01	9.2E-01	2.0E-02	1.4E-03
Benzene	71-43-2	2.5E-02	2.5E-02	5.0E-03	2.6E-04
Bromobenzene	108-86-1	2.9E+02	2.9E+02	5.0E-03	5.2E-04
Bromochloromethane	74-97-5	1.5E+02	1.5E+02	5.0E-03	9.4E-04
Bromodichloromethane	75-27-4	1.6E-02	1.6E-02	5.0E-03	5.3E-04
Bromoform	75-25-2	6.9E-01	6.9E-01	5.0E-03	4.0E-04
Bromomethane	74-83-9	3.6E-01	3.6E-01	5.0E-03	8.6E-04
Carbon disulfide	75-15-0	7.7E+02	8.1E-01	1.0E-02	4.9E-04
Carbon tetrachloride	56-23-5	7.6E-02	7.6E-02	5.0E-03	5.3E-04
Chlorobenzene	108-90-7	1.4E+00	1.4E+00	5.0E-03	2.9E-04
Chloroethane	75-00-3	1.2E+00	1.2E+00	5.0E-03	4.5E-04
Chloroform	67-66-3	2.3E-02	2.3E-02	5.0E-03	2.6E-04
Chloromethane	74-87-3	1.1E+01	1.1E+01	5.0E-03	5.0E-04
cis-1,2-Dichloroethene	156-59-2	1.9E-01	1.9E-01	5.0E-03	8.9E-04
cis-1,3-Dichloropropene	10061-01-5	1.8E+00	1.8E+00	5.0E-03	6.4E-04
Dibromochloromethane	124-48-1	3.5E-01	3.5E-01	5.0E-03	2.1E-04
Dibromomethane	74-95-3	2.4E+01	2.4E+01	5.0E-03	5.8E-04
Dichlorodifluoromethane	75-71-8	8.7E+01	8.7E+01	5.0E-03	8.9E-04
Ethylbenzene	100-41-4	4.3E-01	2.7E-01	5.0E-03	3.4E-04
Hexachlorobutadiene	87-68-3	2.8E-02	9.0E-03	5.0E-03	3.3E-04
Isopropylbenzene	98-82-8	1.9E+03	1.9E+03	5.0E-03	5.2E-04
Methyl tert-butyl ether	1634-04-4	2.8E-02	2.8E-02	1.0E-02	6.0E-04
Methylene Chloride	75-09-2	1.2E-01	1.2E-01	1.0E-02	8.4E-04
m-Xylene & p-Xylene	179601-23-1	5.5E+02	1.4E+00	5.0E-03	8.1E-04
Naphthalene	91-20-3	4.2E-02	4.2E-02	5.0E-03	6.3E-04
n-Butylbenzene	104-51-8	2.4E+03	2.4E+03	5.0E-03	6.6E-04
N-Propylbenzene	103-65-1	3.8E+03	3.8E+03	5.0E-03	2.9E-04
o-Xylene	95-47-6	6.5E+02	1.4E+00	5.0E-03	3.3E-04
p-Isopropyltoluene	99-87-6	1.1E+03	1.1E+03	5.0E-03	6.3E-04

Table A-3. Soil Reporting Limits and California Screening Levels

Lower Klamath Hydroelectric Project California Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Soil Screening Level for Sites with Human Health and Leaching to Groundwater (mg/kg)	Soil Screening Level for Sites with Ecological Receptors (mg/kg)	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)
sec-Butylbenzene	135-98-8	2.2E+03	2.2E+03	5.0E-03	7.5E-04
Styrene	100-42-5	9.2E-01	9.2E-01	5.0E-03	3.1E-04
tert-Butylbenzene	98-06-6	2.2E+03	2.2E+03	5.0E-03	5.4E-04
Tetrachloroethene	127-18-4	8.0E-02	8.0E-02	5.0E-03	6.1E-04
Toluene	108-88-3	3.2E+00	3.2E+00	5.0E-03	6.1E-04
trans-1,2-Dichloroethene	156-60-5	6.5E-01	6.5E-01	5.0E-03	3.8E-04
trans-1,3-Dichloropropene	10061-02-6	1.8E+00	1.8E+00	5.0E-03	7.5E-04
Trichloroethene	79-01-6	8.5E-02	8.5E-02	5.0E-03	6.0E-04
Trichlorofluoromethane	75-69-4	1.2E+03	5.2E+01	5.0E-03	3.4E-04
Vinyl acetate	108-05-4	9.1E+02	9.1E+02	1.0E-02	6.9E-04
Vinyl chloride	75-01-4	1.5E-03	1.5E-03	5.0E-03	3.6E-04
Xylenes, Total	1330-20-7	2.1E+00	1.4E+00	5.0E-03	8.1E-04
SVOC: SW8270C					
Acenaphthene	83-32-9	1.2E+01	2.5E-01	5.0E-03	6.3E-04
Acenaphthylene	208-96-8	6.4E+00	6.4E+00	5.0E-03	6.6E-04
Anthracene	120-12-7	1.9E+00	1.9E+00	5.0E-03	6.7E-04
Azobenzene	103-33-3	5.6E+00	5.6E+00	3.3E-01	9.2E-02
Benzo[a]anthracene	56-55-3	1.1E+00	7.3E-01	5.0E-03	7.1E-04
Benzo[b]fluoranthene	205-99-2	1.1E+00	1.1E+00	5.0E-03	7.7E-04
Benzo[k]fluoranthene	207-08-9	4.8E+00	4.8E+00	5.0E-03	7.2E-04
Benzo[g,h,i]perylene	191-24-2	2.7E+01	2.5E+01	5.0E-03	7.2E-04
Benzo[a]pyrene	50-32-8	1.1E-01	1.1E-01	5.0E-03	7.0E-04
Benzoic acid	65-85-0	2.5E+05	1.0E-02	1.6E+00	2.9E-01
Benzyl alcohol	100-51-6	6.3E+03	2.0E-03	3.3E-01	1.7E-01
Bis(2-chloroethoxy)methane	111-91-1	1.9E+02	1.9E+02	3.3E-01	8.8E-02
Bis(2-chloroethyl)ether	111-44-4	3.4E-05	3.4E-05	3.3E-01	8.1E-02
bis (2-chloroisopropyl) ether	108-60-1	5.1E-03	5.1E-03	3.3E-01	7.9E-02
Bis(2-ethylhexyl) phthalate	117-81-7	3.9E+01	2.0E-02	3.3E-01	9.8E-02
4-Bromophenyl phenyl ether	101-55-3	--	--	3.3E-01	8.5E-02
Butyl benzyl phthalate	85-68-7	2.9E+02	9.0E+01	3.3E-01	9.5E-02
4-Chloroaniline	106-47-8	6.7E-03	6.7E-03	3.3E-01	5.8E-02
4-Chloro-3-methylphenol	59-50-7	6.3E+03	6.3E+03	3.3E-01	9.2E-02
2-Chloronaphthalene	91-58-7	4.1E+03	4.1E+03	3.3E-01	8.1E-02
2-Chlorophenol	95-57-8	1.2E-02	1.2E-02	3.3E-01	8.8E-02
4-Chlorophenyl phenyl ether	7005-72-3	--	--	3.3E-01	9.3E-02
Chrysene	218-01-9	2.2E+00	2.2E+00	5.0E-03	7.2E-04
Dibenz(a,h)anthracene	53-70-3	2.8E-02	2.8E-02	5.0E-03	7.7E-04
Dibenzofuran	132-64-9	6.6E+01	6.1E+00	3.3E-01	8.6E-02
Di-n-butyl phthalate	84-74-2	6.3E+03	1.1E-02	3.3E-01	9.7E-02
1,2-Dichlorobenzene	95-50-1	1.0E+00	9.0E-02	5.0E-03	6.4E-04
1,3-Dichlorobenzene	541-73-1	7.4E+00	8.0E-02	5.0E-03	3.0E-04
1,4-Dichlorobenzene	106-46-7	2.0E-01	2.0E-01	5.0E-03	7.8E-04

Table A-3. Soil Reporting Limits and California Screening Levels

Lower Klamath Hydroelectric Project California Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Soil Screening Level for Sites with Human Health and Leaching to Groundwater (mg/kg)	Soil Screening Level for Sites with Ecological Receptors (mg/kg)	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)
3,3'-Dichlorobenzidine	91-94-1	2.5E-02	2.5E-02	1.6E+00	9.4E-02
2,4-Dichlorophenol	120-83-2	7.5E-03	7.5E-03	3.3E-01	8.9E-02
Diethyl phthalate	84-66-2	2.5E-02	2.5E-02	3.3E-01	9.0E-02
2,4-Dimethylphenol	105-67-9	8.1E+00	4.0E-02	3.3E-01	1.7E-01
Dimethyl phthalate	131-11-3	3.5E-02	3.5E-02	3.3E-01	8.7E-02
4,6-Dinitro-2-methylphenol	534-52-1	5.1E+00	5.1E+00	1.6E+00	8.1E-02
2,4-Dinitrophenol	51-28-5	3.0E+00	6.1E-02	1.6E+00	2.1E-01
2,4-Dinitrotoluene	121-14-2	2.3E-02	2.3E-02	3.3E-01	8.9E-02
2,6-Dinitrotoluene	606-20-2	3.6E-01	3.6E-01	3.3E-01	9.9E-02
Di-n-octyl phthalate	117-84-0	6.3E+02	9.1E-01	3.3E-01	9.7E-02
Fluoranthene	206-44-0	8.6E+01	1.0E+01	5.0E-03	8.1E-04
Fluorene	86-73-7	6.0E+00	3.7E+00	5.0E-03	6.4E-04
Hexachlorobenzene	118-74-1	8.0E-04	8.0E-04	3.3E-01	8.9E-02
Hexachlorobutadiene	87-68-3	2.8E-02	9.0E-03	5.0E-03	3.3E-04
Hexachlorocyclopentadiene	77-47-4	1.8E+00	1.0E-03	1.6E+00	6.2E-02
Hexachloroethane	67-72-1	1.9E-02	1.9E-02	3.3E-01	8.1E-02
Indeno[1,2,3-cd] Pyrene	193-39-5	1.1E+00	1.1E+00	5.0E-03	7.7E-04
Isophorone	78-59-1	5.7E+02	5.7E+02	3.3E-01	9.3E-02
1-Methylnaphthalene	90-12-0	9.9E+00	9.9E+00	3.3E-01	1.7E-01
2-Methylnaphthalene	91-57-6	8.8E-01	8.8E-01	3.3E-01	8.5E-02
2-Methylphenol	95-48-7	3.2E+03	6.7E-01	3.3E-01	5.8E-02
3-Methylphenol & 4-Methylphenol	15831-10-4	1.9E+04	6.9E-01	6.6E-01	3.3E-01
Naphthalene	91-20-3	4.2E-02	4.2E-02	5.0E-03	6.3E-04
2-Nitroaniline	88-74-4	6.3E+02	5.3E+00	1.6E+00	8.4E-02
3-Nitroaniline	99-09-2	2.7E+01	2.6E+02	1.6E+00	1.7E-01
4-Nitroaniline	100-01-6	2.7E+01	2.7E+01	1.6E+00	8.8E-02
Nitrobenzene	98-95-3	5.1E+00	4.8E+00	3.3E-01	7.6E-02
2-Nitrophenol	88-75-5	1.9E+04	1.9E+04	3.3E-01	8.2E-02
4-Nitrophenol	100-02-7	1.9E+04	1.9E+04	1.6E+00	2.8E-01
N-Nitrosodiphenylamine	86-30-6	1.1E+02	5.5E-01	3.3E-01	8.6E-02
N-Nitrosodi-n-propylamine	621-64-7	7.8E-02	7.8E-02	3.3E-01	8.4E-02
Pentachlorophenol	87-86-5	9.8E-02	9.8E-02	1.6E+00	5.1E-02
Phenanthrene	85-01-8	1.1E+01	5.5E+00	5.0E-03	7.2E-04
Phenol	108-95-2	1.6E-01	1.6E-01	3.3E-01	8.3E-02
Pyrene	129-00-0	4.5E+01	1.0E+01	5.0E-03	7.5E-04
Pyridine	110-86-1	5.8E+01	5.8E+01	6.6E-01	7.2E-02
1,2,4-Trichlorobenzene	120-82-1	1.2E+00	2.7E-01	5.0E-03	7.5E-04
2,4,5-Trichlorophenol	95-95-4	2.9E+00	2.9E+00	3.3E-01	8.3E-02
2,4,6-Trichlorophenol	88-06-2	4.0E-02	4.0E-02	3.3E-01	8.4E-02
PAH: SW8270C-SIM					
Acenaphthene	83-32-9	1.2E+01	2.5E-01	5.0E-03	6.3E-04
Acenaphthylene	208-96-8	6.4E+00	6.4E+00	5.0E-03	6.6E-04

Table A-3. Soil Reporting Limits and California Screening Levels

Lower Klamath Hydroelectric Project California Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Soil Screening Level for Sites with Human Health and Leaching to Groundwater (mg/kg)	Soil Screening Level for Sites with Ecological Receptors (mg/kg)	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)
Anthracene	120-12-7	1.9E+00	1.9E+00	5.0E-03	6.7E-04
Benzo[a]anthracene	56-55-3	1.1E+00	7.3E-01	5.0E-03	7.1E-04
Benzo[a]pyrene	50-32-8	1.1E-01	1.1E-01	5.0E-03	7.0E-04
Benzo[b]fluoranthene	205-99-2	1.1E+00	1.1E+00	5.0E-03	7.7E-04
Benzo[g,h,i]perylene	191-24-2	2.7E+01	2.5E+01	5.0E-03	7.2E-04
Benzo[k]fluoranthene	207-08-9	4.8E+00	4.8E+00	5.0E-03	7.2E-04
Chrysene	218-01-9	2.2E+00	2.2E+00	5.0E-03	7.2E-04
Dibenz(a,h)anthracene	53-70-3	2.8E-02	2.8E-02	5.0E-03	7.7E-04
Fluoranthene	206-44-0	8.6E+01	1.0E+01	5.0E-03	8.1E-04
Fluorene	86-73-7	6.0E+00	3.7E+00	5.0E-03	6.4E-04
Indeno[1,2,3-cd] Pyrene	193-39-5	1.1E+00	1.1E+00	5.0E-03	7.7E-04
Naphthalene	91-20-3	4.2E-02	4.2E-02	5.0E-03	6.3E-04
Phenanthrene	85-01-8	1.1E+01	5.5E+00	5.0E-03	7.2E-04
Pyrene	129-00-0	4.5E+01	1.0E+01	5.0E-03	7.5E-04
Dioxin/Furan: 8290A					
2,3,7,8-TCDD	1746-01-6	4.8E-06	2.9E-07	1.0E-06	1.5E-07
2,3,7,8-TCDF	51207-31-9	4.8E-05	4.8E-05	1.0E-06	1.1E-07
1,2,3,7,8-PeCDD	40321-76-4	4.8E-06	4.8E-06	5.0E-06	3.0E-07
1,2,3,7,8-PeCDF	57117-41-6	1.6E-04	1.6E-04	5.0E-06	2.7E-07
2,3,4,7,8-PeCDF	57117-31-4	1.6E-05	1.6E-05	5.0E-06	2.9E-07
1,2,3,4,7,8-HxCDD	39227-28-6	4.8E-05	4.8E-05	5.0E-06	7.1E-07
1,2,3,6,7,8-HxCDD	57653-85-7	4.8E-05	4.8E-05	5.0E-06	5.8E-07
1,2,3,7,8,9-HxCDD	19408-74-3	4.8E-05	4.8E-05	5.0E-06	5.8E-07
1,2,3,4,7,8-HxCDF	70648-26-9	4.8E-05	4.8E-05	5.0E-06	3.0E-07
1,2,3,6,7,8-HxCDF	57117-44-9	4.8E-05	4.8E-05	5.0E-06	3.8E-07
1,2,3,7,8,9-HxCDF	72918-21-9	4.8E-05	4.8E-05	5.0E-06	4.3E-07
2,3,4,6,7,8-HxCDF	60851-34-5	4.8E-05	4.8E-05	5.0E-06	3.0E-07
1,2,3,4,6,7,8-HpCDD	35822-46-9	4.8E-04	4.8E-04	5.0E-06	4.6E-07
1,2,3,4,6,7,8-HpCDF	67562-39-4	4.8E-04	4.8E-04	5.0E-06	3.8E-07
1,2,3,4,7,8,9-HpCDF	55673-89-7	4.8E-04	4.8E-04	5.0E-06	6.5E-07
OCDD	3268-87-9	1.6E-02	1.6E-02	1.0E-05	1.5E-06
OCDF	39001-02-0	1.6E-02	1.6E-02	1.0E-05	1.2E-06

Table A-3. Soil Reporting Limits and California Screening Levels

Lower Klamath Hydroelectric Project California Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Soil Screening Level for Sites with Human Health and Leaching to Groundwater (mg/kg)	Soil Screening Level for Sites with Ecological Receptors (mg/kg)	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)
Pesticide: 8081A					
4,4'-DDD	72-54-8	1.9E+00	6.3E-03	3.4E-03	1.1E-03
4,4'-DDE	72-55-9	2.0E+00	1.1E-01	3.4E-03	4.8E-04
4,4'-DDT	50-29-3	1.9E+00	4.4E-02	3.4E-03	1.2E-03
Aldrin	309-00-2	3.9E-02	3.7E-02	3.4E-03	5.0E-04
Dieldrin	60-57-1	4.6E-04	4.6E-04	3.4E-03	4.2E-04
Endosulfan sulfate	1031-07-8	3.8E+02	6.5E-03	3.4E-03	5.5E-04
Endrin	72-20-8	7.6E-03	1.4E-03	3.4E-03	6.1E-04
Endrin aldehyde	7421-93-4	1.9E+01	1.9E+01	3.4E-03	1.1E-03
Heptachlor	76-44-8	1.3E-01	1.3E-01	3.4E-03	4.3E-04
Heptachlor epoxide	1024-57-3	1.8E-04	1.8E-04	3.4E-03	8.5E-04
PCB: 8082A					
PCB-1016	12674-11-2	4.0E+00	1.1E+00	3.3E-02	2.6E-03
PCB-1221	11104-28-2	2.0E-01	2.0E-01	3.3E-02	3.6E-03
PCB-1232	11141-16-5	1.7E-01	1.7E-01	3.3E-02	4.8E-03
PCB-1242	53469-21-9	2.3E-01	4.1E-02	3.3E-02	5.9E-03
PCB-1248	12672-29-6	2.3E-01	7.3E-03	3.3E-02	2.4E-03
PCB-1254	11097-69-1	2.4E-01	4.1E-02	3.3E-02	3.8E-03
PCB-1260	11096-82-5	2.4E-01	2.4E-01	3.3E-02	2.7E-03
PCB-1262	37324-23-5	2.4E-01	2.4E-01	3.3E-02	6.8E-03
PCB-1268	11100-14-4	2.4E-01	2.4E-01	3.3E-02	5.4E-03
Explosives: 8330A					
1,3,5-Trinitrobenzene	99-35-4	2.2E+03	1.1E+02	2.5E-01	7.1E-02
1,3-Dinitrobenzene	99-65-0	6.3E+00	7.2E-02	2.5E-01	6.1E-02
2,4,6-Trinitrotoluene	118-96-7	2.1E+01	7.5E+00	2.5E-01	5.8E-02
2,4-Dinitrotoluene	121-14-2	2.3E-02	2.3E-02	2.5E-01	5.0E-02
2,6-Dinitrotoluene	606-20-2	3.6E-01	3.6E-01	2.5E-01	5.4E-02
2-Amino-4,6-dinitrotoluene	35572-78-2	1.5E+02	1.6E+01	2.5E-01	1.0E-01
4-Amino-2,6-dinitrotoluene	19406-51-0	1.5E+02	1.2E+01	2.5E-01	3.9E-02
RDX	121-82-4	8.3E+00	2.3E+00	2.6E-01	8.5E-02
3-Nitrotoluene	99-08-1	6.3E+00	1.3E-01	5.0E-01	1.2E-01
Nitrobenzene	98-95-3	5.1E+00	4.8E+00	2.5E-01	6.1E-02
2-Nitrotoluene	88-72-2	2.2E+00	1.9E-01	2.5E-01	8.4E-02
4-Nitrotoluene	99-99-0	3.4E+01	2.1E+01	4.0E-01	1.1E-01
HMX	2691-41-0	3.9E+03	1.6E+01	2.5E-01	7.8E-02
Tetryl	479-45-8	1.6E+02	1.8E-02	5.0E-01	5.5E-02

Notes:

Reporting Limits and Method Detection Limits based on current values as reported by Eurofins TestAmerica; West Sacramento, CA.

CAS = Chemical Abstracts Service

mg/kg = milligram(s) per kilogram

SL = screening level

Table A-4. Groundwater Reporting Limits and California Screening Levels

Lower Klamath Hydroelectric Project California Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Groundwater Screening Level (µg/L)	Reporting Limit (µg/L)	Method Detection Limit (µg/L)
TPH: SW8015B-P				
Gasoline	GRO	7.6E+02	5.0E+01	1.5E+01
TPH: SW8015B-P				
Diesel	DRO	2.0E+02	5.0E+01	1.6E+01
Motor oil	MRO	6.0E+04	5.0E+02	1.7E+02
Metals: SW6010B				
Antimony	7440-36-0	6.0E+00	2.0E+01	9.8E+00
Arsenic	7440-38-2	8.2E-03	2.0E+01	1.2E+01
Barium	7440-39-3	1.0E+03	5.0E+00	2.5E+00
Beryllium	7440-41-7	4.0E+00	2.0E+00	3.0E-01
Boron	7440-42-8	4.0E+03	1.0E+02	2.1E+01
Cadmium	7440-43-9	5.0E+00	2.0E+00	5.0E-01
Chromium	7440-47-3	1.0E+02	8.0E+00	1.2E+00
Cobalt	7440-48-4	6.0E+00	5.0E+00	3.0E+00
Copper	7440-50-8	8.0E+02	1.0E+01	2.1E+00
Iron	7439-89-6	1.4E+04	1.0E+02	2.0E+01
Lead	7439-92-1	1.5E+01	5.0E+00	2.5E+00
Manganese	7439-96-5	4.3E+02	5.0E+00	2.5E+00
Molybdenum	7439-98-7	1.0E+02	2.0E+01	2.7E+00
Nickel	7440-02-0	1.0E+02	5.0E+00	2.4E+00
Selenium	7782-49-2	5.0E+01	2.0E+01	1.3E+01
Silver	7440-22-4	9.4E+01	5.0E+00	8.4E-01
Thallium	7440-28-0	2.0E-01	2.0E+01	9.0E+00
Vanadium	7440-62-2	8.6E+01	5.0E+00	1.9E+00
Zinc	7440-66-6	6.0E+03	1.0E+01	3.0E+00
Mercury	7439-97-6	6.3E-02	2.0E-01	1.0E-01
VOC: SW8260B				
1,1,1,2-Tetrachloroethane	630-20-6	5.7E-01	5.0E-01	1.0E-01
1,1,1-Trichloroethane	71-55-6	2.0E+02	5.0E-01	1.0E-01
1,1,2,2-Tetrachloroethane	79-34-5	7.6E-02	5.0E-01	1.1E-01
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	1.2E+03	5.0E-01	1.7E-01
1,1,2-Trichloroethane	79-00-5	2.8E-01	5.0E-01	1.2E-01
1,1-Dichloroethane	75-34-3	2.8E+00	5.0E-01	1.0E-01
1,1-Dichloroethene	75-35-4	6.0E+00	5.0E-01	1.3E-01
1,1-Dichloropropene	563-58-6	4.7E-01	5.0E-01	1.2E-01
1,2,3-Trichlorobenzene	87-61-6	3.4E+00	1.0E+00	4.0E-01
1,2,3-Trichloropropane	96-18-4	2.0E-04	1.0E+00	1.3E-01
1,2,4-Trichlorobenzene	120-82-1	4.6E-01	1.0E+01	1.4E+00
1,2,4-Trimethylbenzene	95-63-6	5.6E+01	1.0E+00	3.2E-01
1,2-Dibromo-3-Chloropropane	96-12-8	3.0E-04	1.0E+00	2.0E-01
1,2-Dibromoethane (EDB)	106-93-4	7.5E-03	5.0E-01	1.2E-01
1,2-Dichlorobenzene	95-50-1	3.0E+02	1.0E+01	1.5E+00
1,2-Dichloroethane	107-06-2	1.7E-01	5.0E-01	1.4E-01
1,2-Dichloropropane	78-87-5	8.5E-01	5.0E-01	1.5E-01
1,3,5-Trimethylbenzene	108-67-8	6.0E+01	5.0E-01	1.6E-01

Table A-4. Groundwater Reporting Limits and California Screening Levels

Lower Klamath Hydroelectric Project California Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Groundwater Screening Level (µg/L)	Reporting Limit (µg/L)	Method Detection Limit (µg/L)
1,3-Dichlorobenzene	541-73-1	3.0E+02	1.0E+01	1.5E+00
1,3-Dichloropropane	142-28-9	1.1E+02	1.0E+00	1.0E-01
1,4-Dichlorobenzene	106-46-7	4.8E-01	1.0E+01	1.4E+00
2,2-Dichloropropane	594-20-7	8.5E-01	1.0E+00	4.6E-01
2-Butanone (MEK)	78-93-3	5.6E+03	2.0E+00	3.3E-01
2-Chlorotoluene	95-49-8	9.8E+01	5.0E-01	1.1E-01
2-Hexanone	591-78-6	3.8E+01	2.0E+00	1.7E-01
4-Chlorotoluene	106-43-4	1.0E+02	5.0E-01	1.0E-01
4-Methyl-2-pentanone (MIBK)	108-10-1	6.3E+03	2.0E+00	1.1E-01
Acetone	67-64-1	1.4E+04	1.0E+01	3.8E+00
Benzene	71-43-2	1.5E-01	5.0E-01	8.0E-02
Bromobenzene	108-86-1	6.2E+01	1.0E+00	9.1E-02
Bromochloromethane	74-97-5	8.3E+01	1.0E+00	1.8E-01
Bromodichloromethane	75-27-4	1.3E-01	5.0E-01	1.4E-01
Bromoform	75-25-2	3.3E+00	1.0E+00	1.9E-01
Bromomethane	74-83-9	7.5E+00	1.0E+00	2.1E-01
Carbon disulfide	75-15-0	8.1E+02	2.0E+00	3.6E-01
Carbon tetrachloride	56-23-5	4.5E-01	5.0E-01	1.2E-01
Chlorobenzene	108-90-7	7.0E+01	5.0E-01	7.0E-02
Chloroethane	75-00-3	2.1E+04	1.0E+00	2.4E-01
Chloroform	67-66-3	2.2E-01	1.0E+00	1.2E-01
Chloromethane	74-87-3	1.9E+02	1.0E+00	2.6E-01
cis-1,2-Dichloroethene	156-59-2	6.0E+00	5.0E-01	1.8E-01
cis-1,3-Dichloropropene	10061-01-5	4.7E-01	5.0E-01	1.5E-01
Dibromochloromethane	124-48-1	2.0E-01	5.0E-01	1.6E-01
Dibromomethane	74-95-3	8.3E+00	5.0E-01	1.7E-01
Dichlorodifluoromethane	75-71-8	2.0E+02	1.0E+00	3.2E-01
Ethylbenzene	100-41-4	1.5E+00	5.0E-01	8.4E-02
Hexachlorobutadiene	87-68-3	1.4E-01	1.0E+01	1.3E+00
Isopropylbenzene	98-82-8	4.5E+02	5.0E-01	1.1E-01
Methyl tert-butyl ether	1634-04-4	1.3E+01	5.0E-01	1.2E-01
Methylene Chloride	75-09-2	1.7E+00	1.0E+00	1.6E-01
m-Xylene & p-Xylene	179601-23-1	1.9E+02	5.0E-01	2.7E-01
Naphthalene	91-20-3	1.2E-01	1.0E+01	1.3E+00
n-Butylbenzene	104-51-8	2.9E+02	1.0E+00	1.8E-01
N-Propylbenzene	103-65-1	6.6E+02	1.0E+00	1.1E-01
o-Xylene	95-47-6	1.9E+02	5.0E-01	1.4E-01
p-Isopropyltoluene	99-87-6	4.1E+02	1.0E+00	1.5E-01
sec-Butylbenzene	135-98-8	5.9E+02	1.0E+00	1.4E-01
Styrene	100-42-5	1.0E+02	5.0E-01	1.3E-01
tert-Butylbenzene	98-06-6	3.8E+02	1.0E+00	1.3E-01
Tetrachloroethene	127-18-4	8.4E-02	5.0E-01	1.0E-01
Toluene	108-88-3	1.5E+02	5.0E-01	9.5E-02
trans-1,2-Dichloroethene	156-60-5	1.0E+01	5.0E-01	1.1E-01
trans-1,3-Dichloropropene	10061-02-6	4.7E-01	5.0E-01	1.6E-01
Trichloroethene	79-01-6	4.9E-01	5.0E-01	1.0E-01

Table A-4. Groundwater Reporting Limits and California Screening Levels

Lower Klamath Hydroelectric Project California Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Groundwater Screening Level (µg/L)	Reporting Limit (µg/L)	Method Detection Limit (µg/L)
Trichlorofluoromethane	75-69-4	1.5E+02	1.0E+00	1.3E-01
Vinyl acetate	108-05-4	4.1E+02	2.0E+00	1.9E-01
Vinyl chloride	75-01-4	9.8E-03	5.0E-01	1.8E-01
Xylenes, Total	1330-20-7	1.9E+02	5.0E-01	2.7E-01
SVOC: SW8270C				
Acenaphthene	83-32-9	2.6E+02	1.0E+01	1.1E+00
Acenaphthylene	208-96-8	8.1E+01	1.0E+01	1.1E+00
Anthracene	120-12-7	1.0E+03	1.0E+01	1.0E+00
Azobenzene	103-33-3	1.2E-01	1.0E+01	7.1E-01
Benzo[a]anthracene	56-55-3	1.7E-02	1.0E+01	1.0E+00
Benzo[b]fluoranthene	205-99-2	2.5E-01	1.0E+01	1.2E+00
Benzo[k]fluoranthene	207-08-9	2.5E+00	1.0E+01	9.6E-01
Benzo[g,h,i]perylene	191-24-2	8.1E+01	1.0E+01	1.4E+00
Benzo[a]pyrene	50-32-8	2.5E-02	1.0E+01	6.8E-01
Benzoic acid	65-85-0	7.5E+04	5.0E+01	2.0E+01
Benzyl alcohol	100-51-6	2.0E+03	1.0E+01	2.6E+00
Bis(2-chloroethoxy)methane	111-91-1	5.9E+01	1.0E+01	1.0E+00
Bis(2-chloroethyl)ether	111-44-4	6.3E-03	1.0E+01	1.5E+00
bis (2-chloroisopropyl) ether	108-60-1	2.3E+02	1.0E+01	1.3E+00
Bis(2-ethylhexyl) phthalate	117-81-7	4.0E+00	1.0E+01	1.0E+00
4-Bromophenyl phenyl ether	101-55-3	0.0E+00	1.0E+01	1.1E+00
Butyl benzyl phthalate	85-68-7	1.6E+01	1.0E+01	1.4E+00
4-Chloroaniline	106-47-8	3.7E-01	1.0E+01	2.0E+00
4-Chloro-3-methylphenol	59-50-7	1.4E+03	1.0E+01	2.0E+00
2-Chloronaphthalene	91-58-7	3.5E+02	1.0E+01	1.3E+00
2-Chlorophenol	95-57-8	2.9E+01	1.0E+01	1.6E+00
4-Chlorophenyl phenyl ether	7005-72-3	0.0E+00	1.0E+01	1.1E+00
Chrysene	218-01-9	2.5E+01	1.0E+01	6.1E-01
Dibenz(a,h)anthracene	53-70-3	6.1E-03	1.0E+01	2.0E+00
Dibenzofuran	132-64-9	4.0E+00	1.0E+01	1.1E+00
Di-n-butyl phthalate	84-74-2	9.0E+02	1.0E+01	1.1E+00
1,2-Dichlorobenzene	95-50-1	3.0E+02	1.0E+01	1.5E+00
1,3-Dichlorobenzene	541-73-1	3.0E+02	1.0E+01	1.5E+00
1,4-Dichlorobenzene	106-46-7	4.8E-01	1.0E+01	1.4E+00
3,3'-Dichlorobenzidine	91-94-1	4.7E-02	5.0E+01	9.6E-01
2,4-Dichlorophenol	120-83-2	4.6E+01	1.0E+01	2.6E+00
Diethyl phthalate	84-66-2	1.5E+04	1.0E+01	9.3E-01
2,4-Dimethylphenol	105-67-9	3.6E+02	1.0E+01	2.2E+00
Dimethyl phthalate	131-11-3	0.0E+00	1.0E+01	8.8E-01
4,6-Dinitro-2-methylphenol	534-52-1	1.5E+00	5.0E+01	2.2E+00
2,4-Dinitrophenol	51-28-5	3.9E+01	5.0E+01	2.0E+01
2,4-Dinitrotoluene	121-14-2	2.4E-01	1.0E+01	2.0E+00
2,6-Dinitrotoluene	606-20-2	4.9E-02	1.0E+01	2.0E+00
Di-n-octyl phthalate	117-84-0	2.0E+02	1.0E+01	1.5E+00
Fluoranthene	206-44-0	8.0E+02	1.0E+01	6.5E-01
Fluorene	86-73-7	1.6E+02	1.0E+01	9.3E-01

Table A-4. Groundwater Reporting Limits and California Screening Levels

Lower Klamath Hydroelectric Project California Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Groundwater Screening Level (µg/L)	Reporting Limit (µg/L)	Method Detection Limit (µg/L)
Hexachlorobenzene	118-74-1	8.8E-03	1.0E+01	1.4E+00
Hexachlorobutadiene	87-68-3	1.4E-01	1.0E+01	1.3E+00
Hexachlorocyclopentadiene	77-47-4	4.1E-01	5.0E+01	5.0E+00
Hexachloroethane	67-72-1	3.3E-01	1.0E+01	1.4E+00
Indeno[1,2,3-cd] Pyrene	193-39-5	2.5E-01	1.0E+01	3.4E+00
Isophorone	78-59-1	7.8E+01	1.0E+01	1.0E+00
1-Methylnaphthalene	90-12-0	4.6E-01	1.0E+01	7.4E-01
2-Methylnaphthalene	91-57-6	1.7E+01	1.0E+01	1.5E+00
2-Methylphenol	95-48-7	9.3E+02	1.0E+01	9.3E-01
3-Methylphenol & 4-Methylphenol	15831-10-4	5.8E+03	2.0E+01	1.2E+00
Naphthalene	91-20-3	1.2E-01	1.0E+01	1.3E+00
2-Nitroaniline	88-74-4	1.9E+02	5.0E+01	2.0E+00
3-Nitroaniline	99-09-2	1.3E+01	5.0E+01	1.4E+00
4-Nitroaniline	100-01-6	3.8E+00	5.0E+01	1.5E+00
Nitrobenzene	98-95-3	1.4E-01	1.0E+01	1.6E+00
2-Nitrophenol	88-75-5	5.8E+03	1.0E+01	1.9E+00
4-Nitrophenol	100-02-7	5.8E+03	5.0E+01	6.1E+00
N-Nitrosodiphenylamine	86-30-6	1.2E+01	1.0E+01	5.4E-01
N-Nitrosodi-n-propylamine	621-64-7	1.1E-02	1.0E+01	1.4E+00
Pentachlorophenol	87-86-5	4.1E-02	5.0E+01	2.0E+00
Phenanthrene	85-01-8	8.1E+01	1.0E+01	1.0E+00
Phenol	108-95-2	5.8E+03	1.0E+01	1.1E+00
Pyrene	129-00-0	8.1E+01	1.0E+01	1.4E+00
Pyridine	110-86-1	5.9E+00	2.0E+01	8.0E-01
1,2,4-Trichlorobenzene	120-82-1	4.6E-01	1.0E+01	1.4E+00
2,4,5-Trichlorophenol	95-95-4	1.2E+03	1.0E+01	2.0E+00
2,4,6-Trichlorophenol	88-06-2	6.5E-01	1.0E+01	2.0E+00
PAH: SW8270C-SIM				
Acenaphthene	83-32-9	2.6E+02	1.0E+01	1.1E+00
Acenaphthylene	208-96-8	8.1E+01	1.0E+01	1.1E+00
Anthracene	120-12-7	1.0E+03	1.0E+01	1.0E+00
Benzo[a]anthracene	56-55-3	1.7E-02	1.0E+01	1.0E+00
Benzo[a]pyrene	50-32-8	2.5E-02	1.0E+01	6.8E-01
Benzo[b]fluoranthene	205-99-2	2.5E-01	1.0E+01	1.2E+00
Benzo[g,h,i]perylene	191-24-2	8.1E+01	1.0E+01	1.4E+00
Benzo[k]fluoranthene	207-08-9	2.5E+00	1.0E+01	9.6E-01
Chrysene	218-01-9	2.5E+01	1.0E+01	6.1E-01
Dibenz(a,h)anthracene	53-70-3	6.1E-03	1.0E+01	2.0E+00
Fluoranthene	206-44-0	8.0E+02	1.0E+01	6.5E-01
Fluorene	86-73-7	1.6E+02	1.0E+01	9.3E-01
Indeno[1,2,3-cd] Pyrene	193-39-5	2.5E-01	1.0E+01	3.4E+00
Naphthalene	91-20-3	1.2E-01	1.0E+01	1.3E+00
Phenanthrene	85-01-8	8.1E+01	1.0E+01	1.0E+00
Pyrene	129-00-0	8.1E+01	1.0E+01	1.4E+00
Dioxin/Furan: 8290A				
2,3,7,8-TCDD	1746-01-6	1.2E-07	1.0E-05	1.2E-07

Table A-4. Groundwater Reporting Limits and California Screening Levels

Lower Klamath Hydroelectric Project California Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Groundwater Screening Level (µg/L)	Reporting Limit (µg/L)	Method Detection Limit (µg/L)
2,3,7,8-TCDF	51207-31-9	1.2E-06	1.0E-05	2.0E-07
1,2,3,7,8-PeCDD	40321-76-4	1.2E-07	5.0E-05	2.5E-07
1,2,3,7,8-PeCDF	57117-41-6	4.0E-06	5.0E-05	2.2E-07
2,3,4,7,8-PeCDF	57117-31-4	4.0E-07	5.0E-05	4.3E-07
1,2,3,4,7,8-HxCDD	39227-28-6	1.2E-06	5.0E-05	1.0E-06
1,2,3,6,7,8-HxCDD	57653-85-7	1.2E-06	5.0E-05	5.7E-07
1,2,3,7,8,9-HxCDD	19408-74-3	1.2E-06	5.0E-05	5.2E-07
1,2,3,4,7,8-HxCDF	70648-26-9	1.2E-06	5.0E-05	2.1E-07
1,2,3,6,7,8-HxCDF	57117-44-9	1.2E-06	5.0E-05	5.1E-07
1,2,3,7,8,9-HxCDF	72918-21-9	1.2E-06	5.0E-05	2.3E-07
2,3,4,6,7,8-HxCDF	60851-34-5	1.2E-06	5.0E-05	2.2E-07
1,2,3,4,6,7,8-HpCDD	35822-46-9	1.2E-05	5.0E-05	9.4E-07
1,2,3,4,6,7,8-HpCDF	67562-39-4	1.2E-05	5.0E-05	2.5E-07
1,2,3,4,7,8,9-HpCDF	55673-89-7	1.2E-05	5.0E-05	3.8E-07
OCDD	3268-87-9	4.0E-04	1.0E-04	4.6E-06
OCDF	39001-02-0	4.0E-04	1.0E-04	8.6E-07
Pesticides: 8081A				
4,4'-DDD	72-54-8	3.2E-02	5.0E-02	4.2E-03
4,4'-DDE	72-55-9	4.6E-02	5.0E-02	4.2E-03
4,4'-DDT	50-29-3	2.3E-01	5.0E-02	2.4E-02
Aldrin	309-00-2	9.2E-04	5.0E-02	6.2E-03
Dieldrin	60-57-1	6.6E-04	5.0E-02	4.6E-03
Endosulfan sulfate	1031-07-8	1.1E+02	5.0E-02	4.9E-03
Endrin	72-20-8	2.0E+00	5.0E-02	8.6E-03
Endrin aldehyde	7421-93-4	2.3E+00	5.0E-02	8.7E-03
Heptachlor	76-44-8	1.4E-03	5.0E-02	1.0E-02
Heptachlor epoxide	1024-57-3	1.4E-03	5.0E-02	3.2E-03
PCB: 8082A				
PCB-1016	12674-11-2	2.2E-01	1.0E+00	1.5E-01
PCB-1221	11104-28-2	4.7E-03	1.0E+00	5.3E-01
PCB-1232	11141-16-5	4.7E-03	1.0E+00	1.6E-01
PCB-1242	53469-21-9	7.8E-03	1.0E+00	2.5E-01
PCB-1248	12672-29-6	7.8E-03	1.0E+00	2.4E-01
PCB-1254	11097-69-1	7.9E-03	1.0E+00	1.9E-01
PCB-1260	11096-82-5	7.8E-03	1.0E+00	2.2E-01
PCB-1262	37324-23-5	7.8E-03	1.0E+00	1.0E-01
PCB-1268	11100-14-4	7.8E-03	1.0E+00	1.8E-01

Notes:

Reporting Limits and Method Detection Limits based on current values as reported by Eurofins TestAmerica; West Sacramento, CA.

µg/L = microgram(s) per liter

CAS = Chemical Abstracts Service

Appendix B
Consolidated Comment Matrix

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
California Department of Water Resources / California Department of Fish and Wildlife - Office of Spill Prevention and Response					
CA-1	CH	general		In screening for chemicals of potential ecological concern (COPECs), CDFW-OSPR will not agree with soil concentrations of organic constituents being compared to "ambient" concentrations for the selection of contaminants of concern (COCs) (DTSC, 1996).	Background concentrations are compared to screening levels for metals in soil only (see Section 3.3) and not to organic constituents. No change to document required.
CA-2	CH	general		Please indicate how sample locations will be selected to obtain a site-wide range of contaminant concentrations for the different analytes (e.g., 3-4 replicates from 3-4 concentration ranges or maximal concentrations only?). For example, will composite samples be collected at each sampling location?	The overall objectives of this SIWP are to collect the necessary data required to either support closure of the 12 RECs presented or to collect field and analytical data required to support remedial planning, if needed. This initial phase is a screening effort to primarily determine the presence or absence of constituents of potential concern (COPCs) and does not constitute a full risk assessment or remediation plan. The SIWP was edited to make it clearer what the intent of the investigations are at each of the RECs. Composite samples will not be collected at all the selected sample locations. Composite samples will be collected for waste characterization as indicated in the sampling tables in Section 3 for selected RECs.
CA-3	CH	general		Please conduct a hot-spot evaluation for those chemicals that were detected in less than 5% of the soil samples, prior to their elimination as COPECs. Significant risks from hot-spots may be considered for remediation, depending on the sensitivity of the habitat, species present, and the degree of potential exposure (e.g., sample depth). Spatial mapping of comparison exceedances for all COPECs would greatly assist in evaluating the overall significance of ecological risks for RECs.	Because this is primarily a site screening evaluation (with the objective of determining whether COPCs are present above the selected screening levels and/or if further site evaluation is necessary) and not a risk evaluation or remediation plan, all detections, regardless of the frequency of detection, will be screened against the appropriate screening levels selected for the REC based on potential future use.
CA-4	CH	general		Please explain the basis for whether the maximum or the upper confidence limit (UCL) on the mean will be used when evaluating chemical concentrations in soil. In addition, please specify what percentile the UCL represents (e.g., 95th percentile UCL).	Because this is primarily a site screening evaluation (with the objective of determining whether COPCs are present above the selected screening levels and/or if further site evaluation is necessary) and not a risk evaluation or remediation plan, the maximum detected concentrations will be used when evaluating chemical concentrations in soil rather than calculating a 95 percent UCL on the mean (which is generally used as an exposure point concentration in risk evaluation).
CA-5	CH	general		Should compare Ecological Soil Screening Levels to soil chemical concentrations, in addition to Human Health Screening levels.	Ecological screening levels have been added to the screening level tables.
CA-6	AD	Transfer of Real Property	entire document	Discussion regarding transfer of real property which includes approval from FERC which has been received. Document makes several references that actual components and transfer is unclear.	The SIWP was written before the FERC June 2021 order approving License Transfer. Regardless, Section 1.4 where there was discussion of FERC and their role in the process has been deleted per Comment CA-9.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
CA-7	KT	Background	1.1	Background discussion gives impression that the universe of environmental conditions is what appears in Exhibit C of the PTA. It is California's position that Exhibit C is the starting point. It is California's understanding that AECOM did not cover all of Parcel B. It is also California's expectation that any other existing environmental condition that is not on Exhibit C will be addressed by PacifiCorp. Additional CA comment emailed by Kevin Takei (CDFW) to Demian Ebert (PAC) on September 1, 2021 at 2:21 PM: This will be a topic for the lawyers to discuss.	Consistent with agreement of the principals for California, Oregon, the Renewal Corporation, and PacifiCorp, Exhibit C of the Property Transfer Agreement expressly defines the set of environmental conditions and the sites that PacifiCorp is responsible for addressing. The position in California's comments that Exhibit C "is the starting point" is inconsistent with both the agreement of the KHSA principals and expectations of PacifiCorp's state utility regulators. No edits necessary. Response to Additional California Comment: This issue was resolved during a September 8, 2021, meeting with the legal group. California clarified that its comments were focused on conditions that may arise *after* Exhibit C was created but before the property transfer closes. No edits to workplan required.
CA-8	JD	Number discrepancy	1.2	Work Plan states that "The remaining six pre-existing environmental conditions..." but above it states a total of 17 sites with 12 being considered in this Plan, which would only leave five sites.	The Copco No. 2 Powerhouse Transformer Fire is not listed in Exhibit C. See footnote on page 2 of SIWP which explains why this site is included in the SIWP. No edits necessary.
CA-9	KT	Introduction	1.4 & 1.5	Seems unnecessary. Recommend delete.	These sections have been deleted.
CA-10	KT	Introduction	1.7	As part of the documentation seeking closure, California would like Jacobs to provide an unedited recommendation as to why additional testing is, or is not, warranted.	As noted in Section 4, a site investigation report (Report) will be prepared to document the investigations performed at each of the RECs. The Report will document the field activities performed, summarize key field observations, and identify major deviations from the SIWP. The analytical results will be summarized and compared to the screening levels identified for each REC. Recommended next steps will be provided for each REC and may include a request for REC closure to be prepared by PacifiCorp in accordance with the developed process, advancement of step-out borings to collect additional environmental samples according to the sampling plan established for the REC, or development of a remediation plan based on the field and analytical data already collected. The Site Investigation Report will be submitted electronically and will include all the analytical data from the sampling events at each REC.
CA-11	CS	Site descriptions & related site figures	2.1	Site descriptions need to reference associated site figures. Figures need to show site extents/boundaries in order to understand locations of RECs within those boundaries. These should be further referenced in Section 3.	The SIWP has been edited so that sites described in Section 2.1 now reference Figures ES-2 through ES-4 (which depict the location of each dam to be removed and each REC to be investigated and evaluated in this SIWP). Because of mapping scale, Figures ES-2 through ES-4 will not show the limits of the SIWP; the limits of the SIWP are shown in Figures 3-1 through 3-13, which are already referenced in Sections 3.4 through 3.14.
CA-12	CS	Clarification	2.2	This section states, "The powerhouses have not generated hazardous materials." Please elaborate how this conclusion was made. Such as, "Based on X, X, and X, the powerhouses have not generated hazardous materials. It seems unlikely that during their entire lengths of use, all four facilities have never generated any hazardous materials.	This statement was intended to convey the fact that as hydroelectric power generating facilities, these developments do not create new hazardous materials like some other thermal power generation (e.g., coal) plants or industrial facilities do. Limited quantities of hazardous materials are used in connection with operating and maintaining the facilities and when these materials have exceeded their life span they are considered hazardous waste, but those materials are not "generated" by the facilities. This particular sentence has been removed from the document.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
CA-13	CH	*Site Investigation and Evaluation*	3.1	Regarding 1.5-2.5 feet below ground surface (bgs) as the sampling depth in Iron Gate Shooting Range, 2.5 feet bgs in Copco No. 1 Debris Pile/Scrap Yard, 0.5-1 foot bgs in Copco No. 2 Wood Stave Penstock, 2.5 feet bgs in Copco No. 2 Burn Pit, and 1.5 feet bgs in Iron Gate Fish Hatchery Burn Pit. Instead, please sample at depth intervals to 6 feet bgs, with 6-inch sampling intervals, because burrowing animals and plant roots may inhabit these deeper soil intervals as recommended by DTSC (1998). Furthermore, please collect surface soil samples (0-6 inches bgs) in addition to the depth intervals proposed. Additional CA comment emailed by Kevin Takei (CDFW) to Demian Ebert (PAC) on September 1, 2021 at 2:21 PM: We are not satisfied with the rationale as to why samples are not collected at depth to 6 feet. Thus, we reiterate that depth intervals to 6 feet bgs be evaluated to assess burrowing animals and plant roots which inhabit these deeper soil intervals (DTSC 1998).	The overall objectives of this SIWP are to collect the necessary data required to either support closure of the identified 12 RECs or to collect field and analytical data required to support remedial planning, if needed. This initial phase is primarily a screening effort to determine the presence or absence of COPCs and does not constitute a full risk assessment or remediation plan. The SIWP was edited to make it clearer what the intent of the investigations are at each of the RECs. Sampling depths proposed are specific to each REC, history of site use, and anticipated depths of greatest potential for COPCs above selected screening levels. Surface soil samples will be collected at all locations with the potential for COPCs, which includes all those listed in the comment (see the sampling tables in Section 3). If COPCS are detected above the selected screening levels based on potential future use, DTSC (1998) will be referenced to determine depth of additional sampling. Response to Additional California Comment: Per a meeting with PacifiCorp, Jacobs, and the State of California on September 9, 2021, it was agreed that approximately 20 percent of the borings at these RECs would be advanced to a depth of 6 feet bgs and that sample intervals would not be at 6-inch intervals but rather at the following intervals: 0.0 to 0.5, 1.0 to 1.5, 3.0 to 3.5, and 5.5 to 6.0 feet bgs.
CA-14	CH	*Iron Gate Shooting Range*	3.1	Please adopt Ecological Soil Screening Levels (Eco-SSLs) by USEPA in 2005a. For example, while the screen level of soil lead is only at 320 mg/kg in the SIWP, the lowest Eco-SSL screening value is for bird at 11 mg/kg lead in dry weight in soil and 56 mg/kg lead for mammal (US EPA, 2005a). In addition, if there is a drainage channel, surface water samples should be collected into 250-milliliter a polyethylene bottles containing a nitric acid preservative. To ensure that the water is filtered for dissolved lead, use 0.45-micrometer filter. Use the chronic value to screen (criterion continuous concentration) for lead from California Toxics Rule (US EPA, 2000). Additional CA comment emailed by Kevin Takei (CDFW) to Demian Ebert (PAC) on September 1, 2021 at 2:21 PM: Please clarify in the work plan that a second sampling will occur closer to when the site will be closed. Page 3-23 indicates that a second sampling would occur <u>if</u> the initial sampling indicates there's contamination.	EPAs (2005a) ecological screening levels (EcoSSLs) have been added to Section 3.3. The screening levels selected for each REC will depend on the potential future use of the REC. This initial investigation of the shooting range will occur during early fall before surface water typically accumulates in any drainage channels, so no surface water samples will be collected. Soil samples will be collected in drainages as described in Section 3.12. The Iron Gate Shooting Range is an active range and is not scheduled for closure at this time. Investigation of the shooting range will primarily occur when the site is planned for closure (in approximately 2 years). The future investigation will be defined by the initial investigation and could include surface water sampling, more extensive soil sampling, and a full risk assessment. Response to Additional California Comment: As noted, above the investigation for the Iron Gate Shooting Range will occur when the site is planned for closure. The first paragraph in section 3.12.2 was revised to clarify that a second sampling event will be performed in line with the scheduled closure of the shooting range.
CA-15	CH	*Iron Gate Shooting Range*	3.1	Lead shot, as elemental lead, will eventually degrade and oxidize into soil overtime. Additionally, the derivation of the avian-based toxicity benchmark supports the notion that lead shot will degrade into soil; thus, the exposure-based screening level for lead shot should be same as soil No-Observed-Adverse-Effect-Level Lead at 11 mg/kg for birds.	Ecological screening levels have been added to Section 3.3. Lead detected in soils at the Iron Gate Shooting Range will be compared to ecological screening levels.
CA-16	CH	*Iron Gate Shooting Range*	3.1	The US EPA's latest guidance on assessing risk to birds from lead shot pellet ingestion (Bennett et al., 2011) should be used as part of the ecological risk assessment. Studies have shown that the ingestion of as little as one pellet can kill a bird.	Remedial actions will consider potential exposures, however risks to ecological receptors will be evaluated using lead concentrations in exposure media. The Bennett et al. (2011) document is a white paper evaluating different approaches for evaluating ingestion of grit and does not constitute EPA guidance.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
CA-17	CH	*Iron Gate Shooting Range*	3.1	As part of the grit ingestion model development based on the US EPA's guidance on assessing risk to birds from lead shot pellet ingestion, the following information should be provided (This information is required to develop the percent of various natural grit-sized particles for a given area-depth of sediment or soil): i. Soil density. ii. Soil moisture content. iii. Surface soil description from past boring logs, including percent of fine to medium sand and silt. iv. Number of shot pellets per 12X12 inches and 1 inch thick. v. Number of natural grit particles within the bird ingestion size in the same square-foot-inch volume of soil.	Development of a grit ingestion model is not part of the scope of this investigation, which is limited to a screening evaluation.
CA-18	CS	Soil/rock descriptions lacking detail	2.3.1	Site (or REC location) specific soil/rock types should be included, where available, to better understand contaminant migration ability. This will help with assessment of proposed sampling methods/extent.	Inserted Local Soils subsection, which describes soils in the J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate developments and at Iron Gate Hatchery. Added Natural Resource Conservation Service (NRCS) soil classification to the discussion for each REC site.
CA-19	CS	Groundwater and surface water information lacking detail	2.3.3	Site (or REC location) specific groundwater flow and surface water flow data should be included, where available, to better understand contaminant migration ability. This will help with assessment of proposed sampling methods/extent.	Streams and reservoirs are shown in the figures for the various sites when they are in proximity to the site such that they appear in the images used. In PacifiCorp's experience depth to groundwater in domestic wells in the area generally range from 40 to 300 feet below the surface with shallower depths being in close proximity to the reservoirs. Site-specific data related to groundwater at the RECs is not available, and neither is more specific data on surface waters at each location. The SIWP is written in such a way that if groundwater is encountered, then groundwater samples are collected for laboratory analysis. As discussed in Section 3, the sampling plan allows for site-specific adjustment in sampling strategy based on site-specific conditions and observations. No edits necessary.
CA-20	KT	*Residual explosives*	3.2.2.3	Please explain how a visual determination can be made to detect explosives as low as 2% and so precise.	Section 3.4.2.3 text has been modified to state the following, "If explosives are not present but it is visually determined that there is a potential for residual explosives to be present based on observation of fine-grained material on the floor of the cave, then field staff will determine if residual explosives are present through the use of Expray, an aerosol-based field test kit that provides a positive or negative assessment as to whether residual explosives are present."
CA-21	CS	Missing information about sampling depth and additional sampling	3.3.2	This section does not discuss what steps will be taken if samples collected within the top 2.5 feet result in analyte levels above their respective regulatory level(s). Will additional samples then be collected to evaluate the vertical extent of the exceedance(s)? How?	As noted in Section 4, a site investigation report (Report) will be prepared to document the investigations performed at each of the RECs. The Report will document the field activities performed, summarize key field observations, and identify major deviations from the SIWP. The analytical results will be summarized and compared to the screening levels identified for each REC. Recommended next steps will be provided for each REC and may include a request for REC closure to be prepared by PacifiCorp in accordance with the developed process, advancement of step-out borings to collect additional environmental samples according to the sampling plan established for the REC, or development of a remediation plan based on the field and analytical data already collected.
CA-22	CS	Missing information about sampling depth and additional sampling	3.4.2	This section does not discuss what steps will be taken if samples collected within the top 1.0 feet (or 5/10 feet for deeper samples) result in analyte levels above their respective regulatory level(s). Will additional samples then be collected to evaluate the vertical extent of the exceedance(s)? How?	Please refer to the response to Comment CA-21.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
CA-23	CS	Missing information about sampling depth and additional sampling	3.5.2	This section does not discuss what steps will be taken if samples collected within the top 5.0 feet result in analyte levels above their respective regulatory level(s). Will additional samples then be collected to evaluate the vertical extent of the exceedance(s)? How?	Please refer to the response to Comment CA-21.
CA-24	CS	Clarification	3.6.1	Do we know from the Parametrix 2006 report the lateral extent of the concrete slab encountred [*sic*] at 3 feet bgs? If there is no vertical rim to the concrete slab then horizontal migration of the COC may not have been properly investigated. Additonal [*sic*] downgradient and cross gradient borings may be needed to confirm.	Parametrix identified at least 0.25 feet of concrete debris (average thickness 0.5 feet) in all six DPT borings advanced around Transformer C. The maximum concentration of TPH-D (650 mg/kg above concrete debris) and the maximum concentration of TPH-MO (130 mg/kg below concrete debris) were detected at depths of 1 and 3 feet, respectively, in boring COPCO-1, which was adjacent to the former location of Transformer C. These maximum TPH detections do not exceed the selected soil screening levels for the REC. Because the surrounding borings located at least 25 feet away from boring COPCO-1 and because the total volume of oil lost (spilled or combusted) during the fire was estimated to be 715 gallons, no additional soil borings are planned other than those originally proposed to confirm that soil from beneath the footprint of the former transformers does not need to be removed due to an exceedance of a soil screening level.
CA-25	CH/KT	*Copco 2 sampling plan*	3.7.2	Please consider using local Regional Water Quality Control Board Criteria for TPH in soil instead of relying visual determinations of TPH impacts	The San Francisco Regional Water Quality Control Board (Water Board) Environmental Screening Levels (ESLs) are the default screening levels for the North Coast Regional Water Quality Control Board. Sampling decisions in the field will be guided by the sampling tables provided in this SIWP but will also be based on observations of odorous soil, stained or discolored soil, and/or soil with photo-ionization detector (PID) readings greater than 50 parts per million by volume (ppmv). The 50 ppmv threshold is, by definition per South Coast Air Quality Management District (AQMD) Rule 1166, VOC-impacted soil that must be segregated and stockpiled on plastic sheeting separately from soil with PID readings less than 50 ppmv. VOC-impacted soil is required to be actively managed, while soil with PID readings less than 50 ppmv does not. No revisions required.
CA-26	CS	Additional analytes	3.7.2	Without a better understanding of the useage [sic] of these facilities, I would suggest also including sampling for VOCs.	While solvents are known to be used in limited quantities and while one would not reasonably anticipate a significant amount of solvent usage given the results of the Phase I ESAs and the processes utilized for clean energy generation at the Copco No. 2 Development, VOC analysis has been added to Table 3-8 and BTEX analysis has been removed. SIWP text has also been modified accordingly.
CA-27	KT	*Copco 2 sampling plan*	3.7.2	This section mentions there will be seven boring locations. Please confirm the quantity because table 3-7 seems to indicate there would be four boring locations	Table 3-8 will be corrected to include a total of seven borings.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
CA-28	CH/KT	*Copco 2 UST*	3.8.2	Please consider using local Regional Water Quality Control Board Criteria for TPH in soil instead of relying visual determinations of TPH impacts. Or explain why visual determinations would be sufficient.	There is no site history documenting a release, so the site investigation will look for evidence of a release. The word "visually" will be removed from sentence. Sampling decisions in the field will be guided by the sampling tables provided in this SIWP but also based on observations of odorous soil, stained or discolored soil, and/or soil with PID readings greater than 50 ppmv since AQMD Rule 1166 defines VOC-contaminated soil as soil with PID readings greater than 50 ppmv which must be actively managed, unlike soil with PID readings less than 50 ppmv.
CA-29	CS	Missing information about sampling depth and additional analytes	3.8.2	Please explain why samples will only be collected to 15 feet. Do we have evidence that the USTs were located at or above that depth? All borings should be initially completed to a minimum of 5 feet below estimated former UST depth. Additionally, since both leaded and unleaded USTs were present at the site, all samples should also be tested for VOCs (especially important are 1,2-dibromoethane [EDB], 1,2-dichloroethane, tetraethyl lead [TEL], and methyl tert butyl ether [MTBE]).	There are no documents describing the depth of the USTs. Typical diameters of 9,000- to 10,000-gallon USTs are 8 to 10 feet. Assuming the USTs were buried 3 to 5 feet bgs indicates the bottom of the USTs were 11 to 15 feet bgs. Using this information, the SIWP has been revised to extend the borings to a depth of 20 feet. Table 3-9 has been revised to analyze for VOC instead of BTEX.
CA-30	CS	Missing information about sampling depth and additional sampling	3.9.2	This section does not discuss what steps will be taken if samples collected withing [sic] the top 2.5 feet result in analyte levels above their respective regulatory level(s). Will additional samples then be collected to evaluate the vertical extent of the exceedance(s)? How?	Please refer to the response to Comment CA-21.
CA-31	CS	Missing information about sampling depth and additional sampling	3.10.2	This section does not discuss what steps will be taken if samples collected withing the top 1.5 feet result in analyte levels above their respective regulatory level(s). Will additional samples then be collected to evaluate the vertical extent of the exceedance(s)? How?	Please refer to the response to Comment CA-21.
CA-32	KT	*Iron Gate Shooting Range*	3.10.2	Please explain how visual observations are sufficient to determine if contamination is deeper. In our experience it's virtually impossible to see lead shot.	This is an initial sampling intended to provide data to better understand the magnitude of potential contamination at the shooting range and help plan a more rigorous sampling event that will be performed after the site is closed (in approximately 2 years). It is acknowledged that visual observation of lead shot is virtually impossible, but if shot is observed, then sampling will be extended. The more rigorous sampling event will establish the vertical extent of contamination.
CA-33	CS	Clarification	3.11.2	The following statement is confusing: "If bedrock or refusal is not encountered when delineating the vertial [sic] and lateral extent of the burn pit, hand auger and/or DPT borings will be advanced to collect visually unimpacted soil samples from beneach [sic] the portions of the burn pit that have the most visually impacted material." Please clearly restate what methods will be utilized to investigate the REC.	This statement has been modified as follows, "Hand auger or DPT borings will be advanced to collect soil samples from within the burn pit and from beneath portions of the burn pit that have the most visually impacted material."
CA-34	KG	Clarification	3.12.1/3-25 paragraph 3	"...This may ultimately require management of the sediment in settling ponds..." Suggest clarifying the word management (removal? disposal? more sampling?) or call it unknown.	This statement in has been edited for clarity so the reader understands that if the sediments are contaminated, then some sort of action may be necessary to address that contamination.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
CA-35	KT	Sampling Plan	3.12.2	California is still reviewing PacifiCorp's request [Email received August 13, 2021 with the following resolution] "California finished its review and is comfortable with no further testing at the settling ponds."	No response is necessary to this comment.
CA-36	CH	*Data Evaluation*	4.1	Please ensure the detected organic COCs are carried forward through the risk assessment to provide the decision makers with an estimate of the risk and hazard. We believe that COCs identified in a screening assessment should include: 1) inorganic chemicals exceeding ambient conditions and 2) chemicals potentially causing toxicity. Therefore, inorganic chemicals with maximum detected on-site concentrations greater than the 95th percentile of the background data will be considered as COPECs. All organic chemicals detected on-site should be included as COPECs. For chemicals with non-detect results, one-half of the sample quantitation limit (SQL) should be used as a proxy value for that sample when calculating descriptive statistics. The lower of the 95% upper confidence limit (95 UCL) or maximum detected value is used to identify organic COPECs. When the chemical is detected in less than half of the total samples collected, a 95 UCL is not calculated, and maximum detected value is used	As noted in previous responses, this investigation and SIWP do not include a full risk assessment. All detections will be screened against the appropriate ecological and/or human health screening levels (based on future use of the REC) and results will be used along with other site information evaluated to propose a path to closure for each REC. The outcome for each REC may include one of the following (as presented in Section 4): 1) No further investigation – Site is off-ramped to PacifiCorp for closure in accordance with the procedure to be developed between the parties. 2) Further investigation warranted - Additional investigation and/or evaluation that may include more sampling and a full risk assessment. 3) Remediation – Remediation plans may be developed as appropriate based on data collected during implementation of the SIWP.
CA-37	CH	*Reporting*	4.2	Please clarify the statistical methods used for data analysis. If parametric or non-parametric methods are used, please explain how they are appropriate	Because this is a screening evaluation, the maximum detected concentrations will be used when evaluating chemical concentrations in soil. Statistical methods will not be used for evaluating data at this stage and are not appropriate for the sample sizes that will be generated by this work.
CA-38	CH	*Appendix A Sampling and Analysis Plan (SAP)*		We recommend that this SAP be organized according to the *Uniform Federal Policy for Quality Assurance Project Plans* (UFP-QAPP) (USEPA, 2005b)	The SAP was developed consistent with professional standards for projects with similar objectives and scope. Typically, a UFP-QAPP type document is developed for larger, multiyear projects under the direction of a federal authority such as the EPA, Department of Defense, or Department of Energy. In accordance with Sect. III Q.9, A.9 of *Uniform Federal Policy For Quality Assurance Project Plans Manual* (UFP-QAPP Manual), the UFP-QAPP Manual is expected to be used to develop QAPPs or SAPs for managing the collection and use of environmental data at Federal facilities. The essential elements regarding sampling and analysis (e.g., sampling guidelines, equipment, hold times, documentation, packing, shipping, EPA analytical methods, limits, etc.) as detailed in the UFP-QAPP (USEPA, 2005b) document are included in the Jacobs SAP.
CA-39	CH	*Appendix A Sampling and Analysis Plan (SAP)*		Please add a Personnel Responsibilities and Qualifications Table into Appendix A. a. This table should contain the responsibilities and qualifications for any of the individuals listed.	A Personnel Responsibilities and Qualifications Table was added to Appendix A
CA-40	CH	*Appendix A, laboratory*	App. Sec. 2	Is the contracted laboratory a part of the California Environmental Laboratory Accreditation Program (ELAP)? We do not find any ELAP Certificates in SAP. Please provide the certification as an appendix to the SIWP. CDFW-OSPR requests the contracted laboratory to provide current accreditation documents in the Draft Final version of the document	The proposed contracted laboratory, Eurofins/TA, holds the necessary accreditations for both soil and water in both CA and OR to perform the requested analyses. A laboratory has not been contracted. Jacobs will ensure the selected laboratory holds the necessary accreditations (ELAP and ORELAP) as required. Certification documents will be attached to the Site Investigation Report.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
CA-41	CH	Appendix A, Detection Limits	App. Sec. 2.2	Please ensure detection levels are sufficient for all COCs and sufficient to meet project goals. Many samples are analyzed by a specific method that is used to determine levels of waste. Is the method sensitive enough to evaluate ecological hazard? Please explain the rationale for use of these methods. The laboratory-specific Quantitation Limits and Method Detection Limits (MDLs) should be evaluated to assure the MDLs are of sufficient sensitivity to meet the requirements necessary to evaluate ecological hazard as part of the laboratory selection process. For clarification, please add a sentence to say, "Ranges of laboratory reporting limits for given parameters must be low enough so that the results can be compared to the corresponding action limit, such as a regulatory threshold or risk-based no toxicity effect value (i.e., no observable adverse effect concentration Eco-SSLs)." Additional CA comment emailed by Kevin Takei (CDFW) to Demian Ebert (PAC) on September 1, 2021 at 2:21 PM: California expects the results of each sample ID to be included in the final report. Please let us know if our expectation is inaccurate.	All methods proposed in Section 3 and Appendix A are standard methods used for evaluation in CERCLA and RCRA investigations. It is well known that detection limits for some analytes will not meet ecological screening criteria - especially those that are back-calculated risk-based values rather than media tested effect levels. A summary of analytes that have reporting limits in excess of screening levels will be presented in the site investigation report and discussed in the uncertainties. Response to Additional California Comment: Analytical data for samples collected during the investigation will be provided, and the analytical results will be summarized in tables and figures.
CA-42	CH	Appendix A, Detection Limilts	App. Sec. 2.2	It is not clear to CDFW-OSPR how the non-detect chemical values were treated to identify COPECs in the datasets. Please include a discussion of non-detects in the next version of the document. [the Commentor provided this clarification of the comment via email on August 10, 2021] The achievable limits are used through the best available technology by the laboratory's ELAP-accredited methods. COPECs will be identified based on screening maximum detects against ecological benchmarks. When computing UCLs, non-detects will be included into the calculations. COPECs concentrations will not be zero and should be half of the detection limits and zero.	Jacobs has confirmed with the selected laboratory that the best available technologies and associated detection limits will be used. Non-detect values for COPECs on the target analyte list will be appropriately qualified in accordance with standard laboratory practice utilizing accepted data qualifiers for non-detects, estimated values, and verified detections. Application of data qualifiers to the final sample result will be based upon laboratory method detection limits (MDLs), limits of detection (LODs), limits of quantitation (LOQs), and reporting limits (RLs). Non-detect values for COPECs will be reported at the reporting limit (RL) but qualified as estimated down to the DL or LOD. These values are non-zero values. Section text has been updated.
CA-43	CH	Appendix A, Detection Limits and attached Table A-3 on Page A-8	App. Sec. 2.2	CDFW-OSPR strongly recommends that homologue analysis be used to estimate total polychlorinated biphenyls (PCBs) concentrations in environmental samples. It is unclear if Aroclor-based methods or PCB congener-specific and PCB homologue methods will be used in analytical testing services for soil and surface water samples. The analytical method described in Valoppi, et al. (2000) should be used for the 28 PCB congeners that exhibit dioxin-like toxicity.	Table A-3 has been revised to indicate that the nine common PCB Aroclors will be analyzed by EPA Method 8082A. The Aroclor Method 8082A is sufficient with regards to the sensitivity required to meet the screening limits in the very limited number of soil samples where PCBs are to be sampled. It is highly unlikely that PCBs will be analyzed in groundwater because soil samples will only be collected to a depth of 3 ft bgs which is well above the anticipated water table; none of the borings drilled down to 25 ft bgs encountered groundwater during the July 2006 Phase II ESA performed by Parametrix.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
CA-44	CH			Additional CA comment emailed by Kevin Takei (CDFW) to Dustin Till (PAC) on September 13, 2021 at 11:24 AM: "A complete, post-remedial ecological risk assessment (ERA) should be performed following any removal action and include consideration of potential special-status species and sensitive habitats, as well as plants and invertebrate species as receptors of concern. Any off-site areas with the potential to be affected by site contamination or remediation also should be assessed. In the meantime, as PacifiCorp moves forward with the current investigation, it should understand that residual inorganic/organic contamination that may cause impacts to ecological receptors should be quantified through confirmation sampling and in a post-remedial ERA."	Response to Additional California Comment: If COPCs are determined to exceed approved screening levels, residual REC-specific COPCs (inorganic or organic) must be further assessed through additional step-out sampling prior to remediation and/or through additional confirmation sampling performed under an approved REC-specific remedial plan. Such sampling would be performed iteratively to determine the vertical and lateral extent of the REC-specific COPCs. Post-remedial ecological risk assessments (ERAs) may be performed if the vertical and lateral extent of residual contamination precludes removal of a REC-specific contaminant(s) to levels less than the specified screening level(s). In this case, a post-remedial ERA would be performed to evaluate residual risks to upland ecological receptors (plants, invertebrates, birds, and mammals) that may use the REC and would consider Federal- and California State-listed threatened or endangered species and sensitive habitats. Evaluation would be limited to confirmation samples collected within the applicable exposure depth of the receptor (up to 6 feet below ground surface). Post-remedial ERAs will not be performed for RECs where site investigation samples or remedial confirmation samples do not exceed a REC-specific COPC screening level. No changes to the SIWP are necessary.

*Review Point of Contact: Tony Meyers (916.919.7171 and anthony.meyers@water.ca.gov)
Reviewers:
Allan Davis (AD)
Kim Gazzaniga (KG)
Chris Silva (CS)

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-1	Camas		General	The plan does not clearly describe the "Investigation Standard" which is vital to clearly outlining how the areas of concern will be evaluated and to what standard. The Investigation Standard should clearly state the specific CA environmental agencies/programs (CUPA, DTSC) and OR environmental agencies programs (DEQ) that will be used to evaluate the areas of concern. For example, there are certain requirements to address leaks from underground storage tanks in OR, which is not defined in this Work Plan. The Investigation Standard should then describe how if there are no CA/OR standards for certain analytes, etc., when/how the EPA standards will then be utilized. The Investigation Standard should also include specific sampling requirements that are required by CA, OR, and EPA. This can include sampling methodology, a specified number of composite samples, etc. If this is not applicable to the identified areas of concern, then please disregard this comment. Camas was not provided Appendix A, if this information is included in Appendix A, please disregard this comment.	A stand-alone Investigation Standard section has been added to the SIWP. EPA analytical methods are provided in the SAP (Appendix A). Composite samples are collected for waste characterization at appropriate sites and for disposal of investigation derived waste generated during the sampling investigation.
KRRC-2	Camas		Section 4	Data Evaluation does provide some detail on the standards (e.g. exposure pathways) that will be used, but the Work Plan does not define the exposure pathway to be utilized for each REC based on its future use (e.g. recreation, remote etc.).	The intended future uses and potentially complete exposure pathways have been identified for each REC in Section 1.5. Section 4.1 Data Evaluation has been moved to Section 3.3 and updated to include the applicable screening levels for exposure pathways for human health, leaching to groundwater, and ecological exposures.
KRRC-3	Camas		General	Will there be a follow-up report as to the protocols if contamination is identified and the following steps to be taken (e.g. confirmation samples, impacted soil disposal, etc.)? Will there be a separate report to identify how to obtain closure per CA/OR regulations if contamination is identified?	See please see the response to CA-10.
KRRC-4	Lloyd Lowy (LL)[a]		Executive Summary	In addition to the AECOM ESAs, site sampling plans were developed based on review of previous sampling and results at two of the RECs. [[*Please explain the source of the additional information and whether any other additional sources were reviewed or considered in developing the current plan; what other records does PAC have that would be relevant to structuring the work plan to accomplish the objective of appropriate resolution of environmental conditions*]]	The paragraph in which this sentence was proposed has been updated and now references four sources of additional information reviewed or considered in developing the current SIWP: (Parametrix 2006), (Watercourse 2018), (AECOM 2019c), and (AECOM 2020a). These sources are relevant to the structuring of the SIWP, whose objective is to accomplish the appropriate resolution of RECs.
KRRC-5	LL		Section 1.5	In Section 1.5 Roles and Responsibilities: The states of California and Oregon will be the ultimate landowners once the KRRC completes removal and restoration. The individual states may have different and additional responsibilities that are associated with the regulatory agencies that oversee cleanup of contaminated sites. The nature of this oversite will depend on the results of the investigations described in subsequent sections of this report. [[*This paragraph seems to suggest an alternative allocation of responsibilities. I suggest deleting it.*]]	This section has been deleted.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-6	LL		Section 1.6	In Section 1.6 Program Timeline: There are six pre-existing environmental conditions listed in Agreement Exhibit C that are unknown or were inaccessible ~~(e.g., possible contaminated areas underneath dams or powerhouses)~~to AECOM. Additional work at these locations cannot occur until the KRRC proceeds with dam removal. Therefore, these will be considered as pre-existing environmental conditions that are not subject to resolution prior to transfer. These conditions are not addressed in this work plan or schedule. In accordance with Agreement Section 3.5(c), PacifiCorp will develop subsequent investigation plans that will allow for investigation, remediation, and closure as appropriate in coordination with the overall dam removal project. [[*This section seems to make premature assumptions and conclusions. PacifiCorp is obligated to minimize impact and delay on dam removal activities. We would expect that some level of diligence and investigation could be performed in anticipation of dam removal work in the affected areas.*]] Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on August 27, 2021 at 12:22 PM: There are six pre-existing environmental conditions listed in Agreement Exhibit C that are, or are referenced in Exhibit C as, unknown or inaccessible ~~(e.g., possible contaminated areas underneath dams or powerhouses). Additional work at these locations cannot occur until the KRRC proceeds with dam removal. Therefore, these will be considered as pre-existing environmental conditions that are not subject to resolution prior to transfer.~~: • Condition 5 – Undiscovered Impacted Soil and Groundwater at the four Powerhouses • Condition 8 – High voltage switchyards • Condition 9 – Undiscovered Impacted Soil and Groundwater and the four dam developments • Condition 15 – Inaccessible Areas • Condition 16 – Retained Easement Areas • Condition 17 – Undiscovered Impacted Soil and Groundwater outside the removal work zone These conditions are not addressed in this work plan or schedule. ~~In accordance with Agreement Section 3.5(c),~~ PacifiCorp will develop ~~subsequent~~separate investigation plans ~~that will allow for investigation, remediation, and closure as appropriate in coordination with the overall dam removal project~~for these conditions	The suggested edit makes it appear that AECOM simply could not observe these locations and that is not the case. Of the six pre-existing environmental conditions in Exhibit C that are not addressed in the SIWP, three are areas that are not currently accessible to anyone (#5, #9, and 15), one is not currently safely accessible (#6), and one is outside the work area (#17), and one encompasses the retained easements (#16) that were not defined when AECOM did their work. The SIWP is not making premature conclusions about the conditions at any of these locations. It is simply stating which sites are not included in the SIWP and why. A secondary planning effort will be necessary (in accordance with the Property Transfer Agreement Section 3.5(c)) which will address these areas. The RECs subject to this secondary planning effort will be (the numbers in the list below corresponds to Exhibit C of the Property Transfer Agreement): 5. Undiscovered impacted soil and groundwater at the four powerhouses 6. High voltage switchyards 9. Undiscovered impacted soil and groundwater at the four dam developments 15. Inaccessible areas 16. Retained easement areas 17. Undiscovered impacted soil and groundwater outside the removal work zone Response to additional KRRC Comment: The suggested edits in the comment essentially mirror changes already made to the draft SIWP. No further edits are necessary.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-7	LL		Section 1.9	Regarding Section 1.9 Investigative Standard: "This section should define the OR/CA standards to be taken into account and then in each section under Section 2, it should state what specific standards are being used. E.g. recreation sites will have different cleanup standards than an area where there is not designated occupational use (or lease [*sic*] conservative {industrial]. Move info from Section 4 Data evaluation to this section.	Section 1.5 describes the investigative standard and provides a table that includes future uses and exposure pathways for each REC.
KRRC-8	LL		Section 3	In Section 3 Site Investigation and Evaluation, the bullet that states: • Total petroleum hydrocarbons (TPH) as gasoline, diesel, and motor oil by EPA Method SW8015M Comment: OR DEQ has specific GR, DRO, ORO methods.	This specific bullet has not been changed because the samples collected at the Oregon site (J.C. Boyle Dispersed Recreation Area 2) for the purpose of determining the existence of contamination will not be analyzed for TPH. However, since composite samples from this site will be analyzed for TPH, these Oregon-specific methods was added to the bullets discussing waste characterization, Table 3-1, and the SAP in the Oregon SIWP.
KRRC-9	LL		Section 3	In Section 3 Site Investigation and Evaluation, the paragraph that states: The second objective of the sampling is to precharacterize potential REC wastes to assist in the future development of waste profiles for REC closure. Based on the anticipated excavation volume and a sampling frequency of 1 per 500 cubic yards, one, four-point composite sample will be prepared from select RECs to represent soil that may potentially need to be excavated. Comment: What standard is this? CA and OR have specific requirements for waste characterization and for landfills to accept waste. Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: PAC response not satisfactory. Section 3 needs to be revised to clarify the difference of sampling to disposal purposes versus site extent investigations. Include a subsection heading of "Site Material Disposal Sampling"	The waste characterization sampling frequency is based on the requirements of the receiving facility. Commonly landfills require 1 sample per every 250 cubic-yards (cy) for the first 1,000 cy and reduce the number of samples for higher volumes. The SIWP will be revised to 1 per 250 cy. This is pre-characterization sampling, so if it is determined that soil needs to be removed and disposed at a landfill, additional sampling will be performed during excavation to satisfy landfill requirements. Response to Additional KRRC Comment: Section 3.0 has been divided into Section 3.1 Environmental Sampling and Section 3.2 Waste Characterization Sampling to more clearly describe the two types of sampling that will be performed.
KRRC-10	LL		Section 3.1.2	In Section 3.1 J.C. Boyle Dispersed Recreation Area 2, subsection 3.1.2 Sampling Plan, second paragraph: Samples will be collected from the soil within and adjacent to the fire ring, and outside the visually impacted area to determine whether contamination exists, the extent of contamination, and the need to address this contamination (Figure 3-1). Samples will be analyzed for Title 22 metals, VOCs, SVOCs, dioxins, and furans (Table 3-1). Comment: Results compared to which standard, what is the exposure pathway at this site?	Laboratory analytical results will be compared to published soil screening levels for human health (ingestion, dermal contact, and inhalation exposure pathways for a residential exposure scenario), soil leaching to groundwater, and ecological receptors. Screening levels were established based on future uses of the sites as determined by California and Oregon. This has been clarified in the SIWP.
KRRC-11	LL		Section 3.2	In Section 3.2 Copco No. 1 Dynamite Cave, subsection 3.2.2 Sampling Plan: This section describes the activities that will be performed to confirm an absence of dynamite and other explosives within the cave. If dynamite and other explosives are confirmed absent, the REC will be considered closed. *[[Let's get the results and then decide if it's closed]]*	The subject sentence has been modified.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-12	LL		Section 3.3	In Section 3.3 Copco No. 1 Debris Pile/Scrap Yard, subsection 3.3.1 Findings from Previous Investigations, second paragraph: The areas with ceramic electrical insulators, scrap dock materials, building materials, and the pile of borrow soil/gravel are not anticipated to have caused any contamination to soils, so no samples will be collected in these areas unless soil staining or other signs of potential contamination are observed during sampling activities. Comment: If staining is seen, what will the results compared to which standard, what is the exposure pathway at this site? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: PAC response not satisfactory. Copco Debris piles. A location figure is required. The response to only do soil samples if "staining" in present, presumes that all regulated materials leave a stain. Soil samples should be taken here if it is a known "dumping" area.	If staining is seen, samples will be collected. The standards and exposure pathways are the same as for comment KRRC-10. This has been clarified in the document. Response to Additional KRRC Comment: Callouts for the "scrap material storage area", "ceramic electrical insulators", and the "gravel borrow area" were added to the overall REC Figure 3-3. Text in this section clarifies that these are not known dumping areas and are not anticipated to have caused contamination to soils. The field sampling team will inspect these areas to evaluate whether there are observable signs of potential contamination. If they see any signs of potential contamination, samples will be collected.
KRRC-13	LL		Section 3.4	In Section 3.4 Copco No. 2 Wood Stave Penstock, subsection 3.4.1 Findings from Previous Investigations: Based on the analytical results of the four soil samples (AECOM 2020), metals did not exceed background concentrations for the Klamath Mountains (ODEQ 2013), except for arsenic which was detected in sample SOIL 2 at a concentration of 36 milligrams per kilogram (mg/kg), above the background concentration of 12 mg/kg, and above the maximum range of background concentrations (0.273 to 29.50 mg/kg). Comment: For which exposure pathway? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: PAC response may be satisfactory, need to see the revised version. Also, the term "typically allows for exceedance" is not a sufficient conclusion. It is recommended that the SIWP include adjacent soil sampling to establish background conditions.	The arsenic detection for 1 of 3 soil samples was above the background concentration for the Cascade Mountains Region. The standards and exposure pathways are the same as for comment KRRC-10. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways were presented in the August 19, 2021 meeting with KRRC and the States and have been updated in the SIWP and should satisfy concerns about which pathways will be referenced for each REC. Soils are not evenly distributed and therefore "adjacent soil sampling" would not adequately characterize background conditions. Instead, published background metals concentrations for the Cascade Mountains Region (ODEH 2013) will be used, unless other establish risk-based screening levels are greater. The background metals concentrations in ODEH 2013 are based on multiple large datasets and a rigorous statistical analysis of the data. It is standard practice to use documented background metal concentrations for an area because they are more representative of background concentrations than collecting a limited number of samples in any one location.
KRRC-14	LL		Section 3.4	In Section 3.4 Copco No. 2 Wood Stave Penstock, subsection 3.4.2 Sampling Plan last paragraph: The soil samples, and any collected water samples, will be analyzed for metals and SVOCs. Comment: Compare to what standards/exposure pathways? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Same as Comment 13 above.	The standards and exposure pathways are the same as for comment KRRC-10. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways have been updated in the SIWP.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-15	LL		Section 3.5	In Section 3.5 Copco No. 2 Wood Pile, subsection 3.5.2 Sampling Plan, second paragraph: Samples will be analyzed for Title 22 metals, VOCs, and SVOCs (Table 3-5). Comment: Compare to what standards/exposure pathways? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Same as Comment 13 above.	Laboratory analytical results will be compared to published soil screening levels for human health (ingestion, dermal contact, and inhalation exposure pathways for a residential exposure scenario), soil leaching to groundwater, and ecological receptors. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways have been updated in the SIWP.
KRRC-16	LL		Section 3.6	In Section 3.6 Copco No. 2 Transformer Fire, subsection 3.6.2 Sampling Plan, only paragraph: The borings will be advanced via hand auger and/or a DPT rig and will be analyzed for **BTEX, TPH, PAHs, and PCBs (Table 3-6).** All sample locations will be marked and cleared for subsurface utilities prior to augering or drilling. Comment: Compare to what standards/exposure pathways? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Same as Comment 13 above.	Laboratory analytical results will be compared to published soil screening levels for human health (ingestion, dermal contact, and inhalation exposure pathways for a residential exposure scenario) and soil leaching to groundwater. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways have been updated in the SIWP.
KRRC-17	LL		Section 3.7	In Section 3.7 Copco No. 2 Former Mobile Oil Containment Building, subsection 3.7.2 Sampling Plan, second paragraph: If the soil within continuous cores is visually determined to be impacted by TPHs (staining, odor, or PID readings greater than 50 ppmv), then soil samples will be collected f**or analysis of BTEX, TPHs and PAHs.** Comment: Compare to what standards/exposure pathways? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Same as Comment 13 above.	The standards and exposure pathways are the same as for comment KRRC-16. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways have been updated in the SIWP.
KRRC-18	LL		Section 3.8	In Section 3.8 Copco No. 2 Underground Storage Tanks, subsection 3.8.2 Sampling Plan, entire subsection. Comment: Should include any other specific CA CUPA requirements for UST leak discovery C. [*sic*]	If contamination is found at any of the RECs, the REC will be moved into the proper cleanup program. Section 4 of the SIWP has been clarified to reflect this.

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-19	LL		Section 3.8	In Section 3.8 Copco No. 2 Underground Storage Tanks, subsection 3.8.2 Sampling Plan, second paragraph: For the purposes of this site investigation, it is assumed that one or more of the three USTs may have been or still is located at the approximate location of the former fuel pumps and USTs shown on Figure 3-10. To first determine whether any USTs are still in this area, ground-penetrating radar (GPR) surveys will be performed over a larger area around the Copco No. 2 Maintenance Building and east to Daggett Road (Figure 3-10). If USTs are located, the USTs will be removed in accordance with federal, state, and local regulations. [[*Has PacifiCorp consulted its own records?*]] Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on August 27, 2021 at 12:22 PM: The AECOM summary of conditions references potential UST's at JC Boyle, Copco 2 and the Iron Gate Fish Hatchery. Section 3.8 addresses Copco 2 – where are JC Boyle and IGH addressed?	PacifiCorp has consulted our own records, which indicate that there were two tanks that were removed in 1987. This is based on an UST inventory prepared in July 1987 that included tanks at this location. Internal documents dated November 4,1987 provided funding to remove these tanks and indicated that PacifiCorp had been granted an extension until December 1, 1987 to complete this work. An update to that inventory in November 15, 1988 indicates that there were no tanks at PacifiCorp California facilities meaning that the tanks at Copco No. 2 had been removed. Unfortunately, it appears that any closure records and documentation of that work is missing from the files. Because there are no closure records, the GPR survey should definitively indicate if the tanks have been removed or not. Soil sampling will indicate if there is any legacy contamination that needs to be addressed. Response to Additional KRRC Comment: Seven USTs were identified within the Copco No. 1, Copco No. 2, and Iron Gate developments and at the Iron Gate Fish Hatchery by AECOM (2018). Two USTs (one 1,000-gallon regular leaded gasoline UST and one 1,000-gallon unleaded gasoline UST) identified at 27734 Copco Road, Montague, California are located outside the removal work zone (AECOM 2018). Two USTs (one UST identified at the J.C. Boyle Powerhouse and one UST identified at the Iron Gate Hatchery located at Copco Star Route-Copco Road) are unmappable "orphan sites" (AECOM 2018). Three sources of additional information were reviewed or considered for these four USTs: *EnviroStor* (DTSC 2021), *Draft Buried Structures Site Investigation*. April (KPC 2020), and *GeoTracker* (SWRCB, 2021). No further information is available regarding the specific location of these four USTs or whether these four USTs have been removed. Additionally, these four USTs are not identified in Exhibit C of the Agreement and are therefore omitted from the SIWP. However, if these four USTs (or any other USTs for that matter) are discovered during dam removal activities, they will be removed under applicable regulations. The removal process for these would be included in the plan developed to address RECs 5, 9, or 13 as applicable (see comment KRRC-6). Three USTs (one 1,000-gallon regular leaded gasoline UST, one 1,000-gallon unleaded gasoline UST, and one 9,000-gallon UST) were identified at 19305 Daggett Road, Hornbrook, California (AECOM 2018) and are in Exhibit C of the Agreement and are therefore included in the SIWP.
KRRC-20	LL		Section 3.8	In Section 3.8 Copco No. 2 Underground Storage Tanks, subsection 3.8.2 Sampling Plan, fourth paragraph: If the soil within continuous cores is visually determined to be impacted by TPHs (staining, odor, or PID readings greater than 50 ppmv), then soil samples will be collected **for analysis of BTEX, TPHs and PAHs.** Comment: Compare to what standards/exposure pathways? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: PAC response may be satisfactory, need to see the revised version. (Exposure pathway).	The standards and exposure pathways are the same as for comment KRRC-16. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways have been updated in the SIWP.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-21	LL		Section 3.9	In Section 3.9 Copco No. 2 Burn Pit, subsection 3.9.2 Sampling Plan, second paragraph: Because of the variety of features and expected constituents, samples will be analyzed for some or all of the following constituents: **Title 22 metals, VOCs, SVOCs, TPHs, PAHs, dioxins, and furans (Table 3-9).** Comment: Compare to what standards/exposure pathways? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Same as Comment 20 above	The standards and exposure pathways are the same as for comment KRRC-10. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways have been updated in the SIWP.
KRRC-22	LL		Section 3.10	In Section 3.10 Iron Gate Shooting Range, subsection 3.10.2 Sampling Plan, last paragraph: Borings will be extended if visual observations indicate contamination is deeper. If groundwater is encountered in any of the borings, groundwater samples will be collected and analyzed for the same set of analytes as the soil samples. **Samples will be analyzed for Title 22 metals and PAHs.** Comment: Compare to what standards/exposure pathways? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Same as Comment 20 above	The standards and exposure pathways are the same as for comment KRRC-10. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways have been updated in the SIWP.
KRRC-23	LL		Section 3.11	In Section 3.11 Iron Gate Fish Hatchery Burn Pit, subsection 3.11.2 Sampling Plan, last paragraph: All samples collected from within and beneath the burn pit will be analyzed **for metals, TPHs, VOCs, SVOCs, dioxins, and furans (Table 3-11)**. The deeper unimpacted soil sample may be held for analysis pending the analytical results for the shallower unimpacted soil sample. Comment: Compare to what standards/exposure pathways? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Same as Comment 20 above	The standards and exposure pathways are the same as for comment KRRC-10. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways have been updated in the SIWP.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-24	LL		Section 4.1	In Section 4.1 Data Evaluation, second paragraph: To evaluate the potential contamination level at each REC, soil and groundwater analytical data will be compared to published screening levels. The screening level for the specific analyte at each REC located in California is taken as the lowest (most conservative) of screening levels from the following pathways and sources: [[*ARE THESE THE APPROPRIATE LEVELS IN LIGHT OF THE ANTICIPATED USE AS NATURAL HABITAT AND PASSIVE RECREATION AREA AFTER DAM REMOVAL?*]] Comment: Need to confirm consistent with CUPA etc. regulations. Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: PAC response not satisfactory. Per the Siskiyou County (the CUPA) website…"Siskiyou County Environmental Health is responsible for responding to incidents involving any release or threatened release of hazardous materials. Threats to people, property and the environment are assessed, and then remedial action procedures are conducted under the supervision of a Registered Environmental Health Specialist." It is recommended that the Siskiyou County CUPA be included in the investigation and the establishment of the site risks. If Jacobs believes this step is not statutorily required, please provide such regulation and/or case law.	Laboratory analytical results for sites with future uses of passive recreation and natural habitat will be compared to published soil screening levels for human health (residential exposure pathways), soil leaching to groundwater, and ecological receptors. This has been clarified in the document. The sites being investigated are not known hazardous waste generating sites and are therefore not regulated under a CUPA. Response to Additional KRRC Comment: The following has been added to section 4: "CUPA reporting will be provided as needed in compliance with California Health and Safety Code Section 25500, et. Seq. if hazardous waste in quantities exceeding 500 pounds solids or 55 gallons of liquids are generated or if any other actions trigger CUPA reporting. In the event that threats to people, property and the environment are identified, in accordance with the Siskiyou County CUPA requirements these threats will be assessed, and then remedial action procedures will be conducted under the supervision of a Registered Environmental Health Specialist."
KRRC-25	LL		Section 4.1	Second bullet: • Groundwater: Human health direct contact exposure (for carcinogenic and noncarcinogenic constituents) for ingestion, dermal contact, and inhalation exposure pathways for tapwater: Priority of 1) DTSC Human Health Risk Assessment Note 3 value for tapwater (DTSC 2020, Table 2); 2) EPA RSL for tapwater based on target cancer risk of 1 x 10-6 and target noncancer hazard of 1 (EPA 2021); 3) For petroleum hydrocarbons, SFRWQCB screening levels for tapwater (SFRWQCB 2019, Table GW-1). Comment: Need to confirm consistent with CUPA etc. regulations. Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Same as Comment 24 above.	The screening levels will be used to evaluate whether contamination is present at the sites. The sites being investigated are not known hazardous waste generating sites and are therefore not regulated under a CUPA. No changes to the SIWP were made. Response to Additional KRRC Comment: See response to Comment 24.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-26	LL		Section 4.1	Paragraph under Groundwater bullet: For certain metals in soil, the screening level selected from the criteria provided above may actually be lower than naturally occurring levels of metals in local soils, so published regional background soil data were considered when developing screening levels. **The 95 percent upper prediction level for the Klamath Mountains (ODEQ 2013)** will be used to represent background for all RECs; if a regional background level is higher than a screening level defined from the sources above, the background level is the default screening level for that specific metal in soil (Table 4-1). Comment: Is this appropriate for CA? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Do not know if it is satisfactory. Point of clarification, Iron Gate may not be considered the Klamath Mountains.	Because the California sites are within the Cascade Range, using the 95 percent upper prediction levels for the Cascade Range (ODEQ 2013) are considered representative of background levels for each site. Background values specific to the Northern California Cascade Range are not available nor are they expected to be different from those across an arbitrary line that separates Oregon and California. Response to Additional KRRC Comment: Jacobs has determined that the proposed SIWP sites in California are within the Cascade Range. The California Cascade Range aligns with Cascade Range in Oregon. The SIWP has been revised to refer to the Cascade Range for background concentrations for metals.
KRRC-27	LL		Section 4.1	Second paragraph under Groundwater bullet: The soil screening levels for the specific analytes at the J.C. Boyle REC located in Oregon are taken as the lowest (most conservative) screening levels for Occupational, Construction Worker, Excavation Worker, and Leaching to Groundwater from the State of Oregon Department of Environmental Quality Risk-Based Concentrations for Individual Chemicals in Soil (ODEQ 2010). If no screening level is listed for an analyte from this source, then the lowest screening levels from the EPA Regional Screening Level for Industrial Soil (EPA 2019) are used. ***[[ARE THESE THE APPROPRIATE LEVELS IN LIGHT OF THE ANTICIPATED USE AS NATURAL HABITAT AND PASSIVE RECREATION AREA AFTER DAM REMOVAL?]]*** Comment: Is this appropriate for CA?	The SIWP has been updated to include a summary of the all the RECs, future uses for those areas, potentially complete exposure pathways, and the applicable screening levels for human health (changed from industrial to residential scenario), ecological receptors (added since draft SIWP), and soil leaching to groundwater exposure pathways. These changes apply to all RECs; OR and CA.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-28	LL		Section 4.2	In Section 4.2 Reporting, the reviewer inserted the following tracked edits: A single report documenting the site investigations at all RECs will be prepared, with a section for each individual REC. The report will ~~briefly~~include PacifiCorp records reviewed and considered and will reasonably document field activities, summarize key field observations, and describe and provide reasons for any deviations from the SIWP. Analytical data will be provided and will be summarized in tables for each REC, identifying any exceedances of or revisions to the preliminary screening levels. ~~For RECs where analytical data do not exceed preliminary screening levels, no further action will be recommended. The investigation report will become the basis for determining that a REC has been resolved per the requirements of the Agreement and will be used to support the closure process.~~ Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on August 27, 2021 at 12:22 PM: A single report documenting the site investigations at all RECs will be prepared, with a section for each individual REC. The report will ~~briefly~~include PacifiCorp records reviewed and considered and will reasonably document field activities, summarize key field observations, and describe and provide reasons for any deviations from the SIWP. Analytical data will be provided and will be summarized in tables for each REC, identifying any exceedances of or revisions to the preliminary screening levels. For RECs where analytical data do not exceed preliminary screening levels, no further action will be recommended~~. The~~, absent any considerations to the contrary under the Investigative Standard. In such instances the investigation report will become the basis for ~~determining that a~~requesting a determination that the REC has been resolved per the requirements of the Agreement and will be used to support the closure process. For RECs where preliminary screening levels are exceeded, the investigation report will recommend next steps that may include additional data collection and analysis, remediation, any regulatory requirements applicable to the REC and whether regulatory approvals are required, and a work plan for subsequent recommended actions.	At this time, the bulk of the PacifiCorp records reviewed are included in the Phase 1 reports that AECOM prepared. Those reports are available to the principal parties for review. Including them again in the report prepared to present the results of site-specific sampling is redundant. Should additional records be discovered that provide relevant information, those will be included in the report following SIWP implementation (e.g., UST records for Copco No. 2 – See Comment CA-19 above). The SIWP has been edited to reflect this. The SIWP implementation report will document field methods with a focus on those situations that forced a change from the SIWP or SAP. The level of detail will be adequate to allow the reader of that report to understand what happened and why. The suggestion that analytical laboratory data be provided is a good one, and the SIWP has been edited to reflect that. The suggested deletion of the paragraph describing what the report will recommend for sites where there is no contamination that exceeds screening levels creates an inconsistency with the paragraph that follows this one. That paragraph indicates the next steps to be taken where sites exceed screening levels. Should the suggested edit be made, that inconsistency would lead a reader of the SIWP to ask what happens to the sites where there is no contamination. No changes have been made Response to Additional KRRC Comment: Given the other edits made to this section of the SIWP before the additional comments from the KRRC were received by PacifiCorp, the suggested edits to the text were not incorporated.

[a] Except for comments KRRC-29 to KRRC-32, comments from Lloyd Lowy (LL) are extracted from the MS Word file named, *KRRC_Draft SIWP with Technical comments*. Prescriptive edits from the MS Word file (primarily wordsmithing changes) are not included in this comment table.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Oregon Department of Justice					
OR-1	CM		General	There needs to be an objective investigation and remediation standard for all work, and it needs to be something that Jacobs certifies (for reliance on by KRRC and the States). This is not a situation where PacifiCorp (with its greater situational knowledge) should be proposing something to see if we like it. Rather, given that knowledge, we need to rely on Jacobs certification that (a) all work meets or exceeds all applicable regulatory and legal requirements, and (b) that all work is consistent with current best practices (and if those are debatable, we are informed of the debate and the specific reasoning for the given choice).	The SIWP has been prepared by Jacobs with input from PacifiCorp and is consistent with industry practice. The SIWP is only an investigation plan – the first step in addressing potential contamination at these sites. At this time, it is unknown if there are any contamination issues at any of these locations. Remediation plans and/or additional investigation plans, as necessary, will be prepared based on the results of the investigation activities detailed in the SIWP. Our understanding is that an investigation plan does not require certification. The reporting that comes after implementation may require certification, but that is a step in the future. The SIWP has been separated into a California SIWP and an Oregon SIWP. All edits that addressed comments from the KRRC and California have been incorporated into the Oregon SIWP.
OR-2	CM		General	At the opening of the body of the partial report (Section 3) Jacobs asks KRRC to confirm that certain standards are appropriate for anticipated uses. KRRC is not the end user, the States are. The AKHSA describes generally the required and anticipated future uses on the property, and Jacobs needs to understand them. If Jacobs finds there to be a question, in a particular location, as to which standard is appropriate, inquiry may be made to the States, but in the absence of current definitive knowledge (which is likely given the sequencing of events) Jacobs must meet the higher standard.	PacifiCorp circulated the SIWP for review specifically so that the states and the KRRC could provide comments about these very issues. While the KHSA may have presented expected end uses, many things have changed regarding specific project implementation and restoration since the KSHA was drafted. As such, PacifiCorp has requested that the states and the KRRC confirm the end use for all the sites and will adjust screening levels as appropriate based on the input from those organizations. If multiple screening levels are appropriate for a given location, the more conservative (protective of whatever the end use might be) will be used. As PacifiCorp has stated, this process is intended to be transparent and collaborative to avoid misaligned expectations on issues like future uses and screening standards. No edits have been made to the SIWP.
OR-3	CM		General	The Jacobs partial report seems to straddle the line between being a technical document and also trying to serve as a legal document of some sort, which is inappropriate. The property transfer agreement is the legal document that this work serves. Sections 1.3 through 1.5 do not belong in any work plan. Please delete those elements from this plan and do not include it in any of the necessary future plans either.	Section 1.3 has been retained because it helps provide background context to anyone reading the SIWP as to why PacifiCorp is preparing the document and doing this work. Sections 1.4 and 1.5 have been deleted.
OR-4	CM		General	The partial report we are reviewing is identified as an "External Review Draft". As the work is performed, KRRC and the States will want to know that they are getting all the pertinent information, not a sanitized version. There should be no difference between versions circulated to PacifiCorp and to KRRC and the States going forward.	The draft SIWP that was provided to the states and the KRRC for review is the only version of this document and is the complete document; nothing has been "sanitized" or omitted from this document. The term 'External Review Draft' is a nonsubstantive label simply meant to differentiate this document from administrative drafts of the same document. No edits have been made to the SIWP.
OR-5	CM		General	In addition to the general implications of these comments on the specific proposal for the burn pit, at least one of the advance conclusions impacts Oregon. What is the basis for the conclusion that there are no USTs on the Oregon property? Please explain	As was discussed in the SIWP, site conditions at the various sites are based on work conducted by AECOM. AECOM did not identify any USTs historically or currently present on PacifiCorp property in Oregon in the Phase 1 documents they prepared (Section 1.1). Because of this, Exhibit C of the Property Transfer Agreement did not include any USTs in Oregon. The SIWP is based on those sites identified in Exhibit C. It is worth noting that there are RECs in Exhibit C that are directed at the undiscovered items. Should any USTs be discovered on PacifiCorp property in Oregon during dam removal, then the plan developed to address the unknown or undiscovered environmental conditions would be implemented. That plan has not yet been prepared.

*Chris Mathews (CM)

COMMENT MATRIX for the Draft Final
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.*	Reviewer Initials**	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
California Department of Water Resources / California Department of Fish and Wildlife - Office of Spill Prevention and Response					
California submitted no comments on the draft final SIWP.					
Klamath River Renewal Corporation					
KRRC comments emailed by Lloyd Lowy (KRRC) to Demian Ebert (PacifiCorp) on October 22, 2021, based on review of the Final Review Draft of the California SIWP and Final Review Draft of the Oregon SIWP submitted October 1, 2021					
KRRC-29	LL		ES, page ES-2 (both OR and CA SIWPs)	The last paragraph refers to an "Agreement A"; is that intended to be a reference to the Property Transfer Agreement? Please clarify. [this comment applies to both the California SIWP and Oregon SIWP]	The comment is correct. The text should have referenced the Property Transfer Agreement. The text "Agreement A" has been changed to "the Agreement" in both the Oregon and California SIWPs.
KRRC-30	LL		Section 1.5 (both OR and CA SIWPs)	At the end of the third paragraph please change "hazardous materials" to "hazardous substances, pollutants and contaminants." I think that's consistent with the intent and reflects the more typical formulation (mea culpa for proposing the initial phrase). [this comment applies to both the California SIWP and Oregon SIWP]	Text has been changed accordingly in both the Oregon and California SIWPs.
KRRC-31	LL		Section 3.1 (OR SIWP)	The list of compounds being tested for excludes a number that are included in the CA SIWP. Why is that? [this comment applies to the Oregon SIWP]	The OR SIWP presents only those compounds of interest at the J.C Boyle Dispersed Recreation Area – 2, a burn pit or fire ring. These compounds are consistent with the COPC for all burn pits being evaluated on the Lower Klamath Hydroelectric Project (including the three burn pits in California at the Copco No. 1 Debris Pile/Scrap Yard, Copco No. 2 Burn Pit, and Iron Gate Hatchery Burn Pit RECs). The COPC list in California is different because the California SIWP has many more RECs, and as a result, additional compounds of interest for which samples will be analyzed as compared to Oregon. No changes were made to the Oregon SIWP.
KRRC-32	LL		Section 4 (OR SIWP)	We echo Chris's question regarding the last paragraph [this comment applies to the Oregon SIWP]	See response to OR-6 below.
Oregon Department of Justice					
Oregon comments emailed by Chris Mathews to Demian Ebert (PacifiCorp) on October 22, 2021, based on review of the Final Review Draft of the Oregon SIWP submitted October 1, 2021.					
OR-6	CM		Section 4, page 4-1	There are some areas where the applicable regulatory standard with respect to Oregon work (inadvertently perhaps?) references California law or agreement. This drafting glitch was partially ameliorated in earlier drafts where there was language providing that an off-state standard was used when there was not an established standard in the other state. Since that language appears to have been removed, it is not clear when PacifiCorp is proposing to apply a CA standard in Oregon and why. An example of this problem occurs in the last paragraph of Sec 4 on p. 4-1.	This was an oversight and the last paragraph in Section 4 has been changed to the following: *If remediation waste is characterized as RCRA hazardous, the Oregon Department of Environmental Quality (ODEQ) will be notified via submittal of the Hazardous Waste Site Identification Form to obtain the RCRA Site Identification Number (i.e., the U.S. EPA ID Number) if required under RCRA and consistent with ODEQ guidance documents.*
OR-7	CM		3.2	Why is the order of regulation/standards to be used not OR, EPA, CA?	The Oregon SIWP has been modified in Section 3.2 to clarify that wastes will first be characterized to determine if it is hazardous as required by RCRA regulations, adopted by reference in the Oregon Administrative Code. The text has also been clarified to indicate that a non-RCRA hazardous waste determination would only be required for waste that will be disposed in California. The non-RCRA determination may be necessary because the final waste disposal site is not known at this time.

COMMENT MATRIX for the Draft Final
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.*	Reviewer Initials**	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
OR-8	CM		Section 3.1, paragraph 2	Paragraph 2 of Section 3.1 references a CA specific agreement for Oregon work. We support such work being done but are unclear about the reference.	California requested that boreholes at five of the California RECs be extended to a depth of 6 feet (see comment CA-13). In a follow up meeting with California, it was agreed that approximately 20 percent of the borings would be advanced to a depth of 6 feet and samples collected at four depth intervals. PacifiCorp decided to apply this same approach at the J.C. Boyle REC so the sampling approach was consistent at the Oregon REC. The text was intended to explain the change in the sampling plan for the J.C. Boyle site. The Oregon SIWP has been edited to clarify the reason for taking this approach in Oregon.

* Numbering continues from previously submitted comments

** Chris Mathews (CM), Lloyd Lowy (LL)

REFERENCES

Bennett, R., D. Hoff, and M. Etterson. 2011. *Assessment of Methods for Estimating Risk to Birds from Ingestion of Contaminated Grit Particles*. U.S. Environmental Protection Agency, Ecological Risk Assessment Support Center, Cincinnati, OH. EPA/600/R-11/023.

Department of Toxic Substances Control (DTSC).1996. *Guidance for Ecological Risk Assessments at Hazardous Waste Sites and Permitted Facilities*. Part A: Overview. July 4. https://dtsc.ca.gov/ecological-risk-assessment-hero/

Department of Toxic Substances Control (DTSC). 1998. *Depth of soil samples used to set exposure point concentration for burrowing mammals and burrow-dwelling birds in an ecological risk assessments*. HERD ERA Note Number 1. California Environmental Protection Agency, Department of Toxic Substances Control. May 15. https://dtsc.ca.gov/wp-content/uploads/sites/31/2018/01/econote1.pdf.

Knight Piesold Consulting (KPC). 2020. *Draft Buried Structures Site Investigation*. April

State Water Resources Control Board (SWRCB). 2021. *Geotracker*. https://geotracker.waterboards.ca.gov/.

Tsao, C. L. M. Zafonte, B. J. Stanton, R. Donohoe, C. Rech., C. Huang, and M. J. Anderson. 2013. *Screening-Level Ecological Risk Assessment Approach for Quantifying Lead Ammunition Ingestion and Adverse Effects in Upland and Wetland Birds*. California Department of Fish and Wildlife, Office of Spill Prevention and Response. Poster presented at the 2013 California Department of Fish and Wildlife Scientific Symposium, Sacramento, CA. October 8 – 9.

Valoppi, L., M. Petreas, R. M. Donohoe, L. Sullivan, and C.A. Callahan. 2000. "Use of PCB Congener and Homologue Analysis in Ecological Risk Assessment." *Environmental Toxicology and Risk Assessment: Recent Achievements in Environmental Fate and Transport*. Ninth Volume, ASTM STP 1381, F. T. Price, K. V. Brix, and N. K. Lane, Eds., American Society for Testing and Materials, West Conshohochen, PA. 9:147-160.

US EPA. 2000. 40 CFR 131. *Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California (California Toxics Rule)*. 65 FR 31681. pp. 31681-31719. May 18.

US EPA. 2002. *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites*. Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Report No. EPA 540-R-01-003 / OSWER 9285.7-41.

US EPA. 2005a. *Ecological Soil Screening Level for Lead. Interim Final*. OSWER Directive 9285.7-70. Office of Solid Waste and Emergency Response, Washington, DC. March. https://www.epa.gov/risk/ecological-soil-screening-level-eco-ssl-guidance-and-documents.

US EPA. 2005b. *Uniform Federal Policy for Quality Assurance Project Plans.* DoD and DOE Intergovernmental Data Quality Task Force. EPA-505-B-04-900A. DoD Pub. No. DTIC ADA427785. March.

Lower Klamath Hydroelectric Project (FERC No. P-14803)

Oregon Site Investigation Work Plan

Final

November 2021

Prepared by:

Jacobs

Prepared for:

PACIFICORP

Lower Klamath Hydroelectric Project
(FERC No. P-14803)

Project No:	D3493300.A.CS.EV.01.01
Document Title:	Oregon Site Investigation Work Plan
Document No.:	PPS0917210533PDX
Revision:	Final
Date:	November 2021
Client Name:	PacifiCorp, Demian Ebert, Klamath Program Manager, 503-813-6625
Project Manager:	Emilio Candanoza, Jacobs, 541-768-3509

Jacobs Engineering Group Inc.

2020 SW Fourth Avenue
Suite 300
Portland, Oregon
United States
T +1.503.235.5000

www.jacobs.com

Executive Summary

Introduction

As part of the Lower Klamath Hydroelectric Project dam removal activities, PacifiCorp and the Klamath River Renewal Corporation have entered into a Property Transfer Agreement (Agreement). This legally-binding document defines 17 recognized environmental conditions (RECs) located in the states of California and Oregon that PacifiCorp is responsible for investigating, closing, and remediating, as necessary, in advance of the Agreement's closing date.

This Site Investigation Work Plan (SIWP) describes the sampling activities that will be performed to confirm the presence or absence of constituents of potential concern (COPCs) that are greater than identified screening levels at the J.C. Boyle Dispersed Recreation Area – 2 REC in Oregon. The primary objective of the sampling activities is to collect key environmental and waste management data that support REC closure. AECOM Technical Services, Inc. (AECOM) identified the REC as part of a Phase I environmental site assessment (ESA) performed in 2020 (AECOM 2020b) and the Agreement documents the REC in Exhibit C.

The remaining Oregon RECs documented in Exhibit C (Section 1.1) are identified as unknown, inaccessible, or both, and will not be investigated under this SIWP. PacifiCorp will develop a separate work plan to address these RECs in a manner that will minimize disruption or delay of dam removal efforts. Environmental sampling of 11 RECs in the State of California is addressed in a separate work plan (Jacobs 2021).

PacifiCorp Dam Sites

As part of the Lower Klamath Hydroelectric Project, the J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate dams and supporting infrastructure will be removed and adjacent lands will be restored (Figure ES-1). The four dams were constructed between 1911 and 1962; Copco No. 1 is the oldest.

The dams and associated powerhouses have been and continue to be operated to generate and distribute electricity. Hazardous materials that have been used onsite include diesel fuel, leaded and unleaded gasoline, non-polychlorinated biphenyls (PCBs), and governor, transformer, and motor oils. Battery banks and oils are stored within secondary containment systems. As noted in the Phase I ESA conducted by AECOM, the powerhouses appeared to be in good operating condition, with proper housekeeping and hazardous materials management practices (AECOM 2018).

Findings and Discussion

This SIWP presents the planned sampling approach for the J.C. Boyle Dispersed Recreation Area – 2 (Figure ES-2). The sampling approach is not meant to be rigid but rather dynamic and in line with the U.S. Environmental Protection Agency's (EPA's) Triad Approach, where sampling strategies are subject to change based on real-time consideration of field observations and conditions in an effort to streamline site characterization and better allow for more rapid site cleanup and closure (EPA 2001). The ultimate objective is to collect field and analytical data that meet the Investigative Standard described in this SIWP so that: 1) the REC can be closed based on the field and analytical results of the site investigation; or 2) the nature and extent of discovered contaminants are defined, and if necessary, a remedial action plan can be developed and implemented that ultimately leads to closure of the REC.

A Site Investigation Report will be prepared to document the site investigations performed at the REC. The Site Investigation Report will document field activities, summarize key field observations, and identify major deviations from this SIWP. The analytical results will be summarized in tables for the REC and compared to the screening levels identified in SIWP tables. The analytical results will also be evaluated against applicable regulatory requirements for the REC. The Site Investigation Report will summarize the key findings and provide recommended next steps and conclusions for the REC. Recommended next steps could include collection of additional environmental samples, remediation of the site or a request for REC closure based on a remedial action or determination that no further action is required. If the analytical results of COPCs are less than screening levels established in this SIWP, PacifiCorp will request closure of the REC in accordance with the terms of the Agreement and a process to be developed with the Klamath River Renewal Corporation and the State of Oregon. If COPC concentrations are greater than screening levels, PacifiCorp will either propose advancement of step-out borings to collect additional environmental samples according to the sampling plan established for the REC, or development of a remediation plan based on the field and analytical data already collected.

Contents

Figures (located at the end of text)

Acronyms and Abbreviations

°F	degree(s) Fahrenheit
AECOM	AECOM Technical Services, Inc.
Agreement	Property Transfer Agreement entered into by PacifiCorp and Klamath River Renewal Corporation
bgs	below ground surface
CCR	California Code of Regulations
COPC	constituent(s) of potential concern
EPA	U.S. Environmental Protection Agency
ESA	environmental site assessment
FERC	Federal Energy Regulatory Commission
Jacobs	Jacobs Engineering Group Inc.
KRRC	Klamath River Renewal Corporation
ODEQ	Oregon Department of Environmental Quality
PCB	polychlorinated biphenyls
PID	photoionization detector
Project	Lower Klamath Hydroelectric Project
RCRA	Resource Conservation and Recovery Act
REC	recognized environmental condition
RM	river mile
SIWP	Site Investigation Work Plan
STLC	soluble threshold limit concentration
SVOC	semivolatile organic compound
TCLP	toxicity characteristic leaching procedure
TPH	total petroleum hydrocarbon
TTLC	total threshold limit concentration
UST	underground storage tank
VOC	volatile organic compound

1. Introduction

PacifiCorp retained Jacobs Engineering Group Inc. (Jacobs) to develop a Site Investigation Work Plan (SIWP) for the Lower Klamath Hydroelectric Project (Project). The purpose of the SIWP is to further investigate and evaluate one recognized environmental condition (REC) on the Parcel B land surrounding the J.C. Boyle Development in Oregon. The REC was identified during Phase I environmental site assessments (Phase I ESAs) conducted by AECOM Technical Services, Inc. (AECOM) on behalf of the Klamath River Renewal Corporation (KRRC).

This SIWP does the following:

- Summarizes the findings from the previous Phase I ESAs.
- Establishes the data needs for the further evaluation of each REC.
- Identifies data quality objectives to determine the type and extent of potential contamination at the REC.
- Proposes a sampling approach for the REC, with a figure showing sampling locations and a table showing media to be sampled, sample collection depths, and analyses to be performed.
- Describes how the data collected will be used for decision-making.
- Outlines general procedures and protocols for sample collection and handling in the Sampling and Analysis Plan (Appendix A).

1.1 Background

As part of the Lower Klamath Hydroelectric Project dam removal activities, PacifiCorp and the KRRC have entered into a Property Transfer Agreement (Agreement). As part of the Agreement, a list of 17 recognized environmental conditions (RECs) have been identified. The RECs are consolidated as Exhibit C to the Agreement. PacifiCorp is responsible for investigating, closing, or remediating the RECs, as necessary, in advance of the Agreement's closing date. The complete list of RECs is as follows:

1) Iron Gate Shooting Range (Parcel B REC 9)
2) Copco No. 2 Burn Pit (Parcel B REC 6)
3) Wood-Stave Penstock
4) Copco No. 1 Dynamite Cave
5) Undiscovered Impacted Soil and Groundwater at the Four Powerhouses
6) Underground Storage Tanks (USTs)
7) Copco No. 2 Former Mobile Oil Containment Building
8) High-voltage Switchyards
9) Undiscovered Impacted Soil and Groundwater at the Four Dam Developments
10) J.C. Boyle Dispersed Recreation Area – 2 (Parcel B REC 1)
11) Copco No. 1 Debris Piles/Scrap Yard (Parcel B REC 4)
12) Copco No. 2 Wood Pile (Parcel B REC 7)
13) Iron Gate Hatchery Burn Pit
14) Iron Gate Hatchery Settling Ponds
15) Inaccessible Areas
16) Retained Easement Areas
17) Undiscovered Impacted Soil and Groundwater Outside the Removal Work Zone

AECOM conducted six Phase I or II ESAs between 2018 and 2020 from which the list of preexisting environmental conditions was generated. These specific ESA studies are:

- J.C. Boyle Dam, Copco No. 1 Dam, Copco No. 2 Dam, Iron Gate Dam, and Iron Gate Hatchery Phase I Environmental Site Assessments (AECOM 2018)
- City of Yreka Diversion Dam Phase I Environmental Site Assessment (AECOM 2019a)
- Fall Creek Hatchery Phase I Environmental Site Assessment (AECOM 2019b)
- Burn Pit at Iron Gate Hatchery Phase II Soil Investigation (AECOM 2019c)
- Draft Wood-Stave Penstock and Soil Investigation (AECOM 2020a)
- Draft Phase I Environmental Site Assessment of the Parcel B Lands (AECOM 2020b)

Of the RECs identified by AECOM and documented in Exhibit C of the Agreement, PacifiCorp has elected to conduct additional site investigations for the following:

1) Iron Gate Shooting Range (Parcel B REC 9)
2) Copco No. 2 Burn Pit (Parcel B REC 6)
3) Wood-Stave Penstock
4) Copco No. 1 Dynamite Cave
5) Underground Storage Tanks (USTs)
6) Copco No. 2 Former Mobile Oil Containment Building
7) J.C. Boyle Dispersed Recreation Area – 2 (Parcel B REC 1)
8) Copco No. 1 Debris Piles/Scrap Yard (Parcel B REC 4)
9) Copco No. 2 Wood Pile (Parcel B REC 7)
10) Iron Gate Hatchery Burn Pit
11) Iron Gate Hatchery Settling Ponds
12) Copco No. 2 Powerhouse Transformer Fire[1]

The remaining RECs identified in Exhibit C are unknown, inaccessible, or both:

- Condition 5 – Undiscovered Impacted Soil and Groundwater at the four Powerhouses
- Condition 8 – High voltage switchyards
- Condition 9 – Undiscovered Impacted Soil and Groundwater and the four dam developments
- Condition 15 – Inaccessible Areas
- Condition 16 – Retained Easement Areas
- Condition 17 – Undiscovered Impacted Soil and Groundwater outside the removal work zone

These conditions are not addressed in this SIWP. In accordance with Agreement Section 3.5(c), PacifiCorp will develop subsequent separate investigation plans that will allow for investigation, remediation, and closure, as appropriate, and in coordination with the overall dam removal project.

This SIWP describes the soil sampling activities that will be performed at the J.C. Boyle Dispersed Recreation Area – 2. The other 11 RECs are in California and are addressed in a separate SIWP (Jacobs 2021).

[1] KRRC Facility Phase I ESA identified the Copco No. 2 Powerhouse Transformer Fire and Oil Release as a REC that was not included in Exhibit C. During the Phase I ESA, no documentation of the remedial action could be found. PacifiCorp has elected to conduct additional site investigation work to confirm the remedial action was completed and close the REC.

1.2 Objectives

The primary objective of the site investigations described in this SIWP is to facilitate collection of key environmental data that support closure of the J.C. Boyle Dispersed Recreation Area – 2 REC. Because the REC is situated in a remote location and because accessibility to the REC is seasonal, the prescribed timeframe for collecting data associated with the REC is relatively short. Consequently, a secondary objective of the SIWP is to outline a sampling approach to collect as much analytical and field observational data as are considered required for REC closure under a single mobilization; data collection is currently anticipated to occur in the fall of 2021. The field and analytical data will be used to determine and delineate the vertical and horizontal extent of potentially impacted soil, groundwater, or both, as needed, for REC closure. Waste characterization data will also be collected to help in planning a remedial action at a site. These data will be used to determine onsite waste segregation and management requirements for hazardous and nonhazardous waste, and to determine offsite disposal requirements.

1.3 Program Organization

The intent of this section is to generally describe the primary stakeholders in the property transfer process, and the relationships among those stakeholders. Section 3.5(a) of the Agreement between PacifiCorp and the KRRC specifically enumerated RECs subject to the reasonable satisfaction of the KRRC in consultation with the states of Oregon and California. Section 3.5(b) of the Agreement obligates PacifiCorp to provide the KRRC written documentation containing a reasonably detailed description of:

i. Its efforts to assess the scope of the condition.

ii. The results of such efforts.

iii. Its proposed approach to resolving the condition.

iv. The legal and regulatory requirements applicable to the condition and the compliance of the proposed approach with such requirements, including any regulatory approvals required to be obtained.

v. Any obligations or limitations relating to such approach that would survive the proposed resolution, including monitoring or institutional controls, and any effect they would have on the design or implementation of the Definite Plan and on the prospective uses of the Real Property following Facilities Removal as anticipated by the Klamath Hydroelectric Settlement Agreement.

vi. PacifiCorp's proposed schedule for performing any work, making any required regulatory filings, and receiving any required regulatory approvals.

1.4 Program Timeline

Agreement Section 3.5(c) requires each REC (as identified in Agreement Exhibit C) to be resolved prior to the transfer of the license for the Lower Klamath Hydroelectric Project. PacifiCorp is responsible for providing written documentation of that resolution. Further, PacifiCorp is required to explain any REC that cannot be resolved prior to transfer and what work remains to be done to resolve those issues following transfer. Given these requirements, PacifiCorp is working to meet the following program schedule for the REC in this SIWP and the 11 RECs in the California SIWP (Jacobs 2021):

- The SIWPs will be completed in November 2021.
- Site investigations as described in the SIWPs will occur through mid-2022 depending on weather and access conditions. Laboratory analysis of samples, laboratory data analysis, and report preparation will follow through the fall of 2022.

- For those sites where no further work is required, PacifiCorp expects closure can be reached by early 2023.
- For sites where further investigation or remediation is necessary, site-specific investigation or remediation plans would be developed in late 2022 or early 2023.
- Investigation and remedial work would occur in the spring of 2023 as sites are accessible. Documentation of this work and site closure would follow investigation and remediation, as specified by the site-specific remedial plans.

Six RECs listed in Agreement Exhibit C are unknown or inaccessible (for example, possible contaminated areas situated underneath dams or powerhouses). Additional work at these locations cannot occur until the KRRC proceeds with dam removal. Therefore, these RECs will not be subject to resolution prior to transfer and the RECs are not addressed in this work plan or schedule. In accordance with Agreement Section 3.5(c), PacifiCorp will develop subsequent investigation plans that allow for investigation, remediation, and closure, as appropriate, in coordination with the overall dam removal project.

1.5 Investigative Standard and Future Uses

The work performed for the SIWP will be carried out in accordance with the Investigative Standard described in this section.

The "Investigative Standard" means:

The level and scope of diligence, investigation, field work, analysis, review and follow-up that a prudent purchaser of property intended for conversion from utility operations to use as natural habit for passive recreation would undertake in order to assure that such work and any resulting determinations regarding the need for and scope of any remediation complies with:

a) All applicable legal and regulatory requirements, standards, guidances, and advisories, including any regulatory standards or requirements expressly identified in this SIWP,

b) The requirements of all permits and governmental approvals applicable to work conducted under this SIWP, and

c) All applicable industry practices relating to environmental investigations and remediation.

The work carried out pursuant to this SIWP will give due consideration to all relevant available records and historical information, including but not limited to AECOM's Environmental Site Assessments, PacifiCorp internal records, and all other considerations appropriate to assure that the resulting investigations are sufficient for determinations regarding the need for and scope of any remediation to eliminate, to the extent practical, any residual risk of liability or regulatory burdens relating to the presence of hazardous substances, pollutants, and contaminants at the site or sites addressed in this SIWP.

Where a screening level or assessment is called for in investigating any condition, it will be selected in light of the anticipated future use of the affected property for active recreation or passive recreation and natural habitat following dam removal. Where a sampling plan, approach, or strategy changes due to onsite observations or for any other reason, the change and the basis for the change will be documented and timely reported to the States and KRRC.

The intended future use at the REC and the exposure pathways has been identified and approved by KRRC and the State of Oregon (Table 1-1). The exposure pathways were used to determine the screening levels developed in Section 3.3. The analytical results from the site investigations at the REC will be evaluated

against these screening levels to determine if the REC can be closed or if further assessment, remediation, or both, are required.

Table 1-1. Site Future Uses and Exposure Pathways

Site/REC	Site Future Use	Exposure Pathways
J.C. Boyle Dispersed Recreation Area – 2	Passive recreation/natural habitat	Residential/Ecological/Leaching to Groundwater

The Investigative Standard includes preparation of a Site Investigation Report, as described in Section 4. The Site Investigation Report will document the investigations performed at the REC, summarize key field observations, and provide figures and tables with analytical results compared to soil screening levels and waste characterization criteria. The Site Investigation Report will include recommended next steps for the REC and an appendix containing the analytical data for samples collected.

Except as may be otherwise expressly approved in writing by PacifiCorp, KRRC, the State of California, and the State of Oregon, the implementation of any work under this SIWP and any updates or follow-up will constitute Jacobs' representation to PacifiCorp, KRRC, the State of California, and the State of Oregon, that such work complies with the Investigative Standard.

1.6 Site Investigation Work Plan Organization

This SIWP contains the following sections and appendices:

- **Section 1 – Introduction**: Describes the SIWP purpose, provides background information on the evolution of the REC, and summarizes the investigation objectives, program organization and timeline, and investigative standards and future site uses.
- **Section 2 – Site Description and Characteristics**: Describes the J.C. Boyle Dam development site, surrounding lands, and historical practices. Includes a description of physical characteristics such as geology, hydrogeology, and hydrology, as well as a discussion of biological and cultural resources in the area.
- **Section 3 – Site Evaluation and Investigation**: Describes the REC and corresponding sampling objectives, data evaluation, and screening levels. Provides a sampling plan for the REC based on an evaluation of the available data. Summarizes findings from previous investigations to identify data gaps and to determine data quality objectives, so that the type and extent of constituents of potential concern (COPCs) at the REC can be evaluated and waste characterization for proper disposal offsite can be made, as needed. The sampling approach is prepared for the REC, with a figure depicting planned sampling locations and a table summarizing media to be sampled, sample collection depths, and analysis to be performed by the laboratory.
- **Section 4 – Closure Plan and Reporting**: Describes how data will be used for decision-making and how the results of the assessments will be documented, as well as next steps in the process to resolve the REC per the Agreement.
- **Section 5 – References**. Provides a bibliographic listing of documents cited in the SIWP.
- **Appendix A – Sampling and Analysis Plan**: Describes quality assurance and quality control for field collection methods (sampling equipment, sample identification method, field data collected, sample containers and preservation, sample hold times, sampling shipping requirements), and laboratory methods (analytical methods, detection limits). Outlines health and safety procedures for the fieldwork and describes decontamination of field equipment and disposal of investigation-derived waste (soil, water, and personal protective equipment).

- **Appendix B – Consolidated Comment Matrix**: Contains consolidated review comments and responses from California, KRRC, and Oregon on previous draft documents submitted in July 2021 as well as supplemental comments received and discussed following the initial round of comments.

2. Site Description and Characteristics

This section generally describes the J.C. Boyle Development site in Klamath County, Oregon, where the J.C. Boyle Dispersed Recreation Area – 2 REC has been identified and the site investigation work will take place. This information is summarized from the *J.C. Boyle Dam, Copco No. 1 Dam, Copco No. 2 Dam, Iron Gate Dam, and Iron Gate Fish Hatchery Phase I Environmental Site Assessments* (AECOM 2018) and *Draft Phase I Environmental Site Assessment of the Parcel B Lands* (AECOM 2020b).

2.1 Site Description

The J.C. Boyle Development includes the J.C. Boyle Dam and Powerhouse. The J.C. Boyle Dispersed Recreation Area – 2 REC is located on the northeastern shoreline of J.C. Boyle Reservoir (Figure ES-2). The J.C. Boyle Development and original supporting structures were constructed in 1958 along the Klamath River between river mile (RM) 224.9 and 233. The combination embankment and concrete J.C. Boyle Dam impounds the J.C. Boyle Reservoir. Additional features include a gate spillway, water conveyance system, fish ladder, forebay, and powerhouse (AECOM 2018). Approximately 951 acres of undeveloped land (Parcel B Lands), including the approximately 350-acre J.C. Boyle Reservoir, is located within and in the vicinity of the J.C. Boyle Development (AECOM 2018, 2020b).

Land use along the Klamath River and adjacent to the J.C. Boyle Development and Parcel B Lands include undeveloped land (timber production and federally managed property), with rural residential development, and recreational areas (AECOM 2018).

2.2 Historical Practices

Since it was put into service in 1958, the J.C. Boyle Powerhouse has continuously generated electricity. The powerhouse has used and stored hazardous materials throughout this time. These materials include diesel fuel, leaded, and unleaded gasoline, and non-PCBs governor, transformer, and motor oils. Battery banks and oils are stored within secondary containment systems. When conducting the Phase I ESA, AECOM (2018) found the powerhouse to be in good operating conditions, with proper housekeeping and hazardous materials waste management practices.

2.3 Physical Characteristics

2.3.1 Local Soils

Soils within the J.C. Boyle Development are generally classified as Greystoke-Pinehurst complex and Skookum rock outcrops (AECOM 2018, 2020b). The Greystoke series formed in residuum and colluvium weathered from andesite and is well drained. The Pinehurst series formed in mixed colluvium weathered from andesite, volcanic breccia, or tuffs, and is well drained. The Skookum series formed in colluvium and residuum weathered from extrusive igneous rock on mountainsides and hills, and is moderately well drained. Soil within the J.C. Boyle Dispersed Recreation Area – 2 REC is generally classified as Bly-Royst complex (USDA 2021).

2.3.2 Volcanic and Sedimentary Rocks

The Project area is located within an area of Cenozoic-era volcanic rocks in the southern portion of the Cascade Mountain Range (AECOM 2018). The J.C. Boyle Development is located in the High Cascades geologic province. Volcanic activities generally occurred between 5 million years before present to the

present (AECOM 2018). The J.C. Boyle Development is surrounded by shield volcanoes; however, most of these are small in comparison to the High Cascades stratovolcanic complexes (AECOM 2020b).

A variety of sedimentary deposits also occur throughout the Project area. Glacial Lakes formed in the Project area during the Pleistocene. Historically, large volumes of water discharged from these lakes deposited coarse alluvium (i.e., river terrace) within the Klamath River (AECOM 2020b).

Landslides and volcanic eruptions within Parcel B Lands blocked rivers and streams, thereby forming ephemeral lakes and depositing lacustrine sediments (i.e., bedded silts, diatomites, and deltaic terraces of sand and gravel). Additional sedimentary lithologies include mass wasting materials (e.g., talus, colluvium, and landslide deposits) (AECOM 2020b).

2.3.3 Regional and Site-specific Climate

The J.C. Boyle Development is located approximately 5 miles west of Keno, Oregon. Keno is classified as dry-summer subtropical (i.e., Mediterranean) climate, with relatively mild winters and warm summers.

The average yearly temperatures in Keno is approximately 53.3 degrees Fahrenheit (°F). In Keno, August averages the warmest monthly temperature (approximately 68.2°F) and December averages the coolest monthly temperature (approximately 40.1°F) (Weatherbase 2021).

The average annual precipitation in Keno is approximately 43.5 inches. In Keno, December averages the most monthly precipitation (approximately 7.6 inches) and July averages the least monthly precipitation (approximately 0.5 inch) (Weatherbase 2021).

Keno receives an average of approximately 115 days of precipitation annually. In Keno, January averages the most precipitation days (approximately 15 days) and July averages the least precipitation days (approximately 2 days). Keno receives an average of approximately 176.1 inches of snowfall annually. January averages the most snowfall for Keno at approximately 38.9 inches (Weatherbase 2021).

2.3.4 Hydrogeology and Hydrology

Groundwater depths and flow directions are variable because of topography, stratigraphy, and bedrock surfaces. Groundwater is generally encountered in deeper fractured horizons and other low permeability zones within the volcanic bedrock. Groundwater is generally encountered in shallow perched zones within the sedimentary deposits and tends to flow towards, or away from, the Klamath River, depending on seasonal rainfall totals (AECOM 2020b).

2.4 Cultural and Biological Resources

Cultural and biological resources exist in the area of the J.C. Boyle Development and surrounding lands. A cultural and biological assessment will be completed to review potential affects to historical, archaeological, and biological resources before removing debris and implementing the sampling plans. Available information on historical, archaeological, and biological resources will be reviewed to ensure that the assessments do not adversely affect a National Register of Historic Places-eligible archaeological or historic resource, as well as special-status species and/or sensitive habitats. Where subsurface disturbances (e.g., soil or groundwater testing) are planned, archaeological and biological investigations will be performed, as necessary, to determine if there are buried precontact deposits and special-status species and sensitive habitats within the REC boundaries. Detailed recommendations for further archaeological and biological investigations and mitigation measures will be prepared during that assessment.

3. Site Investigation and Evaluation

This section evaluates the J.C. Boyle Dispersed Recreation Area – 2 REC. The discussion for the REC addresses findings from previous investigations and presents a sampling plan. There is a figure depicting the planned sampling locations and a table summarizing media to be sampled (soil or sediment, and groundwater, if encountered), sample collection depths, and analyses to be performed by the laboratory. Sample collection and investigation-derived waste management protocols are described in Sampling and Analysis Plan (Appendix A).

3.1 Environmental Sampling

The primary objective of the sampling is to determine whether COPCs are present at concentrations greater than the screening levels identified in Section 3.3 and to define the nature and extent of COPC exceedances. Environmental samples will be collected at the REC, as described in the following subsections and in Appendix A, and will be analyzed for the following compounds via use of the laboratory methods identified below:

- Title 22 metals by U.S. Environmental Protection Agency (EPA) Method SW6010B (mercury by EPA Method SW7471A)
- Volatile organic compounds (VOCs) by EPA Method SW8260B
- Semivolatile organic compounds (SVOCs) by EPA Method SW8270C
- Dioxins and furans by EPA Method SW846 8290A

This SIWP has been prepared using existing documents and office-based resources. Because of this methodology, sampling locations and depths may change based on field conditions and observations when sampling. Step-out borings may be advanced and deeper soil samples may be collected if soil is found to be stained, odorous, or have photoionization detector (PID) readings greater than 50 parts per million by volume. Additionally, deeper (minimum of 6 feet below ground surface [bgs]) soil samples will be collected for 20 percent of the boreholes associated with the REC. This approach is being taken to ensure consistent sampling design in the Oregon and California SIWPs.

The planned sampling approach is meant to be dynamic and in line with EPA's Triad Approach, where sampling strategies are subject to change based on real-time consideration of field observations and conditions in an effort to streamline site characterization and better allow for more rapid site evaluation, cleanup, and closure (EPA 2001).

3.2 Waste Characterization Sampling

Concurrent with the collection of environmental samples will be the collection of waste characterization samples to assist in planning site-specific remedial actions, if required. These data will be used to determine onsite waste segregation and management requirements for hazardous and nonhazardous waste, and to determine offsite disposal requirements. One composite soil sample will be collected from the REC. Care will be taken to composite waste characterization samples such that the composite sample is representative of the full depth range and lateral extent of the area from where the samples were collected.

Waste characterization samples will be analyzed for the total concentrations of contaminants and contaminant properties as follows:

- Title 22 metals by EPA Method SW6010B (mercury by EPA Method SW7471A)
- VOCs by EPA Method SW8260B (VOC samples will not be field composited – rather a single Terracore sample will be collected at the location with the highest likelihood of contamination based on visual observations or PID readings)
- SVOCs by EPA Method SW8270C
- TPH as gasoline by method NWTPH-Gx; TPH as diesel and motor oil by method NWTPH-Dx
- Ignitability (EPA Method SW1030), Reactivity (EPA Method SW846 CH7), and Corrosivity (EPA Method SW846 9045)
- pH (for aqueous samples only)

Additional procedures and analyses will be performed to determine if nonaqueous media (i.e., soil) are a Resource Conservation and Recovery Act (RCRA) or a non-RCRA (i.e., California only) hazardous waste, as follows:

- RCRA Hazardous Waste determination: If the total concentration of a contaminant in nonaqueous environmental media is greater than 20 times the RCRA hazardous waste toxicity characteristic level in 40 Code of Federal Regulations 261.24 (adopted by reference in OAR 340-100-2), the sample extract (extracted using the toxicity characteristic leaching procedure or TCLP using EPA Method SW1311) will be analyzed for the contaminant(s) to determine if the media are a RCRA hazardous waste. Note that if environmental media are determined to be a RCRA hazardous waste, additional evaluation for non-RCRA hazardous waste characteristics may not be required.
- Non-RCRA Hazardous Waste determination (only required for waste that will be disposed in California): If the total concentration of a contaminant in nonaqueous environmental media is below the total threshold limit concentration (TTLC) but greater than 10 times the soluble threshold limit concentration (STLC) identified in 22 California Code of Regulations (CCR) 66261.24(a)(2), the Waste Extraction Test will be performed on that sample, and the Waste Extraction Test extract will be analyzed for the constituent in question. Total analysis results and Waste Extraction Test results will be compared to the TTLC and STLC levels, respectively, in 22 CCR 66261.24(a)(2). If a TTLC or STLC is exceeded, the waste will be characterized as a non-RCRA hazardous waste.

If required, additional landfill-specific analyses will be performed for waste acceptance and disposal.

3.3 Data Evaluation and Screening Levels

Analytical data collected at the REC when implementing the SIWP will be managed as described in the Sampling and Analysis Plan (Appendix A). The analytical data provided by the analytical laboratory (accredited under the National Environmental Laboratory Accreditation Program) will undergo quality control checks for useability, then uploaded to a database for use in the analysis and reporting process. To evaluate COPCs at the REC, collected analytical data will be compared to published screening levels based on the future site use.

3.3.1 Screening Levels for Soil

The future use of the J.C. Boyle Dispersed Recreation Area – 2 REC is passive recreation and natural habitat (Section 1.5). The exposure pathways are human health direct contact exposure, soil leaching to groundwater, and ecological receptors exposure. The soil screening levels for this REC are taken as the lowest (most conservative) screening levels from the following pathways and sources:

- Human health: direct contact exposure (for carcinogenic and noncarcinogenic constituents) for ingestion, dermal contact, and inhalation exposure pathways for a residential exposure scenario from the Oregon Department of Environmental Quality (ODEQ) *Risk-Based Concentrations for Individual Chemicals in Soil* (ODEQ 2010).
- Leaching to groundwater: residential exposure scenario from the ODEQ *Risk-Based Concentrations for Individual Chemicals in Soil* (ODEQ 2010).
- Ecological Receptors: most conservative across all receptor groups (terrestrial plants, soil invertebrates, birds, and mammals) from ODEQ Level II Screening Benchmark Values (ODEQ 2001). If that source does not have a value, then use the most conservative across all receptor groups (terrestrial plants, soil invertebrates, birds, and mammals) between EPA Soil Screening Levels (EPA 2008) and Los Alamos National Laboratory (LANL 2017) No Effect Screening Levels. If none of these sources has a value, then use EPA Region 4 Soil Screening Levels (EPA 2018).
- If no screening level is listed for an analyte from the above sources, then the lowest screening levels from the EPA Regional Screening Level for Residential Soil (EPA 2019) are used.

For certain metals in soil, the screening level selected from the criteria provided above may be lower than naturally occurring levels of metals in local soils, so published regional background soil data were considered when developing screening levels. The 95 percent upper prediction level for the Cascade Range (ODEQ 2013) was used to represent background conditions at this REC. In other words, if a regional background level is greater than a screening level defined from the sources above, the background level is the default screening level for that specific metal in soil.

Using these sources and the process outlined above, screening levels for the COPCs in soil at this site have been established (Table 3-1).

3.3.2 Screening Levels for Groundwater

The screening level for the COPCs in groundwater for the REC will be the lowest (most conservative) of the screening levels from the following pathways and sources:

- Human Health: direct contact exposure (for carcinogenic and noncarcinogenic constituents) for ingestion, dermal contact, and inhalation exposure pathways for tap water, EPA regional screening level for tap water based on target cancer risk of 1 x 10-6 and target noncancer hazard of 1 (EPA 2021)
- Human Health: ingestion and inhalation from tapwater for a residential exposure scenario from the ODEQ *Risk-Based Concentrations for Individual Chemicals in Soil* (ODEQ 2010)
- Human Health: EPA maximum contaminant level (EPA 2021)

Using these sources, the screening levels for the COPCs in groundwater has been compiled (Table 3-2).

3.4 J.C. Boyle Dispersed Recreation Area – 2

3.4.1 Findings from Previous Investigations

A burn pit surrounded by stressed vegetation located on the north bank of the J.C. Boyle Reservoir approximately 0.4 mile east of Spencer Creek (Figures ES-2 and 3-1) was documented in the *Draft Phase I Environmental Site Assessment of the Parcel B Lands* (AECOM 2020b). A review of the photographs in that document indicates this is a human-made fire ring that may have been spread out after use (Photograph 3-1). The original fire ring appears to have been 4 or 5 feet in diameter and the disturbed area was approximately 10 feet by 10 feet, containing ash, charred wood, broken glass, and other debris. Burning

these materials may generate contaminants that can leach into the soil and groundwater beneath the pit. No other features were observed in this area.

3.4.2 Sampling Plan

Before collecting samples, field staff will measure and delineate the extent of observed stained soil using a Global Positioning System. Field staff will also note topography and drainage in the area, and adjust the sample locations if necessary, to bias towards areas where runoff may have collected. Planned sample locations will be marked, and utility clearance will be obtained prior to beginning sampling.

Soil samples will be collected within and adjacent to the fire ring and from outside the visually impacted area (Figure 3-1) and analyzed for Title 22 metals, VOCs, SVOCs, dioxins, and furans (Table 3-3).

Potential contamination will likely be confined to shallow soil. Samples will be collected at 6-inch intervals every foot beginning at the surface to approximately 3.5 feet bgs (Table 3-3) at each sample location. The boring in the center of the fire ring will be advanced to a depth of 6 feet bgs for the collection of soil samples at the following intervals: 0.0-0.5 foot, 1.0-1.5 feet, 3.0-3.5 feet, and 5.5-6.0 feet bgs. Borings will be extended if visual observations or field instruments indicate COPCs are deeper. Two additional soil samples will be collected below the impacted soil. If groundwater is encountered in any of the borings, groundwater samples will be collected and analyzed for the same set of analytes as the soil samples.

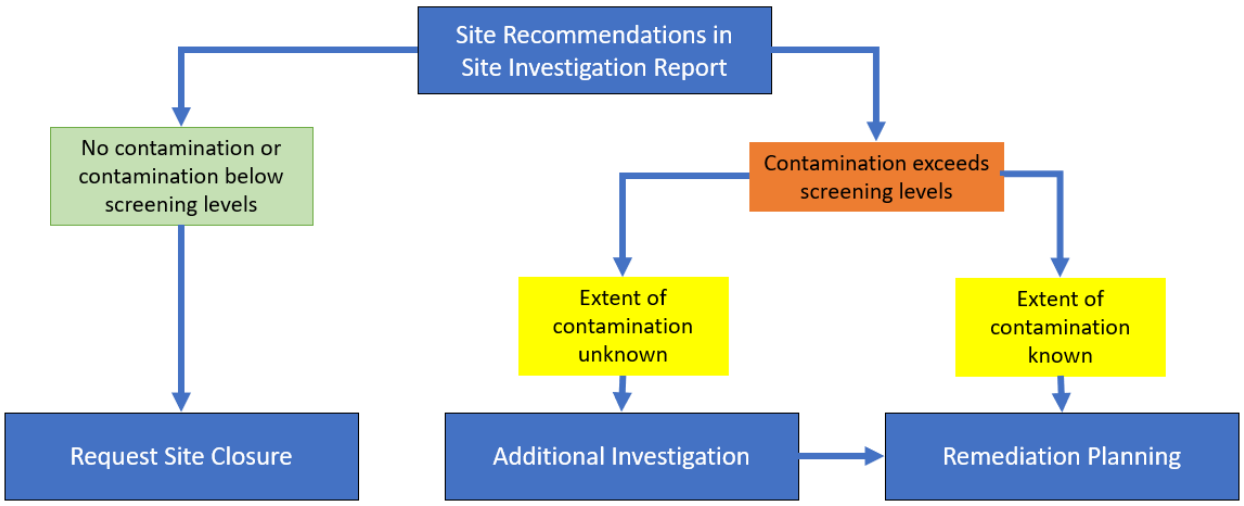
Photograph 3-1: J.C. Boyle Dispersed Recreation Area-2 Human-made Fire Pit Looking East (AECOM 2020b)

4. Site Closure and Reporting

The purpose for implementing the SIWP is to collect enough site-specific information such that any necessary follow-up actions can be planned and eventually, the J.C. Boyle Dispersed Recreation Area – 2 REC can reach site closure in a manner consistent with the Agreement and with Section 1.5 (Investigative Standards and Future Site Uses). In the context of this SIWP, "site closure" means that the REC has been investigated adequately and that collected field and analytical data are sufficient to demonstrate an absence of COPCs greater than the screening levels identified in Sections 1.5 and 3.3 (Data Evaluation and Screening Levels). In such cases, the site investigation will be considered complete for the REC, allowing PacifiCorp to move forward with formal REC close-out per the terms of the Agreement and a process to be developed with the KRRC and the State of Oregon. A REC will not be considered closed if COPCs are detected at levels greater than the screening levels identified for the REC and if additional step-out sampling or remedial action are necessary.

As described previously (Sections 1 and 3), a Site Investigation Report will be prepared to document the investigations performed at the REC and to demonstrate the suitability for REC closure. The Site Investigation Report will document the field activities performed, summarize key field observations, and identify major deviations from this SIWP (if any). Laboratory analytical data for all samples collected will be provided and the analytical results will be summarized in tables and figures for the REC. The analytical results will be compared to the screening levels identified for the REC. The Site Investigation Report will be submitted electronically to the state and the KRRC.

Recommended next steps will be provided for the REC based on a comparison of the analytical data with screening levels. Recommended next steps may consist of a request for REC closure, collection of additional environmental samples, or site remediation (Flowchart 4-1). If analytical results of COPCs are less than the screening levels, PacifiCorp will request closure of the REC. If analytical results of COPCs are greater than screening levels, PacifiCorp will either propose advancement of step-out borings to collect additional samples according to the sampling plan established for the REC or develop a remediation plan based on the field and analytical data already collected.



Flowchart 4-1. Site Closure

If remediation waste is characterized as RCRA hazardous, ODEQ will be notified via submittal of the Hazardous Waste Site Identification Form to obtain the RCRA Site Identification Number (i.e., the "U.S. EPA ID Number") if required under RCRA and consistent with ODEQ guidance documents.

5. References

AECOM Technical Services, Inc. (AECOM). 2018. J.C. Boyle Dam, Copco No. 1 Dam, Copco No. 2 Dam, Iron Gate Dam, and Iron Gate Fish Hatchery Phase I Environmental Site Assessments. Prepared for Klamath River Renewal Corporation. November.

AECOM Technical Services, Inc. (AECOM). 2020a. *Draft Wood-Stave Penstock and Soil Investigation*. Prepared for Klamath River Renewal Corporation. January.

AECOM Technical Services, Inc. (AECOM). 2020b. *Draft Phase I Environmental Site Assessment of the Parcel B Lands*. Prepared for Klamath River Renewal Corporation. March.

Los Alamos National Laboratory (LANL). 2017. "Minimal No Effect Ecological Screening Levels." *EcoRisk Database* Release 4.1. LA-UR-17-26376.

Oregon Department of Environmental Quality (ODEQ). 2001. *Guidance for Ecological Risk Assessment: levels I, II, III, IV*. Final 1998 and updated December 2001.

Oregon Department of Environmental Quality (ODEQ). 2010. *Risk-Based Concentrations for Individual Chemicals in Soil*.

Oregon Department of Environmental Quality (ODEQ). 2013. *Development of Oregon Background Metals Concentrations in Soil.* Technical Report. March. Accessed June 2021. https://www.oregon.gov/deq/FilterDocs/DebORbackgroundMetal.pdf.

U.S. Department of Agriculture (USDA). 2021. *Natural Resources Conservation Services Web Soil Survey*. Accessed August 2021. https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx.

U.S. Environmental Protection Agency (EPA). 2001. *Current Perspectives in Site Remediation and Monitoring. Using the Triad Approach to Improve the Cost-effectiveness of Hazardous Waste Site Cleanups*. D. A. Crumbling, EPA Technology Innovation Office. EPA 542-R-01-016. October.

U.S. Environmental Protection Agency (EPA). 2008. *Ecological Soil Screening Levels (EcoSSLs)*. OSWER Directive 9285.7-55 as updated from 2003-2008 https://www.epa.gov/risk/ecological-soil-screening-level-eco-ssl-guidance-and-documents

U.S. Environmental Protection Agency (EPA). 2018. *Supplemental Guidance to ERAGS: Region 4, Ecological Risk Assessment*. March 2018 Update. Scientific Support Section Superfund Division.

U.S. Environmental Protection Agency (EPA). 2019. *Regional Screening Level for Industrial Soil*.

U.S. Environmental Protection Agency (EPA). 2021. *Regional Screening Levels (RSLs) – Generic Tables*. May. Accessed June 2021. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables.

Weatherbase. 2021. *Keno, Oregon*. Accessed June 2021. https://www.weatherbase.com/weather/weather-summary.php3?s=829253&cityname=Keno%2C+Oregon%2C+United+States+of+America&units=.

Tables

Table 3-1. Soil Screening Levels for Oregon REC

PacifiCorp, Lower Klamath Hydroelectric Project

Analyte Group Analyte	CAS Number	Soil SL (mg/kg)	Soil Screening Level Source
TPH			
Gasoline	GRO	3.1E+01	ODEQ Soil Leaching
Diesel	DRO	2.6E+02	ODEQ Level II SLV Plant
Motor oil	MRO	2.6E+02	ODEQ Level II SLV Plant
Metal			
Antimony	7440-36-0	6.7E-01	Background Concentration
Arsenic	7440-38-2	1.9E+01	Background Concentration
Barium	7440-39-3	6.3E+02	Background Concentration
Beryllium	7440-41-7	2.5E+00	ODEQ Level II SLV Plant
Boron	7440-42-8	2.0E+00	ODEQ Level II SLV Bird
Cadmium	7440-43-9	5.4E-01	Background Concentration
Chromium	7440-47-3	2.0E+02	Background Concentration
Cobalt	7440-48-4	1.3E+01	ODEQ Level II SLV Plant
Copper	7440-50-8	7.3E+01	Background Concentration
Iron	7439-89-6	5.5E+04	2021 USEPA RSL, Residential Soil
Lead	7439-92-1	3.4E+01	Background Concentration
Manganese	7439-96-5	2.1E+03	Background Concentration
Molybdenum	7439-98-7	2.6E+00	ODEQ Level II SLV Mammal
Nickel	7440-02-0	1.1E+02	Background Concentration
Selenium	7782-49-2	5.2E-01	Background Concentration
Silver	7440-22-4	2.6E+00	ODEQ Level II SLV Bird
Thallium	7440-28-0	2.8E+00	Background Concentration
Vanadium	7440-62-2	2.8E+02	Background Concentration
Zinc	7440-66-6	1.7E+02	Background Concentration
Mercury	7439-97-6	2.4E-01	Background Concentration
VOC			
1,1,1,2-Tetrachloroethane	630-20-6	7.0E-02	EPA Region 4 SSV Invertebrate
1,1,1-Trichloroethane	71-55-6	1.9E+02	ODEQ Soil Leaching
1,1,2,2-Tetrachloroethane	79-34-5	1.3E-01	EPA Region 4 SSV Mammal
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	4.0E+05	ODEQ Residential Direct Contact
1,1,2-Trichloroethane	79-00-5	6.3E-03	ODEQ Soil Leaching
1,1-Dichloroethane	75-34-3	4.4E-02	ODEQ Soil Leaching
1,1-Dichloroethene	75-35-4	6.7E+00	ODEQ Soil Leaching
1,1-Dichloropropene	563-58-6	0.0E+00	--
1,2,3-Trichlorobenzene	87-61-6	2.0E+01	EPA Region 4 SSV Invertebrate
1,2,3-Trichloropropane	96-18-4	5.1E-03	2021 USEPA RSL, Residential Soil
1,2,4-Trichlorobenzene	120-82-1	2.7E-01	ODEQ Level II SLV Mammal
1,2,4-Trimethylbenzene	95-63-6	9.0E-02	EPA Region 4 SSV Invertebrate
1,2-Dibromo-3-Chloropropane	96-12-8	5.3E-03	2021 USEPA RSL, Residential Soil
1,2-Dibromoethane (EDB)	106-93-4	1.2E-04	ODEQ Soil Leaching
1,2-Dichlorobenzene	95-50-1	9.0E-02	EPA Region 4 SSV Invertebrate
1,2-Dichloroethane	107-06-2	2.8E-03	ODEQ Soil Leaching
1,2-Dichloropropane	78-87-5	2.8E-01	EPA Region 4 SSV Invertebrate
1,3,5-Trimethylbenzene	108-67-8	7.0E-02	EPA Region 4 SSV Invertebrate

Table 3-1. Soil Screening Levels for Oregon REC

PacifiCorp, Lower Klamath Hydroelectric Project

Analyte Group Analyte	CAS Number	Soil SL (mg/kg)	Soil Screening Level Source
1,3-Dichlorobenzene	541-73-1	8.0E-02	EPA Region 4 SSV Invertebrate
1,3-Dichloropropane	142-28-9	1.6E+03	2021 USEPA RSL, Residential Soil
1,4-Dichlorobenzene	106-46-7	5.7E-02	ODEQ Soil Leaching
2,2-Dichloropropane	594-20-7	0.0E+00	--
2-Butanone (MEK)	78-93-3	2.7E+03	ODEQ Level II SLV Mammal
2-Chlorotoluene	95-49-8	1.6E+03	2021 USEPA RSL, Residential Soil
2-Hexanone	591-78-6	3.6E-01	ODEQ Level II SLV Bird
4-Chlorotoluene	106-43-4	1.6E+03	2021 USEPA RSL, Residential Soil
4-Methyl-2-pentanone (MIBK)	108-10-1	9.7E+00	ODEQ Level II SLV Mammal
Acetone	67-64-1	1.2E+00	ODEQ Level II SLV Mammal
Benzene	71-43-2	2.3E-02	ODEQ Soil Leaching
Bromobenzene	108-86-1	2.9E+02	2021 USEPA RSL, Residential Soil
Bromochloromethane	74-97-5	1.5E+02	2021 USEPA RSL, Residential Soil
Bromodichloromethane	75-27-4	2.0E-03	ODEQ Soil Leaching
Bromoform	75-25-2	4.6E-02	ODEQ Soil Leaching
Bromomethane	74-83-9	8.3E-02	ODEQ Soil Leaching
Carbon disulfide	75-15-0	8.1E-01	ODEQ Level II SLV Mammal
Carbon tetrachloride	56-23-5	1.3E-02	ODEQ Soil Leaching
Chlorobenzene	108-90-7	5.8E+00	ODEQ Soil Leaching
Chloroethane	75-00-3	3.1E+02	ODEQ Soil Leaching
Chloroform	67-66-3	3.4E-03	ODEQ Soil Leaching
Chloromethane	74-87-3	2.2E+00	ODEQ Soil Leaching
cis-1,2-Dichloroethene	156-59-2	6.3E-01	ODEQ Soil Leaching
cis-1,3-Dichloropropene	10061-01-5	0.0E+00	--
Dibromochloromethane	124-48-1	2.4E-03	ODEQ Soil Leaching
Dibromomethane	74-95-3	2.4E+01	2021 USEPA RSL, Residential Soil
Dichlorodifluoromethane	75-71-8	8.7E+01	2021 USEPA RSL, Residential Soil
Ethylbenzene	100-41-4	2.2E-01	ODEQ Soil Leaching
Hexachlorobutadiene	87-68-3	9.0E-03	EPA Region 4 SSV Invertebrate
Isopropylbenzene	98-82-8	9.6E+01	ODEQ Soil Leaching
Methyl tert-butyl ether	1634-04-4	1.1E-01	ODEQ Soil Leaching
Methylene Chloride	75-09-2	1.4E-01	ODEQ Soil Leaching
m-Xylene & p-Xylene	179601-23-1	1.4E+00	ODEQ Level II SLV Mammal
Naphthalene	91-20-3	7.7E-02	ODEQ Soil Leaching
n-Butylbenzene	104-51-8	3.9E+03	2021 USEPA RSL, Residential Soil
N-Propylbenzene	103-65-1	3.8E+03	2021 USEPA RSL, Residential Soil
o-Xylene	95-47-6	1.4E+00	ODEQ Level II SLV Mammal
p-Isopropyltoluene	99-87-6	0.0E+00	--
sec-Butylbenzene	135-98-8	7.8E+03	2021 USEPA RSL, Residential Soil
Styrene	100-42-5	1.2E+00	ODEQ Level II SLV Invertebrate
tert-Butylbenzene	98-06-6	7.8E+03	2021 USEPA RSL, Residential Soil
Tetrachloroethene	127-18-4	1.8E-01	ODEQ Level II SLV Mammal
Toluene	108-88-3	2.3E+01	ODEQ Level II SLV Mammal
trans-1,2-Dichloroethene	156-60-5	7.0E+00	ODEQ Soil Leaching
trans-1,3-Dichloropropene	10061-02-6	0.0E+00	--

Table 3-1. Soil Screening Levels for Oregon REC

PacifiCorp, Lower Klamath Hydroelectric Project

Analyte Group Analyte	CAS Number	Soil SL (mg/kg)	Soil Screening Level Source
Trichloroethene	79-01-6	9.4E-01	2021 USEPA RSL, Residential Soil
Trichlorofluoromethane	75-69-4	5.2E+01	ODEQ Level II SLV Mammal
Vinyl acetate	108-05-4	9.1E+02	2021 USEPA RSL, Residential Soil
Vinyl chloride	75-01-4	5.7E-04	ODEQ Soil Leaching
Xylenes, Total	1330-20-7	1.4E+00	ODEQ Level II SLV Mammal
SVOC			
Acenaphthene	83-32-9	2.5E-01	ODEQ Level II SLV Plant
Acenaphthylene	208-96-8	1.2E+02	ODEQ Level II SLV Mammal
Anthracene	120-12-7	6.8E+00	ODEQ Level II SLV Plant
Azobenzene	103-33-3	5.6E+00	2021 USEPA RSL, Residential Soil
Benzo[a]anthracene	56-55-3	7.3E-01	ODEQ Level II SLV Bird
Benzo[b]fluoranthene	205-99-2	1.1E+00	2021 USEPA RSL, Residential Soil
Benzo[k]fluoranthene	207-08-9	1.1E+01	2021 USEPA RSL, Residential Soil
Benzo[g,h,i]perylene	191-24-2	2.5E+01	ODEQ Level II SLV Mammal
Benzo[a]pyrene	50-32-8	1.1E-01	2021 USEPA RSL, Residential Soil
Benzoic acid	65-85-0	1.0E+00	ODEQ Level II SLV Mammal
Benzyl alcohol	100-51-6	2.0E-03	EPA Region 4 SSV Invertebrate
Bis(2-chloroethoxy)methane	111-91-1	1.9E+02	2021 USEPA RSL, Residential Soil
Bis(2-chloroethyl)ether	111-44-4	1.9E-04	ODEQ Soil Leaching
bis (2-chloroisopropyl) ether	108-60-1	3.1E+03	2021 USEPA RSL, Residential Soil
Bis(2-ethylhexyl) phthalate	117-81-7	2.0E-02	ODEQ Level II SLV Bird
4-Bromophenyl phenyl ether	101-55-3	0.0E+00	--
Butyl benzyl phthalate	85-68-7	9.0E+01	ODEQ Level II SLV Mammal
4-Chloroaniline	106-47-8	1.0E+00	LANL No Effect Level Plant
4-Chloro-3-methylphenol	59-50-7	6.3E+03	2021 USEPA RSL, Residential Soil
2-Chloronaphthalene	91-58-7	4.8E+03	2021 USEPA RSL, Residential Soil
2-Chlorophenol	95-57-8	3.9E-01	ODEQ Level II SLV Bird
4-Chlorophenyl phenyl ether	7005-72-3	0.0E+00	--
Chrysene	218-01-9	3.1E+00	ODEQ Level II SLV Mammal
Dibenz(a,h)anthracene	53-70-3	1.1E-01	2021 USEPA RSL, Residential Soil
Dibenzofuran	132-64-9	6.1E+00	ODEQ Level II SLV Plant
Di-n-butyl phthalate	84-74-2	1.1E-02	ODEQ Level II SLV Bird
1,2-Dichlorobenzene	95-50-1	9.0E-02	EPA Region 4 SSV Invertebrate
1,3-Dichlorobenzene	541-73-1	8.0E-02	EPA Region 4 SSV Invertebrate
1,4-Dichlorobenzene	106-46-7	5.7E-02	ODEQ Soil Leaching
3,3'-Dichlorobenzidine	91-94-1	3.0E-02	EPA Region 4 SSV Invertebrate
2,4-Dichlorophenol	120-83-2	5.0E-02	EPA Region 4 SSV Invertebrate
Diethyl phthalate	84-66-2	1.0E+02	ODEQ Level II SLV Plant
2,4-Dimethylphenol	105-67-9	4.0E-02	EPA Region 4 SSV Invertebrate
Dimethyl phthalate	131-11-3	1.0E+01	ODEQ Level II SLV Invertebrate
4,6-Dinitro-2-methylphenol	534-52-1	5.1E+00	2021 USEPA RSL, Residential Soil
2,4-Dinitrophenol	51-28-5	6.1E-02	EPA Region 4 SSV Mammal
2,4-Dinitrotoluene	121-14-2	1.7E+00	2021 USEPA RSL, Residential Soil
2,6-Dinitrotoluene	606-20-2	8.9E-03	ODEQ Soil Leaching
Di-n-octyl phthalate	117-84-0	9.1E-01	ODEQ Level II SLV Mammal

Table 3-1. Soil Screening Levels for Oregon REC

PacifiCorp, Lower Klamath Hydroelectric Project

Analyte Group Analyte	CAS Number	Soil SL (mg/kg)	Soil Screening Level Source
Fluoranthene	206-44-0	1.0E+01	ODEQ Level II SLV Invertebrate
Fluorene	86-73-7	3.7E+00	ODEQ Level II SLV Invertebrate
Hexachlorobenzene	118-74-1	1.8E-02	ODEQ Soil Leaching
Hexachlorobutadiene	87-68-3	9.0E-03	EPA Region 4 SSV Invertebrate
Hexachlorocyclopentadiene	77-47-4	1.0E-03	EPA Region 4 SSV Invertebrate
Hexachloroethane	67-72-1	2.2E-02	ODEQ Soil Leaching
Indeno[1,2,3-cd] Pyrene	193-39-5	1.1E+00	2021 USEPA RSL, Residential Soil
Isophorone	78-59-1	5.7E+02	2021 USEPA RSL, Residential Soil
1-Methylnaphthalene	90-12-0	1.8E+01	2021 USEPA RSL, Residential Soil
2-Methylnaphthalene	91-57-6	1.6E+01	ODEQ Level II SLV Mammal
2-Methylphenol	95-48-7	6.7E-01	ODEQ Level II SLV Plant
3-Methylphenol & 4-Methylphenol	15831-10-4	6.9E-01	ODEQ Level II SLV Plant
Naphthalene	91-20-3	7.7E-02	ODEQ Soil Leaching
2-Nitroaniline	88-74-4	5.3E+00	ODEQ Level II SLV Mammal
3-Nitroaniline	99-09-2	0.0E+00	--
4-Nitroaniline	100-01-6	2.7E+01	2021 USEPA RSL, Residential Soil
Nitrobenzene	98-95-3	2.2E+00	ODEQ Level II SLV Invertebrate
2-Nitrophenol	88-75-5	0.0E+00	--
4-Nitrophenol	100-02-7	0.0E+00	--
N-Nitrosodiphenylamine	86-30-6	5.5E-01	EPA Region 4 SSV Mammal
N-Nitrosodi-n-propylamine	621-64-7	9.4E-04	ODEQ Soil Leaching
Pentachlorophenol	87-86-5	6.6E-02	ODEQ Soil Leaching
Phenanthrene	85-01-8	5.5E+00	ODEQ Level II SLV Invertebrate
Phenol	108-95-2	7.9E-01	ODEQ Level II SLV Plant
Pyrene	129-00-0	1.0E+01	ODEQ Level II SLV Invertebrate
Pyridine	110-86-1	7.8E+01	2021 USEPA RSL, Residential Soil
1,2,4-Trichlorobenzene	120-82-1	2.7E-01	ODEQ Level II SLV Mammal
2,4,5-Trichlorophenol	95-95-4	4.0E+00	EPA Region 4 SSV Plant
2,4,6-Trichlorophenol	88-06-2	2.4E+00	ODEQ Soil Leaching

Table 3-1. Soil Screening Levels for Oregon REC

PacifiCorp, Lower Klamath Hydroelectric Project

Analyte Group Analyte	CAS Number	Soil SL (mg/kg)	Soil Screening Level Source
PAH			
Acenaphthene	83-32-9	2.5E-01	ODEQ Level II SLV Plant
Acenaphthylene	208-96-8	1.2E+02	ODEQ Level II SLV Mammal
Anthracene	120-12-7	6.8E+00	ODEQ Level II SLV Plant
Benzo[a]anthracene	56-55-3	7.3E-01	ODEQ Level II SLV Bird
Benzo[a]pyrene	50-32-8	1.1E-01	2021 USEPA RSL, Residential Soil
Benzo[b]fluoranthene	205-99-2	1.1E+00	2021 USEPA RSL, Residential Soil
Benzo[g,h,i]perylene	191-24-2	2.5E+01	ODEQ Level II SLV Mammal
Benzo[k]fluoranthene	207-08-9	1.1E+01	2021 USEPA RSL, Residential Soil
Chrysene	218-01-9	3.1E+00	ODEQ Level II SLV Mammal
Dibenz(a,h)anthracene	53-70-3	1.1E-01	2021 USEPA RSL, Residential Soil
Fluoranthene	206-44-0	1.0E+01	ODEQ Level II SLV Invertebrate
Fluorene	86-73-7	3.7E+00	ODEQ Level II SLV Invertebrate
Indeno[1,2,3-cd] Pyrene	193-39-5	1.1E+00	2021 USEPA RSL, Residential Soil
Naphthalene	91-20-3	7.7E-02	ODEQ Soil Leaching
Phenanthrene	85-01-8	5.5E+00	ODEQ Level II SLV Invertebrate
Pyrene	129-00-0	1.0E+01	ODEQ Level II SLV Invertebrate
Dioxin/Furan			
2,3,7,8-TCDD	1746-01-6	3.7E-08	ODEQ Level II SLV Mammal
2,3,7,8-TCDF	51207-31-9	4.5E-07	ODEQ Level II SLV Mammal
1,2,3,7,8-PeCDD	40321-76-4	4.2E-08	ODEQ Level II SLV Mammal
1,2,3,7,8-PeCDF	57117-41-6	9.7E-07	ODEQ Level II SLV Mammal
2,3,4,7,8-PeCDF	57117-31-4	9.7E-08	ODEQ Level II SLV Mammal
1,2,3,4,7,8-HxCDD	39227-28-6	1.8E-07	ODEQ Level II SLV Mammal
1,2,3,6,7,8-HxCDD	57653-85-7	1.3E-07	ODEQ Level II SLV Mammal
1,2,3,7,8,9-HxCDD	19408-74-3	1.3E-07	ODEQ Level II SLV Mammal
1,2,3,4,7,8-HxCDF	70648-26-9	1.6E-07	ODEQ Level II SLV Mammal
1,2,3,6,7,8-HxCDF	57117-44-9	1.6E-07	ODEQ Level II SLV Mammal
1,2,3,7,8,9-HxCDF	72918-21-9	2.1E-07	ODEQ Level II SLV Mammal
2,3,4,6,7,8-HxCDF	60851-34-5	1.6E-07	ODEQ Level II SLV Mammal
1,2,3,4,6,7,8-HpCDD	35822-46-9	1.0E-06	ODEQ Level II SLV Mammal
1,2,3,4,6,7,8-HpCDF	67562-39-4	1.6E-06	ODEQ Level II SLV Mammal
1,2,3,4,7,8,9-HpCDF	55673-89-7	1.6E-06	ODEQ Level II SLV Mammal
OCDD	3268-87-9	4.5E-05	ODEQ Level II SLV Mammal
OCDF	39001-02-0	3.3E-05	ODEQ Level II SLV Mammal

Table 3-1. Soil Screening Levels for Oregon REC

PacifiCorp, Lower Klamath Hydroelectric Project

Analyte Group Analyte	CAS Number	Soil SL (mg/kg)	Soil Screening Level Source
Pesticide			
4,4'-DDD	72-54-8	2.0E-02	ODEQ Level II SLV Mammal
4,4'-DDE	72-55-9	2.0E-02	ODEQ Level II SLV Mammal
4,4'-DDT	50-29-3	2.0E-02	ODEQ Level II SLV Mammal
Aldrin	309-00-2	8.5E-05	ODEQ Level II SLV Bird
Dieldrin	60-57-1	4.5E-03	ODEQ Level II SLV Mammal
Endosulfan sulfate	1031-07-8	6.4E-01	ODEQ Level II SLV Mammal
Endrin	72-20-8	1.4E-03	ODEQ Level II SLV Bird
Endrin aldehyde	7421-93-4	1.4E-03	ODEQ Level II SLV Bird
Heptachlor	76-44-8	1.7E-02	ODEQ Soil Leaching
Heptachlor epoxide	1024-57-3	1.5E-03	EPA Region 4 SSV Invertebrate
PCB			
PCB-1016	12674-11-2	7.3E-03	ODEQ Level II SLV Mammal
PCB-1221	11104-28-2	7.3E-03	ODEQ Level II SLV Mammal
PCB-1232	11141-16-5	7.3E-03	ODEQ Level II SLV Mammal
PCB-1242	53469-21-9	7.3E-03	ODEQ Level II SLV Mammal
PCB-1248	12672-29-6	7.3E-03	ODEQ Level II SLV Mammal
PCB-1254	11097-69-1	7.3E-03	ODEQ Level II SLV Mammal
PCB-1260	11096-82-5	7.3E-03	ODEQ Level II SLV Mammal
PCB-1262	37324-23-5	7.3E-03	ODEQ Level II SLV Mammal
PCB-1268	11100-14-4	7.3E-03	ODEQ Level II SLV Mammal

Notes:

-- : No value available.

EcoSSL = ecological soil screening level

EPA = U.S. Environmental Protection Agency

ESL = environmental screening level

LANL = Las Alamos National Laboratory

mg/kg = milligram(s) per kilogram

ODEQ = Oregon Department of Environmental Quality

RSL = regional screening level

SL = screening level

SLV = screening level value

SSV = soil screening value

TEF = toxicity equivalency factor

Resources:

Oregon Department of Enviromental Quality (ODEQ). 2010. Risk-Based Concentrations for Individual Chemicals.

U.S. Environmental Protection Agency (EPA). 2021. Regional Screening Levels for Chemical Contaminants at Superfund Sites. May. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

ODEQ Guidance for Ecological Risk Assessment: Levels I, II, III, IV. Final 1998 and updated December 2001

Table 3-2. Groundwater Screening Levels for Oregon RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analytical Group Analyte	CAS Number	Groundwater Screening Level (µg/L)	Groundwater Screening Level Source
TPH			
Gasoline	GRO	1.1E+02	2018 ODEQ Residential Ing/Inh Tapwater
Diesel	DRO	1.0E+02	2018 ODEQ Residential Ing/Inh Tapwater
Motor oil	MRO	3.0E+02	2018 ODEQ Residential Ing/Inh Tapwater
Metal			
Antimony	7440-36-0	6.0E+00	EPA MCL
Arsenic	7440-38-2	5.2E-02	2018 ODEQ Residential Ing/Inh Tapwater
Barium	7440-39-3	2.0E+03	EPA MCL
Beryllium	7440-41-7	4.0E+00	EPA MCL
Boron	7440-42-8	4.0E+03	2021 EPA RSL for Tapwater
Cadmium	7440-43-9	5.0E+00	EPA MCL
Chromium	7440-47-3	1.0E+02	EPA MCL
Cobalt	7440-48-4	6.0E+00	2021 EPA RSL for Tapwater
Copper	7440-50-8	8.0E+02	2018 ODEQ Residential Ing/Inh Tapwater
Iron	7439-89-6	1.4E+04	2021 EPA RSL for Tapwater
Lead	7439-92-1	1.5E+01	2018 ODEQ Residential Ing/Inh Tapwater
Manganese	7439-96-5	4.3E+02	2021 EPA RSL for Tapwater
Molybdenum	7439-98-7	1.0E+02	2021 EPA RSL for Tapwater
Nickel	7440-02-0	3.9E+02	2021 EPA RSL for Tapwater
Selenium	7782-49-2	5.0E+01	EPA MCL
Silver	7440-22-4	9.4E+01	2021 EPA RSL for Tapwater
Thallium	7440-28-0	2.0E-01	2021 EPA RSL for Tapwater
Vanadium	7440-62-2	8.6E+01	2021 EPA RSL for Tapwater
Zinc	7440-66-6	6.0E+03	2021 EPA RSL for Tapwater
Mercury	7439-97-6	6.3E-01	2021 EPA RSL for Tapwater
VOC			
1,1,1,2-Tetrachloroethane	630-20-6	5.7E-01	2021 EPA RSL for Tapwater
1,1,1-Trichloroethane	71-55-6	2.0E+02	EPA MCL
1,1,2,2-Tetrachloroethane	79-34-5	7.6E-02	2021 EPA RSL for Tapwater
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	1.0E+04	2021 EPA RSL for Tapwater
1,1,2-Trichloroethane	79-00-5	2.8E-01	2018 ODEQ Residential Ing/Inh Tapwater
1,1-Dichloroethane	75-34-3	2.8E+00	2018 ODEQ Residential Ing/Inh Tapwater
1,1-Dichloroethene	75-35-4	7.0E+00	EPA MCL
1,1-Dichloropropene	563-58-6	4.7E-01	Surrogate (RSL for 1,3-Dichloropropene)
1,2,3-Trichlorobenzene	87-61-6	7.0E+00	2021 EPA RSL for Tapwater
1,2,3-Trichloropropane	96-18-4	7.5E-04	2021 EPA RSL for Tapwater
1,2,4-Trichlorobenzene	120-82-1	1.2E+00	2021 EPA RSL for Tapwater
1,2,4-Trimethylbenzene	95-63-6	5.4E+01	2018 ODEQ Residential Ing/Inh Tapwater
1,2-Dibromo-3-Chloropropane	96-12-8	3.3E-04	2021 EPA RSL for Tapwater
1,2-Dibromoethane (EDB)	106-93-4	7.5E-03	2018 ODEQ Residential Ing/Inh Tapwater
1,2-Dichlorobenzene	95-50-1	3.0E+02	2018 ODEQ Residential Ing/Inh Tapwater
1,2-Dichloroethane	107-06-2	1.7E-01	2018 ODEQ Residential Ing/Inh Tapwater
1,2-Dichloropropane	78-87-5	8.5E-01	2021 EPA RSL for Tapwater
1,3,5-Trimethylbenzene	108-67-8	5.9E+01	2018 ODEQ Residential Ing/Inh Tapwater

Table 3-2. Groundwater Screening Levels for Oregon RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analytical Group Analyte	CAS Number	Groundwater Screening Level (µg/L)	Groundwater Screening Level Source
1,3-Dichlorobenzene	541-73-1	3.0E+02	Surrogate (RSL for 1,2-Dichlorobenzene)
1,3-Dichloropropane	142-28-9	3.7E+02	2021 EPA RSL for Tapwater
1,4-Dichlorobenzene	106-46-7	4.8E-01	2018 ODEQ Residential Ing/Inh Tapwater
2,2-Dichloropropane	594-20-7	8.5E-01	Surrogate (RSL for 1,2-Dichloropropane)
2-Butanone (MEK)	78-93-3	5.6E+03	2021 EPA RSL for Tapwater
2-Chlorotoluene	95-49-8	2.4E+02	2021 EPA RSL for Tapwater
2-Hexanone	591-78-6	3.8E+01	2021 EPA RSL for Tapwater
4-Chlorotoluene	106-43-4	2.5E+02	2021 EPA RSL for Tapwater
4-Methyl-2-pentanone (MIBK)	108-10-1	6.3E+03	2021 EPA RSL for Tapwater
Acetone	67-64-1	1.4E+04	2021 EPA RSL for Tapwater
Benzene	71-43-2	4.6E-01	2018 ODEQ Residential Ing/Inh Tapwater
Bromobenzene	108-86-1	6.2E+01	2021 EPA RSL for Tapwater
Bromochloromethane	74-97-5	8.3E+01	2021 EPA RSL for Tapwater
Bromodichloromethane	75-27-4	1.3E-01	2018 ODEQ Residential Ing/Inh Tapwater
Bromoform	75-25-2	3.3E+00	2018 ODEQ Residential Ing/Inh Tapwater
Bromomethane	74-83-9	7.5E+00	2018 ODEQ Residential Ing/Inh Tapwater
Carbon disulfide	75-15-0	8.1E+02	2021 EPA RSL for Tapwater
Carbon tetrachloride	56-23-5	4.6E-01	2018 ODEQ Residential Ing/Inh Tapwater
Chlorobenzene	108-90-7	7.7E+01	2018 ODEQ Residential Ing/Inh Tapwater
Chloroethane	75-00-3	2.1E+04	2018 ODEQ Residential Ing/Inh Tapwater
Chloroform	67-66-3	2.2E-01	2018 ODEQ Residential Ing/Inh Tapwater
Chloromethane	74-87-3	1.9E+02	2018 ODEQ Residential Ing/Inh Tapwater
cis-1,2-Dichloroethene	156-59-2	3.6E+01	2018 ODEQ Residential Ing/Inh Tapwater
cis-1,3-Dichloropropene	10061-01-5	4.7E-01	Surrogate (RSL for 1,3-Dichloropropene)
Dibromochloromethane	124-48-1	1.7E-01	2018 ODEQ Residential Ing/Inh Tapwater
Dibromomethane	74-95-3	8.3E+00	2021 EPA RSL for Tapwater
Dichlorodifluoromethane	75-71-8	2.0E+02	2021 EPA RSL for Tapwater
Ethylbenzene	100-41-4	1.5E+00	2018 ODEQ Residential Ing/Inh Tapwater
Hexachlorobutadiene	87-68-3	1.4E-01	2021 EPA RSL for Tapwater
Isopropylbenzene	98-82-8	4.4E+02	2018 ODEQ Residential Ing/Inh Tapwater
Methyl tert-butyl ether	1634-04-4	1.4E+01	2018 ODEQ Residential Ing/Inh Tapwater
Methylene Chloride	75-09-2	5.0E+00	EPA MCL
m-Xylene & p-Xylene	179601-23-1	1.9E+02	2021 EPA RSL for Tapwater
Naphthalene	91-20-3	1.2E-01	2021 EPA RSL for Tapwater
n-Butylbenzene	104-51-8	1.0E+03	2021 EPA RSL for Tapwater
N-Propylbenzene	103-65-1	6.6E+02	2021 EPA RSL for Tapwater
o-Xylene	95-47-6	1.9E+02	2021 EPA RSL for Tapwater
p-Isopropyltoluene	99-87-6	4.1E+02	Surrogate (DTSC Note 3 for Toluene)
sec-Butylbenzene	135-98-8	2.0E+03	2021 EPA RSL for Tapwater
Styrene	100-42-5	1.0E+02	EPA MCL
tert-Butylbenzene	98-06-6	6.9E+02	2021 EPA RSL for Tapwater
Tetrachloroethene	127-18-4	5.0E+00	EPA MCL
Toluene	108-88-3	1.0E+03	EPA MCL
trans-1,2-Dichloroethene	156-60-5	6.8E+01	2021 EPA RSL for Tapwater

Table 3-2. Groundwater Screening Levels for Oregon RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analytical Group Analyte	CAS Number	Groundwater Screening Level (µg/L)	Groundwater Screening Level Source
trans-1,3-Dichloropropene	10061-02-6	4.1E+02	Surrogate (RSL for 1,3-Dichloropropene)
Trichloroethene	79-01-6	4.9E-01	2018 ODEQ Residential Ing/Inh Tapwater
Trichlorofluoromethane	75-69-4	1.1E+03	2018 ODEQ Residential Ing/Inh Tapwater
Vinyl acetate	108-05-4	4.1E+02	2021 EPA RSL for Tapwater
Vinyl chloride	75-01-4	1.9E-02	2021 EPA RSL for Tapwater
Xylenes, Total	1330-20-7	1.9E+02	2018 ODEQ Residential Ing/Inh Tapwater
SVOC			
Acenaphthene	83-32-9	5.1E+02	2018 ODEQ Residential Ing/Inh Tapwater
Acenaphthylene	208-96-8	8.1E+01	Surrogate (DTSC Note 3 for Pyrene)
Anthracene	120-12-7	1.8E+03	2021 EPA RSL for Tapwater
Azobenzene	103-33-3	1.2E-01	2021 EPA RSL for Tapwater
Benzo[a]anthracene	56-55-3	3.0E-02	2018 ODEQ Residential Ing/Inh Tapwater
Benzo[b]fluoranthene	205-99-2	2.5E-01	2018 ODEQ Residential Ing/Inh Tapwater
Benzo[k]fluoranthene	207-08-9	2.5E+00	2021 EPA RSL for Tapwater
Benzo[g,h,i]perylene	191-24-2	8.1E+01	Surrogate (DTSC Note 3 for Pyrene)
Benzo[a]pyrene	50-32-8	2.5E-02	2018 ODEQ Residential Ing/Inh Tapwater
Benzoic acid	65-85-0	7.5E+04	2021 EPA RSL for Tapwater
Benzyl alcohol	100-51-6	2.0E+03	2021 EPA RSL for Tapwater
Bis(2-chloroethoxy)methane	111-91-1	5.9E+01	2021 EPA RSL for Tapwater
Bis(2-chloroethyl)ether	111-44-4	1.4E-02	2018 ODEQ Residential Ing/Inh Tapwater
bis (2-chloroisopropyl) ether	108-60-1	7.1E+02	2021 EPA RSL for Tapwater
Bis(2-ethylhexyl) phthalate	117-81-7	5.6E+00	2018 ODEQ Residential Ing/Inh Tapwater
4-Bromophenyl phenyl ether	101-55-3	0.0E+00	No SL
Butyl benzyl phthalate	85-68-7	1.6E+01	2021 EPA RSL for Tapwater
4-Chloroaniline	106-47-8	3.7E-01	2021 EPA RSL for Tapwater
4-Chloro-3-methylphenol	59-50-7	1.4E+03	2021 EPA RSL for Tapwater
2-Chloronaphthalene	91-58-7	7.5E+02	2021 EPA RSL for Tapwater
2-Chlorophenol	95-57-8	9.1E+01	2021 EPA RSL for Tapwater
4-Chlorophenyl phenyl ether	7005-72-3	0.0E+00	No SL
Chrysene	218-01-9	2.5E+01	2021 EPA RSL for Tapwater
Dibenz(a,h)anthracene	53-70-3	2.5E-02	2018 ODEQ Residential Ing/Inh Tapwater
Dibenzofuran	132-64-9	7.9E+00	2021 EPA RSL for Tapwater
Di-n-butyl phthalate	84-74-2	9.0E+02	2021 EPA RSL for Tapwater
1,2-Dichlorobenzene	95-50-1	3.0E+02	2018 ODEQ Residential Ing/Inh Tapwater
1,3-Dichlorobenzene	541-73-1	3.0E+02	Surrogate (RSL for 1,2-Dichlorobenzene)
1,4-Dichlorobenzene	106-46-7	4.8E-01	2018 ODEQ Residential Ing/Inh Tapwater
3,3'-Dichlorobenzidine	91-94-1	1.3E-01	2021 EPA RSL for Tapwater
2,4-Dichlorophenol	120-83-2	4.6E+01	2021 EPA RSL for Tapwater
Diethyl phthalate	84-66-2	1.5E+04	2021 EPA RSL for Tapwater
2,4-Dimethylphenol	105-67-9	3.6E+02	2021 EPA RSL for Tapwater
Dimethyl phthalate	131-11-3	0.0E+00	No SL
4,6-Dinitro-2-methylphenol	534-52-1	1.5E+00	2021 EPA RSL for Tapwater
2,4-Dinitrophenol	51-28-5	3.9E+01	2021 EPA RSL for Tapwater
2,4-Dinitrotoluene	121-14-2	2.4E-01	2021 EPA RSL for Tapwater

Table 3-2. Groundwater Screening Levels for Oregon RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analytical Group Analyte	CAS Number	Groundwater Screening Level (µg/L)	Groundwater Screening Level Source
2,6-Dinitrotoluene	606-20-2	4.9E-02	2018 ODEQ Residential Ing/Inh Tapwater
Di-n-octyl phthalate	117-84-0	2.0E+02	2021 EPA RSL for Tapwater
Fluoranthene	206-44-0	8.0E+02	2021 EPA RSL for Tapwater
Fluorene	86-73-7	2.8E+02	2018 ODEQ Residential Ing/Inh Tapwater
Hexachlorobenzene	118-74-1	9.8E-03	2018 ODEQ Residential Ing/Inh Tapwater
Hexachlorobutadiene	87-68-3	1.4E-01	2021 EPA RSL for Tapwater
Hexachlorocyclopentadiene	77-47-4	4.1E-01	2021 EPA RSL for Tapwater
Hexachloroethane	67-72-1	3.3E-01	2021 EPA RSL for Tapwater
Indeno[1,2,3-cd] Pyrene	193-39-5	2.5E-01	2021 EPA RSL for Tapwater
Isophorone	78-59-1	7.8E+01	2021 EPA RSL for Tapwater
1-Methylnaphthalene	90-12-0	1.1E+00	2021 EPA RSL for Tapwater
2-Methylnaphthalene	91-57-6	3.6E+01	2021 EPA RSL for Tapwater
2-Methylphenol	95-48-7	9.3E+02	2021 EPA RSL for Tapwater
3-Methylphenol & 4-Methylphenol	15831-10-4	5.8E+03	Surrogate (RSL for Phenol)
Naphthalene	91-20-3	1.2E-01	2021 EPA RSL for Tapwater
2-Nitroaniline	88-74-4	1.9E+02	2021 EPA RSL for Tapwater
3-Nitroaniline	99-09-2	1.3E+01	Surrogate (RSL for Alinine)
4-Nitroaniline	100-01-6	3.8E+00	2021 EPA RSL for Tapwater
Nitrobenzene	98-95-3	1.4E-01	2021 EPA RSL for Tapwater
2-Nitrophenol	88-75-5	5.8E+03	Surrogate (RSL for Phenol)
4-Nitrophenol	100-02-7	5.8E+03	Surrogate (RSL for Phenol)
N-Nitrosodiphenylamine	86-30-6	1.2E+01	2021 EPA RSL for Tapwater
N-Nitrosodi-n-propylamine	621-64-7	1.1E-02	2018 ODEQ Residential Ing/Inh Tapwater
Pentachlorophenol	87-86-5	4.1E-02	2021 EPA RSL for Tapwater
Phenanthrene	85-01-8	8.1E+01	Surrogate (DTSC Note 3 for Pyrene)
Phenol	108-95-2	5.8E+03	2021 EPA RSL for Tapwater
Pyrene	129-00-0	1.1E+02	2018 ODEQ Residential Ing/Inh Tapwater
Pyridine	110-86-1	2.0E+01	2021 EPA RSL for Tapwater
1,2,4-Trichlorobenzene	120-82-1	1.2E+00	2021 EPA RSL for Tapwater
2,4,5-Trichlorophenol	95-95-4	1.2E+03	2021 EPA RSL for Tapwater
2,4,6-Trichlorophenol	88-06-2	4.1E+00	2021 EPA RSL for Tapwater

Table 3-2. Groundwater Screening Levels for Oregon RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analytical Group Analyte	CAS Number	Groundwater Screening Level (µg/L)	Groundwater Screening Level Source
PAH			
Acenaphthene	83-32-9	5.1E+02	2018 ODEQ Residential Ing/Inh Tapwater
Acenaphthylene	208-96-8	8.1E+01	Surrogate (DTSC Note 3 for Pyrene)
Anthracene	120-12-7	1.8E+03	2021 EPA RSL for Tapwater
Benzo[a]anthracene	56-55-3	3.0E-02	2018 ODEQ Residential Ing/Inh Tapwater
Benzo[a]pyrene	50-32-8	2.5E-02	2018 ODEQ Residential Ing/Inh Tapwater
Benzo[b]fluoranthene	205-99-2	2.5E-01	2018 ODEQ Residential Ing/Inh Tapwater
Benzo[g,h,i]perylene	191-24-2	8.1E+01	Surrogate (DTSC Note 3 for Pyrene)
Benzo[k]fluoranthene	207-08-9	2.5E+00	2021 EPA RSL for Tapwater
Chrysene	218-01-9	2.5E+01	2021 EPA RSL for Tapwater
Dibenz(a,h)anthracene	53-70-3	2.5E-02	2018 ODEQ Residential Ing/Inh Tapwater
Fluoranthene	206-44-0	8.0E+02	2021 EPA RSL for Tapwater
Fluorene	86-73-7	2.8E+02	2018 ODEQ Residential Ing/Inh Tapwater
Indeno[1,2,3-cd] Pyrene	193-39-5	2.5E-01	2021 EPA RSL for Tapwater
Naphthalene	91-20-3	1.2E-01	2021 EPA RSL for Tapwater
Phenanthrene	85-01-8	8.1E+01	Surrogate (DTSC Note 3 for Pyrene)
Pyrene	129-00-0	1.1E+02	2018 ODEQ Residential Ing/Inh Tapwater
Dioxin/Furan			
2,3,7,8-TCDD	1746-01-6	9.1E-08	2018 ODEQ Residential Ing/Inh Tapwater
2,3,7,8-TCDF	51207-31-9	9.1E-07	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)
1,2,3,7,8-PeCDD	40321-76-4	9.1E-08	2,3,7,8-TCDD TEF of 1 (DTSC Note 2)
1,2,3,7,8-PeCDF	57117-41-6	3.0E-06	2,3,7,8-TCDD TEF of 0.03 (DTSC Note 2)
2,3,4,7,8-PeCDF	57117-31-4	3.0E-07	2,3,7,8-TCDD TEF of 0.3 (DTSC Note 2)
1,2,3,4,7,8-HxCDD	39227-28-6	9.1E-07	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)
1,2,3,6,7,8-HxCDD	57653-85-7	9.1E-07	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)
1,2,3,7,8,9-HxCDD	19408-74-3	9.1E-07	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)
1,2,3,4,7,8-HxCDF	70648-26-9	9.1E-07	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)
1,2,3,6,7,8-HxCDF	57117-44-9	9.1E-07	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)
1,2,3,7,8,9-HxCDF	72918-21-9	9.1E-07	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)
2,3,4,6,7,8-HxCDF	60851-34-5	9.1E-07	2,3,7,8-TCDD TEF of 0.1 (DTSC Note 2)
1,2,3,4,6,7,8-HpCDD	35822-46-9	9.1E-06	2,3,7,8-TCDD TEF of 0.01 (DTSC Note 2)
1,2,3,4,6,7,8-HpCDF	67562-39-4	9.1E-06	2,3,7,8-TCDD TEF of 0.01 (DTSC Note 2)
1,2,3,4,7,8,9-HpCDF	55673-89-7	9.1E-06	2,3,7,8-TCDD TEF of 0.01 (DTSC Note 2)
OCDD	3268-87-9	3.0E-04	2,3,7,8-TCDD TEF of 0.0003 (DTSC Note 2)
OCDF	39001-02-0	3.0E-04	2,3,7,8-TCDD TEF of 0.0003 (DTSC Note 2)

Table 3-2. Groundwater Screening Levels for Oregon RECs

PacifiCorp, Lower Klamath Hydroelectric Project

Analytical Group Analyte	CAS Number	Groundwater Screening Level (µg/L)	Groundwater Screening Level Source
Pesticide			
4,4'-DDD	72-54-8	3.1E-02	2018 ODEQ Residential Ing/Inh Tapwater
4,4'-DDE	72-55-9	4.6E-02	2018 ODEQ Residential Ing/Inh Tapwater
4,4'-DDT	50-29-3	2.3E-01	2018 ODEQ Residential Ing/Inh Tapwater
Aldrin	309-00-2	9.2E-04	2018 ODEQ Residential Ing/Inh Tapwater
Dieldrin	60-57-1	1.7E-03	2018 ODEQ Residential Ing/Inh Tapwater
Endosulfan sulfate	1031-07-8	1.1E+02	2021 EPA RSL for Tapwater
Endrin	72-20-8	1.9E+00	2018 ODEQ Residential Ing/Inh Tapwater
Endrin aldehyde	7421-93-4	2.3E+00	Surrogate (RSL for Endrin)
Heptachlor	76-44-8	1.4E-03	2018 ODEQ Residential Ing/Inh Tapwater
Heptachlor epoxide	1024-57-3	1.4E-03	2018 ODEQ Residential Ing/Inh Tapwater
PCB			
PCB-1016	12674-11-2	2.2E-01	2021 EPA RSL for Tapwater
PCB-1221	11104-28-2	4.7E-03	2021 EPA RSL for Tapwater
PCB-1232	11141-16-5	4.7E-03	2021 EPA RSL for Tapwater
PCB-1242	53469-21-9	7.8E-03	2021 EPA RSL for Tapwater
PCB-1248	12672-29-6	7.8E-03	2021 EPA RSL for Tapwater
PCB-1254	11097-69-1	6.0E-03	2018 ODEQ Residential Ing/Inh Tapwater
PCB-1260	11096-82-5	7.8E-03	2021 EPA RSL for Tapwater
PCB-1262	37324-23-5	7.8E-03	Surrogate (RSL for PCB-1260)
PCB-1268	11100-14-4	7.8E-03	Surrogate (RSL for PCB-1260)

Notes:

µg/L = microgram(s) per liter

CAS = Chemical Abstracts Service

EPA = U.S. Environmental Protection Agency

Ing/Inh = Ingestion/Inhalation

MCL = maximum contaminant level

ODEQ = Oregon Department of Environmental Quality

RSL = regional screening level

TEF = Toxicity Equivalency Factor

Resources:

Oregon Department of Environmental Quality (ODEQ). 2010. Risk-Based Concentrations for Individual Chemicals.

U.S. Environmental Protection Agency (EPA). 2021. Regional Screening Levels for Chemical Contaminants at Superfund Sites. May. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

Table 3-3. Proposed Sampling and Analysis Plan for Soil at J.C. Boyle Dispersed Recreation Area - 2

PacifiCorp, Lower Klamath Hydroelectric Project

Location Description	Boring Location	Sample ID	Depth (ft bgs)	Title 22 metals total (EPA Method 6010B), Mercury by (SW7471A)	Volatile Organic Compounds (EPA Method SW8260B)	Semivolatile Organic Compounds (EPA Method SW8270C)	Dioxins and Furans (EPA Method SW846 8290A)	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) (EPA Method SW8260B)	Total Petroleum Hydrocarbons as Gasoline (NWTPH-Gx)	Total Petroleum Hydrocarbons as Diesel and Motor Oil (NWTPH-Dx)	Polynuclear Aromatic Hydrocarbons (EPA Method SW8270C-SIM)	Polychlorinated Biphenyls (PCBs) (EPA Method SW846 882A)	STLC* (when TTLC results are 10x STLC limit)	TCLP* (when TTLC results are 20x TCLP limit)	Ignitability (EPA Method 1030), Reactivity (SW 846 CH7), Corrosivity (SW-846 9045)
J.C. Boyle Dispersed Recreation Area - 2	JBRA-01	JBRA-01-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		JBRA-01-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		JBRA-01-2.5-YYYYMMDD	2.0-2.5	X	X	X	X						X	X	
		JBRA-01-3.5-YYYYMMDD	3.0-3.5	X	X	X	X						X	X	
	JBRA-02	JBRA-02-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		JBRA-02-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		JBRA-02-3.5-YYYYMMDD	3.0-3.5	X	X	X	X						X	X	
		JBRA-02-6.0-YYYYMMDD	5.5-6.0	X	X	X	X						X	X	
	JBRA-03	JBRA-03-0.5-YYYYMMDD	0.0-0.5	X	X	X	X						X	X	
		JBRA-03-1.5-YYYYMMDD	1.0-1.5	X	X	X	X						X	X	
		JBRA-03-2.5-YYYYMMDD	2.0-2.5	X	X	X	X						X	X	
		JBRA-03-3.5-YYYYMMDD	3.0-3.5	X	X	X	X						X	X	
	ALL	JBRA-WC-YYYYMMDD	Composite	X	X	X			X	X			X	X	X

Notes:

* Hold extractions for metals, SVOCs, and dioxins/furans pending total results (TTLC).

ft bgs = feet below ground surface

X = sample to analyzed

NA = not applicable

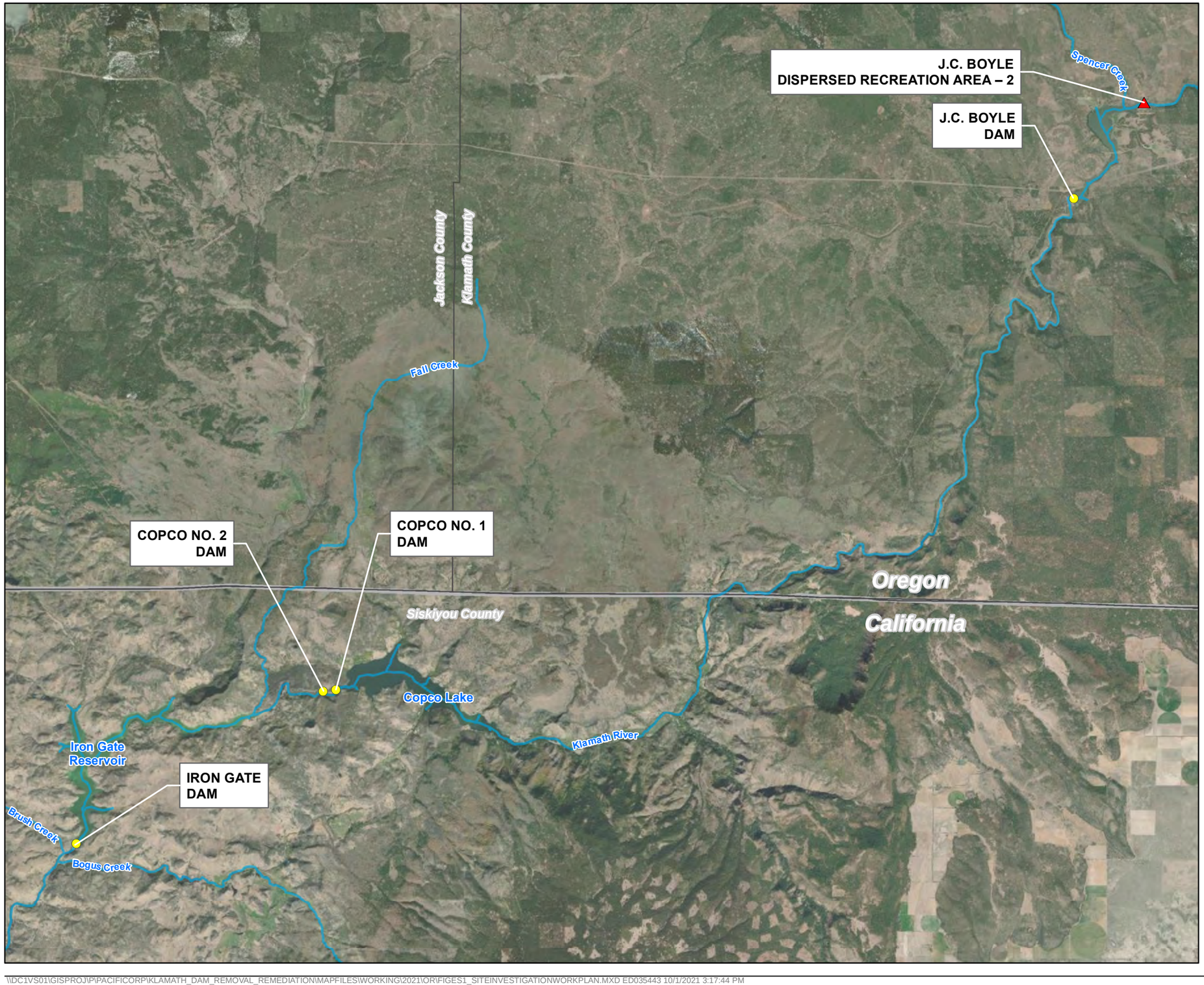
STLC = soluble threshold limit concentration

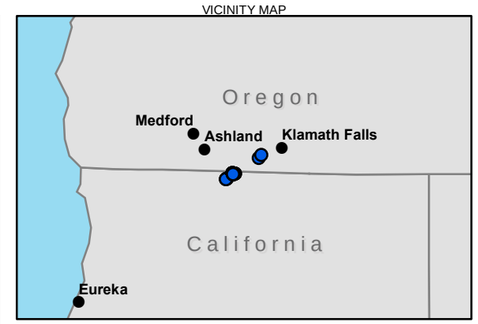
TCLP = toxicity characteristic leaching procedure

TTLC = total threshold limit concentration

USEPA = U.S. Environmental Protection Agency

Figures





LEGEND

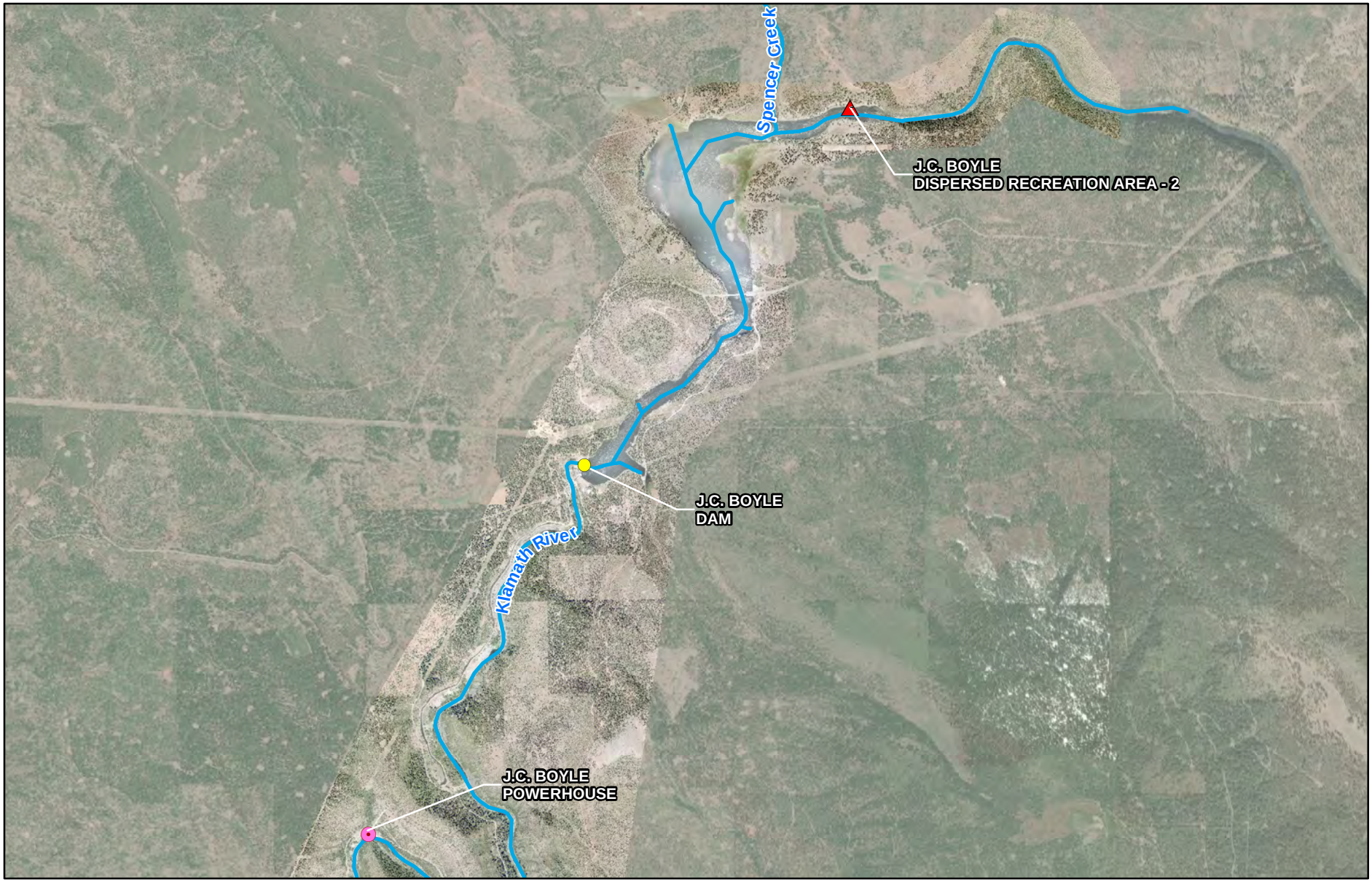
- Dam to be Removed
- Recognized Environmental Condition
- River/Creek
- County Boundary
- State Boundary

N

0 1 2
Miles

FIGURE ES-1
Site Investigation Work Plan
Recognized Environmental Conditions
Lower Klamath Hydroelectric Project

Jacobs



LEGEND

- Dam to be Removed
- Recognized Environmental Condition
- Powerhouse
- Klamath River

N

0 2,000 4,000

Feet

FIGURE ES-2
J.C. Boyle Dam
Recognized Environmental Condition
Lower Klamath Hydroelectric Project

Jacobs

\\DC1VS01\GISPROJ\P\PACIFICORP\KLAMATH_DAM_REMOVAL_REMEDIATION\MAPFILES\WORKING\2021\OR\FIGES2_JCBOYLEDAM.MXD ED035443 9/20/2021 11:41:42 AM

LEGEND

- Limits of SIWP
- Proposed Shallow Soil Boring Location
- Proposed Deep Soil Boring Location
- Klamath River

N

0 15 30

Feet

FIGURE 3-1
J.C. Boyle Dispersed Recreation Area - 2
Lower Klamath Hydroelectric Project

Jacobs

Appendix A
Sampling and Analysis Plan

Lower Klamath Hydroelectric Project (FERC No. P-14803)

Oregon Sampling and Analysis Plan

Final

November 2021

Prepared by:

Jacobs

Prepared for:

PACIFICORP

Contents

Attachment

Tables

Tables (located at the end of text)

Acronyms and Abbreviations

°C	degrees Celsius
CoC	chain-of-custody
COPC	constituent of potential concern
ESA	environmental site assessment
FTL	Field Team Lead
GPS	global positioning system
HDPE	high-density polyethylene
HS&E	health, safety, and environment
HSM	Health and Safety Manager
HSP	Health and Safety Plan
ID	identification
IDW	investigation-derived waste
MDL	method detection limit
mL	milliliter
MS/MSD	matrix spike/matrix spike duplicate
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PM	project manager
PPE	personal protective equipment
Project	Klamath Hydroelectric Project
REC	recognized environmental condition
RL	reporting limit
SC	Safety Coordinator
SIWP	Site Investigation Work Plan
SVOC	semivolatile organic compound
TPH	total petroleum hydrocarbon
VOC	volatile organic compound

Oregon Sampling and Analysis Plan

This sampling and analysis plan provides the general procedures and protocols for soil and groundwater sample collection, handling, and analysis associated with the one recognized environmental condition (REC) identified during Phase 1 environmental site assessments (Phase 1 ESAs) for the Klamath Hydroelectric Project (Project) in Oregon.

Sample locations, samples to be collected, and analysis to be conducted on those samples are identified in Section 3 of the *Klamath Hydroelectric Project Oregon Site Investigation Work Plan* (Site Investigation Work Plan [SIWP]) (Jacobs 2021).

1. Sample Collection and Handling

Sample locations were selected at the likely location and depth intervals of contamination and the anticipated boundaries of where contaminants could occur. Groundwater sampling will be performed if encountered at the REC. Soil sample locations and sampling depths may change based on refusal, field conditions, and observations of soil when hand augering or advancing direct-push technology borings. Step-out borings may be advanced and deeper soil samples may be collected if soil is found to be stained, odorous, or has photoionization detector readings greater than 50 parts per million by volume.

1.1 Sample Collection

Planned sample locations may be adjusted in the field, if necessary, based on site-specific access conditions and/or to address safety concerns; final sample locations will be documented with a handheld global positioning system (GPS) unit. A hand auger or direct-push technology drill rig will be used to advance soil borings for the collection of soil samples. Before sampling, surficial soil, gravel, and organic material, such as vegetation roots and debris, will be scraped away. Soil samples will be collected directly into sample jars supplied by the analytical laboratory or will be transferred into sample containers with a decontaminated hand trowel. A disposable bailer will be used to collect groundwater samples, if groundwater is encountered.

1.2 Sampling Equipment

To facilitate the collection of surface or subsurface soil samples, the sampling team will use equipment that includes, but is not limited to, the following items:

- Photoionization detector or flame-ionization detector
- Disposable bailers
- Clean high-density polyethylene (HDPE) or glass containers for collection of water from bailer
- Stainless steel trowel, scoop, spoon, bowls, and hand auger
- Stainless steel split spoon, split barrel, or continuous sampler
- Soil core samplers (En Core sampler, TerraCore, or equivalent)
- Decontamination equipment (e.g., buckets, brushes, and Liquinox detergent)
- Sample jars, labels, and coolers
- Chain-of-custody (CoC) forms

1.3 Sample Containers, Amounts, Preservatives, and Hold Times

Sample containers, amount of material to be sampled, preservatives, and hold times are based on the target analyte and analysis method (Tables A-1 and A-2).

Sample containers needed for the different constituents to be analyzed will be labeled before collecting samples. Sample containers will be labeled with the following information:

- Project name and number
- Sample identification (ID) to establish unique ID for each sample (see Table 3-3 in the SIWP)
- Date and time (24-hour clock) of collection
- Field personnel initials
- Preservative in the sample container, if any
- Requested analysis

Each sample collected will be assigned a unique sample ID. The sample ID will be based on the REC and sample locations, and comprise the components presented in Section 3 of the SIWP. At the J.C. Boyle dispersed recreation area, the sample IDs will use the abbreviation JBRA, followed by the sample location, the sample depth, and the date sampled, as follows: JBRA-01-0.5-YYYYMMDD.

A unique identifier will be added after the sample ID for quality assurance/quality control. The following designations will be used:

- Field duplicate sample: FD
- Equipment blank sample: EB
- Matrix spike/matrix spike duplicate (MS/MSD): MS/MSD

1.3.1 Field Duplicates

Where water samples are collected, field duplicates will be collected at a frequency of 1 duplicate for every 10 water samples or 1 duplicate for the REC if fewer than 10 water samples are collected. The quantity of water could potentially be limited, thus not allowing the collection of a duplicate.

For soil sampling, field duplicates will be collected at a frequency of 1 duplicate for every 10 soil samples or one duplicate for the REC if fewer than 10 soil samples are collected. Field duplicates will be collected at the same time as soil samples. Duplicates will be placed under identical circumstances and treated similarly throughout field activities and laboratory analysis. Analysis of duplicate samples provides a measure of the precision of sample collection, preservation, storage, and laboratory analysis.

1.3.2 Equipment Blanks

Equipment blanks will be collected from equipment used for sampling of soil. Equipment blanks will be collected from hand trowels or other excavation tools by pouring deionized water over

the surface of decontaminated sampling equipment. Equipment blanks are used to monitor the effectiveness of the decontamination process. The rinse water is collected in sample bottles and analyzed for the same parameters as the corresponding sample. One soil equipment blank will be collected before sampling starts at the REC and at least daily during soil sampling.

Disposable bailers will be used for collection of groundwater samples. Therefore, no equipment blanks will be required for water sampling.

1.3.3 Trip Blanks

Trip blanks are samples prepared by a laboratory prior to the sampling event in 40-milliliter (mL) volatile organic analyte sampling vials. These samples remain in the sample cooler in which sample containers are shipped. Trip blanks will be stored in the sample coolers with the investigation samples throughout soil sampling. One trip blank will be included in each cooler containing samples for volatile organic compound (VOC) analysis. Data from analysis of trip blanks are used to determine the presence of any VOC contaminants that may have accumulated during travel to and from the analytical laboratory.

1.3.4 Matrix Spike/Matrix Spike Duplicates

The MS/MSDs are duplicate samples that are collected to evaluate matrix interference and assess effects of the matrix on analyte concentrations. One soil MS/MSD will be collected as a field duplicate at the REC. One soil MS/MSD will be collected for every 20 regular soil samples at the REC if more than 20 regular soil samples are collected. One groundwater MS/MSD will be collected as a field duplicate at the REC if groundwater is encountered and if there is adequate sample volume to collect a native sample and an MS/MSD.

1.4 Field Documentation

Appropriate field activity records will be kept for documentation purposes. This section provides a summary-level description of the appropriate field activity records to be created during field activities.

1.4.1 Sample Identification Method

Samples will be labeled so that analytical data can be easily matched with location data as described above. Field documentation will include completion of all CoC documents, as sampling is completed at the REC. Cross-checking between the sampling plan and the sample IDs will be conducted by different individuals to ensure that all samples are collected, properly identified, and no information is missing.

1.4.2 Field Data Collected

Field notes, sketches of boring locations, GPS coordinates, and observations will be documented in dedicated, water-resistant field notebooks using permanent ink pens. Notes will be logged and include the following items, at a minimum:

- Project name, number, and location

- Date, daily start/lunch/end times, and field personnel
- General description of field activities
- Equipment calibration records
- Health and safety monitoring records
- Initials or signature at the bottom of each page

Each entry will be dated to show that notes are being taken daily. Unused portions of a page will have a line drawn through them to indicate the space is intentionally blank. Errors will be crossed out with a single line and initialed by the note taker. No erasure will occur and no correction fluid will be used.

Notes will also include sample locations; visual and olfactory characteristics and photoionization detector readings indicating evidence of contamination of the soil, water, or sediment sampled; time of sample collection; visual observations (such as weather conditions); and other relevant information. Any deviations from the SIWP will be noted, with an explanation for the deviation. Notes will be double-checked for completeness before the field personnel leaves the site or at the end of the work-day. Complete notes will be scanned and retained in the project file by the project name and number after the field activities are complete.

Photos will be taken throughout field activities to document the REC, investigation methods, and testing. A photo log will be kept that details the date, time, location, and features captured in the images.

1.5 Sample Handling, Packing, and Shipping

1.5.1 Sample Handling

Sample custody documentation allows sample possession to be traced from the time of sample collection until receipt of the samples at the laboratory. Samples will be placed in the custody of the field personnel responsible for collecting samples. Sample possession will be documented according to the CoC procedures.

The CoC form serves as a record of sample collection information, requested analysis, and sample tracking. The CoC forms will be obtained from the laboratory receiving the samples at the same time as the sample containers. The following information will be recorded on the CoC form at the time of sample collection:

- Project name and number
- Name of project manager (PM), field personnel, and laboratory
- Sample ID to establish unique ID for each sample
- Date and time (24-hour clock) of collection
- Number of containers for each sample
- Requested analysis and turnaround times

The CoCs are legal documents and must be filled out in pen with legible handwriting. If a mistake is made, the portion in error will be crossed out with a single line and the individual making the correction must initial the correction.

The CoC form will be prepared, sent electronically to the PM for review, and placed in a sealed plastic bag taped to the inside lid of a cooler once approved by the PM before any cooler leaves the site by means other than courier or field personnel. A custody seal will be signed and dated by the relinquishing field personnel and placed on the cooler so that the cooler cannot be opened without the custody seal being broken. The cooler will be shipped via overnight courier to the laboratory. Samples will remain in sight of field personnel or in a locked location until shipped to the laboratory to retain sample custody.

Upon transferring custody of the samples, the individuals relinquishing and receiving the samples will sign, date, and note the time of transfer on the CoC form(s). The method of shipment, courier name, and other pertinent information will be entered in the remarks section of the CoC form, as necessary. The samples will be inventoried to verify that sample labels and ID match the CoC form. Upon completion of analysis, the laboratory will send copies of the appropriate CoC forms with the analytical reports.

1.5.2 Sample Packing and Shipping

Sample containers will be wrapped, sealed in plastic bags, and placed on ice in a cooler to keep the temperature below 4 degrees Celsius (°C). Two large black plastic bags will be placed one within the other inside the cooler. Samples will be placed in the interior bag and surrounded with loose ice. This interior bag will then be sealed with a zip tie. The second bag will then be sealed with a zip tie. The purpose of the second bag is to contain any leakage from the interior bag. Inert packing materials will be used to fill void space within a cooler to prevent the movement and potential breakage of sample containers during transport. Trip blanks will be placed in sample coolers that contain VOC water and soil samples.

1.6 Roles and Responsibilities

1.6.1 Project Manager

The PM is responsible for providing adequate resources and ensuring that field staff have adequate experience and training for project-specific implementation of the health, safety, and environment (HS&E) management process. The PM and Health and Safety Manager (HSM) cooperatively have overall HS&E program responsibility; however, specific tasks may be delegated to other project staff. The PM retains ultimate HS&E responsibility for the project. The PM will solicit the appropriate technical expertise to adequately identify the best drilling and sampling technology for the job given the current understanding of the site lithology.

1.6.2 Health and Safety Manager

The HSM is responsible for site-specific HS&E and overall compliance with project HS&E requirements. The HSM conducts personal protective equipment (PPE) evaluations, selects the appropriate PPE for the project, lists the requirements in the Health and Safety Plan (HSP), coordinates with the Field Team Lead (FTL), Safety Coordinator (SC), or both, to complete and certify the PPE program, and conducts project audits on the effectiveness of the HS&E program.

1.6.3 Safety Coordinator

The role of SC is sometimes designated to the FTL by the PM, to assist in implementing the project HSP. The SC assists the FTL and HSM with the HS&E program, implements the PPE requirements described in the project HSP, and receives input from project staff that the assigned PPE requirements and ongoing HS&E procedures are effective.

1.6.4 Field Team Lead

The FTL, in conjunction with the SC, is responsible for overall compliance with this SAP. The FTL is responsible for following these procedures or delegating field sampling tasks to team members. The FTL should verify that subcontractors adequately comply with this SAP and the HSP.

2. Laboratory Analytical Methods and Detection Limits

2.1 Analytical Methods

Samples will be analyzed at an approved laboratory with standard turnaround times. The laboratory will provide the proper sampling containers and will comply with the analytical, holding time, sample receipt, and error correction requirements as specified and described in the analytical methods (Tables A-1 and A-2-). Any out-of-control events must be explained in the narrative. Out-of-control events must be shown to be back in control prior to sample analysis.

All analyses will result in quantitative data, unless specified differently. Electronic data deliverables are required. Any reporting limits (RLs) that are not met will be identified. The laboratory can propose a different method of analysis as an alternative, but such proposals are subject to approval by the PM before that analysis occurs.

The laboratory will comply with the calibration acceptance criteria for all analyses and analyze quality control samples at the frequency specified in the methods. The laboratory will complete extractions, analyses, reextractions, reanalyses, and dilutions within the holding times based on time of sample collection for each parameter. The laboratory will send notification if any sample-specific quality control requirement is not met or if the sample volume received by the laboratory is insufficient to conduct analyses.

The laboratory will also perform the following tasks:

- Inspect shipping containers, custody seals, and samples, and document their condition.
- Check the temperature within the coolers upon receipt and record that temperature on the CoC form.
- Record the condition of the samples in a signed, dated, and bound logbook and on the CoC form; sign and date the entries in the logbook and the CoC form.
- Check the hydrogen ion concentration (pH) of preserved samples upon receipt and record on the CoC form.

- Note any breakage, discrepancy, or improper preservation as an out-of-control event and record the event and the corrective action on an out-of-control form, which will be signed and dated by the laboratory personnel and any other personnel responsible for the corrective action.

The laboratory personnel will send notification of discrepancies in shipments to the PM within 24 hours. Any instructions must be received by the laboratory in writing prior to the processing of samples.

The laboratory will provide the following deliverables:

- The CoC for samples collected and submitted for analyses will be emailed on the date of sample receipt.
- The laboratory will submit a complete report within 24 calendar days of sampling. The analytical report will be submitted electronically. The deliverable for each sample will not be considered complete until electronic data have been received. Files with errors will be returned for corrective action.
- The laboratory will provide a Level 2 data package that contains sample receipt information, analysis performed, analytical results, and associated quality control. The project chemist will perform validation of data reports as they are released by the laboratory.

Analytical reports from the laboratory will be reviewed for accuracy and completeness. If required, data quality and quality assurance information from the laboratory will be reviewed to verify discrepancies in the analytical data. Qualified personnel will review and tabulate laboratory confirmation data and field sampling results.

2.2 Detection Limits

Laboratory data will be collected in accordance with analytical methods capable of measurement at prespecified RLs. Reporting limits and method detection limits (MDLs) are developed by the laboratories used for the specific analysis methods employed (Tables A-3 and A-4). Tables A-3 and A-4 include the Oregon screening levels determined in Section 3.3 of the SIWP. The selected laboratory will use the best available technologies and associated MDLs.

Nondetect values for constituents of potential concern (COPCs) on the target analyte list will be appropriately qualified in accordance with standard laboratory practice utilizing accepted data qualifiers for nondetects, estimated values, and verified detections. Application of data qualifiers to the final sample result will be based on laboratory MDLs and RLs. Nondetect values for COPCs will be reported at the RL but qualified as estimated down to the MDL. These values are nonzero values.

The final sample result is flagged by the laboratory with a J-qualifier in instances where the actual sample concentration lies between the RL and the MDL. This flag indicates an estimated concentration. Laboratory analysis results flagged with a J-qualifier will be used if all other acceptance criteria are met. Sample results that are less than the MDL will be reported at the MDL and flagged by the laboratory with a U-qualifier.

3. Health and Safety

A Health and Safety Plan (HSP, as defined above) will be prepared to detail health and safety protocols for field investigations. The HSP will include required elements from PacifiCorp's Hydro Resources Contractor Orientation (revision 1.8.3, December 2013) for the work being performed. A health and safety meeting will be conducted at the start of each day to cover the daily scope of work and known hazards. This briefing will be repeated if work locations, methods, or other conditions (e.g., weather) change during the day. Any new people arriving onsite after the daily briefing will be briefed by the site manager. Personnel PPE will be worn in accordance with PacifiCorp health and safety requirements appropriate for the work being conducted.

Field personnel will contact the PM and PacifiCorp immediately if any problems or health and safety incidents occur, or as necessary if questions or problems arise. Daily field records and detailed soil sampling records will be provided to the PM after the completion of a field event. Field personnel will provide the PM and PacifiCorp with a daily project status update and notify the PM if any visitors are onsite or of any challenges encountered.

4. Equipment Decontamination

For water sampling, disposable bailers and sample bottles will be used for sample collection; therefore, no decontamination will be required as water sampling will be discrete. A hand trowel or other excavation tool will be used for soil sample collection at each soil sample location. Soil sampling equipment will be washed with a cleaning detergent and hot water prior to and after each use to remove any particulate matter or surface film. Soil sampling equipment will be rinsed thoroughly with tap water, followed by deionized or organic-free water. The substitution of higher-purity water is permitted during cleaning and decontamination and does not have to be noted as a variation from the sampling plan. Sampling equipment will be wrapped in aluminum foil, with dull side in, to prevent contamination during storage or transport to the field.

Field measurement equipment will be kept clean to ensure accurate performance and to reduce the potential for cross-contamination. Sampling probes immersed in sample media will be triple-rinsed in distilled water prior to use at each new sample location. The probes will be cleaned daily and calibrated and stored in accordance with the manufacturer's recommended procedures.

Direct-push technology will be used during field activities. Excavation tools will be washed with a cleaning detergent to remove oil, grease, and hydraulic fluid from the exterior of the unit before mobilizing to the site. The cleaning detergent does not have to be laboratory detergent and will not be a degreaser. The excavation tools will be decontaminated prior to each new soil boring location. Decontamination will include hot-water pressure washing to remove all visible evidence of soil, encrustations, or films. Excavation tools will be rinsed with deionized water after pressure washing and prior to use. Cleaning will occur over or on a decontamination trailer to collect wastewater. Decontamination water will be captured, drummed, and stored onsite until sample results are obtained to determine disposal requirements.

5. Waste Management and Disposal

Investigation-derived waste (IDW) will be managed in accordance with USEPA guidance. Wastes potentially generated during field activities include PPE, disposable hand trowels or other excavation tools, soil cuttings, and water produced during decontamination. Standard PPE and other disposable items will be placed in plastic bags and disposed of properly in a trash receptacle. Soil generated during field activities will be contained in drums labeled on the top and side with a description of the contents and accumulation date. Space will be left between the drums during temporary staging so field personnel can use a wrench to remove the drum lids without having to move the drums. A log will be kept of the contents of each drum. Drums will be stored in an area approved by PacifiCorp.

Soil and aqueous IDW will be characterized in accordance with 40 *Code of Federal Regulations* 261 Subpart C – Characteristics of Hazardous Wastes rule. Soil IDW will be sampled at a frequency of one composite per drum. One sample of aqueous IDW will be collected per drum. IDW samples will be submitted to a laboratory for the COPCs associated with the REC.

Soil IDW is anticipated to be nonhazardous and will be managed onsite, consistent with USEPA guidance. Aqueous IDW that is confirmed to be nonhazardous, will be disposed of in a PacifiCorp-designated upland location away from streams and wetlands following testing, review, and acceptance by PacifiCorp. IDW disposal will be coordinated with the PacifiCorp representatives and that coordination will be documented prior to disposal.

Attachment Tables

Table A-1. Soil Sample Containers, Preservation, and Holding Times

Lower Klamath Hydroelectric Project Oregon Sampling and Analysis Plan

Analyte	Method	Container and Minimum Quantity Soil/Sediment	Preservation	Holding Time
Purgeable TPH (Gasoline)	SW8015B	4 EnCore samplers (or equivalent)	Chill to 4°C (±2°C)	48 hours by EnCore or equivalent sampler unless extruded and preserved with 48 hours 14 days if solid samples preserved by the following methods: • 4°C/frozen in 48 hours • Frozen onsite • Sodium bisulfate • Methanol
Extractable TPH (as diesel/as motor oil)	SW8015B	8-oz/G or T	Chill to 4°C (±2°C)	14 days to extraction (soil); 40 days to analysis
Title 22 Metals	SW6010B/SW7471A	8-oz/G or T	Chill to 4°C (±2°C)	180 days to analysis; 28 days to analysis (mercury)
VOCs	SW8260B	4 EnCore samplers (or equivalent)	Chill to 4°C (±2°C)	48 hours by EnCore or equivalent sampler unless extruded and preserved with 48 hours 14 days if solid samples preserved by the following methods: • 4°C/frozen in 48 hours • Frozen onsite • Sodium bisulfate • Methanol
SVOCs	SW8270C	8-oz G or T	Chill to 4°C (±2°C)	14 days to extraction; 40 days to analysis
PAHs	SW8270C-SIM	8-oz G or T	Chill to 4°C (±2°C)	14 days to extraction; 40 days to analysis
Pest/PCBs	SW8081/8082	8-oz G or T	Chill to 4°C (±2°C)	14 days to extraction; 40 days to analysis
Dioxins/Furans	SW8290A	8-oz G or T	Chill to 4°C (±2°C)	30 days to extraction; 45 days to analysis
Explosives	SW8330A	8-oz G or T	Chill to 4°C (±2°C)	14 days to extraction; 40 days to analysis
Reactivity:				
Reactive Cyanide	S.7.3 SW-846	8-oz wide-mouth glass jar	Chill to 4°C (±2°C)	As soon as possible
Reactive Sulfide	S.7.3 SW-846	Share with Reactive Cyanide	Chill to 4°C (±2°C)	As soon as possible
Ignitibility	EPA 1020	4-oz wide-mouth glass jar	Chill to 4°C (±2°C)	14 days

Table A-1. Soil Sample Containers, Preservation, and Holding Times

Lower Klamath Hydroelectric Project Oregon Sampling and Analysis Plan

Analyte	Method	Container and Minimum Quantity Soil/Sediment	Preservation	Holding Time
Corrosivity	EPA 9045C	4-oz wide-mouth glass jar	Chill to 4°C (±2°C)	As soon as possible
TCLP/STLC Metals	EPA 1311 (extraction), followed by SW6010B/ SW7471A	Share with 8-oz Total Jar above	Chill to 4°C (±2°C)	EPA 1311 - 180/28 days from collection to TCLP extraction: 28 days after EPA 1311 to analysis for mercury; 180 days for all others
TCLP/STLC VOCs	EPA 1311 (extraction), SW8260B	25-gram EnCore-type device	Chill to 4°C (±2°C)	EPA 1311 - 14 days from collection to TCLP extraction: 14 days for analysis if preserved
TCLP/STLC SVOCs	EPA 1311 (extraction), followed by 8270D	Share with 8-oz Total Jar above	Chill to 4°C (±2°C)	EPA 1311-14 days from collection to TCLP extraction 7 days after EPA 1311 to preparative extraction 40 days for analysis
TCLP/SLTC Organochlorine Pesticides	EPA 1311 (extraction), followed by 8081	Share with 8-oz Total Jar above	Chill to 4°C (±2°C)	EPA 1311-14 days from collection to TCLP extraction 7 days after 1311 to preparative extraction 40 days for analysis
TCLP/STLC Chlorinated Herbicides	EPA 1311 (extraction), followed by 8151A	8-oz G or T	Chill to 4°C (±2°C)	EPA 1311-14 days from collection to TCLP extraction 7 days after 1311 to preparative extraction 40 days for analysis
Percent Moisture/Percent Solids	Moisture	Share	Chill to 4°C (±2°C)	Not applicable

Notes:

°C = degree(s) Celsius
EPA = U.S. Environmental Protection Agency
G = glass
oz = ounce
SVOC = semivolatile organic compound
T = brass sleeves in the sample barrel (sometimes called California brass)
TCLP = toxicity characteristic leaching procedure
TPH = total petroleum hydrocarbon
VOC = volatile organic compound

Table A-2. Water Sample Containers, Preservation, and Holding Times

Lower Klamath Hydroelectric Project Oregon Sampling and Analysis Plan

Analyte	Method	Container and Minimum Quantity	Preservation	Prep/Analysis Holding Time
Purgeable TPH (Gasoline)	SW8015B	3-Glass VOA Vial, Tef Cap 40-mL	Cool to <6°C; HCl to pH <2	14 days
Extractable TPH (as diesel/as motor oil)	SW8015B	2-Glass Amber Liter, Tef Cap 1-L	Cool to <6°C	7 days to extraction; 40 days to analysis
Title 22 Metals	SW6010B/ SW7471A	HDPE, 250-mL	Cool to <6°C; HNO_3 to pH <2	6 months
VOCs	SW8260B	3-Glass VOA Vial, Tef Cap 40-mL	Cool to <6°C; HCl to pH <2	14 days
SVOCs	SW8270C	2-Glass Amber Liter, Tef Cap 1-L	Chill to 4°C (±2°C)	7 days to extraction; 40 days to analysis
PAHs	SW8270C-SIM	2-Glass Amber Liter, Tef Cap 1-L	Chill to 4°C (±2°C)	7 days to extraction; 40 days to analysis
Pest/PCBs	SW8081/8082	2-Glass Amber Liter, Tef Cap 1-L	Chill to 4°C (±2°C)	7 days to extraction; 40 days to analysis
Dioxins/Furans	SW8290A	2-Glass Amber Liter, Tef Cap 1-L	Chill to 4°C (±2°C)	30 days to extraction; 45 days to analysis

Notes:

°C = degrees Celsius
G = glass
L = liter
mL = milliliter
oz = ounce
SVOC = semivolatile organic compound
T = brass sleeves in the sample barrel (sometimes called California brass)
TPH = total petroleum hydrocarbon
VOC = volatile organic compound

Table A-3. Soil Reporting Limits and Oregon Screening Levels

Lower Klamath Hydroelectric Project Oregon Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Soil Screening Levels (mg/kg)	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)
NWTPH_Gx				
Gasoline	GRO	3.1E+01	4.0E+00	5.7E-01
NWTPH_Dx				
Diesel	DRO	2.6E+02	5.0E+01	1.2E+01
Motor oil	MRO	2.6E+02	5.0E+01	1.8E+01
Metal: SW6010B				
Antimony	7440-36-0	6.7E-01	2.0E+00	9.4E-01
Arsenic	7440-38-2	1.9E+01	2.0E+00	1.3E+00
Barium	7440-39-3	6.3E+02	1.0E+00	1.2E-01
Beryllium	7440-41-7	2.5E+00	2.0E-01	3.0E-02
Boron	7440-42-8	2.0E+00	1.0E+01	1.3E+00
Cadmium	7440-43-9	5.4E-01	2.0E-01	3.0E-02
Chromium	7440-47-3	2.0E+02	5.0E-01	1.4E-01
Cobalt	7440-48-4	1.3E+01	5.0E-01	2.5E-01
Copper	7440-50-8	7.3E+01	1.5E+00	2.2E-01
Iron	7439-89-6	5.5E+04	1.0E+01	1.1E+00
Lead	7439-92-1	3.4E+01	1.0E+00	2.6E-01
Manganese	7439-96-5	2.1E+03	5.0E-01	2.5E-01
Molybdenum	7439-98-7	2.6E+00	2.0E+00	7.5E-01
Nickel	7440-02-0	1.1E+02	1.0E+00	2.4E-01
Selenium	7782-49-2	5.2E-01	2.0E+00	1.4E+00
Silver	7440-22-4	2.6E+00	5.0E-01	9.0E-02
Thallium	7440-28-0	2.8E+00	2.0E+00	8.4E-01
Vanadium	7440-62-2	2.8E+02	5.0E-01	1.9E-01
Zinc	7440-66-6	1.7E+02	2.0E+00	1.9E-01
Mercury	7439-97-6	2.4E-01	4.0E-02	8.6E-03
VOC: SW8260B				
1,1,1,2-Tetrachloroethane	630-20-6	7.0E-02	5.0E-03	4.1E-04
1,1,1-Trichloroethane	71-55-6	1.9E+02	5.0E-03	3.6E-04
1,1,2,2-Tetrachloroethane	79-34-5	1.3E-01	5.0E-03	6.8E-04
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	4.0E+05	1.0E-02	8.3E-04
1,1,2-Trichloroethane	79-00-5	6.3E-03	5.0E-03	4.4E-04
1,1-Dichloroethane	75-34-3	4.4E-02	5.0E-03	2.9E-04
1,1-Dichloroethene	75-35-4	6.7E+00	5.0E-03	2.6E-04
1,1-Dichloropropene	563-58-6	0.0E+00	5.0E-03	3.7E-04
1,2,3-Trichlorobenzene	87-61-6	2.0E+01	5.0E-03	7.5E-04
1,2,3-Trichloropropane	96-18-4	5.1E-03	5.0E-03	7.6E-04
1,2,4-Trichlorobenzene	120-82-1	2.7E-01	5.0E-03	7.5E-04
1,2,4-Trimethylbenzene	95-63-6	9.0E-02	5.0E-03	5.1E-04
1,2-Dibromo-3-Chloropropane	96-12-8	5.3E-03	1.0E-02	8.8E-04
1,2-Dibromoethane (EDB)	106-93-4	1.2E-04	1.0E-02	2.7E-04
1,2-Dichlorobenzene	95-50-1	9.0E-02	5.0E-03	6.4E-04
1,2-Dichloroethane	107-06-2	2.8E-03	5.0E-03	7.3E-04

Table A-3. Soil Reporting Limits and Oregon Screening Levels

Lower Klamath Hydroelectric Project Oregon Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Soil Screening Levels (mg/kg)	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)
1,2-Dichloropropane	78-87-5	2.8E-01	5.0E-03	6.0E-04
1,3,5-Trimethylbenzene	108-67-8	7.0E-02	5.0E-03	3.5E-04
1,3-Dichlorobenzene	541-73-1	8.0E-02	5.0E-03	3.0E-04
1,3-Dichloropropane	142-28-9	1.6E+03	5.0E-03	5.7E-04
1,4-Dichlorobenzene	106-46-7	5.7E-02	5.0E-03	7.8E-04
2,2-Dichloropropane	594-20-7	0.0E+00	5.0E-03	3.8E-04
2-Butanone (MEK)	78-93-3	2.7E+03	1.0E-02	1.4E-03
2-Chlorotoluene	95-49-8	1.6E+03	5.0E-03	6.2E-04
2-Hexanone	591-78-6	3.6E-01	1.0E-02	7.4E-04
4-Chlorotoluene	106-43-4	1.6E+03	5.0E-03	8.6E-04
4-Methyl-2-pentanone (MIBK)	108-10-1	9.7E+00	1.0E-02	9.2E-04
Acetone	67-64-1	1.2E+00	2.0E-02	1.4E-03
Benzene	71-43-2	2.3E-02	5.0E-03	2.6E-04
Bromobenzene	108-86-1	2.9E+02	5.0E-03	5.2E-04
Bromochloromethane	74-97-5	1.5E+02	5.0E-03	9.4E-04
Bromodichloromethane	75-27-4	2.0E-03	5.0E-03	5.3E-04
Bromoform	75-25-2	4.6E-02	5.0E-03	4.0E-04
Bromomethane	74-83-9	8.3E-02	5.0E-03	8.6E-04
Carbon disulfide	75-15-0	8.1E-01	1.0E-02	4.9E-04
Carbon tetrachloride	56-23-5	1.3E-02	5.0E-03	5.3E-04
Chlorobenzene	108-90-7	5.8E+00	5.0E-03	2.9E-04
Chloroethane	75-00-3	3.1E+02	5.0E-03	4.5E-04
Chloroform	67-66-3	3.4E-03	5.0E-03	2.6E-04
Chloromethane	74-87-3	2.2E+00	5.0E-03	5.0E-04
cis-1,2-Dichloroethene	156-59-2	6.3E-01	5.0E-03	8.9E-04
cis-1,3-Dichloropropene	10061-01-5	0.0E+00	5.0E-03	6.4E-04
Dibromochloromethane	124-48-1	2.4E-03	5.0E-03	2.1E-04
Dibromomethane	74-95-3	2.4E+01	5.0E-03	5.8E-04
Dichlorodifluoromethane	75-71-8	8.7E+01	5.0E-03	8.9E-04
Ethylbenzene	100-41-4	2.2E-01	5.0E-03	3.4E-04
Hexachlorobutadiene	87-68-3	9.0E-03	5.0E-03	3.3E-04
Isopropylbenzene	98-82-8	9.6E+01	5.0E-03	5.2E-04
Methyl tert-butyl ether	1634-04-4	1.1E-01	1.0E-02	6.0E-04
Methylene Chloride	75-09-2	1.4E-01	1.0E-02	8.4E-04
m-Xylene & p-Xylene	179601-23-1	1.4E+00	5.0E-03	8.1E-04
Naphthalene	91-20-3	7.7E-02	5.0E-03	6.3E-04
n-Butylbenzene	104-51-8	3.9E+03	5.0E-03	6.6E-04
N-Propylbenzene	103-65-1	3.8E+03	5.0E-03	2.9E-04
o-Xylene	95-47-6	1.4E+00	5.0E-03	3.3E-04
p-Isopropyltoluene	99-87-6	0.0E+00	5.0E-03	6.3E-04
sec-Butylbenzene	135-98-8	7.8E+03	5.0E-03	7.5E-04
Styrene	100-42-5	1.2E+00	5.0E-03	3.1E-04
tert-Butylbenzene	98-06-6	7.8E+03	5.0E-03	5.4E-04

Table A-3. Soil Reporting Limits and Oregon Screening Levels

Lower Klamath Hydroelectric Project Oregon Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Soil Screening Levels (mg/kg)	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)
Tetrachloroethene	127-18-4	1.8E-01	5.0E-03	6.1E-04
Toluene	108-88-3	2.3E+01	5.0E-03	6.1E-04
trans-1,2-Dichloroethene	156-60-5	7.0E+00	5.0E-03	3.8E-04
trans-1,3-Dichloropropene	10061-02-6	0.0E+00	5.0E-03	7.5E-04
Trichloroethene	79-01-6	9.4E-01	5.0E-03	6.0E-04
Trichlorofluoromethane	75-69-4	5.2E+01	5.0E-03	3.4E-04
Vinyl acetate	108-05-4	9.1E+02	1.0E-02	6.9E-04
Vinyl chloride	75-01-4	5.7E-04	5.0E-03	3.6E-04
Xylenes, Total	1330-20-7	1.4E+00	5.0E-03	8.1E-04
SVOC: SW8270C				
Acenaphthene	83-32-9	2.5E-01	5.0E-03	6.3E-04
Acenaphthylene	208-96-8	1.2E+02	5.0E-03	6.6E-04
Anthracene	120-12-7	6.8E+00	5.0E-03	6.7E-04
Azobenzene	103-33-3	5.6E+00	3.3E-01	9.2E-02
Benzo[a]anthracene	56-55-3	7.3E-01	5.0E-03	7.1E-04
Benzo[b]fluoranthene	205-99-2	1.1E+00	5.0E-03	7.7E-04
Benzo[k]fluoranthene	207-08-9	1.1E+01	5.0E-03	7.2E-04
Benzo[g,h,i]perylene	191-24-2	2.5E+01	5.0E-03	7.2E-04
Benzo[a]pyrene	50-32-8	1.1E-01	5.0E-03	7.0E-04
Benzoic acid	65-85-0	1.0E+00	1.6E+00	2.9E-01
Benzyl alcohol	100-51-6	2.0E-03	3.3E-01	1.7E-01
Bis(2-chloroethoxy)methane	111-91-1	1.9E+02	3.3E-01	8.8E-02
Bis(2-chloroethyl)ether	111-44-4	1.9E-04	3.3E-01	8.1E-02
bis (2-chloroisopropyl) ether	108-60-1	3.1E+03	3.3E-01	7.9E-02
Bis(2-ethylhexyl) phthalate	117-81-7	2.0E-02	3.3E-01	9.8E-02
4-Bromophenyl phenyl ether	101-55-3	0.0E+00	3.3E-01	8.5E-02
Butyl benzyl phthalate	85-68-7	9.0E+01	3.3E-01	9.5E-02
4-Chloroaniline	106-47-8	1.0E+00	3.3E-01	5.8E-02
4-Chloro-3-methylphenol	59-50-7	6.3E+03	3.3E-01	9.2E-02
2-Chloronaphthalene	91-58-7	4.8E+03	3.3E-01	8.1E-02
2-Chlorophenol	95-57-8	3.9E-01	3.3E-01	8.8E-02
4-Chlorophenyl phenyl ether	7005-72-3	0.0E+00	3.3E-01	9.3E-02
Chrysene	218-01-9	3.1E+00	5.0E-03	7.2E-04
Dibenz(a,h)anthracene	53-70-3	1.1E-01	5.0E-03	7.7E-04
Dibenzofuran	132-64-9	6.1E+00	3.3E-01	8.6E-02
Di-n-butyl phthalate	84-74-2	1.1E-02	3.3E-01	9.7E-02
1,2-Dichlorobenzene	95-50-1	9.0E-02	5.0E-03	6.4E-04
1,3-Dichlorobenzene	541-73-1	8.0E-02	5.0E-03	3.0E-04
1,4-Dichlorobenzene	106-46-7	5.7E-02	5.0E-03	7.8E-04
3,3'-Dichlorobenzidine	91-94-1	3.0E-02	1.6E+00	9.4E-02
2,4-Dichlorophenol	120-83-2	5.0E-02	3.3E-01	8.9E-02
Diethyl phthalate	84-66-2	1.0E+02	3.3E-01	9.0E-02
2,4-Dimethylphenol	105-67-9	4.0E-02	3.3E-01	1.7E-01

Table A-3. Soil Reporting Limits and Oregon Screening Levels

Lower Klamath Hydroelectric Project Oregon Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Soil Screening Levels (mg/kg)	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)
Dimethyl phthalate	131-11-3	1.0E+01	3.3E-01	8.7E-02
4,6-Dinitro-2-methylphenol	534-52-1	5.1E+00	1.6E+00	8.1E-02
2,4-Dinitrophenol	51-28-5	6.1E-02	1.6E+00	2.1E-01
2,4-Dinitrotoluene	121-14-2	1.7E+00	3.3E-01	8.9E-02
2,6-Dinitrotoluene	606-20-2	8.9E-03	3.3E-01	9.9E-02
Di-n-octyl phthalate	117-84-0	9.1E-01	3.3E-01	9.7E-02
Fluoranthene	206-44-0	1.0E+01	5.0E-03	8.1E-04
Fluorene	86-73-7	3.7E+00	5.0E-03	6.4E-04
Hexachlorobenzene	118-74-1	1.8E-02	3.3E-01	8.9E-02
Hexachlorobutadiene	87-68-3	9.0E-03	5.0E-03	3.3E-04
Hexachlorocyclopentadiene	77-47-4	1.0E-03	1.6E+00	6.2E-02
Hexachloroethane	67-72-1	2.2E-02	3.3E-01	8.1E-02
Indeno[1,2,3-cd] Pyrene	193-39-5	1.1E+00	5.0E-03	7.7E-04
Isophorone	78-59-1	5.7E+02	3.3E-01	9.3E-02
1-Methylnaphthalene	90-12-0	1.8E+01	3.3E-01	1.7E-01
2-Methylnaphthalene	91-57-6	1.6E+01	3.3E-01	8.5E-02
2-Methylphenol	95-48-7	6.7E-01	3.3E-01	5.8E-02
3-Methylphenol & 4-Methylphenol	15831-10-4	6.9E-01	6.6E-01	3.3E-01
Naphthalene	91-20-3	7.7E-02	5.0E-03	6.3E-04
2-Nitroaniline	88-74-4	5.3E+00	1.6E+00	8.4E-02
3-Nitroaniline	99-09-2	0.0E+00	1.6E+00	1.7E-01
4-Nitroaniline	100-01-6	2.7E+01	1.6E+00	8.8E-02
Nitrobenzene	98-95-3	2.2E+00	3.3E-01	7.6E-02
2-Nitrophenol	88-75-5	0.0E+00	3.3E-01	8.2E-02
4-Nitrophenol	100-02-7	0.0E+00	1.6E+00	2.8E-01
N-Nitrosodiphenylamine	86-30-6	5.5E-01	3.3E-01	8.6E-02
N-Nitrosodi-n-propylamine	621-64-7	9.4E-04	3.3E-01	8.4E-02
Pentachlorophenol	87-86-5	6.6E-02	1.6E+00	5.1E-02
Phenanthrene	85-01-8	5.5E+00	5.0E-03	7.2E-04
Phenol	108-95-2	7.9E-01	3.3E-01	8.3E-02
Pyrene	129-00-0	1.0E+01	5.0E-03	7.5E-04
Pyridine	110-86-1	7.8E+01	6.6E-01	7.2E-02
1,2,4-Trichlorobenzene	120-82-1	2.7E-01	5.0E-03	7.5E-04
2,4,5-Trichlorophenol	95-95-4	4.0E+00	3.3E-01	8.3E-02
2,4,6-Trichlorophenol	88-06-2	2.4E+00	3.3E-01	8.4E-02

Table A-3. Soil Reporting Limits and Oregon Screening Levels

Lower Klamath Hydroelectric Project Oregon Sampling and Analysis Plan

Analyte Group: Method **Analyte**	**CAS Number**	**Soil Screening Levels (mg/kg)**	**Reporting Limit (mg/kg)**	**Method Detection Limit (mg/kg)**
PAH: SW8270C-SIM				
Acenaphthene	83-32-9	2.5E-01	5.0E-03	6.3E-04
Acenaphthylene	208-96-8	1.2E+02	5.0E-03	6.6E-04
Anthracene	120-12-7	6.8E+00	5.0E-03	6.7E-04
Benzo[a]anthracene	56-55-3	7.3E-01	5.0E-03	7.1E-04
Benzo[a]pyrene	50-32-8	1.1E-01	5.0E-03	7.0E-04
Benzo[b]fluoranthene	205-99-2	1.1E+00	5.0E-03	7.7E-04
Benzo[g,h,i]perylene	191-24-2	2.5E+01	5.0E-03	7.2E-04
Benzo[k]fluoranthene	207-08-9	1.1E+01	5.0E-03	7.2E-04
Chrysene	218-01-9	3.1E+00	5.0E-03	7.2E-04
Dibenz(a,h)anthracene	53-70-3	1.1E-01	5.0E-03	7.7E-04
Fluoranthene	206-44-0	1.0E+01	5.0E-03	8.1E-04
Fluorene	86-73-7	3.7E+00	5.0E-03	6.4E-04
Indeno[1,2,3-cd] Pyrene	193-39-5	1.1E+00	5.0E-03	7.7E-04
Naphthalene	91-20-3	7.7E-02	5.0E-03	6.3E-04
Phenanthrene	85-01-8	5.5E+00	5.0E-03	7.2E-04
Pyrene	129-00-0	1.0E+01	5.0E-03	7.5E-04
Dioxin/Furan: 8290A				
2,3,7,8-TCDD	1746-01-6	3.7E-08	1.0E-06	1.5E-07
2,3,7,8-TCDF	51207-31-9	4.5E-07	1.0E-06	1.1E-07
1,2,3,7,8-PeCDD	40321-76-4	4.2E-08	5.0E-06	3.0E-07
1,2,3,7,8-PeCDF	57117-41-6	9.7E-07	5.0E-06	2.7E-07
2,3,4,7,8-PeCDF	57117-31-4	9.7E-08	5.0E-06	2.9E-07
1,2,3,4,7,8-HxCDD	39227-28-6	1.8E-07	5.0E-06	7.1E-07
1,2,3,6,7,8-HxCDD	57653-85-7	1.3E-07	5.0E-06	5.8E-07
1,2,3,7,8,9-HxCDD	19408-74-3	1.3E-07	5.0E-06	5.8E-07
1,2,3,4,7,8-HxCDF	70648-26-9	1.6E-07	5.0E-06	3.0E-07
1,2,3,6,7,8-HxCDF	57117-44-9	1.6E-07	5.0E-06	3.8E-07
1,2,3,7,8,9-HxCDF	72918-21-9	2.1E-07	5.0E-06	4.3E-07
2,3,4,6,7,8-HxCDF	60851-34-5	1.6E-07	5.0E-06	3.0E-07
1,2,3,4,6,7,8-HpCDD	35822-46-9	1.0E-06	5.0E-06	4.6E-07
1,2,3,4,6,7,8-HpCDF	67562-39-4	1.6E-06	5.0E-06	3.8E-07
1,2,3,4,7,8,9-HpCDF	55673-89-7	1.6E-06	5.0E-06	6.5E-07
OCDD	3268-87-9	4.5E-05	1.0E-05	1.5E-06
OCDF	39001-02-0	3.3E-05	1.0E-05	1.2E-06

Table A-3. Soil Reporting Limits and Oregon Screening Levels

Lower Klamath Hydroelectric Project Oregon Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Soil Screening Levels (mg/kg)	Reporting Limit (mg/kg)	Method Detection Limit (mg/kg)
Pesticide: 8081A				
4,4'-DDD	72-54-8	2.0E-02	3.4E-03	1.1E-03
4,4'-DDE	72-55-9	2.0E-02	3.4E-03	4.8E-04
4,4'-DDT	50-29-3	2.0E-02	3.4E-03	1.2E-03
Aldrin	309-00-2	8.5E-05	3.4E-03	5.0E-04
Dieldrin	60-57-1	4.5E-03	3.4E-03	4.2E-04
Endosulfan sulfate	1031-07-8	6.4E-01	3.4E-03	5.5E-04
Endrin	72-20-8	1.4E-03	3.4E-03	6.1E-04
Endrin aldehyde	7421-93-4	1.4E-03	3.4E-03	1.1E-03
Heptachlor	76-44-8	1.7E-02	3.4E-03	4.3E-04
Heptachlor epoxide	1024-57-3	1.5E-03	3.4E-03	8.5E-04
PCB: 8082A				
PCB-1016	12674-11-2	7.3E-03	3.3E-02	2.6E-03
PCB-1221	11104-28-2	7.3E-03	3.3E-02	3.6E-03
PCB-1232	11141-16-5	7.3E-03	3.3E-02	4.8E-03
PCB-1242	53469-21-9	7.3E-03	3.3E-02	5.9E-03
PCB-1248	12672-29-6	7.3E-03	3.3E-02	2.4E-03
PCB-1254	11097-69-1	7.3E-03	3.3E-02	3.8E-03
PCB-1260	11096-82-5	7.3E-03	3.3E-02	2.7E-03
PCB-1262	37324-23-5	7.3E-03	3.3E-02	6.8E-03
PCB-1268	11100-14-4	7.3E-03	3.3E-02	5.4E-03

Notes:

-- : No value available.

CAS = Chemical Abstracts Service

mg/kg = milligram(s) per kilogram

SL = screening level

Reporting Limits and Method Detection Limits based on current values as reported by Eurofins TestAmerica; West Sacramento, CA.

Table A-4. Groundwater Reporting Limits and Oregon Screening Levels

Lower Klamath Hydroelectric Project Oregon Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Groundwater Screening Level (µg/L)	Reporting Limit (µg/L)	Method Detection Limit (µg/L)
NWTPH_Gx				
Gasoline	GRO	1.1E+02	2.5E+02	1.0E+02
NWTPH_Dx				
Diesel	DRO	1.0E+02	1.1E+02	6.5E+01
Motor oil	MRO	3.0E+02	3.5E+02	9.6E+01
Metals: SW6010B				
Antimony	7440-36-0	6.0E+00	2.0E+01	9.8E+00
Arsenic	7440-38-2	5.2E-02	2.0E+01	1.2E+01
Barium	7440-39-3	2.0E+03	5.0E+00	2.5E+00
Beryllium	7440-41-7	4.0E+00	2.0E+00	3.0E-01
Boron	7440-42-8	4.0E+03	1.0E+02	2.1E+01
Cadmium	7440-43-9	5.0E+00	2.0E+00	5.0E-01
Chromium	7440-47-3	1.0E+02	8.0E+00	1.2E+00
Cobalt	7440-48-4	6.0E+00	5.0E+00	3.0E+00
Copper	7440-50-8	8.0E+02	1.0E+01	2.1E+00
Iron	7439-89-6	1.4E+04	1.0E+02	2.0E+01
Lead	7439-92-1	1.5E+01	5.0E+00	2.5E+00
Manganese	7439-96-5	4.3E+02	5.0E+00	2.5E+00
Molybdenum	7439-98-7	1.0E+02	2.0E+01	2.7E+00
Nickel	7440-02-0	3.9E+02	5.0E+00	2.4E+00
Selenium	7782-49-2	5.0E+01	2.0E+01	1.3E+01
Silver	7440-22-4	9.4E+01	5.0E+00	8.4E-01
Thallium	7440-28-0	2.0E-01	2.0E+01	9.0E+00
Vanadium	7440-62-2	8.6E+01	5.0E+00	1.9E+00
Zinc	7440-66-6	6.0E+03	1.0E+01	3.0E+00
Mercury	7439-97-6	6.3E-01	2.0E-01	1.0E-01
VOC: SW8260B				
1,1,1,2-Tetrachloroethane	630-20-6	5.7E-01	5.0E-01	1.0E-01
1,1,1-Trichloroethane	71-55-6	2.0E+02	5.0E-01	1.0E-01
1,1,2,2-Tetrachloroethane	79-34-5	7.6E-02	5.0E-01	1.1E-01
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	1.0E+04	5.0E-01	1.7E-01
1,1,2-Trichloroethane	79-00-5	2.8E-01	5.0E-01	1.2E-01
1,1-Dichloroethane	75-34-3	2.8E+00	5.0E-01	1.0E-01
1,1-Dichloroethene	75-35-4	7.0E+00	5.0E-01	1.3E-01
1,1-Dichloropropene	563-58-6	4.7E-01	5.0E-01	1.2E-01
1,2,3-Trichlorobenzene	87-61-6	7.0E+00	1.0E+00	4.0E-01
1,2,3-Trichloropropane	96-18-4	7.5E-04	1.0E+00	1.3E-01
1,2,4-Trichlorobenzene	120-82-1	1.2E+00	1.0E+01	1.4E+00
1,2,4-Trimethylbenzene	95-63-6	5.4E+01	1.0E+00	3.2E-01
1,2-Dibromo-3-Chloropropane	96-12-8	3.3E-04	1.0E+00	2.0E-01
1,2-Dibromoethane (EDB)	106-93-4	7.5E-03	5.0E-01	1.2E-01
1,2-Dichlorobenzene	95-50-1	3.0E+02	1.0E+01	1.5E+00

Table A-4. Groundwater Reporting Limits and Oregon Screening Levels

Lower Klamath Hydroelectric Project Oregon Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Groundwater Screening Level (µg/L)	Reporting Limit (µg/L)	Method Detection Limit (µg/L)
1,2-Dichloroethane	107-06-2	1.7E-01	5.0E-01	1.4E-01
1,2-Dichloropropane	78-87-5	8.5E-01	5.0E-01	1.5E-01
1,3,5-Trimethylbenzene	108-67-8	5.9E+01	5.0E-01	1.6E-01
1,3-Dichlorobenzene	541-73-1	3.0E+02	1.0E+01	1.5E+00
1,3-Dichloropropane	142-28-9	3.7E+02	1.0E+00	1.0E-01
1,4-Dichlorobenzene	106-46-7	4.8E-01	1.0E+01	1.4E+00
2,2-Dichloropropane	594-20-7	8.5E-01	1.0E+00	4.6E-01
2-Butanone (MEK)	78-93-3	5.6E+03	2.0E+00	3.3E-01
2-Chlorotoluene	95-49-8	2.4E+02	5.0E-01	1.1E-01
2-Hexanone	591-78-6	3.8E+01	2.0E+00	1.7E-01
4-Chlorotoluene	106-43-4	2.5E+02	5.0E-01	1.0E-01
4-Methyl-2-pentanone (MIBK)	108-10-1	6.3E+03	2.0E+00	1.1E-01
Acetone	67-64-1	1.4E+04	1.0E+01	3.8E+00
Benzene	71-43-2	4.6E-01	5.0E-01	8.0E-02
Bromobenzene	108-86-1	6.2E+01	1.0E+00	9.1E-02
Bromochloromethane	74-97-5	8.3E+01	1.0E+00	1.8E-01
Bromodichloromethane	75-27-4	1.3E-01	5.0E-01	1.4E-01
Bromoform	75-25-2	3.3E+00	1.0E+00	1.9E-01
Bromomethane	74-83-9	7.5E+00	1.0E+00	2.1E-01
Carbon disulfide	75-15-0	8.1E+02	2.0E+00	3.6E-01
Carbon tetrachloride	56-23-5	4.6E-01	5.0E-01	1.2E-01
Chlorobenzene	108-90-7	7.7E+01	5.0E-01	7.0E-02
Chloroethane	75-00-3	2.1E+04	1.0E+00	2.4E-01
Chloroform	67-66-3	2.2E-01	1.0E+00	1.2E-01
Chloromethane	74-87-3	1.9E+02	1.0E+00	2.6E-01
cis-1,2-Dichloroethene	156-59-2	3.6E+01	5.0E-01	1.8E-01
cis-1,3-Dichloropropene	10061-01-5	4.7E-01	5.0E-01	1.5E-01
Dibromochloromethane	124-48-1	1.7E-01	5.0E-01	1.6E-01
Dibromomethane	74-95-3	8.3E+00	5.0E-01	1.7E-01
Dichlorodifluoromethane	75-71-8	2.0E+02	1.0E+00	3.2E-01
Ethylbenzene	100-41-4	1.5E+00	5.0E-01	8.4E-02
Hexachlorobutadiene	87-68-3	1.4E-01	1.0E+01	1.3E+00
Isopropylbenzene	98-82-8	4.4E+02	5.0E-01	1.1E-01
Methyl tert-butyl ether	1634-04-4	1.4E+01	5.0E-01	1.2E-01
Methylene Chloride	75-09-2	5.0E+00	1.0E+00	1.6E-01
m-Xylene & p-Xylene	179601-23-1	1.9E+02	5.0E-01	2.7E-01
Naphthalene	91-20-3	1.2E-01	1.0E+01	1.3E+00
n-Butylbenzene	104-51-8	1.0E+03	1.0E+00	1.8E-01
N-Propylbenzene	103-65-1	6.6E+02	1.0E+00	1.1E-01
o-Xylene	95-47-6	1.9E+02	5.0E-01	1.4E-01
p-Isopropyltoluene	99-87-6	4.1E+02	1.0E+00	1.5E-01
sec-Butylbenzene	135-98-8	2.0E+03	1.0E+00	1.4E-01

Table A-4. Groundwater Reporting Limits and Oregon Screening Levels

Lower Klamath Hydroelectric Project Oregon Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Groundwater Screening Level (µg/L)	Reporting Limit (µg/L)	Method Detection Limit (µg/L)
Styrene	100-42-5	1.0E+02	5.0E-01	1.3E-01
tert-Butylbenzene	98-06-6	6.9E+02	1.0E+00	1.3E-01
Tetrachloroethene	127-18-4	5.0E+00	5.0E-01	1.0E-01
Toluene	108-88-3	1.0E+03	5.0E-01	9.5E-02
trans-1,2-Dichloroethene	156-60-5	6.8E+01	5.0E-01	1.1E-01
trans-1,3-Dichloropropene	10061-02-6	4.1E+02	5.0E-01	1.6E-01
Trichloroethene	79-01-6	4.9E-01	5.0E-01	1.0E-01
Trichlorofluoromethane	75-69-4	1.1E+03	1.0E+00	1.3E-01
Vinyl acetate	108-05-4	4.1E+02	2.0E+00	1.9E-01
Vinyl chloride	75-01-4	1.9E-02	5.0E-01	1.8E-01
Xylenes, Total	1330-20-7	1.9E+02	5.0E-01	2.7E-01
SVOC: SW8270C				
Acenaphthene	83-32-9	5.1E+02	1.0E+01	1.1E+00
Acenaphthylene	208-96-8	8.1E+01	1.0E+01	1.1E+00
Anthracene	120-12-7	1.8E+03	1.0E+01	1.0E+00
Azobenzene	103-33-3	1.2E-01	1.0E+01	7.1E-01
Benzo[a]anthracene	56-55-3	3.0E-02	1.0E+01	1.0E+00
Benzo[b]fluoranthene	205-99-2	2.5E-01	1.0E+01	1.2E+00
Benzo[k]fluoranthene	207-08-9	2.5E+00	1.0E+01	9.6E-01
Benzo[g,h,i]perylene	191-24-2	8.1E+01	1.0E+01	1.4E+00
Benzo[a]pyrene	50-32-8	2.5E-02	1.0E+01	6.8E-01
Benzoic acid	65-85-0	7.5E+04	5.0E+01	2.0E+01
Benzyl alcohol	100-51-6	2.0E+03	1.0E+01	2.6E+00
Bis(2-chloroethoxy)methane	111-91-1	5.9E+01	1.0E+01	1.0E+00
Bis(2-chloroethyl)ether	111-44-4	1.4E-02	1.0E+01	1.5E+00
bis (2-chloroisopropyl) ether	108-60-1	7.1E+02	1.0E+01	1.3E+00
Bis(2-ethylhexyl) phthalate	117-81-7	5.6E+00	1.0E+01	1.0E+00
4-Bromophenyl phenyl ether	101-55-3	0.0E+00	1.0E+01	1.1E+00
Butyl benzyl phthalate	85-68-7	1.6E+01	1.0E+01	1.4E+00
4-Chloroaniline	106-47-8	3.7E-01	1.0E+01	2.0E+00
4-Chloro-3-methylphenol	59-50-7	1.4E+03	1.0E+01	2.0E+00
2-Chloronaphthalene	91-58-7	7.5E+02	1.0E+01	1.3E+00
2-Chlorophenol	95-57-8	9.1E+01	1.0E+01	1.6E+00
4-Chlorophenyl phenyl ether	7005-72-3	0.0E+00	1.0E+01	1.1E+00
Chrysene	218-01-9	2.5E+01	1.0E+01	6.1E-01
Dibenz(a,h)anthracene	53-70-3	2.5E-02	1.0E+01	2.0E+00
Dibenzofuran	132-64-9	7.9E+00	1.0E+01	1.1E+00
Di-n-butyl phthalate	84-74-2	9.0E+02	1.0E+01	1.1E+00
1,2-Dichlorobenzene	95-50-1	3.0E+02	1.0E+01	1.5E+00
1,3-Dichlorobenzene	541-73-1	3.0E+02	1.0E+01	1.5E+00
1,4-Dichlorobenzene	106-46-7	4.8E-01	1.0E+01	1.4E+00
3,3'-Dichlorobenzidine	91-94-1	1.3E-01	5.0E+01	9.6E-01

Table A-4. Groundwater Reporting Limits and Oregon Screening Levels

Lower Klamath Hydroelectric Project Oregon Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Groundwater Screening Level (µg/L)	Reporting Limit (µg/L)	Method Detection Limit (µg/L)
2,4-Dichlorophenol	120-83-2	4.6E+01	1.0E+01	2.6E+00
Diethyl phthalate	84-66-2	1.5E+04	1.0E+01	9.3E-01
2,4-Dimethylphenol	105-67-9	3.6E+02	1.0E+01	2.2E+00
Dimethyl phthalate	131-11-3	0.0E+00	1.0E+01	8.8E-01
4,6-Dinitro-2-methylphenol	534-52-1	1.5E+00	5.0E+01	2.2E+00
2,4-Dinitrophenol	51-28-5	3.9E+01	5.0E+01	2.0E+01
2,4-Dinitrotoluene	121-14-2	2.4E-01	1.0E+01	2.0E+00
2,6-Dinitrotoluene	606-20-2	4.9E-02	1.0E+01	2.0E+00
Di-n-octyl phthalate	117-84-0	2.0E+02	1.0E+01	1.5E+00
Fluoranthene	206-44-0	8.0E+02	1.0E+01	6.5E-01
Fluorene	86-73-7	2.8E+02	1.0E+01	9.3E-01
Hexachlorobenzene	118-74-1	9.8E-03	1.0E+01	1.4E+00
Hexachlorobutadiene	87-68-3	1.4E-01	1.0E+01	1.3E+00
Hexachlorocyclopentadiene	77-47-4	4.1E-01	5.0E+01	5.0E+00
Hexachloroethane	67-72-1	3.3E-01	1.0E+01	1.4E+00
Indeno[1,2,3-cd] Pyrene	193-39-5	2.5E-01	1.0E+01	3.4E+00
Isophorone	78-59-1	7.8E+01	1.0E+01	1.0E+00
1-Methylnaphthalene	90-12-0	1.1E+00	1.0E+01	7.4E-01
2-Methylnaphthalene	91-57-6	3.6E+01	1.0E+01	1.5E+00
2-Methylphenol	95-48-7	9.3E+02	1.0E+01	9.3E-01
3-Methylphenol & 4-Methylphenol	15831-10-4	5.8E+03	2.0E+01	1.2E+00
Naphthalene	91-20-3	1.2E-01	1.0E+01	1.3E+00
2-Nitroaniline	88-74-4	1.9E+02	5.0E+01	2.0E+00
3-Nitroaniline	99-09-2	1.3E+01	5.0E+01	1.4E+00
4-Nitroaniline	100-01-6	3.8E+00	5.0E+01	1.5E+00
Nitrobenzene	98-95-3	1.4E-01	1.0E+01	1.6E+00
2-Nitrophenol	88-75-5	5.8E+03	1.0E+01	1.9E+00
4-Nitrophenol	100-02-7	5.8E+03	5.0E+01	6.1E+00
N-Nitrosodiphenylamine	86-30-6	1.2E+01	1.0E+01	5.4E-01
N-Nitrosodi-n-propylamine	621-64-7	1.1E-02	1.0E+01	1.4E+00
Pentachlorophenol	87-86-5	4.1E-02	5.0E+01	2.0E+00
Phenanthrene	85-01-8	8.1E+01	1.0E+01	1.0E+00
Phenol	108-95-2	5.8E+03	1.0E+01	1.1E+00
Pyrene	129-00-0	1.1E+02	1.0E+01	1.4E+00
Pyridine	110-86-1	2.0E+01	2.0E+01	8.0E-01
1,2,4-Trichlorobenzene	120-82-1	1.2E+00	1.0E+01	1.4E+00
2,4,5-Trichlorophenol	95-95-4	1.2E+03	1.0E+01	2.0E+00
2,4,6-Trichlorophenol	88-06-2	4.1E+00	1.0E+01	2.0E+00

Table A-4. Groundwater Reporting Limits and Oregon Screening Levels

Lower Klamath Hydroelectric Project Oregon Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Groundwater Screening Level (µg/L)	Reporting Limit (µg/L)	Method Detection Limit (µg/L)
PAH: SW8270C-SIM				
Acenaphthene	83-32-9	5.1E+02	1.0E+01	1.1E+00
Acenaphthylene	208-96-8	8.1E+01	1.0E+01	1.1E+00
Anthracene	120-12-7	1.8E+03	1.0E+01	1.0E+00
Benzo[a]anthracene	56-55-3	3.0E-02	1.0E+01	1.0E+00
Benzo[a]pyrene	50-32-8	2.5E-02	1.0E+01	6.8E-01
Benzo[b]fluoranthene	205-99-2	2.5E-01	1.0E+01	1.2E+00
Benzo[g,h,i]perylene	191-24-2	8.1E+01	1.0E+01	1.4E+00
Benzo[k]fluoranthene	207-08-9	2.5E+00	1.0E+01	9.6E-01
Chrysene	218-01-9	2.5E+01	1.0E+01	6.1E-01
Dibenz(a,h)anthracene	53-70-3	2.5E-02	1.0E+01	2.0E+00
Fluoranthene	206-44-0	8.0E+02	1.0E+01	6.5E-01
Fluorene	86-73-7	2.8E+02	1.0E+01	9.3E-01
Indeno[1,2,3-cd] Pyrene	193-39-5	2.5E-01	1.0E+01	3.4E+00
Naphthalene	91-20-3	1.2E-01	1.0E+01	1.3E+00
Phenanthrene	85-01-8	8.1E+01	1.0E+01	1.0E+00
Pyrene	129-00-0	1.1E+02	1.0E+01	1.4E+00
Dioxin/Furan: 8290A				
2,3,7,8-TCDD	1746-01-6	9.1E-08	1.0E-05	1.2E-07
2,3,7,8-TCDF	51207-31-9	9.1E-07	1.0E-05	2.0E-07
1,2,3,7,8-PeCDD	40321-76-4	9.1E-08	5.0E-05	2.5E-07
1,2,3,7,8-PeCDF	57117-41-6	3.0E-06	5.0E-05	2.2E-07
2,3,4,7,8-PeCDF	57117-31-4	3.0E-07	5.0E-05	4.3E-07
1,2,3,4,7,8-HxCDD	39227-28-6	9.1E-07	5.0E-05	1.0E-06
1,2,3,6,7,8-HxCDD	57653-85-7	9.1E-07	5.0E-05	5.7E-07
1,2,3,7,8,9-HxCDD	19408-74-3	9.1E-07	5.0E-05	5.2E-07
1,2,3,4,7,8-HxCDF	70648-26-9	9.1E-07	5.0E-05	2.1E-07
1,2,3,6,7,8-HxCDF	57117-44-9	9.1E-07	5.0E-05	5.1E-07
1,2,3,7,8,9-HxCDF	72918-21-9	9.1E-07	5.0E-05	2.3E-07
2,3,4,6,7,8-HxCDF	60851-34-5	9.1E-07	5.0E-05	2.2E-07
1,2,3,4,6,7,8-HpCDD	35822-46-9	9.1E-06	5.0E-05	9.4E-07
1,2,3,4,6,7,8-HpCDF	67562-39-4	9.1E-06	5.0E-05	2.5E-07
1,2,3,4,7,8,9-HpCDF	55673-89-7	9.1E-06	5.0E-05	3.8E-07
OCDD	3268-87-9	3.0E-04	1.0E-04	4.6E-06
OCDF	39001-02-0	3.0E-04	1.0E-04	8.6E-07

Table A-4. Groundwater Reporting Limits and Oregon Screening Levels

Lower Klamath Hydroelectric Project Oregon Sampling and Analysis Plan

Analyte Group: Method Analyte	CAS Number	Groundwater Screening Level (µg/L)	Reporting Limit (µg/L)	Method Detection Limit (µg/L)
Pesticides: 8081A				
4,4'-DDD	72-54-8	3.1E-02	5.0E-02	4.2E-03
4,4'-DDE	72-55-9	4.6E-02	5.0E-02	4.2E-03
4,4'-DDT	50-29-3	2.3E-01	5.0E-02	2.4E-02
Aldrin	309-00-2	9.2E-04	5.0E-02	6.2E-03
Dieldrin	60-57-1	1.7E-03	5.0E-02	4.6E-03
Endosulfan sulfate	1031-07-8	1.1E+02	5.0E-02	4.9E-03
Endrin	72-20-8	1.9E+00	5.0E-02	8.6E-03
Endrin aldehyde	7421-93-4	2.3E+00	5.0E-02	8.7E-03
Heptachlor	76-44-8	1.4E-03	5.0E-02	1.0E-02
Heptachlor epoxide	1024-57-3	1.4E-03	5.0E-02	3.2E-03
PCB: 8082A				
PCB-1016	12674-11-2	2.2E-01	1.0E+00	1.5E-01
PCB-1221	11104-28-2	4.7E-03	1.0E+00	5.3E-01
PCB-1232	11141-16-5	4.7E-03	1.0E+00	1.6E-01
PCB-1242	53469-21-9	7.8E-03	1.0E+00	2.5E-01
PCB-1248	12672-29-6	7.8E-03	1.0E+00	2.4E-01
PCB-1254	11097-69-1	6.0E-03	1.0E+00	1.9E-01
PCB-1260	11096-82-5	7.8E-03	1.0E+00	2.2E-01
PCB-1262	37324-23-5	7.8E-03	1.0E+00	1.0E-01
PCB-1268	11100-14-4	7.8E-03	1.0E+00	1.8E-01

Notes:

Reporting Limits and Method Detection Limits based on current values as reported by Eurofins TestAmerica; West Sacramento, CA.

µg/L = microgram(s) per liter

CAS = Chemical Abstracts Service

Appendix B
Consolidated Comment Matrix

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
California Department of Water Resources / California Department of Fish and Wildlife - Office of Spill Prevention and Response					
CA-1	CH	general		In screening for chemicals of potential ecological concern (COPECs), CDFW-OSPR will not agree with soil concentrations of organic constituents being compared to "ambient" concentrations for the selection of contaminants of concern (COCs) (DTSC, 1996).	Background concentrations are compared to screening levels for metals in soil only (see Section 3.3) and not to organic constituents. No change to document required.
CA-2	CH	general		Please indicate how sample locations will be selected to obtain a site-wide range of contaminant concentrations for the different analytes (e.g., 3-4 replicates from 3-4 concentration ranges or maximal concentrations only?). For example, will composite samples be collected at each sampling location?	The overall objectives of this SIWP are to collect the necessary data required to either support closure of the 12 RECs presented or to collect field and analytical data required to support remedial planning, if needed. This initial phase is a screening effort to primarily determine the presence or absence of constituents of potential concern (COPCs) and does not constitute a full risk assessment or remediation plan. The SIWP was edited to make it clearer what the intent of the investigations are at each of the RECs. Composite samples will not be collected at all the selected sample locations. Composite samples will be collected for waste characterization as indicated in the sampling tables in Section 3 for selected RECs.
CA-3	CH	general		Please conduct a hot-spot evaluation for those chemicals that were detected in less than 5% of the soil samples, prior to their elimination as COPECs. Significant risks from hot-spots may be considered for remediation, depending on the sensitivity of the habitat, species present, and the degree of potential exposure (e.g., sample depth). Spatial mapping of comparison exceedances for all COPECs would greatly assist in evaluating the overall significance of ecological risks for RECs.	Because this is primarily a site screening evaluation (with the objective of determining whether COPCs are present above the selected screening levels and/or if further site evaluation is necessary) and not a risk evaluation or remediation plan, all detections, regardless of the frequency of detection, will be screened against the appropriate screening levels selected for the REC based on potential future use.
CA-4	CH	general		Please explain the basis for whether the maximum or the upper confidence limit (UCL) on the mean will be used when evaluating chemical concentrations in soil. In addition, please specify what percentile the UCL represents (e.g., 95th percentile UCL).	Because this is primarily a site screening evaluation (with the objective of determining whether COPCs are present above the selected screening levels and/or if further site evaluation is necessary) and not a risk evaluation or remediation plan, the maximum detected concentrations will be used when evaluating chemical concentrations in soil rather than calculating a 95 percent UCL on the mean (which is generally used as an exposure point concentration in risk evaluation).
CA-5	CH	general		Should compare Ecological Soil Screening Levels to soil chemical concentrations, in addition to Human Health Screening levels.	Ecological screening levels have been added to the screening level tables.
CA-6	AD	Transfer of Real Property	entire document	Discussion regarding transfer of real property which includes approval from FERC which has been received. Document makes several references that actual components and transfer is unclear.	The SIWP was written before the FERC June 2021 order approving License Transfer. Regardless, Section 1.4 where there was discussion of FERC and their role in the process has been deleted per Comment CA-9.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
CA-7	KT	Background	1.1	Background discussion gives impression that the universe of environmental conditions is what appears in Exhibit C of the PTA. It is California's position that Exhibit C is the starting point. It is California's understanding that AECOM did not cover all of Parcel B. It is also California's expectation that any other existing environmental condition that is not on Exhibit C will be addressed by PacifiCorp. Additional CA comment emailed by Kevin Takei (CDFW) to Demian Ebert (PAC) on September 1, 2021 at 2:21 PM: This will be a topic for the lawyers to discuss.	Consistent with agreement of the principals for California, Oregon, the Renewal Corporation, and PacifiCorp, Exhibit C of the Property Transfer Agreement expressly defines the set of environmental conditions and the sites that PacifiCorp is responsible for addressing. The position in California's comments that Exhibit C "is the starting point" is inconsistent with both the agreement of the KHSA principals and expectations of PacifiCorp's state utility regulators. No edits necessary. Response to Additional California Comment: This issue was resolved during a September 8, 2021, meeting with the legal group. California clarified that its comments were focused on conditions that may arise *after* Exhibit C was created but before the property transfer closes. No edits to workplan required.
CA-8	JD	Number discrepancy	1.2	Work Plan states that "The remaining six pre-existing environmental conditions..." but above it states a total of 17 sites with 12 being considered in this Plan, which would only leave five sites.	The Copco No. 2 Powerhouse Transformer Fire is not listed in Exhibit C. See footnote on page 2 of SIWP which explains why this site is included in the SIWP. No edits necessary.
CA-9	KT	Introduction	1.4 & 1.5	Seems unnecessary. Recommend delete.	These sections have been deleted.
CA-10	KT	Introduction	1.7	As part of the documentation seeking closure, California would like Jacobs to provide an unedited recommendation as to why additional testing is, or is not, warranted.	As noted in Section 4, a site investigation report (Report) will be prepared to document the investigations performed at each of the RECs. The Report will document the field activities performed, summarize key field observations, and identify major deviations from the SIWP. The analytical results will be summarized and compared to the screening levels identified for each REC. Recommended next steps will be provided for each REC and may include a request for REC closure to be prepared by PacifiCorp in accordance with the developed process, advancement of step-out borings to collect additional environmental samples according to the sampling plan established for the REC, or development of a remediation plan based on the field and analytical data already collected. The Site Investigation Report will be submitted electronically and will include all the analytical data from the sampling events at each REC.
CA-11	CS	Site descriptions & related site figures	2.1	Site descriptions need to reference associated site figures. Figures need to show site extents/boundaries in order to understand locations of RECs within those boundaries. These should be further referenced in Section 3.	The SIWP has been edited so that sites described in Section 2.1 now reference Figures ES-2 through ES-4 (which depict the location of each dam to be removed and each REC to be investigated and evaluated in this SIWP). Because of mapping scale, Figures ES-2 through ES-4 will not show the limits of the SIWP; the limits of the SIWP are shown in Figures 3-1 through 3-13, which are already referenced in Sections 3.4 through 3.14.
CA-12	CS	Clarification	2.2	This section states, "The powerhouses have not generated hazardous materials." Please elaborate how this conclusion was made. Such as, "Based on X, X, and X, the powerhouses have not generated hazardous materials. It seems unlikely that during their entire lengths of use, all four facilities have never generated any hazardous materials.	This statement was intended to convey the fact that as hydroelectric power generating facilities, these developments do not create new hazardous materials like some other thermal power generation (e.g., coal) plants or industrial facilities do. Limited quantities of hazardous materials are used in connection with operating and maintaining the facilities and when these materials have exceeded their life span they are considered hazardous waste, but those materials are not "generated" by the facilities. This particular sentence has been removed from the document.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
CA-13	CH	*Site Investigation and Evaluation*	3.1	Regarding 1.5-2.5 feet below ground surface (bgs) as the sampling depth in Iron Gate Shooting Range, 2.5 feet bgs in Copco No. 1 Debris Pile/Scrap Yard, 0.5-1 foot bgs in Copco No. 2 Wood Stave Penstock, 2.5 feet bgs in Copco No. 2 Burn Pit, and 1.5 feet bgs in Iron Gate Fish Hatchery Burn Pit. Instead, please sample at depth intervals to 6 feet bgs, with 6-inch sampling intervals, because burrowing animals and plant roots may inhabit these deeper soil intervals as recommended by DTSC (1998). Furthermore, please collect surface soil samples (0-6 inches bgs) in addition to the depth intervals proposed. Additional CA comment emailed by Kevin Takei (CDFW) to Demian Ebert (PAC) on September 1, 2021 at 2:21 PM: We are not satisfied with the rationale as to why samples are not collected at depth to 6 feet. Thus, we reiterate that depth intervals to 6 feet bgs be evaluated to assess burrowing animals and plant roots which inhabit these deeper soil intervals (DTSC 1998).	The overall objectives of this SIWP are to collect the necessary data required to either support closure of the identified 12 RECs or to collect field and analytical data required to support remedial planning, if needed. This initial phase is primarily a screening effort to determine the presence or absence of COPCs and does not constitute a full risk assessment or remediation plan. The SIWP was edited to make it clearer what the intent of the investigations are at each of the RECs. Sampling depths proposed are specific to each REC, history of site use, and anticipated depths of greatest potential for COPCs above selected screening levels. Surface soil samples will be collected at all locations with the potential for COPCs, which includes all those listed in the comment (see the sampling tables in Section 3). If COPCS are detected above the selected screening levels based on potential future use, DTSC (1998) will be referenced to determine depth of additional sampling. Response to Additional California Comment: Per a meeting with PacifiCorp, Jacobs, and the State of California on September 9, 2021, it was agreed that approximately 20 percent of the borings at these RECs would be advanced to a depth of 6 feet bgs and that sample intervals would not be at 6-inch intervals but rather at the following intervals: 0.0 to 0.5, 1.0 to 1.5, 3.0 to 3.5, and 5.5 to 6.0 feet bgs.
CA-14	CH	*Iron Gate Shooting Range*	3.1	Please adopt Ecological Soil Screening Levels (Eco-SSLs) by USEPA in 2005a. For example, while the screen level of soil lead is only at 320 mg/kg in the SIWP, the lowest Eco-SSL screening value is for bird at 11 mg/kg lead in dry weight in soil and 56 mg/kg lead for mammal (US EPA, 2005a). In addition, if there is a drainage channel, surface water samples should be collected into 250-milliliter a polyethylene bottles containing a nitric acid preservative. To ensure that the water is filtered for dissolved lead, use 0.45-micrometer filter. Use the chronic value to screen (criterion continuous concentration) for lead from California Toxics Rule (US EPA, 2000). Additional CA comment emailed by Kevin Takei (CDFW) to Demian Ebert (PAC) on September 1, 2021 at 2:21 PM: Please clarify in the work plan that a second sampling will occur closer to when the site will be closed. Page 3-23 indicates that a second sampling would occur <u>if</u> the initial sampling indicates there's contamination.	EPAs (2005a) ecological screening levels (EcoSSLs) have been added to Section 3.3. The screening levels selected for each REC will depend on the potential future use of the REC. This initial investigation of the shooting range will occur during early fall before surface water typically accumulates in any drainage channels, so no surface water samples will be collected. Soil samples will be collected in drainages as described in Section 3.12. The Iron Gate Shooting Range is an active range and is not scheduled for closure at this time. Investigation of the shooting range will primarily occur when the site is planned for closure (in approximately 2 years). The future investigation will be defined by the initial investigation and could include surface water sampling, more extensive soil sampling, and a full risk assessment. Response to Additional California Comment: As noted, above the investigation for the Iron Gate Shooting Range will occur when the site is planned for closure. The first paragraph in section 3.12.2 was revised to clarify that a second sampling event will be performed in line with the scheduled closure of the shooting range.
CA-15	CH	*Iron Gate Shooting Range*	3.1	Lead shot, as elemental lead, will eventually degrade and oxidize into soil overtime. Additionally, the derivation of the avian-based toxicity benchmark supports the notion that lead shot will degrade into soil; thus, the exposure-based screening level for lead shot should be same as soil No-Observed-Adverse-Effect-Level Lead at 11 mg/kg for birds.	Ecological screening levels have been added to Section 3.3. Lead detected in soils at the Iron Gate Shooting Range will be compared to ecological screening levels.
CA-16	CH	*Iron Gate Shooting Range*	3.1	The US EPA's latest guidance on assessing risk to birds from lead shot pellet ingestion (Bennett et al., 2011) should be used as part of the ecological risk assessment. Studies have shown that the ingestion of as little as one pellet can kill a bird.	Remedial actions will consider potential exposures, however risks to ecological receptors will be evaluated using lead concentrations in exposure media. The Bennett et al. (2011) document is a white paper evaluating different approaches for evaluating ingestion of grit and does not constitute EPA guidance.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
CA-17	CH	*Iron Gate Shooting Range*	3.1	As part of the grit ingestion model development based on the US EPA's guidance on assessing risk to birds from lead shot pellet ingestion, the following information should be provided (This information is required to develop the percent of various natural grit-sized particles for a given area-depth of sediment or soil): i. Soil density. ii. Soil moisture content. iii. Surface soil description from past boring logs, including percent of fine to medium sand and silt. iv. Number of shot pellets per 12X12 inches and 1 inch thick. v. Number of natural grit particles within the bird ingestion size in the same square-foot-inch volume of soil.	Development of a grit ingestion model is not part of the scope of this investigation, which is limited to a screening evaluation.
CA-18	CS	Soil/rock descriptions lacking detail	2.3.1	Site (or REC location) specific soil/rock types should be included, where available, to better understand contaminant migration ability. This will help with assessment of proposed sampling methods/extent.	Inserted Local Soils subsection, which describes soils in the J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate developments and at Iron Gate Hatchery. Added Natural Resource Conservation Service (NRCS) soil classification to the discussion for each REC site.
CA-19	CS	Groundwater and surface water information lacking detail	2.3.3	Site (or REC location) specific groundwater flow and surface water flow data should be included, where available, to better understand contaminant migration ability. This will help with assessment of proposed sampling methods/extent.	Streams and reservoirs are shown in the figures for the various sites when they are in proximity to the site such that they appear in the images used. In PacifiCorp's experience depth to groundwater in domestic wells in the area generally range from 40 to 300 feet below the surface with shallower depths being in close proximity to the reservoirs. Site-specific data related to groundwater at the RECs is not available, and neither is more specific data on surface waters at each location. The SIWP is written in such a way that if groundwater is encountered, then groundwater samples are collected for laboratory analysis. As discussed in Section 3, the sampling plan allows for site-specific adjustment in sampling strategy based on site-specific conditions and observations. No edits necessary.
CA-20	KT	*Residual explosives*	3.2.2.3	Please explain how a visual determination can be made to detect explosives as low as 2% and so precise.	Section 3.4.2.3 text has been modified to state the following, "If explosives are not present but it is visually determined that there is a potential for residual explosives to be present based on observation of fine-grained material on the floor of the cave, then field staff will determine if residual explosives are present through the use of Expray, an aerosol-based field test kit that provides a positive or negative assessment as to whether residual explosives are present."
CA-21	CS	Missing information about sampling depth and additional sampling	3.3.2	This section does not discuss what steps will be taken if samples collected within the top 2.5 feet result in analyte levels above their respective regulatory level(s). Will additional samples then be collected to evaluate the vertical extent of the exceedance(s)? How?	As noted in Section 4, a site investigation report (Report) will be prepared to document the investigations performed at each of the RECs. The Report will document the field activities performed, summarize key field observations, and identify major deviations from the SIWP. The analytical results will be summarized and compared to the screening levels identified for each REC. Recommended next steps will be provided for each REC and may include a request for REC closure to be prepared by PacifiCorp in accordance with the developed process, advancement of step-out borings to collect additional environmental samples according to the sampling plan established for the REC, or development of a remediation plan based on the field and analytical data already collected.
CA-22	CS	Missing information about sampling depth and additional sampling	3.4.2	This section does not discuss what steps will be taken if samples collected within the top 1.0 feet (or 5/10 feet for deeper samples) result in analyte levels above their respective regulatory level(s). Will additional samples then be collected to evaluate the vertical extent of the exceedance(s)? How?	Please refer to the response to Comment CA-21.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
CA-23	CS	Missing information about sampling depth and additional sampling	3.5.2	This section does not discuss what steps will be taken if samples collected within the top 5.0 feet result in analyte levels above their respective regulatory level(s). Will additional samples then be collected to evaluate the vertical extent of the exceedance(s)? How?	Please refer to the response to Comment CA-21.
CA-24	CS	Clarification	3.6.1	Do we know from the Parametrix 2006 report the lateral extent of the concrete slab encountred [*sic*] at 3 feet bgs? If there is no vertical rim to the concrete slab then horizontal migration of the COC may not have been properly investigated. Additonal [*sic*] downgradient and cross gradient borings may be needed to confirm.	Parametrix identified at least 0.25 feet of concrete debris (average thickness 0.5 feet) in all six DPT borings advanced around Transformer C. The maximum concentration of TPH-D (650 mg/kg above concrete debris) and the maximum concentration of TPH-MO (130 mg/kg below concrete debris) were detected at depths of 1 and 3 feet, respectively, in boring COPCO-1, which was adjacent to the former location of Transformer C. These maximum TPH detections do not exceed the selected soil screening levels for the REC. Because the surrounding borings located at least 25 feet away from boring COPCO-1 and because the total volume of oil lost (spilled or combusted) during the fire was estimated to be 715 gallons, no additional soil borings are planned other than those originally proposed to confirm that soil from beneath the footprint of the former transformers does not need to be removed due to an exceedance of a soil screening level.
CA-25	CH/KT	*Copco 2 sampling plan*	3.7.2	Please consider using local Regional Water Quality Control Board Criteria for TPH in soil instead of relying visual determinations of TPH impacts	The San Francisco Regional Water Quality Control Board (Water Board) Environmental Screening Levels (ESLs) are the default screening levels for the North Coast Regional Water Quality Control Board. Sampling decisions in the field will be guided by the sampling tables provided in this SIWP but will also be based on observations of odorous soil, stained or discolored soil, and/or soil with photo-ionization detector (PID) readings greater than 50 parts per million by volume (ppmv). The 50 ppmv threshold is, by definition per South Coast Air Quality Management District (AQMD) Rule 1166, VOC-impacted soil that must be segregated and stockpiled on plastic sheeting separately from soil with PID readings less than 50 ppmv. VOC-impacted soil is required to be actively managed, while soil with PID readings less than 50 ppmv does not. No revisions required.
CA-26	CS	Additional analytes	3.7.2	Without a better understanding of the useage [sic] of these facilities, I would suggest also including sampling for VOCs.	While solvents are known to be used in limited quantities and while one would not reasonably anticipate a significant amount of solvent usage given the results of the Phase I ESAs and the processes utilized for clean energy generation at the Copco No. 2 Development, VOC analysis has been added to Table 3-8 and BTEX analysis has been removed. SIWP text has also been modified accordingly.
CA-27	KT	*Copco 2 sampling plan*	3.7.2	This section mentions there will be seven boring locations. Please confirm the quantity because table 3-7 seems to indicate there would be four boring locations	Table 3-8 will be corrected to include a total of seven borings.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
CA-28	CH/KT	*Copco 2 UST*	3.8.2	Please consider using local Regional Water Quality Control Board Criteria for TPH in soil instead of relying visual determinations of TPH impacts. Or explain why visual determinations would be sufficient.	There is no site history documenting a release, so the site investigation will look for evidence of a release. The word "visually" will be removed from sentence. Sampling decisions in the field will be guided by the sampling tables provided in this SIWP but also based on observations of odorous soil, stained or discolored soil, and/or soil with PID readings greater than 50 ppmv since AQMD Rule 1166 defines VOC-contaminated soil as soil with PID readings greater than 50 ppmv which must be actively managed, unlike soil with PID readings less than 50 ppmv.
CA-29	CS	Missing information about sampling depth and additional analytes	3.8.2	Please explain why samples will only be collected to 15 feet. Do we have evidence that the USTs were located at or above that depth? All borings should be initially completed to a minimum of 5 feet below estimated former UST depth. Additionally, since both leaded and unleaded USTs were present at the site, all samples should also be tested for VOCs (especially important are 1,2-dibromoethane [EDB], 1,2-dichloroethane, tetraethyl lead [TEL], and methyl tert butyl ether [MTBE]).	There are no documents describing the depth of the USTs. Typical diameters of 9,000- to 10,000-gallon USTs are 8 to 10 feet. Assuming the USTs were buried 3 to 5 feet bgs indicates the bottom of the USTs were 11 to 15 feet bgs. Using this information, the SIWP has been revised to extend the borings to a depth of 20 feet. Table 3-9 has been revised to analyze for VOC instead of BTEX.
CA-30	CS	Missing information about sampling depth and additional sampling	3.9.2	This section does not discuss what steps will be taken if samples collected withing [sic] the top 2.5 feet result in analyte levels above their respective regulatory level(s). Will additional samples then be collected to evaluate the vertical extent of the exceedance(s)? How?	Please refer to the response to Comment CA-21.
CA-31	CS	Missing information about sampling depth and additional sampling	3.10.2	This section does not discuss what steps will be taken if samples collected withing the top 1.5 feet result in analyte levels above their respective regulatory level(s). Will additional samples then be collected to evaluate the vertical extent of the exceedance(s)? How?	Please refer to the response to Comment CA-21.
CA-32	KT	*Iron Gate Shooting Range*	3.10.2	Please explain how visual observations are sufficient to determine if contamination is deeper. In our experience it's virtually impossible to see lead shot.	This is an initial sampling intended to provide data to better understand the magnitude of potential contamination at the shooting range and help plan a more rigorous sampling event that will be performed after the site is closed (in approximately 2 years). It is acknowledged that visual observation of lead shot is virtually impossible, but if shot is observed, then sampling will be extended. The more rigorous sampling event will establish the vertical extent of contamination.
CA-33	CS	Clarification	3.11.2	The following statement is confusing: "If bedrock or refusal is not encountered when delineating the vertial [sic] and lateral extent of the burn pit, hand auger and/or DPT borings will be advanced to collect visually unimpacted soil samples from beneach [sic] the portions of the burn pit that have the most visually impacted material." Please clearly restate what methods will be utilized to investigate the REC.	This statement has been modified as follows, "Hand auger or DPT borings will be advanced to collect soil samples from within the burn pit and from beneath portions of the burn pit that have the most visually impacted material."
CA-34	KG	Clarification	3.12.1/3-25 paragraph 3	"...This may ultimately require management of the sediment in settling ponds..." Suggest clarifying the word management (removal? disposal? more sampling?) or call it unknown.	This statement in has been edited for clarity so the reader understands that if the sediments are contaminated, then some sort of action may be necessary to address that contamination.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
CA-35	KT	Sampling Plan	3.12.2	California is still reviewing PacifiCorp's request [Email received August 13, 2021 with the following resolution] "California finished its review and is comfortable with no further testing at the settling ponds."	No response is necessary to this comment.
CA-36	CH	*Data Evaluation*	4.1	Please ensure the detected organic COCs are carried forward through the risk assessment to provide the decision makers with an estimate of the risk and hazard. We believe that COCs identified in a screening assessment should include: 1) inorganic chemicals exceeding ambient conditions and 2) chemicals potentially causing toxicity. Therefore, inorganic chemicals with maximum detected on-site concentrations greater than the 95th percentile of the background data will be considered as COPECs. All organic chemicals detected on-site should be included as COPECs. For chemicals with non-detect results, one-half of the sample quantitation limit (SQL) should be used as a proxy value for that sample when calculating descriptive statistics. The lower of the 95% upper confidence limit (95 UCL) or maximum detected value is used to identify organic COPECs. When the chemical is detected in less than half of the total samples collected, a 95 UCL is not calculated, and maximum detected value is used	As noted in previous responses, this investigation and SIWP do not include a full risk assessment. All detections will be screened against the appropriate ecological and/or human health screening levels (based on future use of the REC) and results will be used along with other site information evaluated to propose a path to closure for each REC. The outcome for each REC may include one of the following (as presented in Section 4): 1) No further investigation – Site is off-ramped to PacifiCorp for closure in accordance with the procedure to be developed between the parties. 2) Further investigation warranted - Additional investigation and/or evaluation that may include more sampling and a full risk assessment. 3) Remediation – Remediation plans may be developed as appropriate based on data collected during implementation of the SIWP.
CA-37	CH	*Reporting*	4.2	Please clarify the statistical methods used for data analysis. If parametric or non-parametric methods are used, please explain how they are appropriate	Because this is a screening evaluation, the maximum detected concentrations will be used when evaluating chemical concentrations in soil. Statistical methods will not be used for evaluating data at this stage and are not appropriate for the sample sizes that will be generated by this work.
CA-38	CH	*Appendix A Sampling and Analysis Plan (SAP)*		We recommend that this SAP be organized according to the *Uniform Federal Policy for Quality Assurance Project Plans* (UFP-QAPP) (USEPA, 2005b)	The SAP was developed consistent with professional standards for projects with similar objectives and scope. Typically, a UFP-QAPP type document is developed for larger, multiyear projects under the direction of a federal authority such as the EPA, Department of Defense, or Department of Energy. In accordance with Sect. III Q.9, A.9 of *Uniform Federal Policy For Quality Assurance Project Plans Manual* (UFP-QAPP Manual), the UFP-QAPP Manual is expected to be used to develop QAPPs or SAPs for managing the collection and use of environmental data at Federal facilities. The essential elements regarding sampling and analysis (e.g., sampling guidelines, equipment, hold times, documentation, packing, shipping, EPA analytical methods, limits, etc.) as detailed in the UFP-QAPP (USEPA, 2005b) document are included in the Jacobs SAP.
CA-39	CH	*Appendix A Sampling and Analysis Plan (SAP)*		Please add a Personnel Responsibilities and Qualifications Table into Appendix A. a. This table should contain the responsibilities and qualifications for any of the individuals listed.	A Personnel Responsibilities and Qualifications Table was added to Appendix A
CA-40	CH	*Appendix A, laboratory*	App. Sec. 2	Is the contracted laboratory a part of the California Environmental Laboratory Accreditation Program (ELAP)? We do not find any ELAP Certificates in SAP. Please provide the certification as an appendix to the SIWP. CDFW-OSPR requests the contracted laboratory to provide current accreditation documents in the Draft Final version of the document	The proposed contracted laboratory, Eurofins/TA, holds the necessary accreditations for both soil and water in both CA and OR to perform the requested analyses. A laboratory has not been contracted. Jacobs will ensure the selected laboratory holds the necessary accreditations (ELAP and ORELAP) as required. Certification documents will be attached to the Site Investigation Report.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
CA-41	CH	Appendix A, Detection Limits	App. Sec. 2.2	Please ensure detection levels are sufficient for all COCs and sufficient to meet project goals. Many samples are analyzed by a specific method that is used to determine levels of waste. Is the method sensitive enough to evaluate ecological hazard? Please explain the rationale for use of these methods. The laboratory-specific Quantitation Limits and Method Detection Limits (MDLs) should be evaluated to assure the MDLs are of sufficient sensitivity to meet the requirements necessary to evaluate ecological hazard as part of the laboratory selection process. For clarification, please add a sentence to say, "Ranges of laboratory reporting limits for given parameters must be low enough so that the results can be compared to the corresponding action limit, such as a regulatory threshold or risk-based no toxicity effect value (i.e., no observable adverse effect concentration Eco-SSLs)." Additional CA comment emailed by Kevin Takei (CDFW) to Demian Ebert (PAC) on September 1, 2021 at 2:21 PM: California expects the results of each sample ID to be included in the final report. Please let us know if our expectation is inaccurate.	All methods proposed in Section 3 and Appendix A are standard methods used for evaluation in CERCLA and RCRA investigations. It is well known that detection limits for some analytes will not meet ecological screening criteria - especially those that are back-calculated risk-based values rather than media tested effect levels. A summary of analytes that have reporting limits in excess of screening levels will be presented in the site investigation report and discussed in the uncertainties. Response to Additional California Comment: Analytical data for samples collected during the investigation will be provided, and the analytical results will be summarized in tables and figures.
CA-42	CH	Appendix A, Detection Limilts	App. Sec. 2.2	It is not clear to CDFW-OSPR how the non-detect chemical values were treated to identify COPECs in the datasets. Please include a discussion of non-detects in the next version of the document. [the Commentor provided this clarification of the comment via email on August 10, 2021] The achievable limits are used through the best available technology by the laboratory's ELAP-accredited methods. COPECs will be identified based on screening maximum detects against ecological benchmarks. When computing UCLs, non-detects will be included into the calculations. COPECs concentrations will not be zero and should be half of the detection limits and zero.	Jacobs has confirmed with the selected laboratory that the best available technologies and associated detection limits will be used. Non-detect values for COPECs on the target analyte list will be appropriately qualified in accordance with standard laboratory practice utilizing accepted data qualifiers for non-detects, estimated values, and verified detections. Application of data qualifiers to the final sample result will be based upon laboratory method detection limits (MDLs), limits of detection (LODs), limits of quantitation (LOQs), and reporting limits (RLs). Non-detect values for COPECs will be reported at the reporting limit (RL) but qualified as estimated down to the DL or LOD. These values are non-zero values. Section text has been updated.
CA-43	CH	Appendix A, Detection Limits and attached Table A-3 on Page A-8	App. Sec. 2.2	CDFW-OSPR strongly recommends that homologue analysis be used to estimate total polychlorinated biphenyls (PCBs) concentrations in environmental samples. It is unclear if Aroclor-based methods or PCB congener-specific and PCB homologue methods will be used in analytical testing services for soil and surface water samples. The analytical method described in Valoppi, et al. (2000) should be used for the 28 PCB congeners that exhibit dioxin-like toxicity.	Table A-3 has been revised to indicate that the nine common PCB Aroclors will be analyzed by EPA Method 8082A. The Aroclor Method 8082A is sufficient with regards to the sensitivity required to meet the screening limits in the very limited number of soil samples where PCBs are to be sampled. It is highly unlikely that PCBs will be analyzed in groundwater because soil samples will only be collected to a depth of 3 ft bgs which is well above the anticipated water table; none of the borings drilled down to 25 ft bgs encountered groundwater during the July 2006 Phase II ESA performed by Parametrix.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
CA-44	CH			Additional CA comment emailed by Kevin Takei (CDFW) to Dustin Till (PAC) on September 13, 2021 at 11:24 AM: "A complete, post-remedial ecological risk assessment (ERA) should be performed following any removal action and include consideration of potential special-status species and sensitive habitats, as well as plants and invertebrate species as receptors of concern. Any off-site areas with the potential to be affected by site contamination or remediation also should be assessed. In the meantime, as PacifiCorp moves forward with the current investigation, it should understand that residual inorganic/organic contamination that may cause impacts to ecological receptors should be quantified through confirmation sampling and in a post-remedial ERA."	Response to Additional California Comment: If COPCs are determined to exceed approved screening levels, residual REC-specific COPCs (inorganic or organic) must be further assessed through additional step-out sampling prior to remediation and/or through additional confirmation sampling performed under an approved REC-specific remedial plan. Such sampling would be performed iteratively to determine the vertical and lateral extent of the REC-specific COPCs. Post-remedial ecological risk assessments (ERAs) may be performed if the vertical and lateral extent of residual contamination precludes removal of a REC-specific contaminant(s) to levels less than the specified screening level(s). In this case, a post-remedial ERA would be performed to evaluate residual risks to upland ecological receptors (plants, invertebrates, birds, and mammals) that may use the REC and would consider Federal- and California State-listed threatened or endangered species and sensitive habitats. Evaluation would be limited to confirmation samples collected within the applicable exposure depth of the receptor (up to 6 feet below ground surface). Post-remedial ERAs will not be performed for RECs where site investigation samples or remedial confirmation samples do not exceed a REC-specific COPC screening level. No changes to the SIWP are necessary.

*Review Point of Contact: Tony Meyers (916.919.7171 and anthony.meyers@water.ca.gov)
Reviewers:
Allan Davis (AD)
Kim Gazzaniga (KG)
Chris Silva (CS)

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-1	Camas		General	The plan does not clearly describe the "Investigation Standard" which is vital to clearly outlining how the areas of concern will be evaluated and to what standard. The Investigation Standard should clearly state the specific CA environmental agencies/programs (CUPA, DTSC) and OR environmental agencies programs (DEQ) that will be used to evaluate the areas of concern. For example, there are certain requirements to address leaks from underground storage tanks in OR, which is not defined in this Work Plan. The Investigation Standard should then describe how if there are no CA/OR standards for certain analytes, etc., when/how the EPA standards will then be utilized. The Investigation Standard should also include specific sampling requirements that are required by CA, OR, and EPA. This can include sampling methodology, a specified number of composite samples, etc. If this is not applicable to the identified areas of concern, then please disregard this comment. Camas was not provided Appendix A, if this information is included in Appendix A, please disregard this comment.	A stand-alone Investigation Standard section has been added to the SIWP. EPA analytical methods are provided in the SAP (Appendix A). Composite samples are collected for waste characterization at appropriate sites and for disposal of investigation derived waste generated during the sampling investigation.
KRRC-2	Camas		Section 4	Data Evaluation does provide some detail on the standards (e.g. exposure pathways) that will be used, but the Work Plan does not define the exposure pathway to be utilized for each REC based on its future use (e.g. recreation, remote etc.).	The intended future uses and potentially complete exposure pathways have been identified for each REC in Section 1.5. Section 4.1 Data Evaluation has been moved to Section 3.3 and updated to include the applicable screening levels for exposure pathways for human health, leaching to groundwater, and ecological exposures.
KRRC-3	Camas		General	Will there be a follow-up report as to the protocols if contamination is identified and the following steps to be taken (e.g. confirmation samples, impacted soil disposal, etc.)? Will there be a separate report to identify how to obtain closure per CA/OR regulations if contamination is identified?	See please see the response to CA-10.
KRRC-4	Lloyd Lowy (LL)[a]		Executive Summary	In addition to the AECOM ESAs, site sampling plans were developed based on review of previous sampling and results at two of the RECs. [[*Please explain the source of the additional information and whether any other additional sources were reviewed or considered in developing the current plan; what other records does PAC have that would be relevant to structuring the work plan to accomplish the objective of appropriate resolution of environmental conditions*]]	The paragraph in which this sentence was proposed has been updated and now references four sources of additional information reviewed or considered in developing the current SIWP: (Parametrix 2006), (Watercourse 2018), (AECOM 2019c), and (AECOM 2020a). These sources are relevant to the structuring of the SIWP, whose objective is to accomplish the appropriate resolution of RECs.
KRRC-5	LL		Section 1.5	In Section 1.5 Roles and Responsibilities: The states of California and Oregon will be the ultimate landowners once the KRRC completes removal and restoration. The individual states may have different and additional responsibilities that are associated with the regulatory agencies that oversee cleanup of contaminated sites. The nature of this oversite will depend on the results of the investigations described in subsequent sections of this report. [[*This paragraph seems to suggest an alternative allocation of responsibilities. I suggest deleting it.*]]	This section has been deleted.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-6	LL		Section 1.6	In Section 1.6 Program Timeline: There are six pre-existing environmental conditions listed in Agreement Exhibit C that are unknown or were inaccessible ~~(e.g., possible contaminated areas underneath dams or powerhouses)~~to AECOM. Additional work at these locations cannot occur until the KRRC proceeds with dam removal. Therefore, these will be considered as pre-existing environmental conditions that are not subject to resolution prior to transfer. These conditions are not addressed in this work plan or schedule. In accordance with Agreement Section 3.5(c), PacifiCorp will develop subsequent investigation plans that will allow for investigation, remediation, and closure as appropriate in coordination with the overall dam removal project. [[*This section seems to make premature assumptions and conclusions. PacifiCorp is obligated to minimize impact and delay on dam removal activities. We would expect that some level of diligence and investigation could be performed in anticipation of dam removal work in the affected areas.*]] Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on August 27, 2021 at 12:22 PM: There are six pre-existing environmental conditions listed in Agreement Exhibit C that are, or are referenced in Exhibit C as, unknown or inaccessible ~~(e.g., possible contaminated areas underneath dams or powerhouses). Additional work at these locations cannot occur until the KRRC proceeds with dam removal. Therefore, these will be considered as pre-existing environmental conditions that are not subject to resolution prior to transfer.~~: • Condition 5 – Undiscovered Impacted Soil and Groundwater at the four Powerhouses • Condition 8 – High voltage switchyards • Condition 9 – Undiscovered Impacted Soil and Groundwater and the four dam developments • Condition 15 – Inaccessible Areas • Condition 16 – Retained Easement Areas • Condition 17 – Undiscovered Impacted Soil and Groundwater outside the removal work zone These conditions are not addressed in this work plan or schedule. ~~In accordance with Agreement Section 3.5(c),~~ PacifiCorp will develop ~~subsequent~~separate investigation plans ~~that will allow for investigation, remediation, and closure as appropriate in coordination with the overall dam removal project~~for these conditions	The suggested edit makes it appear that AECOM simply could not observe these locations and that is not the case. Of the six pre-existing environmental conditions in Exhibit C that are not addressed in the SIWP, three are areas that are not currently accessible to anyone (#5, #9, and 15), one is not currently safely accessible (#6), and one is outside the work area (#17), and one encompasses the retained easements (#16) that were not defined when AECOM did their work. The SIWP is not making premature conclusions about the conditions at any of these locations. It is simply stating which sites are not included in the SIWP and why. A secondary planning effort will be necessary (in accordance with the Property Transfer Agreement Section 3.5(c)) which will address these areas. The RECs subject to this secondary planning effort will be (the numbers in the list below corresponds to Exhibit C of the Property Transfer Agreement): 5. Undiscovered impacted soil and groundwater at the four powerhouses 6. High voltage switchyards 9. Undiscovered impacted soil and groundwater at the four dam developments 15. Inaccessible areas 16. Retained easement areas 17. Undiscovered impacted soil and groundwater outside the removal work zone Response to additional KRRC Comment: The suggested edits in the comment essentially mirror changes already made to the draft SIWP. No further edits are necessary.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-7	LL		Section 1.9	Regarding Section 1.9 Investigative Standard: "This section should define the OR/CA standards to be taken into account and then in each section under Section 2, it should state what specific standards are being used. E.g. recreation sites will have different cleanup standards than an area where there is not designated occupational use (or lease [*sic*] conservative {industrial]. Move info from Section 4 Data evaluation to this section.	Section 1.5 describes the investigative standard and provides a table that includes future uses and exposure pathways for each REC.
KRRC-8	LL		Section 3	In Section 3 Site Investigation and Evaluation, the bullet that states: • Total petroleum hydrocarbons (TPH) as gasoline, diesel, and motor oil by EPA Method SW8015M Comment: OR DEQ has specific GR, DRO, ORO methods.	This specific bullet has not been changed because the samples collected at the Oregon site (J.C. Boyle Dispersed Recreation Area 2) for the purpose of determining the existence of contamination will not be analyzed for TPH. However, since composite samples from this site will be analyzed for TPH, these Oregon-specific methods was added to the bullets discussing waste characterization, Table 3-1, and the SAP in the Oregon SIWP.
KRRC-9	LL		Section 3	In Section 3 Site Investigation and Evaluation, the paragraph that states: The second objective of the sampling is to precharacterize potential REC wastes to assist in the future development of waste profiles for REC closure. Based on the anticipated excavation volume and a sampling frequency of 1 per 500 cubic yards, one, four-point composite sample will be prepared from select RECs to represent soil that may potentially need to be excavated. Comment: What standard is this? CA and OR have specific requirements for waste characterization and for landfills to accept waste. Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: PAC response not satisfactory. Section 3 needs to be revised to clarify the difference of sampling to disposal purposes versus site extent investigations. Include a subsection heading of "Site Material Disposal Sampling"	The waste characterization sampling frequency is based on the requirements of the receiving facility. Commonly landfills require 1 sample per every 250 cubic-yards (cy) for the first 1,000 cy and reduce the number of samples for higher volumes. The SIWP will be revised to 1 per 250 cy. This is pre-characterization sampling, so if it is determined that soil needs to be removed and disposed at a landfill, additional sampling will be performed during excavation to satisfy landfill requirements. Response to Additional KRRC Comment: Section 3.0 has been divided into Section 3.1 Environmental Sampling and Section 3.2 Waste Characterization Sampling to more clearly describe the two types of sampling that will be performed.
KRRC-10	LL		Section 3.1.2	In Section 3.1 J.C. Boyle Dispersed Recreation Area 2, subsection 3.1.2 Sampling Plan, second paragraph: Samples will be collected from the soil within and adjacent to the fire ring, and outside the visually impacted area to determine whether contamination exists, the extent of contamination, and the need to address this contamination (Figure 3-1). Samples will be analyzed for Title 22 metals, VOCs, SVOCs, dioxins, and furans (Table 3-1). Comment: Results compared to which standard, what is the exposure pathway at this site?	Laboratory analytical results will be compared to published soil screening levels for human health (ingestion, dermal contact, and inhalation exposure pathways for a residential exposure scenario), soil leaching to groundwater, and ecological receptors. Screening levels were established based on future uses of the sites as determined by California and Oregon. This has been clarified in the SIWP.
KRRC-11	LL		Section 3.2	In Section 3.2 Copco No. 1 Dynamite Cave, subsection 3.2.2 Sampling Plan: This section describes the activities that will be performed to confirm an absence of dynamite and other explosives within the cave. If dynamite and other explosives are confirmed absent, the REC will be considered closed. *[[Let's get the results and then decide if it's closed]]*	The subject sentence has been modified.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-12	LL		Section 3.3	In Section 3.3 Copco No. 1 Debris Pile/Scrap Yard, subsection 3.3.1 Findings from Previous Investigations, second paragraph: The areas with ceramic electrical insulators, scrap dock materials, building materials, and the pile of borrow soil/gravel are not anticipated to have caused any contamination to soils, so no samples will be collected in these areas unless soil staining or other signs of potential contamination are observed during sampling activities. Comment: If staining is seen, what will the results compared to which standard, what is the exposure pathway at this site? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: PAC response not satisfactory. Copco Debris piles. A location figure is required. The response to only do soil samples if "staining" in present, presumes that all regulated materials leave a stain. Soil samples should be taken here if it is a known "dumping" area.	If staining is seen, samples will be collected. The standards and exposure pathways are the same as for comment KRRC-10. This has been clarified in the document. Response to Additional KRRC Comment: Callouts for the "scrap material storage area", "ceramic electrical insulators", and the "gravel borrow area" were added to the overall REC Figure 3-3. Text in this section clarifies that these are not known dumping areas and are not anticipated to have caused contamination to soils. The field sampling team will inspect these areas to evaluate whether there are observable signs of potential contamination. If they see any signs of potential contamination, samples will be collected.
KRRC-13	LL		Section 3.4	In Section 3.4 Copco No. 2 Wood Stave Penstock, subsection 3.4.1 Findings from Previous Investigations: Based on the analytical results of the four soil samples (AECOM 2020), metals did not exceed background concentrations for the Klamath Mountains (ODEQ 2013), except for arsenic which was detected in sample SOIL 2 at a concentration of 36 milligrams per kilogram (mg/kg), above the background concentration of 12 mg/kg, and above the maximum range of background concentrations (0.273 to 29.50 mg/kg). Comment: For which exposure pathway? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: PAC response may be satisfactory, need to see the revised version. Also, the term "typically allows for exceedance" is not a sufficient conclusion. It is recommended that the SIWP include adjacent soil sampling to establish background conditions.	The arsenic detection for 1 of 3 soil samples was above the background concentration for the Cascade Mountains Region. The standards and exposure pathways are the same as for comment KRRC-10. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways were presented in the August 19, 2021 meeting with KRRC and the States and have been updated in the SIWP and should satisfy concerns about which pathways will be referenced for each REC. Soils are not evenly distributed and therefore "adjacent soil sampling" would not adequately characterize background conditions. Instead, published background metals concentrations for the Cascade Mountains Region (ODEH 2013) will be used, unless other establish risk-based screening levels are greater. The background metals concentrations in ODEH 2013 are based on multiple large datasets and a rigorous statistical analysis of the data. It is standard practice to use documented background metal concentrations for an area because they are more representative of background concentrations than collecting a limited number of samples in any one location.
KRRC-14	LL		Section 3.4	In Section 3.4 Copco No. 2 Wood Stave Penstock, subsection 3.4.2 Sampling Plan last paragraph: The soil samples, and any collected water samples, will be analyzed for metals and SVOCs. Comment: Compare to what standards/exposure pathways? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Same as Comment 13 above.	The standards and exposure pathways are the same as for comment KRRC-10. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways have been updated in the SIWP.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-15	LL		Section 3.5	In Section 3.5 Copco No. 2 Wood Pile, subsection 3.5.2 Sampling Plan, second paragraph: Samples will be analyzed for Title 22 metals, VOCs, and SVOCs (Table 3-5). Comment: Compare to what standards/exposure pathways? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Same as Comment 13 above.	Laboratory analytical results will be compared to published soil screening levels for human health (ingestion, dermal contact, and inhalation exposure pathways for a residential exposure scenario), soil leaching to groundwater, and ecological receptors. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways have been updated in the SIWP.
KRRC-16	LL		Section 3.6	In Section 3.6 Copco No. 2 Transformer Fire, subsection 3.6.2 Sampling Plan, only paragraph: The borings will be advanced via hand auger and/or a DPT rig and will be analyzed for **BTEX, TPH, PAHs, and PCBs (Table 3-6).** All sample locations will be marked and cleared for subsurface utilities prior to augering or drilling. Comment: Compare to what standards/exposure pathways? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Same as Comment 13 above.	Laboratory analytical results will be compared to published soil screening levels for human health (ingestion, dermal contact, and inhalation exposure pathways for a residential exposure scenario) and soil leaching to groundwater. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways have been updated in the SIWP.
KRRC-17	LL		Section 3.7	In Section 3.7 Copco No. 2 Former Mobile Oil Containment Building, subsection 3.7.2 Sampling Plan, second paragraph: If the soil within continuous cores is visually determined to be impacted by TPHs (staining, odor, or PID readings greater than 50 ppmv), then soil samples will be collected f**or analysis of BTEX, TPHs and PAHs.** Comment: Compare to what standards/exposure pathways? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Same as Comment 13 above.	The standards and exposure pathways are the same as for comment KRRC-16. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways have been updated in the SIWP.
KRRC-18	LL		Section 3.8	In Section 3.8 Copco No. 2 Underground Storage Tanks, subsection 3.8.2 Sampling Plan, entire subsection. Comment: Should include any other specific CA CUPA requirements for UST leak discovery C. [*sic*]	If contamination is found at any of the RECs, the REC will be moved into the proper cleanup program. Section 4 of the SIWP has been clarified to reflect this.

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-19	LL		Section 3.8	In Section 3.8 Copco No. 2 Underground Storage Tanks, subsection 3.8.2 Sampling Plan, second paragraph: For the purposes of this site investigation, it is assumed that one or more of the three USTs may have been or still is located at the approximate location of the former fuel pumps and USTs shown on Figure 3-10. To first determine whether any USTs are still in this area, ground-penetrating radar (GPR) surveys will be performed over a larger area around the Copco No. 2 Maintenance Building and east to Daggett Road (Figure 3-10). If USTs are located, the USTs will be removed in accordance with federal, state, and local regulations. [[*Has PacifiCorp consulted its own records?*]] Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on August 27, 2021 at 12:22 PM: The AECOM summary of conditions references potential UST's at JC Boyle, Copco 2 and the Iron Gate Fish Hatchery. Section 3.8 addresses Copco 2 – where are JC Boyle and IGH addressed?	PacifiCorp has consulted our own records, which indicate that there were two tanks that were removed in 1987. This is based on an UST inventory prepared in July 1987 that included tanks at this location. Internal documents dated November 4,1987 provided funding to remove these tanks and indicated that PacifiCorp had been granted an extension until December 1, 1987 to complete this work. An update to that inventory in November 15, 1988 indicates that there were no tanks at PacifiCorp California facilities meaning that the tanks at Copco No. 2 had been removed. Unfortunately, it appears that any closure records and documentation of that work is missing from the files. Because there are no closure records, the GPR survey should definitively indicate if the tanks have been removed or not. Soil sampling will indicate if there is any legacy contamination that needs to be addressed. Response to Additional KRRC Comment: Seven USTs were identified within the Copco No. 1, Copco No. 2, and Iron Gate developments and at the Iron Gate Fish Hatchery by AECOM (2018). Two USTs (one 1,000-gallon regular leaded gasoline UST and one 1,000-gallon unleaded gasoline UST) identified at 27734 Copco Road, Montague, California are located outside the removal work zone (AECOM 2018). Two USTs (one UST identified at the J.C. Boyle Powerhouse and one UST identified at the Iron Gate Hatchery located at Copco Star Route-Copco Road) are unmappable "orphan sites" (AECOM 2018). Three sources of additional information were reviewed or considered for these four USTs: *EnviroStor* (DTSC 2021), *Draft Buried Structures Site Investigation*. April (KPC 2020), and *GeoTracker* (SWRCB, 2021). No further information is available regarding the specific location of these four USTs or whether these four USTs have been removed. Additionally, these four USTs are not identified in Exhibit C of the Agreement and are therefore omitted from the SIWP. However, if these four USTs (or any other USTs for that matter) are discovered during dam removal activities, they will be removed under applicable regulations. The removal process for these would be included in the plan developed to address RECs 5, 9, or 13 as applicable (see comment KRRC-6). Three USTs (one 1,000-gallon regular leaded gasoline UST, one 1,000-gallon unleaded gasoline UST, and one 9,000-gallon UST) were identified at 19305 Daggett Road, Hornbrook, California (AECOM 2018) and are in Exhibit C of the Agreement and are therefore included in the SIWP.
KRRC-20	LL		Section 3.8	In Section 3.8 Copco No. 2 Underground Storage Tanks, subsection 3.8.2 Sampling Plan, fourth paragraph: If the soil within continuous cores is visually determined to be impacted by TPHs (staining, odor, or PID readings greater than 50 ppmv), then soil samples will be collected **for analysis of BTEX, TPHs and PAHs.** Comment: Compare to what standards/exposure pathways? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: PAC response may be satisfactory, need to see the revised version. (Exposure pathway).	The standards and exposure pathways are the same as for comment KRRC-16. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways have been updated in the SIWP.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-21	LL		Section 3.9	In Section 3.9 Copco No. 2 Burn Pit, subsection 3.9.2 Sampling Plan, second paragraph: Because of the variety of features and expected constituents, samples will be analyzed for some or all of the following constituents: **Title 22 metals, VOCs, SVOCs, TPHs, PAHs, dioxins, and furans (Table 3-9).** Comment: Compare to what standards/exposure pathways? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Same as Comment 20 above	The standards and exposure pathways are the same as for comment KRRC-10. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways have been updated in the SIWP.
KRRC-22	LL		Section 3.10	In Section 3.10 Iron Gate Shooting Range, subsection 3.10.2 Sampling Plan, last paragraph: Borings will be extended if visual observations indicate contamination is deeper. If groundwater is encountered in any of the borings, groundwater samples will be collected and analyzed for the same set of analytes as the soil samples. **Samples will be analyzed for Title 22 metals and PAHs.** Comment: Compare to what standards/exposure pathways? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Same as Comment 20 above	The standards and exposure pathways are the same as for comment KRRC-10. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways have been updated in the SIWP.
KRRC-23	LL		Section 3.11	In Section 3.11 Iron Gate Fish Hatchery Burn Pit, subsection 3.11.2 Sampling Plan, last paragraph: All samples collected from within and beneath the burn pit will be analyzed **for metals, TPHs, VOCs, SVOCs, dioxins, and furans (Table 3-11)**. The deeper unimpacted soil sample may be held for analysis pending the analytical results for the shallower unimpacted soil sample. Comment: Compare to what standards/exposure pathways? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Same as Comment 20 above	The standards and exposure pathways are the same as for comment KRRC-10. This has been clarified in the document. Response to Additional KRRC Comment: The standards/exposure pathways have been updated in the SIWP.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-24	LL		Section 4.1	In Section 4.1 Data Evaluation, second paragraph: To evaluate the potential contamination level at each REC, soil and groundwater analytical data will be compared to published screening levels. The screening level for the specific analyte at each REC located in California is taken as the lowest (most conservative) of screening levels from the following pathways and sources: [[*ARE THESE THE APPROPRIATE LEVELS IN LIGHT OF THE ANTICIPATED USE AS NATURAL HABITAT AND PASSIVE RECREATION AREA AFTER DAM REMOVAL?*]] Comment: Need to confirm consistent with CUPA etc. regulations. Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: PAC response not satisfactory. Per the Siskiyou County (the CUPA) website…"Siskiyou County Environmental Health is responsible for responding to incidents involving any release or threatened release of hazardous materials. Threats to people, property and the environment are assessed, and then remedial action procedures are conducted under the supervision of a Registered Environmental Health Specialist." It is recommended that the Siskiyou County CUPA be included in the investigation and the establishment of the site risks. If Jacobs believes this step is not statutorily required, please provide such regulation and/or case law.	Laboratory analytical results for sites with future uses of passive recreation and natural habitat will be compared to published soil screening levels for human health (residential exposure pathways), soil leaching to groundwater, and ecological receptors. This has been clarified in the document. The sites being investigated are not known hazardous waste generating sites and are therefore not regulated under a CUPA. Response to Additional KRRC Comment: The following has been added to section 4: "CUPA reporting will be provided as needed in compliance with California Health and Safety Code Section 25500, et. Seq. if hazardous waste in quantities exceeding 500 pounds solids or 55 gallons of liquids are generated or if any other actions trigger CUPA reporting. In the event that threats to people, property and the environment are identified, in accordance with the Siskiyou County CUPA requirements these threats will be assessed, and then remedial action procedures will be conducted under the supervision of a Registered Environmental Health Specialist."
KRRC-25	LL		Section 4.1	Second bullet: • Groundwater: Human health direct contact exposure (for carcinogenic and noncarcinogenic constituents) for ingestion, dermal contact, and inhalation exposure pathways for tapwater: Priority of 1) DTSC Human Health Risk Assessment Note 3 value for tapwater (DTSC 2020, Table 2); 2) EPA RSL for tapwater based on target cancer risk of 1 x 10-6 and target noncancer hazard of 1 (EPA 2021); 3) For petroleum hydrocarbons, SFRWQCB screening levels for tapwater (SFRWQCB 2019, Table GW-1). Comment: Need to confirm consistent with CUPA etc. regulations. Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Same as Comment 24 above.	The screening levels will be used to evaluate whether contamination is present at the sites. The sites being investigated are not known hazardous waste generating sites and are therefore not regulated under a CUPA. No changes to the SIWP were made. Response to Additional KRRC Comment: See response to Comment 24.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-26	LL		Section 4.1	Paragraph under Groundwater bullet: For certain metals in soil, the screening level selected from the criteria provided above may actually be lower than naturally occurring levels of metals in local soils, so published regional background soil data were considered when developing screening levels. **The 95 percent upper prediction level for the Klamath Mountains (ODEQ 2013)** will be used to represent background for all RECs; if a regional background level is higher than a screening level defined from the sources above, the background level is the default screening level for that specific metal in soil (Table 4-1). Comment: Is this appropriate for CA? Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on September 14, 2021 at 2:37 PM: Do not know if it is satisfactory. Point of clarification, Iron Gate may not be considered the Klamath Mountains.	Because the California sites are within the Cascade Range, using the 95 percent upper prediction levels for the Cascade Range (ODEQ 2013) are considered representative of background levels for each site. Background values specific to the Northern California Cascade Range are not available nor are they expected to be different from those across an arbitrary line that separates Oregon and California. Response to Additional KRRC Comment: Jacobs has determined that the proposed SIWP sites in California are within the Cascade Range. The California Cascade Range aligns with Cascade Range in Oregon. The SIWP has been revised to refer to the Cascade Range for background concentrations for metals.
KRRC-27	LL		Section 4.1	Second paragraph under Groundwater bullet: The soil screening levels for the specific analytes at the J.C. Boyle REC located in Oregon are taken as the lowest (most conservative) screening levels for Occupational, Construction Worker, Excavation Worker, and Leaching to Groundwater from the State of Oregon Department of Environmental Quality Risk-Based Concentrations for Individual Chemicals in Soil (ODEQ 2010). If no screening level is listed for an analyte from this source, then the lowest screening levels from the EPA Regional Screening Level for Industrial Soil (EPA 2019) are used. ***[[ARE THESE THE APPROPRIATE LEVELS IN LIGHT OF THE ANTICIPATED USE AS NATURAL HABITAT AND PASSIVE RECREATION AREA AFTER DAM REMOVAL?]]*** Comment: Is this appropriate for CA?	The SIWP has been updated to include a summary of the all the RECs, future uses for those areas, potentially complete exposure pathways, and the applicable screening levels for human health (changed from industrial to residential scenario), ecological receptors (added since draft SIWP), and soil leaching to groundwater exposure pathways. These changes apply to all RECs; OR and CA.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Klamath River Renewal Corporation					
KRRC-28	LL		Section 4.2	In Section 4.2 Reporting, the reviewer inserted the following tracked edits: A single report documenting the site investigations at all RECs will be prepared, with a section for each individual REC. The report will ~~briefly~~include PacifiCorp records reviewed and considered and will reasonably document field activities, summarize key field observations, and describe and provide reasons for any deviations from the SIWP. Analytical data will be provided and will be summarized in tables for each REC, identifying any exceedances of or revisions to the preliminary screening levels. ~~For RECs where analytical data do not exceed preliminary screening levels, no further action will be recommended. The investigation report will become the basis for determining that a REC has been resolved per the requirements of the Agreement and will be used to support the closure process.~~ Additional KRRC comment emailed by Lloyd Lowy to Demian Ebert (PAC) on August 27, 2021 at 12:22 PM: A single report documenting the site investigations at all RECs will be prepared, with a section for each individual REC. The report will ~~briefly~~include PacifiCorp records reviewed and considered and will reasonably document field activities, summarize key field observations, and describe and provide reasons for any deviations from the SIWP. Analytical data will be provided and will be summarized in tables for each REC, identifying any exceedances of or revisions to the preliminary screening levels. For RECs where analytical data do not exceed preliminary screening levels, no further action will be recommended~~. The~~, absent any considerations to the contrary under the Investigative Standard. In such instances the investigation report will become the basis for ~~determining that a~~requesting a determination that the REC has been resolved per the requirements of the Agreement and will be used to support the closure process. For RECs where preliminary screening levels are exceeded, the investigation report will recommend next steps that may include additional data collection and analysis, remediation, any regulatory requirements applicable to the REC and whether regulatory approvals are required, and a work plan for subsequent recommended actions.	At this time, the bulk of the PacifiCorp records reviewed are included in the Phase 1 reports that AECOM prepared. Those reports are available to the principal parties for review. Including them again in the report prepared to present the results of site-specific sampling is redundant. Should additional records be discovered that provide relevant information, those will be included in the report following SIWP implementation (e.g., UST records for Copco No. 2 – See Comment CA-19 above). The SIWP has been edited to reflect this. The SIWP implementation report will document field methods with a focus on those situations that forced a change from the SIWP or SAP. The level of detail will be adequate to allow the reader of that report to understand what happened and why. The suggestion that analytical laboratory data be provided is a good one, and the SIWP has been edited to reflect that. The suggested deletion of the paragraph describing what the report will recommend for sites where there is no contamination that exceeds screening levels creates an inconsistency with the paragraph that follows this one. That paragraph indicates the next steps to be taken where sites exceed screening levels. Should the suggested edit be made, that inconsistency would lead a reader of the SIWP to ask what happens to the sites where there is no contamination. No changes have been made Response to Additional KRRC Comment: Given the other edits made to this section of the SIWP before the additional comments from the KRRC were received by PacifiCorp, the suggested edits to the text were not incorporated.

[a] Except for comments KRRC-29 to KRRC-32, comments from Lloyd Lowy (LL) are extracted from the MS Word file named, *KRRC_Draft SIWP with Technical comments*. Prescriptive edits from the MS Word file (primarily wordsmithing changes) are not included in this comment table.

COMMENT MATRIX for the External Review Draft
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.	Reviewer Initials*	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
Oregon Department of Justice					
OR-1	CM		General	There needs to be an objective investigation and remediation standard for all work, and it needs to be something that Jacobs certifies (for reliance on by KRRC and the States). This is not a situation where PacifiCorp (with its greater situational knowledge) should be proposing something to see if we like it. Rather, given that knowledge, we need to rely on Jacobs certification that (a) all work meets or exceeds all applicable regulatory and legal requirements, and (b) that all work is consistent with current best practices (and if those are debatable, we are informed of the debate and the specific reasoning for the given choice).	The SIWP has been prepared by Jacobs with input from PacifiCorp and is consistent with industry practice. The SIWP is only an investigation plan – the first step in addressing potential contamination at these sites. At this time, it is unknown if there are any contamination issues at any of these locations. Remediation plans and/or additional investigation plans, as necessary, will be prepared based on the results of the investigation activities detailed in the SIWP. Our understanding is that an investigation plan does not require certification. The reporting that comes after implementation may require certification, but that is a step in the future. The SIWP has been separated into a California SIWP and an Oregon SIWP. All edits that addressed comments from the KRRC and California have been incorporated into the Oregon SIWP.
OR-2	CM		General	At the opening of the body of the partial report (Section 3) Jacobs asks KRRC to confirm that certain standards are appropriate for anticipated uses. KRRC is not the end user, the States are. The AKHSA describes generally the required and anticipated future uses on the property, and Jacobs needs to understand them. If Jacobs finds there to be a question, in a particular location, as to which standard is appropriate, inquiry may be made to the States, but in the absence of current definitive knowledge (which is likely given the sequencing of events) Jacobs must meet the higher standard.	PacifiCorp circulated the SIWP for review specifically so that the states and the KRRC could provide comments about these very issues. While the KHSA may have presented expected end uses, many things have changed regarding specific project implementation and restoration since the KSHA was drafted. As such, PacifiCorp has requested that the states and the KRRC confirm the end use for all the sites and will adjust screening levels as appropriate based on the input from those organizations. If multiple screening levels are appropriate for a given location, the more conservative (protective of whatever the end use might be) will be used. As PacifiCorp has stated, this process is intended to be transparent and collaborative to avoid misaligned expectations on issues like future uses and screening standards. No edits have been made to the SIWP.
OR-3	CM		General	The Jacobs partial report seems to straddle the line between being a technical document and also trying to serve as a legal document of some sort, which is inappropriate. The property transfer agreement is the legal document that this work serves. Sections 1.3 through 1.5 do not belong in any work plan. Please delete those elements from this plan and do not include it in any of the necessary future plans either.	Section 1.3 has been retained because it helps provide background context to anyone reading the SIWP as to why PacifiCorp is preparing the document and doing this work. Sections 1.4 and 1.5 have been deleted.
OR-4	CM		General	The partial report we are reviewing is identified as an "External Review Draft". As the work is performed, KRRC and the States will want to know that they are getting all the pertinent information, not a sanitized version. There should be no difference between versions circulated to PacifiCorp and to KRRC and the States going forward.	The draft SIWP that was provided to the states and the KRRC for review is the only version of this document and is the complete document; nothing has been "sanitized" or omitted from this document. The term 'External Review Draft' is a nonsubstantive label simply meant to differentiate this document from administrative drafts of the same document. No edits have been made to the SIWP.
OR-5	CM		General	In addition to the general implications of these comments on the specific proposal for the burn pit, at least one of the advance conclusions impacts Oregon. What is the basis for the conclusion that there are no USTs on the Oregon property? Please explain	As was discussed in the SIWP, site conditions at the various sites are based on work conducted by AECOM. AECOM did not identify any USTs historically or currently present on PacifiCorp property in Oregon in the Phase 1 documents they prepared (Section 1.1). Because of this, Exhibit C of the Property Transfer Agreement did not include any USTs in Oregon. The SIWP is based on those sites identified in Exhibit C. It is worth noting that there are RECs in Exhibit C that are directed at the undiscovered items. Should any USTs be discovered on PacifiCorp property in Oregon during dam removal, then the plan developed to address the unknown or undiscovered environmental conditions would be implemented. That plan has not yet been prepared.

*Chris Mathews (CM)

COMMENT MATRIX for the Draft Final
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.*	Reviewer Initials**	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
California Department of Water Resources / California Department of Fish and Wildlife - Office of Spill Prevention and Response					
California submitted no comments on the draft final SIWP.					
Klamath River Renewal Corporation					
KRRC comments emailed by Lloyd Lowy (KRRC) to Demian Ebert (PacifiCorp) on October 22, 2021, based on review of the Final Review Draft of the California SIWP and Final Review Draft of the Oregon SIWP submitted October 1, 2021					
KRRC-29	LL		ES, page ES-2 (both OR and CA SIWPs)	The last paragraph refers to an "Agreement A"; is that intended to be a reference to the Property Transfer Agreement? Please clarify. [this comment applies to both the California SIWP and Oregon SIWP]	The comment is correct. The text should have referenced the Property Transfer Agreement. The text "Agreement A" has been changed to "the Agreement" in both the Oregon and California SIWPs.
KRRC-30	LL		Section 1.5 (both OR and CA SIWPs)	At the end of the third paragraph please change "hazardous materials" to "hazardous substances, pollutants and contaminants." I think that's consistent with the intent and reflects the more typical formulation (mea culpa for proposing the initial phrase). [this comment applies to both the California SIWP and Oregon SIWP]	Text has been changed accordingly in both the Oregon and California SIWPs.
KRRC-31	LL		Section 3.1 (OR SIWP)	The list of compounds being tested for excludes a number that are included in the CA SIWP. Why is that? [this comment applies to the Oregon SIWP]	The OR SIWP presents only those compounds of interest at the J.C Boyle Dispersed Recreation Area – 2, a burn pit or fire ring. These compounds are consistent with the COPC for all burn pits being evaluated on the Lower Klamath Hydroelectric Project (including the three burn pits in California at the Copco No. 1 Debris Pile/Scrap Yard, Copco No. 2 Burn Pit, and Iron Gate Hatchery Burn Pit RECs). The COPC list in California is different because the California SIWP has many more RECs, and as a result, additional compounds of interest for which samples will be analyzed as compared to Oregon. No changes were made to the Oregon SIWP.
KRRC-32	LL		Section 4 (OR SIWP)	We echo Chris's question regarding the last paragraph [this comment applies to the Oregon SIWP]	See response to OR-6 below.
Oregon Department of Justice					
Oregon comments emailed by Chris Mathews to Demian Ebert (PacifiCorp) on October 22, 2021, based on review of the Final Review Draft of the Oregon SIWP submitted October 1, 2021.					
OR-6	CM		Section 4, page 4-1	There are some areas where the applicable regulatory standard with respect to Oregon work (inadvertently perhaps?) references California law or agreement. This drafting glitch was partially ameliorated in earlier drafts where there was language providing that an off-state standard was used when there was not an established standard in the other state. Since that language appears to have been removed, it is not clear when PacifiCorp is proposing to apply a CA standard in Oregon and why. An example of this problem occurs in the last paragraph of Sec 4 on p. 4-1.	This was an oversight and the last paragraph in Section 4 has been changed to the following: *If remediation waste is characterized as RCRA hazardous, the Oregon Department of Environmental Quality (ODEQ) will be notified via submittal of the Hazardous Waste Site Identification Form to obtain the RCRA Site Identification Number (i.e., the U.S. EPA ID Number) if required under RCRA and consistent with ODEQ guidance documents.*
OR-7	CM		3.2	Why is the order of regulation/standards to be used not OR, EPA, CA?	The Oregon SIWP has been modified in Section 3.2 to clarify that wastes will first be characterized to determine if it is hazardous as required by RCRA regulations, adopted by reference in the Oregon Administrative Code. The text has also been clarified to indicate that a non-RCRA hazardous waste determination would only be required for waste that will be disposed in California. The non-RCRA determination may be necessary because the final waste disposal site is not known at this time.

COMMENT MATRIX for the Draft Final
Lower Klamath Hydroelectric Project Site Investigation Work Plans
FERC No. P-14803
November 2021

No.*	Reviewer Initials**	Item Under Review	Section and Page No. / DWG No.	Comment	Response to Comment
OR-8	CM		Section 3.1, paragraph 2	Paragraph 2 of Section 3.1 references a CA specific agreement for Oregon work. We support such work being done but are unclear about the reference.	California requested that boreholes at five of the California RECs be extended to a depth of 6 feet (see comment CA-13). In a follow up meeting with California, it was agreed that approximately 20 percent of the borings would be advanced to a depth of 6 feet and samples collected at four depth intervals. PacifiCorp decided to apply this same approach at the J.C. Boyle REC so the sampling approach was consistent at the Oregon REC. The text was intended to explain the change in the sampling plan for the J.C. Boyle site. The Oregon SIWP has been edited to clarify the reason for taking this approach in Oregon.

* Numbering continues from previously submitted comments

** Chris Mathews (CM), Lloyd Lowy (LL)

REFERENCES

Bennett, R., D. Hoff, and M. Etterson. 2011. *Assessment of Methods for Estimating Risk to Birds from Ingestion of Contaminated Grit Particles*. U.S. Environmental Protection Agency, Ecological Risk Assessment Support Center, Cincinnati, OH. EPA/600/R-11/023.

Department of Toxic Substances Control (DTSC).1996. *Guidance for Ecological Risk Assessments at Hazardous Waste Sites and Permitted Facilities*. Part A: Overview. July 4. https://dtsc.ca.gov/ecological-risk-assessment-hero/

Department of Toxic Substances Control (DTSC). 1998. *Depth of soil samples used to set exposure point concentration for burrowing mammals and burrow-dwelling birds in an ecological risk assessments*. HERD ERA Note Number 1. California Environmental Protection Agency, Department of Toxic Substances Control. May 15. https://dtsc.ca.gov/wp-content/uploads/sites/31/2018/01/econote1.pdf.

Knight Piesold Consulting (KPC). 2020. *Draft Buried Structures Site Investigation*. April

State Water Resources Control Board (SWRCB). 2021. *Geotracker*. https://geotracker.waterboards.ca.gov/.

Tsao, C. L. M. Zafonte, B. J. Stanton, R. Donohoe, C. Rech., C. Huang, and M. J. Anderson. 2013. *Screening-Level Ecological Risk Assessment Approach for Quantifying Lead Ammunition Ingestion and Adverse Effects in Upland and Wetland Birds*. California Department of Fish and Wildlife, Office of Spill Prevention and Response. Poster presented at the 2013 California Department of Fish and Wildlife Scientific Symposium, Sacramento, CA. October 8 – 9.

Valoppi, L., M. Petreas, R. M. Donohoe, L. Sullivan, and C.A. Callahan. 2000. "Use of PCB Congener and Homologue Analysis in Ecological Risk Assessment." *Environmental Toxicology and Risk Assessment: Recent Achievements in Environmental Fate and Transport*. Ninth Volume, ASTM STP 1381, F. T. Price, K. V. Brix, and N. K. Lane, Eds., American Society for Testing and Materials, West Conshohochen, PA. 9:147-160.

US EPA. 2000. 40 CFR 131. *Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California (California Toxics Rule)*. 65 FR 31681. pp. 31681-31719. May 18.

US EPA. 2002. *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites*. Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Report No. EPA 540-R-01-003 / OSWER 9285.7-41.

US EPA. 2005a. *Ecological Soil Screening Level for Lead. Interim Final*. OSWER Directive 9285.7-70. Office of Solid Waste and Emergency Response, Washington, DC. March. https://www.epa.gov/risk/ecological-soil-screening-level-eco-ssl-guidance-and-documents.

US EPA. 2005b. *Uniform Federal Policy for Quality Assurance Project Plans.* DoD and DOE Intergovernmental Data Quality Task Force. EPA-505-B-04-900A. DoD Pub. No. DTIC ADA427785. March.