

UPPER COLUMBIA RIVER

Work Plan for the Soil Amendment Technology Evaluation Study Phase II: Bench-Scale Treatability Studies Soil Collection

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ACRONYMS AND ABBREVIATIONS

CCT	Confederated Tribes of the Colville Reservation
DU	decision unit
EPA	U.S. Environmental Protection Agency
RI/FS	remedial investigation and feasibility study
SATES	Soil Amendment Technology Evaluation Study
SOP	standard operating procedure
TAI	Teck American Incorporated
UCR	Upper Columbia River

UNITS OF MEASURE

mm	millimeter(s)
mg/kg	milligram(s) per kilogram
µm	micrometer(s)

1 INTRODUCTION

The Soil Amendment Technology Evaluation Study (SATES) program is designed to identify and field test a soil amendment technology or technologies that could appropriately and cost-effectively reduce the long-term potential for human exposure to lead in shallow soils in the Upper Columbia River (UCR) site (herein the ‘Site’) (U.S. Environmental Protection Agency [EPA] 2016).¹ The background, purpose, and description of the SATES program and the participants are detailed in the Phase I Work Plan (Ramboll 2017a) and the Phase I Work Plan Addendum (Ramboll 2017b). The program is subdivided into four phases including:

- Phase I – Test plot characterization and amendment alternatives screening
 - Phase IA – Test plot screening and selection (Part 1) and baseline soil characterization (Part 2)
 - Phase IB – Soil amendment technology screening and design
- Phase II – Bench-scale treatability studies
- Phase III - Test plot field implementation
- Phase IV – Test plot monitoring.

Phase II of the SATES program is composed of laboratory bench-scale treatability studies designed to test soil amendment options. The results of the bench-scale treatability studies will inform selection of amendment options that will advance to the field-scale pilot application in Phase III.

The objectives of the Phase II bench-scale treatability study are to 1) determine if soil amendments show potential to reduce lead bioaccessibility, 2) determine the impact of amendments on key soil chemical and physical properties, and 3) obtain data that can be used to reduce uncertainty about selection of amendment technologies for pilot field-scale testing. Soil amendments to be assessed are presented separately in the Phase IB technical memorandum. The information obtained from this treatability study will be considered with other remedial technologies to develop alternatives studied in the Site Feasibility Study.

Field testing of the selected soil treatment or treatments will occur within decision units (DUs) 258, 401, and 441 in tribal allotments sampled during the 2014 residential soil sampling study (CH2M Hill 2016). Six initial test plot areas within these DUs were selected based on criteria described in the Phase I Work Plan (Ramboll 2017a). Of these, four test plots (258-3, 401-1, 401-2, and 441-1) were selected for potential use for pilot soil amendment testing based on results of additional

¹ This work is to be completed as part of the ongoing UCR remedial investigation and feasibility study (RI/FS) TAI is conducting under U.S. Environmental Protection Agency (EPA) oversight, as required by the Settlement Agreement between Teck American Inc. (TAI) and EPA, dated June 2, 2006.

detailed characterization completed during Phase IA. The selected test plots at the associated DUs are shown in Figure 1-1.

The work plan for the SATES Phase II bench-scale treatability studies is presented as two separate documents: the soil sample collection work plan (this document) and the work plan for the bench-top laboratory (treatability study) components. The objective of the Phase II soil sample collection task is to obtain soil that is representative of test plot conditions to be used in laboratory bench-scale treatability testing to evaluate the efficacy of soil amendment options for the test plots. This work plan contains a discussion of the key process elements for this phase which include collection and compositing of a soil sample for bench-scale treatability testing.

This work plan is organized into five sections: Section 1 - Introduction; Section 2 - Soil Collection Study Design; Section 3 - Methods; Section 4 - Quality Assurance and Quality Control; and Section 5 - References.

2 SOIL COLLECTION STUDY DESIGN

The field work component of Phase II is designed to obtain one composite soil sample that is representative of the test plot areas that will receive treatment alternatives at the field-scale in subsequent SATES phases. The following criteria are used to select soil collection locations in the test plots for the Phase II bench-scale treatability study:

- Soil lead concentrations > 800 milligrams per kilogram (mg/kg);
- Soil lead mineralogy representative of potential treatment areas;
- Soil lead bioaccessibility greater than 60%; and
- Consistency of soil physiochemical characteristics (e.g., pH, organic carbon, grain size) representative of the potential treatment test plots.

This section discusses (1) sample collection planning, (2) the sample location selection process, and (3) the minimum sample mass required to be collected.

2.1 SAMPLE COLLECTION PLANNING

Prior to implementation of field activities, permits will be obtained from the U. S. Bureau of Indian Affairs and the Confederated Tribes of the Colville Reservation (CCT), the tribal allotment landowners' representative. A cultural resources coordination plan has been prepared for Phase II sample collection (Appendix A). Standard operating procedure (SOP) 1 in Appendix B summarizes cultural resources monitoring protocol.

Sampling activities will be conducted in accordance with the health and safety plan addendum for the field effort, which is included in Appendix C. This document is an addendum to the general UCR site health and safety plan (SHSP, TAI 2009).

2.2 SAMPLE LOCATION SELECTION

Sample locations considered for this phase are in test plots 258-3, 401-1, 401-2, and 441-1. Each test plot is subdivided into four 50-foot by 50-foot-square sub-plots (A, B, C, D) that are designed for future application of three treatments and one control within each test plot. The interior of each of the four sub-plots includes a 4-foot buffer that will not be tested in the Phase III field application of soil amendments. These buffer areas are designated as potential overspill areas for the planned future remedy materials between sub-plots. The 4-foot buffer areas extend into grid rows E and F and columns 5 and 6 at each test plot, which are grid designators established during the Phase IA Part 1 discrete soil sampling and are shown in Figure 2-1. Soil samples for the bench-scale testing will be collected from these buffer areas within the test plots.

Based on the criteria presented in the introduction to this section, and on the sample volume requirements discussed in Section 2.3, several locations meeting the sample location selection criteria were identified in test plots 401-1, 401-2 and 441-1 (see Table 2-1). Note that the buffer areas of test plot 258-3 are omitted from Table 2-1 because none of the grid squares in those buffer areas meet each of the criteria established in Section 2. Test plot 401-2 has the largest number of soil sample grid locations that do meet the criteria, and thus has the largest area available for soil sample collection from a variety of locations in the test plot (i.e., includes grid locations from each of the sub-plots A, B, C, and D). Based on these conditions, test plot 401-2 is selected as the most appropriate test plot for collection of a composite soil sample that will provide representative soil for bench testing. The composite sample will include sixteen discrete soil samples collected to form the single composite sample as highlighted in Table 2-1 and shown Figure 2-1.

2.3 MINIMUM SAMPLE MASS REQUIRED

Minimum sample sizes for each discrete sample of the composite soil sample were conservatively calculated as described in this section to ensure the collection of sufficient soil mass for laboratory analysis. The bench scale study will utilize approximately 1.1 pounds (approximately 500 grams) of soil with grain size of less than 2 millimeters (< 2-millimeter soil) per pot. The number (#) of pots can be calculated as follows:

of treatments x # of application methods x # of application rates x # of replicates x # of performance monitoring events

A conservatively high estimate of soil quantity includes the expectation of evaluating 10 treatment alternatives (including combinations of soil amendments), 2 application methods, 2 application rates, 4 replicate evaluations, and 3 performance monitoring sampling events. The calculation of the mass of soil based on these assumptions results in a requirement of a minimum of 528 pounds of < 2-millimeter soil (calculated by number of pots x soil per pot = [10 x 2 x 2 x 4 x 3] x 1.1 pounds). The estimated sample masses for each discrete sample location were calculated using the following equation and data in Table 2-2:

$$M = L \times W \times D \times \rho \times S$$

Where:

M = Mass of < 2 millimeter collected (pounds)

L = length of collection area (feet)

W = width of collection area (feet)

D = depth of collection area (feet)

ρ = bulk density (pounds per cubic foot)

S = < 2 millimeter soil mass ratio, which is calculated as: 100 – percent of gravel in soil/100.

Collection of the required soil mass will be accomplished by the soil sample collection program summarized in Table 2-2. This approach will allow the collection of approximately 863 pounds of soil and approximately 548 pounds of < 2-millimeter soil, which will allow sufficient soil for the planned bench testing and will supply additional soil for quality control testing and archiving (up to an additional 20 pounds of < 2-millimeter soil).

Field personnel will confirm that adequate mass will be collected using the soil sampling device(s) selected for use in the field.

Collected sample masses can be predicted using the following equation:

$$M = \rho \times n \times D \times L \times W$$

Where:

M = targeted mass of sample (pounds)

ρ = soil bulk density (pounds per cubic foot)

n = number of discrete samples

D = sampling depth (foot)

L = length of sample area (foot)

W = width of sample area (foot)

3 SOIL COLLECTION METHODS

This section summarizes the field sample collection and analysis program. A brief overview of the discrete sample collection and composite soil sample development procedure is provided below and described in more detail in Surface Soil Sample Collection for Soil Amendment Bench-Scale Treatability Study (SOP-2 in Appendix B).

The field sampling team will have the necessary knowledge and experience to perform the field activities. Such knowledge includes direct experience with specified sampling gear and soil sample collection. Each crew member will be familiar with this work plan and will participate in project area and equipment orientation prior to initiating sample collection. Note that soil sampling activities in the study area will require compliance with the cultural resource coordination plan and SOP-1 in Appendix A and Appendix B, respectively. If required, a qualified cultural resource specialist will inspect all excavated soils.

Soil samples will be collected from locations within the transition buffer area, in grid cells specified in Table 2-1 and shown in Figure 2-1. Sample locations will be identified using measuring tapes from established and marked corners and mid-points on the perimeter of the test plot. The field sampling team will verify the orientation of the measuring tapes and the sample position by measuring the azimuth from the topline, bottomline, leftline, and rightline of the test plot with a compass. The discrete soil samples will only be collected from sub-plot areas within the 4-foot buffer between adjacent sub-plots (i.e., the transition buffer area) to preserve the sub-plot soil in the non-buffer areas where soil amendments will be applied, and test plot amendment evaluation soil samples will be collected in future study phases. Soil collection locations will be laid out as close to the grid cell center as possible while remaining within the 4-foot transition buffer area between adjacent sub-plots.

Soils in the sampling areas must be relatively dry (i.e., no visible moisture present) at the time of collection to reduce shipping weight and minimize risk of anaerobic biological activity during shipping. Meteorological websites will be consulted to ensure that rain is not forecasted for the sample collection period and has not occurred in the study area 48 hours before the planned sample collection event. If rain is forecasted or occurs within 48 hours prior to the planned sampling event, the field sampling team will notify the field supervisor, TAI technical team coordinator, and the TAI project coordinator.

At each sampling location, vegetation and surface debris (e.g., woody debris, undecomposed leaves and pine needles, and surficial rocks) will be cleared from the sample location using a decontaminated sampling tool. Care should be taken to not remove materials that are partially incorporated into the soil, such as compressed, decomposing vegetation. The resulting surface will be considered the 0-inch depth. Soil samples will be collected at selected locations from a 2-foot by

2-foot area to a depth of 3 inches using a new, decontaminated trowel or equivalent sampling device.

At each location, before any soil is collected, a field portable x-ray fluorescence (XRF) analyzer will be used to screen soil for concentrations of lead. The XRF unit will be specifically calibrated for screening metals in soil. Two screening measurements will be completed on *in situ* soil in each sample collection location:

- One measurement will be completed on *in situ* soil at the ground surface once vegetation and surface debris have been cleared; and
- One measurement will be completed at a depth of 1 inch.

If XRF readings indicate sample lead concentrations are less than 800 mg/kg, the field sampling team will notify the field supervisor, TAI technical team coordinator, and the TAI project coordinator to discuss and determine how to proceed. Sampling equipment will be decontaminated prior to mobilization to the field using methods specified in SOP-3, and, as noted in SOP-3, dry decontamination methods will be conducted between discrete samples. Sample custody management will be conducted in accordance with the Sample Custody procedures (SOP-4) included in Appendix B. The soil will be stored and packaged for shipping in accordance with the sample storage, packaging, and shipping procedures described in SOP-2 in Appendix B.

If unanticipated or changed circumstances occur in the field, the field supervisor will institute the necessary corrective actions, complete a corrective action record (an example is included with the Field Forms in Appendix D), and either ensure that the appropriate procedures are followed or complete a change request form. Changes will be noted by the field supervisor in the field log, and a change request form will be completed for the project files and submitted to EPA. Any problems that cannot be easily resolved or that affect the final quality of the work product will be brought to the attention of the TAI technical team coordinator, TAI project coordinator, and EPA.

4 QUALITY ASSURANCE AND QUALITY CONTROL

4.1 DOCUMENTATION AND RECORDS

Procedures for field documentation and records are described in Section 6 of the Phase I Work Plan. Sections that are specifically applicable to the Phase II soil sample collection include: Section 6.1 Field Documentation, Section 6.3 Data Reporting Requirements (specifically Section 6.3.1 Field Data Reporting), and Section 6.4 Project Files. The detailed SOP for field documentation from the Phase I Work Plan is included in Appendix B (SOP-5).

4.2 DATA MANAGEMENT

Procedures for field data management are described in Section 14 (specifically, Section 14.4.2 Field Observations) of the Phase I Work Plan.

4.3 ASSESSMENT AND RESPONSE ACTIONS

Procedures for assessment and response actions are described in Section 15 of the Phase I Work Plan. Sections that are specifically applicable to the Phase II soil sample collection include: Section 15.1 Field Audits and Section 15.3 Corrective Action (Section 15.3.1 Field Data Reporting).

4.4 REPORTS TO MANAGEMENT

Procedures for reports to management are described in Section 16 (specifically, Section 16.1 Field Reports) of the Phase I Work Plan.

4.5 DATA REDUCTION AND REVIEW

Procedures for data reduction and review are described in Section 17 of the Phase I Work Plan. Sections that are specifically applicable to the Phase II soil sample collection include: Section 17.1 General and Section 17.2 Field Data Reduction and Review.

5 REFERENCES

- CH2M Hill. 2016. UCR residential soil study field sampling and data summary report. Prepared for U.S. Environmental Protection Agency, Region 10. February.
- Ramboll. 2017a. Final work plan for the soil amendment technology evaluation study (SATES), phase I: Test plot characterization and initial amendment alternatives evaluation. Prepared for Teck American Incorporated, Seattle, WA. July.
- Ramboll. 2017b. Addendum - soil amendment technology evaluation study (SATES) final work plan for the soil amendment technology evaluation study, phase I: test plot characterization and initial amendment alternatives evaluation. Prepared for Teck American Incorporated, Seattle, WA. September 29.
- Teck American Incorporated. 2009. Upper Columbia River general site health and safety plan for the remedial investigation and feasibility study. Prepared for Teck American Incorporated. Integral Consulting Inc., Mercer Island, Washington, and Parametrix, Bellevue, Washington.

FIGURES

Legend

-  Selected Decision Units (DU)
-  SATES Test Plot
-  Tribal Allotment (TA) Boundaries
-  Test Plots Selected for Phase IA Characterization and Field-scale Soil Amendment Pilot Testing

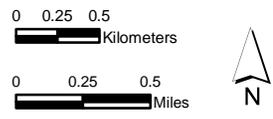
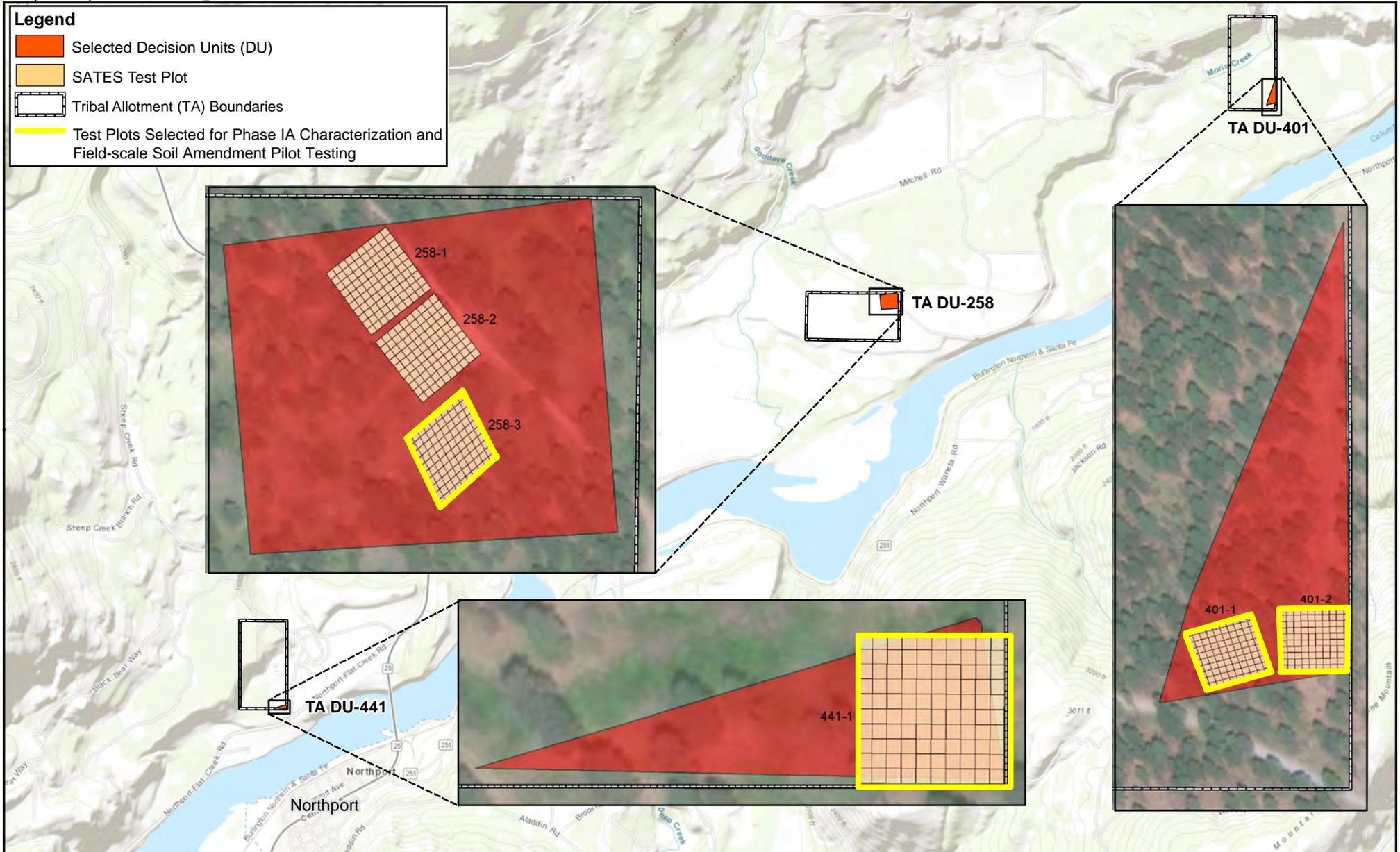
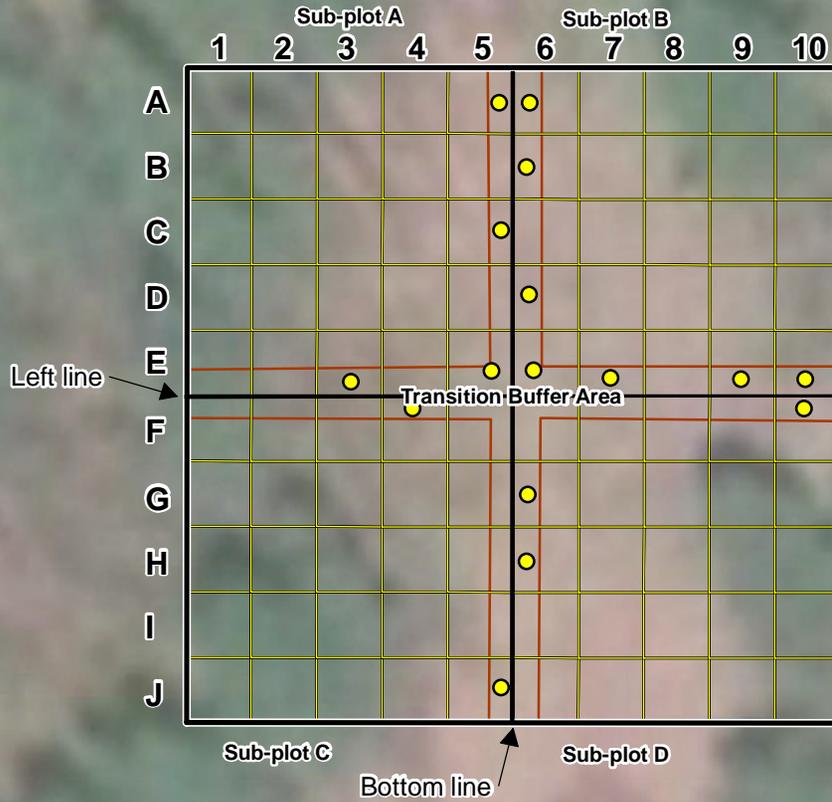


Figure 1-1
Test Plot Decision Units
Upper Columbia River SATES Program



Legend

- Soil Collection Location
- Test Plot Location
- Test Plot Sampling Grid
- Selected Decision Unit

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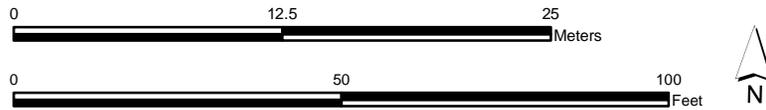


Figure 2-1
Test Plot 401-2: Phase II Bench-Scale Treatability Study Soil Collection Locations
 Upper Columbia River SATES Program

TABLES

Table 2-1: Lead Concentrations by Grid Location from Phase IA Part 1 and Discrete Soil Sample Collection Locations

DU	Sub-plot	Grid Location	Discrete Sample Grid Lead (mg/kg)	Increment Composite Lead (mg/kg)	Increment Composite Lead IVBA (%)
401-1	B	6D	819	1,230	65.3
401-1	C	3F	1,020	1,320	78.4
401-1	D	6I	831	1,450	73.4
401-2	A	A5	1,130	1,587	76.7
401-2	A	C5	858		
401-2	A	E5	1,040		
401-2	A	E3	943		
401-2	B	A6	1,020	964	82.2
401-2	B	B6	839		
401-2	B	D6	1,430		
401-2	B	E6	1,020		
401-2	B	E7	1,010		
401-2	B	E9	1,080		
401-2	B	E10	1,370		
401-2	C	F4	1,800	1,350	68.9
401-2	C	J5	893		
401-2	D	G6	907	1,180	77.5
401-2	D	H6	1,000		
401-2	D	F10	809		
441-1	A	E3	893	552	76.9
441-1	B	A6	1,130	556	78.6
441-1	B	B6	2,150		
441-1	B	E6	809		
441-1	B	E7	831		
441-1	D	F9	1,060	441	81.4

Note:

Only the grid locations from Phase IA Part 1 that meet the criteria defined in Section 2 of this work plan are included in the table. The buffer areas of test plot 258-3 are omitted from this table because none of the grid squares in buffer areas meet the criteria established in Section 2.

Grid locations shaded gray are selected soil collection locations for the Phase II bench-scale treatability soil collection event.

IVBA = in vitro bioaccessibility

mg/kg = milligrams per kilogram

Table 2-2: Minimum Sample Mass Summary

DU	Sub-plot	Grid Location	Cf ^a	Bulk Density (Pcf ^b)	Bulk Soil Mass per Discrete Sample (lbs)	Percent of Gravel in Soil ^c (%)	Amount of < 2 mm Soil (lbs)
401-2	A	A5	1	62.1	62.1	28.5	44.4
401-2	A	C5	1	62.1	62.1	28.5	44.4
401-2	A	E5	1	62.1	62.1	28.5	44.4
401-2	A	E3	1	62.1	62.1	28.5	44.4
401-2	B	A6	1	47.3	47.3	36.7	29.9
401-2	B	B6	1	47.3	47.3	36.7	29.9
401-2	B	D6	1	47.3	47.3	36.7	29.9
401-2	B	E6	1	47.3	47.3	36.7	29.9
401-2	B	E7	1	47.3	47.3	36.7	29.9
401-2	B	E9	1	47.3	47.3	36.7	29.9
401-2	B	E10	1	47.3	47.3	36.7	29.9
401-2	C	F4	1	81.0	81.0	42.7	46.4
401-2	C	J5	1	81.0	81.0	42.7	46.4
401-2	D	G6	1	40.7	40.7	44.3	22.6
401-2	D	H6	1	40.7	40.7	44.3	22.6
401-2	D	F10	1	40.7	40.7	44.3	22.6
Total					863.1	NA	547.8

^aCf = cubic feet

^bPcf = pound per cubic foot, calculated from data generated in Phase I

^cPercent of Gravel in Soil = gravel % calculated from data generated in Phase I (calculated as: % gravel = 100*[gravel (> 2 mm) mass/bulk soil mass])

lbs = pounds

mm = millimeter

APPENDICES

APPENDIX A
CULTURAL RESOURCE COORDINATION PLAN

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ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
APE	area of potential effects
ARPA	Archaeological Resources Protection Act of 1979
bgs	below ground surface
CCT	Confederated Tribes of the Colville Reservation
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CRCP	cultural resources coordination plan
DAHP	Washington State Department of Archaeology & Historic Preservation
DU	decision unit
EPA	U.S. Environmental Protection Agency
FE	fundamental error
FOIA	Freedom of Information Act
FSP	field sampling plan
HHRA	human health risk assessment
IC	incremental composite
Lake Roosevelt	Franklin D. Roosevelt Lake
MOA	Memorandum of Agreement
NAGPRA	Native American Graves Protection and Repatriation Act
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPS	National Park Service
QAPP	quality assurance project plan

RCW	Revised Code of Washington
RI/FS	remedial investigation and feasibility study
RM	river mile
SATES	Soil Amendment Treatability Evaluation Study
SHPO	State Historic Preservation Officer
Site	Upper Columbia River site
STI	Spokane Tribe of Indians
TAI	Teck American Incorporated
THPO	Tribal Historic Preservation Officer
UCR	Upper Columbia River
USBR	U.S. Bureau of Reclamation
WAC	Washington Administrative Code

UNITS OF MEASURE

cm	centimeter(s)
g	gram(s)
in.	inch(es)
µm	micron(s)
mm	millimeter(s)
ppm	part per million

1 INTRODUCTION

This document presents the cultural resources coordination plan (CRCP) for the Upper Columbia River (UCR) site (herein the ‘Site’) remedial investigation and feasibility study (RI/FS). Emphasis is placed on sampling activities associated with the 2018 Phase II Soil Amendment Treatability Evaluation Study (SATES) to be conducted within the UCR Study Area, as defined by the *Work Plan for the Soil Amendment Technology Evaluation Study Phase II: Bench-Scale Treatability Studies Soil Collection* (Ramboll 2018).

1.1 BACKGROUND

As specified in the Statement of Work associated with the June 2, 2006 Settlement Agreement (USEPA 2006), “For all RI/FS activities at the Site involving sediment collection or ground penetration/disturbance, the Company shall work with the potentially affected parties to assess the effects of the planned work and seek ways to avoid, minimize or mitigate any adverse effects on historic properties.” The purpose of this CRCP is to describe known or likely physical impacts of proposed sediment/soil sampling, provide relevant background information, define measures for protecting resources, and define procedures for consulting with the appropriate state, federal, and tribal parties with interests in the cultural resources of the Site and surrounding areas for this study.

The Site is located wholly within the state of Washington and includes approximately 150 river miles of the Columbia River extending from the U.S.-Canada border to the Grand Coulee Dam and those areas in proximity to such contamination necessary for implementation of the response actions described in the 2006 Settlement Agreement. The Colville Indian Reservation borders the UCR from approximately river mile (RM) 690 to the Grand Coulee Dam. The Spokane Indian Reservation borders the UCR to the east from approximately RM 650 to RM 640. Franklin D. Roosevelt Lake (Lake Roosevelt) and associated lands are administered by the U.S. Bureau of Reclamation (USBR) and the National Park Service (NPS) of the U.S. Department of the Interior.

The U.S. Environmental Protection Agency (EPA) has responsibilities under the National Historic Preservation Act (NHPA) to consider how its undertakings would affect historic properties. As defined in the NHPA, “historic properties” include archaeological resources, historic-period buildings and structures, and traditional cultural places listed in or determined eligible for listing in the National Register of Historic Places (National Register). To meet the NHPA requirements, EPA must ensure that sampling and other activities would avoid, minimize, or mitigate any adverse effects on any historic properties.

The CRCP is organized into six sections, as follows: 1) this introductory section, which includes summary information on the archaeology, prehistory, Native peoples, and Euroamerican historical development of the project area; 2) an overview of the relevant federal, state, and tribal laws and regulations, and other appropriate procedures and requirements; 3) a description of the proposed sampling program; 4) a plan for coordination and consultation with all affected parties to address known and likely impacts on cultural resources in implementing the proposed work; 5) a list of references; and 6) a glossary of terms.

1.2 CULTURAL SETTING

The broader context of the cultural development of the upper Columbia region provides the critical framework for understanding the importance of cultural resources in the area. Archaeological and historical resources reflect broad patterns of cultural use and development, just as ongoing traditional use of areas and natural resources represents cultural continuity that can be important to individual and social identities. This section of the CRCP serves as a brief introduction to the cultural history of the upper Columbia region. The primary source of information on the prehistory of the area is Goodal et al. (2004); for Native peoples, the source is Kennedy and Bouchard (1998); and for Euroamerican history, McKay and Renk (2002).

Archaeological research contributes significantly to our understanding of the prehistoric past. In the upper Columbia region, systematic archaeological research began in the late 1930s and has continued to the present. Almost 500 archaeological resources have been recorded in and along Lake Roosevelt, representing prehistoric, protohistoric, ethnohistoric, and historic-period human use and occupation. Research at some of these resources has provided the outlines of prehistoric cultural development in the upper Columbia region. Human presence in the region extends back at least 11,000 years. These first humans lived in small groups and were mobile foragers, hunting and gathering plants. The presence of the Columbia River led to an early focus on the abundance of riverine sources. Beginning about 8,000 years ago, populations appear to have increased and led to a gradual trend to less mobility and more permanent settlements. The growing population also led to use of a greater diversity of resources and increasing reliance on fish.

Permanent settlements increased in size and became concentrated in the river valleys beginning about 6,000 years ago, probably in response to continued population growth. Use of resources in upland areas expanded to meet the needs of the burgeoning populations and settlements. These trends continued until about 1,000 years ago, when there is evidence for a decline in population size. There were fewer settlements, villages were smaller, and there was less use of upland areas.

Cultural patterns of the late prehistoric period were reflected in the lives of the Native peoples at the time of Euroamerican contact. At the time of contact, the UCR was the homeland of the Lakes, Colville, Spokane, and Sanpoil peoples. The Lakes people occupied the Columbia River valley from the vicinity of modern Northport, WA, north into the Arrow Lakes area of modern British Columbia. The Colville lived along the river downstream of the Lakes as far as around the mouth of the Spokane River. Downriver of the Colville were the Spokane, in the Spokane River drainage, and the Sanpoil, who lived along the Columbia River from around the mouth of the Spokane River to near the modern location of the Grand Coulee Dam.

All of these groups spoke Interior Salish languages and shared many cultural features. Their cultural differences largely reflected differences in the local environments in which they lived. The social, political, and economic foundation of these groups was historically the winter village. The villages were concentrated in the river valleys, and each village was politically independent. Residents of the villages relied on provisions gathered, dried, and stored during the summer to survive through the winter. With the coming of spring, families began moving out of the winter village and shifting among the warm-season camps near resource locations. Gathering of plants and hunting game in upland areas were important subsistence activities during this season, but salmon constituted the most important food staple. Kettle Falls was a major aboriginal fishery, attracting people from throughout the region.

Native life began to change with the introduction of elements of Euroamerican culture. Horses reached the region in the 1700s and significantly changed Native travel and transportation. European diseases such as smallpox appeared in the late 1700s and had disastrous consequences for Native groups. Populations may have declined as much as 80 percent between the 1780s and 1840s. Direct contact with Euroamericans came in the early 1800s, when fur-trade posts were established on the Spokane River and at Kettle Falls.

When American settlement began in the 1840s, it bypassed the upper Columbia region. The discovery of gold in the region in the 1850s led to a major influx of Americans and growing conflict between the new settlers and Indian groups. A series of treaties with Indian groups were signed in 1855 but did not include the peoples of the upper Columbia region. As American settlement continued, the federal government responded by Presidential Executive Order creating the Colville Reservation in 1872 for the Colville, Spokane, Methow, Okanogan, Sanpoil, Lakes, Calispel, Coeur d'Alene, and scattering bands. Separate reservations were later set aside for the Spokane, Calispel, and Coeur d'Alene Tribes. Both the Colville and Spokane reservations have subsequently lost lands to the allotment process in the late 1800s and early 1900s and inundation from the waters of Lake Roosevelt. The Colville Reservation is now home to the 12 tribes that comprise the

Confederated Tribes of the Colville Reservation (CCT); the Spokane Reservation is the home of the Spokane Tribe of Indians (STI).

As already noted, the direct Euroamerican presence in the upper Columbia region began with the establishment of fur-trade posts on the Spokane River and at Kettle Falls. These posts were constructed between 1810 and 1825. The fur traders were followed by Christian missionaries in the 1830s and 1840s. A more substantial Euroamerican presence in the region developed in the 1850s, with the discovery of gold near Fort Colville. Conflicts between miners and Indians led to a military campaign in the Spokane River valley in 1858 and the establishment of an army post (Fort Colville) near Kettle Falls in 1859.

American settlement in the UCR drainage accelerated in the 1860s, initially spurred by mining. Farmers eventually followed the miners, but agricultural activity was limited until the construction of the Spokane Falls and Northern Railway through the region in 1890. With improved access to markets, farming—especially orchard crops—developed as one of the economic mainstays of the area, although mining has continued to play an important role.

The growing demands for agriculture led to plans to construct a dam at Grand Coulee. The dam would provide water for irrigation and inexpensive hydroelectric power. Construction of the dam began in 1934 and was completed in 1942. More than 82,000 acres above the dam was flooded, resulting in the relocation of 11 towns and about 3,000 residents. Since its creation, Lake Roosevelt has provided a growing number of recreational and tourist activities, which have become increasingly important to local economies.

2 OVERVIEW OF LAWS AND REGULATIONS

Implementation of the SATES sampling plan will require activities on privately owned lands and tribal allotments. This overview therefore includes a brief description of relevant federal and state law, executive orders, and tribal laws and regulations.

2.1 FEDERAL LEGISLATION AND REGULATIONS

An overview of federal legislation and regulations is provided below. There are three key laws relevant to Site RI/FS activities. The NHPA guides all federal agency actions that could affect cultural resources. Implementation of the RI/FS constitutes an “undertaking” as defined in the NHPA; therefore, complying with the NHPA requirements is the responsibility of EPA. The Archaeological Resources Protection Act (ARPA) of 1979 and the Native American Graves Protection and Repatriation Act (NAGPRA) apply to activities that could affect archaeological resources and Indian burials on federal and tribal lands. These laws and their implementing regulations would therefore apply to RI/FS activities conducted on federal and tribal lands.

2.1.1 National Historic Preservation Act of 1966, as Amended through 1992 (16 USC 470-470w)

The NHPA is the centerpiece of federal legislation protecting cultural resources. In the Act, Congress states that the federal government will “provide leadership in the preservation of the prehistoric and historic resources of the U.S.,” including resources that are federally owned, administered, or controlled. For federal agencies, Sections 106 and 110 of the Act provide the foundation for how federal agencies are to manage cultural resources, but other sections provide further guidance. The implementing regulations for the NHPA are in 36 Code of Federal Regulations (CFR) Part 800. These regulations are summarized below.

Section 106

Similar to the National Environmental Policy Act of 1969 (NEPA), Section 106 of the NHPA requires federal agencies to take into account the effects of their actions or programs, specifically on historic and archaeological properties, prior to implementation. This is accomplished through consultation with the State Historic Preservation Officer (SHPO) and/or the Advisory Council on Historic Preservation (ACHP). On lands held by a tribe with a Tribal Historic Preservation Officer (THPO), the THPO has the same duties and responsibilities as the SHPO. If an undertaking on federal lands may affect properties having historic value to a federally recognized Indian tribe, such tribe shall be afforded the opportunity to participate as interested persons during the consultation process defined in

36 CFR 800. Compliance can also be accomplished using agreed-upon streamlined methods and agreement documents such as programmatic agreements.

The Section 106 process is designed to identify possible conflicts between historic preservation objectives and the proposed activity, and to resolve those conflicts in the public's interest through consultation. Neither the NHPA nor the ACHP's regulations require that all historic properties be preserved. Rather, they only require the agency proposing the undertaking to consider the effects of the proposed undertaking prior to implementation.

Failure to take into account the effects of an undertaking on historic or cultural properties can result in formal notification from the ACHP to the head of the federal agency of foreclosure of the ACHP's opportunity to comment on the undertaking pursuant to NHPA. A notice of foreclosure can be used by litigants against the federal agency in a manner that can halt or delay critical activities or programs.

The process for compliance with Section 106 consists of the following steps:

1. **Identification of Historic Properties**—Identification of historic properties located within the area of potential effects (APE) is accomplished through review of existing documentation and/or field surveys.
2. **Property Evaluation**—Evaluation of the identified historic properties using National Register criteria (36 CFR Part 63) in consultation with the SHPO and, if necessary, the ACHP. Properties that meet the criteria will be considered "Eligible" for listing in the National Register, and will be subject to further review under Section 106. Properties that do not meet the criteria will be considered "Not Eligible" for listing in the National Register, and will not be subject to further Section 106 review.
3. **Determination of Effect**—An assessment is made of the effects of the proposed project on properties that were determined to meet the National Register criteria, in consultation with the SHPO and, if necessary, the ACHP. One of the following effect findings will be made:
 - **No Historic Properties Affected**—If no historic properties are found or no effects on historic properties are found, the agency official provides appropriate documentation to the SHPO/THPO and notifies consulting parties. However, the federal agency must proceed to the assessment of adverse effects when it finds that historic properties may be affected or the SHPO/THPO or Council objects to a "No Historic Properties Affected" finding. The agency must notify all consulting parties and invite their views.

- **No Historic Properties Adversely Affected**—When the Criteria of Adverse Effect are applied (36 CFR 800.5(a)), and it is found that historic properties will not be adversely affected by the undertaking, the agency may make a finding of “No Historic Properties Adversely Affected.” This finding is submitted to the SHPO for concurrence. Typically, the Council will not review “No Adverse Effect” determinations. However, the Council will intervene and review “No Historic Properties Adversely Affected” determinations if it deems it appropriate, or if the SHPO/THPO or another consulting party and the federal agency disagree on the finding and the agency cannot resolve the disagreement. If Indian tribes disagree with the finding, they can request the Council’s review directly, but this must be done within the 30-day review period. Agencies must retain records of their findings of “No Historic Properties Adversely Affected” and make them available to the public. The public should be given access to the information when they so request, subject to Freedom of Information Act (FOIA) and other statutory limits on disclosure, including the confidentiality provisions in Section 304 of the NHPA. Failure of the agency to carry out the undertaking in accordance with the finding requires the agency official to reopen the Section 106 process and determine whether the altered course of action constitutes an adverse effect.
 - **Historic Properties Adversely Affected**—Adverse effects occur when an undertaking may directly or indirectly alter characteristics of a historic property that qualify it for inclusion in the National Register. Reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative also need to be considered. The finding of “Historic Properties Adversely Affected” is submitted to the SHPO for concurrence. The SHPO/THPO may suggest changes in a project or impose conditions so that adverse effects can be avoided and thus result in a “No Historic Properties Adversely Affected” determination.
4. **Resolution of Adverse Effects/Mitigation**—When adverse effects are found, the consultation must continue among the federal agency, SHPO/THPO, and consulting parties to attempt to resolve them. The agency official must notify the Council when adverse effects are found and should invite the Council to participate in the consultation when circumstances as outlined within 36 CFR 15 800.6(a)(1)(i)(A)-(C) exist. A consulting party may also request the Council to join the consultation.

When resolving adverse effects without the Council, the agency official consults with the SHPO/THPO and other consulting parties to develop a Memorandum of Agreement (MOA). The MOA will outline the steps or actions to be taken prior to implementation of the project, in order to mitigate the adverse effects on the historic property. Stipulations included in an MOA may include (but are not limited to) documentation, modification of the project to lessen the adverse effects on the property, efforts to sell or relocate the resource, or step-by-step consultation with interested parties throughout the process to ensure it is carried out according to plan.

The MOA is executed between the agency official and the SHPO/THPO and filed with required documentation with the Council. This filing is the formal conclusion of the Section 106 process and must occur before the undertaking is approved.

In some cases, streamlining of the Section 106 process can be accomplished through the use of programmatic agreements. The ACHP and the agency official may negotiate a programmatic agreement to govern the implementation of a particular program or the resolution of effects from complex projects or multiple undertakings. Programmatic agreements are particularly useful when programs or projects affecting historic properties are similar and repetitive, and have known effects, such as routine maintenance or a series of similar rehabilitation projects.

Section 101(d)(2)

This section of the NHPA provides for the assumption by federally recognized Indian tribes of all or any part of the functions of a SHPO with respect to tribal lands (e.g., all lands within the exterior boundaries of any Indian reservation and all dependent Indian communities). Section 101(d)(2) requires federal agencies, in carrying out their Section 106 responsibilities, to consult with federally recognized Indian tribes that attach religious or cultural significance to a historic property. The agency will consult with federally recognized Indian tribes in the Section 106 process to identify, evaluate, and treat historic properties that have religious or cultural importance to those groups.

Section 110

Section 110 of the NHPA is intended to ensure that historic preservation is integrated into the ongoing programs of federal agencies. This section of the Act requires agencies to identify, evaluate, and nominate for listing in the National Register, historic properties owned or controlled by the agency; use historic properties to the maximum extent feasible; ensure documentation of historic properties that are to be altered or damaged; carry out programs and projects that further the purpose of the Act; and undertake such planning

and actions as may be necessary to minimize harm to any formally designated National Historic Landmark properties.

Section 111

Section 111 of the NHPA requires agency officials, to the extent practicable, to establish and implement alternatives for historic properties, including adaptive use, that are not needed for current or projected agency uses or requirements. Further, Section 111 allows the proceeds from any lease to be retained by the agency to defray the cost of administration, maintenance, repair, and related expenses of historic properties.

Section 112

Section 112 of the NHPA requires that agency officials who are responsible for protection of historic properties pursuant to the NHPA ensure that all actions taken by employees or contractors meet professional historic preservation standards established by the Secretary of the Interior (Professional Qualifications Standards of the Secretary of the Interior's Standards and Guidelines in Archaeology and Historic Preservation [NPS 1983]).

Section 304

Section 304 of the NHPA requires that information about the location, character, or ownership of a historic property be withheld from public disclosure when the federal agency head or other public official determines that disclosure may cause a significant invasion of privacy, risk and/or harm to the historic property, or impede the use of a traditional religious site by practitioners.

CERCLA and the NHPA

EPA's Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Compliance with Other Laws Manual: Part II. Clean Air Act and Other Environmental Statutes and State Requirements (USEPA 1989) outlines how "substantive compliance" with the NHPA is to be achieved in CERCLA actions. The initial step is determining if cultural resources are known or are likely to be present "in or near the area under study in the RI." This step may require conducting a survey of both the location of the proposed remedial action and any associated actions that would occur off-site. The CERCLA manual referenced above defines three stages of a survey: Stage IA, literature search and sensitivity study; Stage IB, field investigation; and Stage II, site definition and evaluation. All studies should include Stage IA but implementation of Stage IB is contingent on the results of Stage IA, and the need for Stage II is contingent on the results of Stage IB. If results of the survey identify significant cultural resources (i.e., resources listed or considered eligible for listing on the National Register), effects of the proposed

remedial action and associated actions to the significant resources must be evaluated. Adverse effects on significant resources must be either avoided or mitigated. Any proposed mitigation measures must be incorporated into the remedial design process.

2.1.2 Archaeological Resources Protection Act of 1979 (16 USC 470aa-470ll)

ARPA is essentially an update to the 1906 Antiquities Act. It expands and strengthens the activities prohibited under the Antiquities Act, increases the criminal penalties for violation, establishes civil penalties, and provides further guidelines for the issuance of permits. This Act continues to apply only to federal and Indian lands (the definition of “Indian lands” in ARPA differs very slightly from the definition of “tribal lands” in the NHPA). Most archaeological excavations and collection of artifacts on these lands are allowed only with an ARPA permit. Trafficking in illegally obtained archaeological resources from federal and Indian lands is also prohibited. Individuals convicted of violating the Act are liable for the value of the archaeological resource itself, and the cost of restoration or repair of the damage caused by illegal excavation or collection.

The implementing regulations are 43 CFR Part 7 (Department of the Interior), which applies to federal lands that are not within military reservations or national forests. The regulations include detailed definitions of “archaeological resource” and “Indian lands” (lands held in trust by the United States on behalf of a federally recognized tribe or individual members of a federally recognized tribe).

2.1.3 Native American Graves Protection and Repatriation Act (25 USC 3001-3013)

NAGPRA establishes that Native American human remains and associated funerary objects found on federal or tribal lands belong to the lineal descendants of the Native American. When the lineal descendants cannot be determined, the remains belong to the tribe on whose land the remains were found (when found on tribal lands), or to the Indian tribe with the “closest cultural affiliation.” This latter rule also applies to unassociated funerary objects, sacred objects, and objects of cultural patrimony (all defined in the Act); NAGPRA applies to both human remains intentionally excavated (which would require an ARPA permit) and those accidentally discovered.

NAGPRA also requires all federal agencies and museums to inventory their holdings of Native American human remains and funerary objects. Once the inventories are completed, the agencies and museums are to notify the appropriate tribes of the remains and other objects in their collections. The remains and associated funerary objects are to be returned (repatriated) at the request of the lineal descendant(s) or tribe. The same requirement applies to unassociated funerary objects, sacred objects, and objects of cultural patrimony for which a cultural affiliation can be demonstrated. Exceptions to the repatriation

requirement are objects that are “indispensable for completion of a specific scientific study, the outcome of which would be of major benefit to the U.S.”

The implementing regulations are 43 CFR Part 10, which largely expand on the elements of the statute. The regulations detail: 1) the process of consultation with Indian tribes to address either intentional excavation of human remains or inadvertent discovery of human remains; 2) how agencies and museums are to inventory their collections; and 3) the repatriation process. When human remains, funerary objects, sacred objects, and objects of cultural patrimony are inadvertently discovered on federal lands, the following steps are to be followed: 1) ongoing activity in the area of the find must cease and a reasonable effort made to protect the find; and 2) the federal land agency (i.e., the federal agency on whose lands the remains or objects have been found) must be immediately notified by telephone, with written confirmation. The federal land agency must then notify the appropriate tribe(s) and further secure and protect the discovery. The activity may be halted for up to days while an appropriate response to the find is negotiated by the federal agency and the appropriate tribe(s).

2.1.4 American Indian Religious Freedom Act (42 USC 1996)

This Act states that it is the policy of the United States to protect and preserve the rights of American Indians to practice traditional religions. That policy includes rights of access to sacred sites and to the use and possession of sacred objects. There are no implementing regulations.

2.2 PRESIDENTIAL EXECUTIVE ORDERS

Presidential executive orders define policies and procedures for federal agencies to facilitate their execution of laws passed by the Congress or clarify how specific laws are to be implemented. Presidential executive orders can be considered instructions or directives from the President to federal agencies on how to carry out specific laws. The executive orders listed below are either directly related to cultural resources or define relationships between federal agencies and tribes.

2.2.1 Executive Order 11593. Protection and Enhancement of the Cultural Environment

Issued in 1971, Executive Order 11593 states that the federal government would provide leadership in “preserving, restoring, and maintaining the historic and cultural environment of the Nation.” Federal agencies were directed to inventory cultural resources under their jurisdiction and nominate National Register-eligible properties to the National Register. Properties that have been determined eligible are not to be transferred, sold, demolished,

or altered without providing the ACHP on Historic Preservation with an opportunity to comment. Properties to be demolished or substantially altered were to be documented prior to demolition or alteration. National Register properties or National Register-eligible properties under federal control were to be maintained following standards set by the Secretary of the Interior. Executive Order 11593 also assigns specific responsibilities to the Secretary of the Interior, including managing the National Register and assisting and advising other federal agencies in the management of cultural resources.

2.2.2 Executive Order 13007. Indian Sacred Sites

Issued in 1996, Executive Order 13007 directs federal agencies to provide access and ceremonial use of Indian sacred sites, where practicable, legal, and not inconsistent with essential agency functions. Agencies are also directed to avoid adversely affecting sacred sites and maintain the confidentiality of such sites. A “sacred site” as defined by this executive order is a specific location that is sacred because of its religious significance to or ceremonial use in an Indian religion.

2.2.3 Executive Order 13175. Consultation and Coordination with Indian Tribal Governments

Issued in 2000, Executive Order 13175 directs federal agencies to consult with tribal officials in the development of policies and regulations that have “tribal implications” or that preempt tribal law. Executive Order 13175 also emphasizes the importance of government-to-government relationships between the United States government and tribes. Agencies must designate an official responsible for implementing the executive order and must document tribal consultation in the development of the relevant policies and regulations.

2.3 TRIBAL LEGISLATION AND REGULATIONS

Tribal laws and regulations addressing cultural resources would apply to lands on the reservations and off-reservation trust lands. The SATES field program is entirely on Colville Tribal allotment lands, therefore the CCT is the tribe whose laws and regulations would be potentially applicable to the Site. The legal code of the CCT addresses cultural resources, as summarized below. This code applies to both on-reservation actions and off-reservation actions by federal agencies that could affect cultural resources. The CCT has a THPO that has the same authority and responsibilities as the SHPO.

2.3.1 Confederated Tribes of the Colville Reservation. Colville Tribal Law and Order Code Chapter 4-4, Cultural Resources Protection

This Colville Tribal Code establishes the Colville Cultural Resources Board, which has the responsibility of developing policies and procedures to protect cultural resources of interest and concern to the Colville Tribes, both on and off the Colville Reservation. The Board reviews proposed federal agency actions off the reservation and is responsible for reviewing all proposed on-reservation actions that could affect significant cultural resources. The code also establishes a Colville Register of Historic and Archaeological Properties for listing of historic properties on the Colville Reservation.

This code defines the roles and responsibilities of the Colville History and Archaeology Department, which include identifying significant cultural resources on the reservation, nominating properties to the National Register and the Colville Register, and promoting efforts to protect cultural resources on the reservation.

Chapter 4-4 of Colville Tribal Code prohibits the excavation, disturbance, or other adverse effects to archaeological resources and historic properties on the reservation without a permit issued by the History and Archaeology Department. The code defines the procedure for the issuance of permits and the duties of permittees.

2.4 STATE LEGISLATION AND REGULATIONS

Washington state laws and regulations regarding archaeological and historical resources, as well as the law protecting Indian graves, are not applicable on federal lands or on tribal trust lands. These laws would apply, however, to any RI/FS-related activities that would affect private lands, non-federal lands, or non-tribal public lands.

2.4.1 Revised Code of Washington (RCW) Chapter 27.44, Indian Graves and Records

This legislation prohibits the removal or other disturbance of Indian burials, cairns, and “glyphic or painted records.” “Burials” and “graves” are not defined in the statute. Excavation or removal of burials is permitted only under provisions of a permit issued by the Washington Department of Archaeology and Historic Preservation. Procedures for obtaining permits are defined in Washington Administrative Code (WAC) Chapter 25-48.

2.4.2 RCW Chapter 27.53, Archaeological Sites and Resources

This legislation prohibits the excavation or disturbance of archaeological sites on public and private lands in Washington except under provisions of a permit issued by the Washington

Department of Archaeology and Historic Preservation. Procedures for obtaining permits are defined in WAC Chapter 25-48.

2.4.3 RCW Chapter 68.60, Abandoned and Historic Cemeteries and Historic Graves

This legislation prohibits the destruction, alteration, or other disturbance of historical land, abandoned cemeteries, and historic graves (Indian graves and burials are protected in RCW Chapter 27.44). A historic cemetery is defined in the statute as one established before November 1889. A historic grave is a grave or graves outside of a cemetery placed prior to June 1990.

2.4.4 RCW Chapter 43.21C, State Environmental Policy Act

This legislation directs state and local agencies in Washington to address environmental impacts of proposed projects. The implementing rules (WAC Chapter 197-11) require that impacts on historic and cultural resources are to be addressed in the State Environmental Policy Act process.

3 PROPOSED SAMPLING PROGRAM

Three decision units (DUs) from tribal allotments in the Columbia River valley just south of China Bend, WA and extending south of the U.S.-Canada border are the focus of this study (see Figures B1 and B2). Properties to be sampled were identified based on the results of residential soil sampling led by USEPA in 2014.

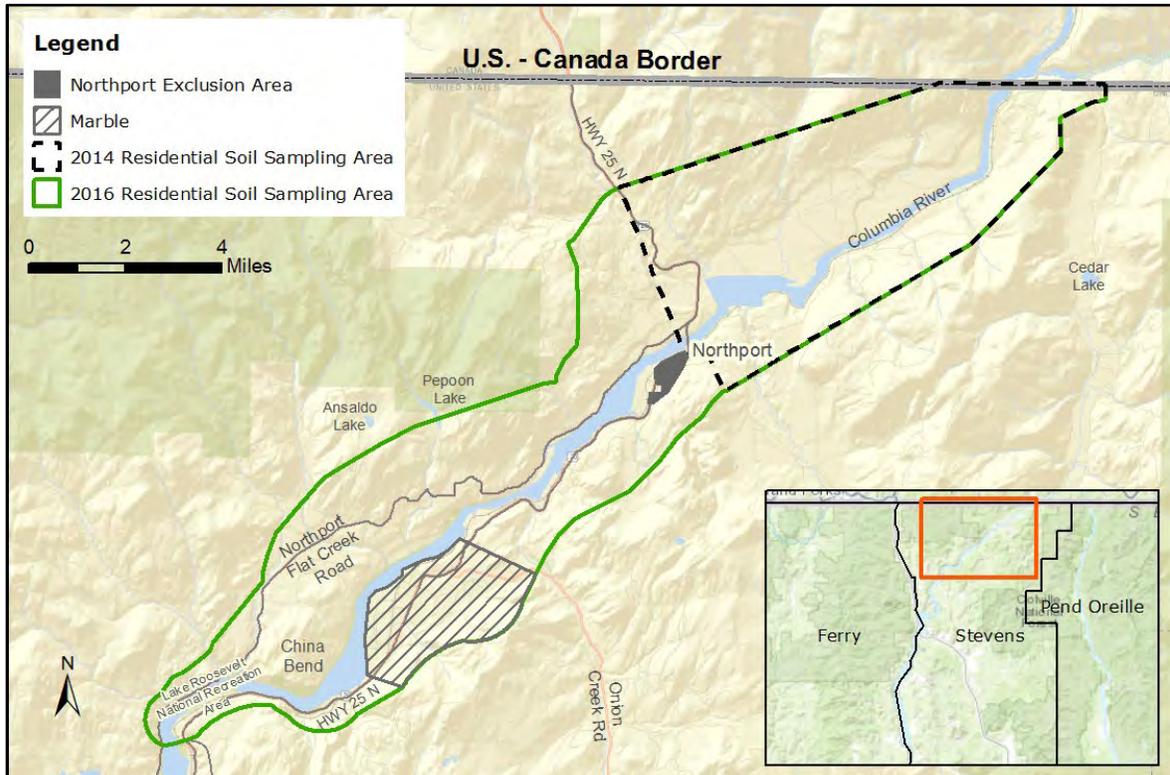


Figure A1. UCR Residential Soil Study Area



Figure A2. SATES Test Plot Decision Units

The soil sample will be collected using a composite sampling design (see Figure A3). Composite sampling entails the collection of multiple individual volumes of soil (termed “discrete samples”) from a target area (i.e., a decision unit [DU]) that are composited.

3.1 METHOD FOR COLLECTING COMPOSITE SOIL SAMPLES

Individual discrete samples will be collected for a single composite sample using hand tools to excavate soils from the ground surface to a depth of approximately 3 inches over a 2-foot by 2-foot area. Each discrete sample will be placed in the same plastic bag or large bucket following visual inspection by the cultural monitor, taking care to ensure that equal volumes of soil are collected from each discrete sample location.

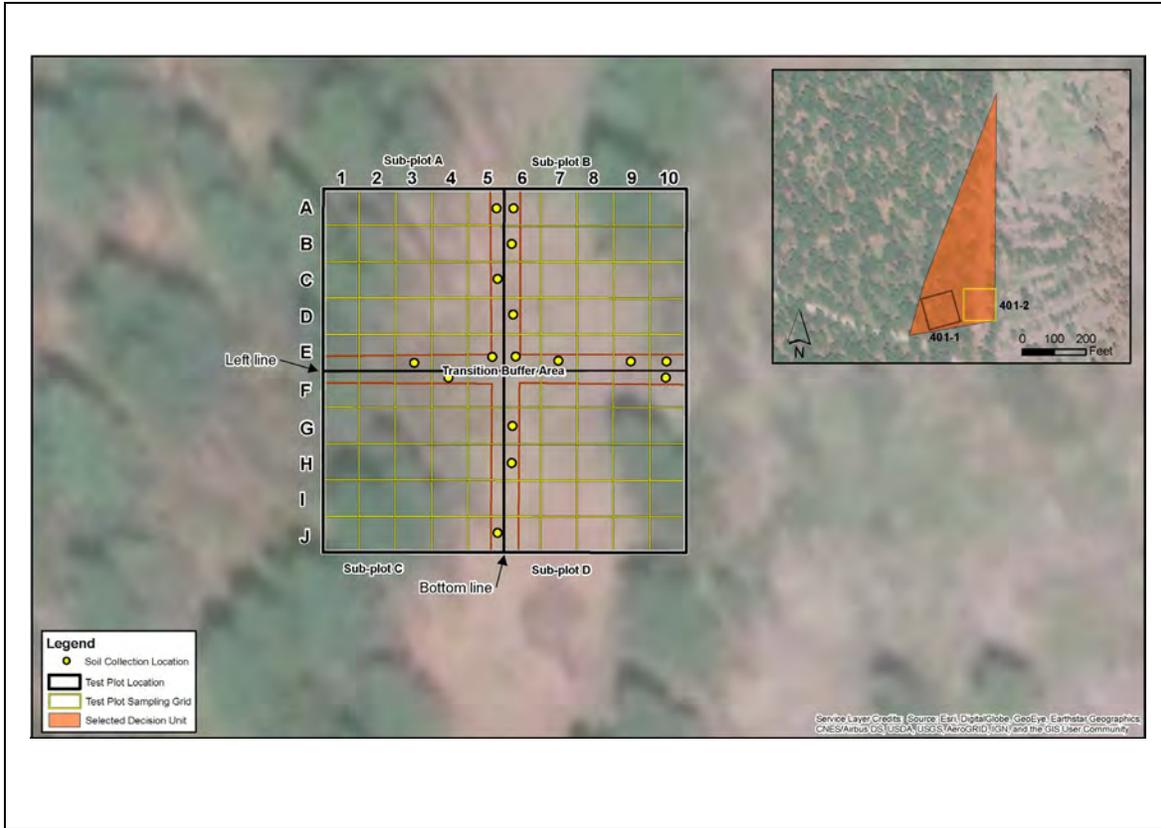


Figure A3. Test Plot 401-2: Phase II Bench-Scale Treatability Study Soil Collection Locations in the 2018 SATES Program

3.2 SAMPLE DEPTH

Samples will be collected to a depth of 3 inches.

4 COORDINATION PLAN

The objective of the CRCP is to ensure that implementation of the SATES program and associated sampling activities does not adversely affect any cultural resources. The plan therefore defines a general process and more specific procedures to meet this objective.

Few of the surveys conducted prior to about 1975 are likely to have met current regulatory and professional standards. In addition, many of the previous surveys focused on archaeological resources to the exclusion of other types of cultural resources (and older archaeological surveys documented only evidence of prehistoric use or occupation). Finally, it is likely that there are some locations previously surveyed at which burials or buried archaeological resources are present but not evident and therefore not recorded at the time of the survey (many surveys both in the past and in the present rely entirely or primarily on surface evidence of archaeological resources or burials).

This plan therefore defines procedures that address sampling at known locations of cultural resources and locations where no cultural resources are currently recorded. EPA is the lead federal agency for cultural resources coordination for the Site. The SATES field work will be conducted entirely on Colville Tribal allotments. Therefore, any issues or concerns related to cultural resources during the planning or implementation of Site work shall be brought to the attention of EPA for consultation with the CCT, as appropriate.

4.1 GENERAL CONSULTATION FRAMEWORK

Successful implementation of the SATES program and of this CRCP, given the issues defined above, will require ongoing consultation and coordination with the CCT. Other consulting parties (STI and the Washington State Department of Archeology and Historic Preservation [DAHP]) may be recognized in the future whose participation would be important for general consultation or coordination in the SATES process or for specific sampling locations. For the purposes of cultural resources coordination activities, the “consulting parties” referred to in this plan are distinguished from other “participating parties” to the SATES and RI/FS processes.

4.2 CULTURAL RESOURCE PROCEDURES IN THE SAMPLING PROCESS

This section defines general procedures to be followed in the sampling process to minimize the potential for inadvertent disturbance of cultural resources. More specific protocols to respond to discoveries are defined in the following sections.

As each of the SATES target DUs are on Colville Tribal allotments, a tribal cultural resources (archeological) monitor and tribal representative will be present on-site to monitor sampling. The protocol for this monitoring is defined below.

4.2.1 Archaeological Monitoring in the Sampling Program

To ensure compliance with the NHPA and the applicable requirements, procedures, and standards of the CCT, the following procedures have been developed to address potential discoveries, including inadvertent discoveries, of cultural materials and deposits (including sacred objects, funerary objects, and objects of cultural patrimony as defined in NAGPRA) and Indian burials and human remains (as defined in NAGPRA) during sediment and soil sampling and associated activity that could result in ground disturbance.

Archaeologist and Tribal Representative On-Site

An archaeological monitor and tribal representative will be present on-site when ground-disturbing sampling or sampling-related activity occurs. The archaeological monitor will visually examine all samples to determine if evident or likely artifacts are present or if other deposits are present that are likely to be cultural in origin. The archaeological monitor will not make physical contact with the sample unless artifacts or other cultural deposits are present. If artifacts or likely archaeological deposits are present, the archaeologist or tribal representative will record the location of the materials and photograph the materials in place in such a manner to provide information on provenience. The artifacts and other archaeological materials will then be re-deposited at their original location.

The archaeological monitor will document their observations on a daily basis, including field notes and photographs that record the location and character of the sampling or other ground-disturbing activity, any archaeological discoveries made, and any decisions made within the provisions of this plan by the archaeological monitor and tribal representative in response to any archaeological discoveries. A standardized archaeological monitoring form may be substituted for the field notes referenced above.

All archaeological monitors and tribal representatives will be required to have read the applicable health and safety plan and to have complete understanding of the archaeological monitoring provisions of this plan. The archaeological monitors and tribal representatives will also be required to meet requirements for personal protective equipment. In addition, all on-site personnel are subject to the directions of the task field supervisor at all times.

Discoveries—Archaeological Monitors Present

At the discretion of the archaeological monitor or tribal representative, ground-disturbing sampling or associated activity may be slowed or halted at any time that a suspected archaeological object or archaeological resource is encountered. The objective of this

slowing or halting of ground-disturbing activity is to allow the archaeologist to confirm and/or make a preliminary assessment of the discovery. At the discretion of the archaeological monitor or tribal representative, a specific sample may be relocated from the location of the discovery but at the sampling location. Such relocation will be coordinated with the on-site sampling manager or supervisor.

At the request of the archaeological monitor or tribal representative, the sampling personnel will either:

- Assist in securing access to the location of the discovery and take appropriate measures to protect the location of the discovery from rain, storm water, and other possible disturbances, or
- Assist in moving the artifacts to a protected and secure area of the site away from the immediate sampling area. Removal of artifacts from the discovery location will be undertaken only if leaving the artifacts in place would jeopardize their integrity due to erosion or collection by unauthorized individuals.

The archaeological monitor, tribal representative, or a member of the TAI field sampling team will remain on-site to ensure the security of the find until more extensive efforts can be made to secure the site from further disturbance or a more extensive evaluation and documentation of the discovery can be made.

Notification of any archaeological discoveries must be provided to EPA for further coordination with consulting parties within 24 hours of the discovery. EPA contact information is provided in Attachment D1. All telephone notification of discoveries must be promptly followed by notification in writing (via email or conventional mail).

Discovery of Human Remains

Native peoples in the UCR Study Area consider the graves of their ancestors to be important in both their cultural identity and in defining their relationship with the land. These graves are therefore considered sacred and should be left undisturbed. Should inadvertent disturbance occur, the remains and associated materials (“funerary objects”) must be treated with respect and honor. All appropriate federal, tribal, and state laws, regulations, and procedures regarding burials should be rigorously enforced. In the event that likely or confirmed human remains are encountered, all further sampling or other ground-disturbing activity will cease immediately.

Upon such discovery, the TAI field sampling team and/or CCT cultural monitor will notify EPA for further coordination with consulting parties (consisting minimally of the STI, and the DAHP). The field sampling team will assist the archaeological monitor and tribal representative in securing the location of the discovery.

If no archaeological monitor or tribal representative is present, the TAI field sampling team will secure the location of the discovery in such a manner that both maintains the physical integrity of the remains and any associated objects and precludes further disturbance, or a member of the TAI field sampling team will remain on-site until an archaeologist or tribal representative can arrive to assess the find.

Other conditions for responses to discoveries of archaeological materials may be defined in the permit(s) issued for the sampling program. Responses to any discoveries of burials must comply with provisions of NAGPRA and its implementing regulations (in addition to those referenced above), as well as the existing protocols of the CCT (these protocols are provided in Attachment D2).

4.2.2 Curation

Artifacts and other cultural materials that may be recovered during the sampling program (with the exception of human remains and associated items subject to NAGPRA) will be curated at a facility that meets the standards of 36 CFR 79. The appropriate tribe will designate the curation facility for cultural materials recovered from tribal lands.

4.2.3 Reporting

Within 150 days of completion of each sampling activity that is covered under this plan, the CCT archaeologist will prepare a confidential written report that presents the results of the archaeological monitoring and responses to any discoveries of archaeological resources or burials. The report will include: 1) copies of field notes, descriptions, and maps of all locations at which sampling-related archaeological monitoring was conducted; 2) descriptions of any discoveries made during such monitoring and the outcome of the discoveries (including the rationale for the decisions for the disposition of any finds); 3) descriptions and maps of all non-monitored locations at which inadvertent discoveries were made and the outcome of those discoveries; and 4) recommendations for any changes in the monitoring protocol or coordination plan that may be appropriate to address results of the monitoring or how well existing coordination procedures worked. A standardized archaeological monitoring form may be substituted for the field notes referenced above.

The draft report will be provided to EPA for review.

4.3 CONFIDENTIALITY

The TAI field sampling team shall make its best efforts, in accordance with state and federal law, to ensure that its employees and contractors keep the discovery of any found or suspected human remains, other cultural items, and potential historic properties confidential. Pertinent TAI employees and contractors will be required to read and sign a

confidentiality statement that specifies procedures to be followed in response to media and public contacts regarding archaeological and other cultural resources. To the extent permitted by law, prior to any release of information, EPA, TAI, and the other consulting parties shall concur on the amount of information, if any, to be released to the public, any third party, and the media and the procedures for such a release.

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6 GLOSSARY OF TERMS

Burial—A burial is defined in NAGPRA as “[a]ny natural or prepared physical location, whether originally below, on, or above the surface of the earth, into which as part of the death rite or ceremony of a culture, individual human remains are deposited.”

Curation—Long-term storage and preservation of archaeological collections. Archaeological collections from federal lands must be curated at facilities that meet the standards of 36 CFR 79.

Ethnohistoric—Information on Native peoples gathered from historical accounts.

Historic, historic-period, historical—The NHPA uses the term “historic” to refer to properties that are listed or have been determined eligible for listing on the National Register of Historic Places. To avoid confusion with this definition of “historic,” “historic-period” or “historical” are used to reference resources, places, events, and people associated with the period since the appearance of Euroamericans and the beginning of written accounts (ca. 1780–1810 in the Pacific Northwest).

Protohistoric—The period of time transitional from prehistory to history. In the Pacific Northwest, the protohistoric can be generally defined as from the late 1600s until late 1700s.

ATTACHMENT A1

USEPA CONTACT INFORMATION

USEPA CONTACT INFORMATION

Monica Tonel is the primary contact for the EPA. Ms. Tonel's telephone number is (206) 553-0323 (office) and email is Tonel.Monica@epa.gov. Ms. Tonel will have a cell phone number that will be provided to the sampling team(s), tribes, and state, prior to field sampling activities commencing.

If Ms. Tonel cannot be reached, then Laura Buelow is the alternate EPA contact at (509) 376-5466 (office) or (509) 420-0435 (cell) and at Buelow.Laura@epa.gov.

In the event that either Ms. Tonel or Ms. Buelow cannot be contacted, then Kira Lynch will be contacted at (206) 553-2144 (office) and at lynch.kira@epa.gov.

ATTACHMENT A2

PROTOCOLS FOR INADVERTENT DISCOVERIES

Federal Columbia River Power System (FCRPS) Grand Coulee Dam Project and Lake Roosevelt National Recreation Area Inadvertent Discovery of Human Remains Protocol

Treatment of Human Remains Found on Federal or Tribal Lands

This protocol covers human remains and/or other cultural objects that are subject to the Native American Graves Protection and Repatriation Act (NAGPRA) that are discovered inadvertently on Federal or tribal lands after November 16, 1990. In this document, Federal lands are defined as: within the boundaries of lands managed by the National Park Service (NPS), Bureau of Reclamation (Reclamation), the Confederated Tribes of the Colville Reservation (CCT), or the Spokane Tribe of Indians (STI). If remains that are potentially human or other NAGPRA items are encountered, any activity in the vicinity of the discovery will cease. All reasonable efforts will be made to protect the remains and any associated cultural items.

1. Secure the area and take protective measures to assure that the remains are not in danger of further depredation or disturbance. The burial or location will not be disturbed. All human remains and associated artifacts will be treated in a respectful manner.
2. In cases where a potential crime scene exists, *personnel except those necessary to protect the location will leave the immediate vicinity in order to prevent unintentional destruction of crime scene information.* The appropriate law enforcement office (Tribal within the boundaries of the Reservation Zone, NPS within the boundaries of the Recreation Zone, and Reclamation within the boundaries of the Reclamation Zone) will be immediately notified, however, site specific information should not be included in radio transmissions to maintain site security.
3. The Tribal Historic Preservation Officer (THPO) (CCT or STI), if applicable, and the archaeologists working for the appropriate tribe or agency will also be contacted immediately after law enforcement (contact phone numbers are provided below). For NAGPRA discoveries associated with the Lake Roosevelt shoreline, Reclamation's Grand Coulee Power Office (GCPO) Archaeologist will be notified. For inadvertent discoveries in the Reservation Zone, the NPS archaeologist does not need to be contacted. Live phone contact is required; backup staff is identified if the primary contacts are unavailable. Phone contact will be followed up by written confirmation, e-mail is acceptable. E-mail should not include detailed (site specific information) for security reasons.

4. Law enforcement, in consultation with a professional archaeologist (if needed), trained in human osteology, will determine if the remains are human, whether it is of recent origin, and if it is part of a crime scene. These initial investigations conducted by law enforcement will be conducted carefully and with a mind toward minimizing damage to potential human remains and burial features
5. A professional archaeologist will also assist law enforcement in determining if the human remains are archaeological in origin and if they should be classified as NAGPRA items. If they are determined to be NAGPRA items yet there is an ARPA-related crime scene (i.e., there is evidence for intentional disturbance or looting of archaeological materials), the archaeologist will assist law enforcement as needed in the collection of archeological data to support the ARPA case. In order to document the crime scene, law enforcement officers and assisting archaeologists may take photographs of human remains and collect other relevant evidence.
6. If law enforcement determines that the find is human and not of law enforcement concern, they will release the site to the appropriate federal or tribal archaeologist. It is then the responsibility of that archaeologist to contact the appropriate Tribal representatives and the Reclamation archaeologist if contact has yet to be made about the Inadvertent Discovery. Live phone contact is required; backup staff are identified if the primary contacts are unavailable. Phone contact will be followed up by written confirmation.
7. As soon as the remains have been determined to be human, then efforts will be made in the field to determine whether they are Native American. The basis of this determination will be documented in writing. If the items are determined to be Native American, go to Item 10. All NAGPRA procedures and protocols for Inadvertent Discoveries on Federal Lands After November 16, 1990 will be followed.
8. If the remains are determined **not** to be Native American, then Washington State burial laws apply and will be followed (Title 68, Chapter 68.50 RCW HUMAN REMAINS).
9. If the NAGPRA items' affiliation cannot be determined in the field, further non-destructive analysis of human NAGPRA items and/or associated cultural materials may be required. The CCT or the STI, the NPS, and Reclamation will coordinate regarding the types of non-destructive analysis to be conducted.
10. On lands managed by the Tribes, NPS, or Reclamation, it will be assumed that the human remains fall under the coverage of ARPA. No further investigations by non-agency or non-tribal personnel will be conducted until an ARPA permit is in place. For the purposes of advancing the process, and out of caution and respect for the concerns of local tribes, it will be assumed that the remains are

Native American and affiliated with the local tribes. A Written Plan of Action will be prepared in consultation with the affected tribe. Provenience information will be collected as specified by the Written Plan of Action and ARPA permit, if applicable. The Reclamation contract language for burials recovered in the shoreline of the National Recreation Area will also apply and should agree with the Written Plan of Action and these protocols.

11. Recording of provenience may include any or all of the following: documenting the location of the burial or scattered NAGPRA items and general site conditions on a site form or on an addendum to an existing form; describing the surface-visible NAGPRA items to the degree that can be accomplished without causing additional disturbance to the grave; documenting the location of the burial on a USGS 7.5' topographic sheet and with a GPS unit (following the methods shown in Appendix C).
12. If it is possible to rebury or cap the NAGPRA items in place, then that decision will be documented in the Written Plan of Action in agreement with the Tribes.
13. If NAGPRA items must be excavated or removed, procedures will be specified by the Written Plan of Action. The Reclamation contract language for burials recovered in the shoreline of the NRA will also apply and will agree with the Written Plan of Action and these protocols. If NAGPRA items are to be excavated or removed by personnel other than those employed by the CCT, the STI, or the US government, an ARPA permit will be required from the NPS or Reclamation. The Written Plans of Action for individual discoveries will detail exact procedures for further implementation of NAGPRA.
14. NAGPRA items will be removed using standard professional archaeological practices in compliance with the ARPA permit issued for the removal, if applicable, and in a culturally sensitive manner at the direction of a Tribal representative. Because each burial is unique and recoveries need to be suited to different situations (e.g., position of the burial on the landform, weather, fluctuating reservoir levels). If work is contracted beyond the reservoir group, the Contractor will brief the appropriate federal and/or tribal archaeologist about their plan for the recovery and seek their concurrence. Because of the sensitivity of the local tribes regarding photographs of human remains, no such photographs will be taken. The only possible exception would be a photograph used for initial identification of remains as human versus non-human. Instead, those removing the remains will create a sketch showing the position of the human remains in the burial feature. After excavations have been completed, a photograph will be taken showing the stratigraphic position of the burial feature so that its association to other potential cultural features is documented.

15. Inadvertent discoveries that result from activities requiring easements or other non-ARPA permits (such as access, construction, etc.) will be dealt with by the permitting agencies, which may be Reclamation or the NPS. This protocol document will be included with documents issued to permittees.
16. Inadvertent discoveries have to be protected. This is primarily the job of the enforcement officers with jurisdiction with the various Lake Roosevelt zones. Additional assistance may be provided as follows: if the find occurred on the Mainstem then the CCT will assist to maintain a presence at the location of the discovery as needed until all contacts have been made and appropriate treatment of the NAGPRA items has been conducted. If the find occurs on the Spokane Arm, the STI will fill this role (see below for the STI contact).
17. Contact Information
 - a. Guy Moura, CCT THPO and Program Manager of the CCT History/Archaeology Program, is the primary contact for the CCT. Mr. Moura's phone number is (509) 634-2695, FAX (509) 634-2694, and the internet address is guy.moura@colvilletribes.com. After work hours, Mr. Moura can generally be reached at (509) 633-8361 (home) or (509) 631-1705 (cell). If Mr. Moura cannot be reached, then Brent Martinez is the alternate contact: phone (509) 634-2648 (work) or (509) 631-1177 (cell); email brent.martinez@colvilletribes.com. Additional contacts include Brenda Covington 634-2699 and Jackie Cook 634-2635.
 - b. Randy Abrahamson, STI THPO, is the primary contact for the STI. Mr. Abrahamson's phone number at the Department is (509) 258-4315, FAX (509) 258-6965, and his e-mail address is randya@spokanetribe.com. After work hours, Mr. Abrahamson can generally be reached at (509) 951-0524 (cell). If Mr. Abrahamson cannot be reached, Mr. John Matt shall be contacted at (509) 258-4060 (work), (509) 258-8945 (home), or (509) 993-1921 (cell).
 - c. Justin Eichelberger, Park Archeologist for the Lake Roosevelt National Recreation Area, is the primary contact for the NPS. Mr. Justin Eichelberger's phone number is (509) 738-6266, ext. 114, FAX (509) 633-3862, and internet address is justin_eichelberger@nps.gov." The NPS will issue an ARPA permit for burial recoveries in the Recreation Zone. If Mr. Eichelberger cannot be contacted in person, the District Ranger can be contacted at (509) 738-6266, ext. 109.
 - d. Derek Beery, Grand Coulee Power Office Archaeologist, is Reclamation's primary contact for NAGPRA on Lake Roosevelt. His phone number is (509) 633-9233, and internet address is dbeery@usbr.gov. His work cell phone is (509) 237-4477 and his home phone is (360) 477-5058. If Mr. Beery is not available, then Dr. Sean Hess, Regional Archaeologist, is Reclamation's

alternate contact. His phone number is (208) 378-5316, Cell (509) 631-0581, and internet address is "shess@pn.usbr.gov." In the event that neither Mr. Beery nor Dr. Hess is available, Reclamation's Contracting Officer will be contacted directly at (208) 378-5364.

- e. Gregory Anderson, FCRPS Cultural Resource Project Manager/Archaeologist, is the primary contact for Bonneville Power Administration. Mr. Anderson's phone number is are: (503) 230-4721, gmanderson@bpa.gov.

Upon completion of the above steps, the appropriate land manager, or its consultant, will prepare a written report of the discovery. The report will include a description of the contents of the discovery, a summary of consultation, and a description of the treatment or mitigation measures. The DAHP and THPO will have 30 days to review and submit comments on the report. The appropriate land manager will then revise the document and file final copies with the appropriate THPO and DAHP if the find occurred outside either reservation.

Treatment of Human Remains Found on Private or State Lands under Washington Law

In the event that human remains are encountered during construction, maintenance, or operation of the Project on private or state lands, the following procedures are to be followed to ensure compliance with RCW 68.60: *Abandoned and Historic Cemeteries and Historic Graves*, and RCW 27.44: *Indian Graves and Records*.

1. Pursuant to RCW 68.60.(050), if a member of the project work force or an archaeologist believes that he/she has encountered human skeletal remains, he/she must immediately stop work and inform the Construction Supervisor or site manager, if applicable. The Construction Supervisor will be responsible for stopping all excavation work adjacent to the discovery in an area large enough to provide for the security and integrity of the remains. The Construction Supervisor will be responsible for taking appropriate steps to protect the remains by installing a physical barrier (i.e., exclusionary fencing) and prohibiting machinery, other vehicles, and unauthorized individuals from coming within at least 100 ft (30 meters) of the discovery site.
2. The Construction Supervisor or other project staff will promptly contact the appropriate local law enforcement, County Coroner, and the landowner. The remains should not be touched, moved, or further disturbed, and will remain secured until law enforcement arrives. They will also notify law enforcement that the treatment of all Native American human remains and associated objects should be respectful and confidential, until the origin of the remains can be determined.

3. The County Coroner will assume jurisdiction over the human skeletal remains and make a determination of whether the remains are forensic or non-forensic. If the Coroner determines the remains are non-forensic, he/she will report that determination to the DAHP who will then take jurisdiction over the remains and report the discovery to the appropriate County cemeteries and affected Indian tribes. The State Physical Anthropologist will determine whether the remains are Native American or non-Native American and will report that finding to the appropriate parties. The State Physical Anthropologist will also establish an appropriate buffer zone around the discovery site within which no work may proceed while investigations proceed. The DAHP will then handle all consultation with the appropriate Indian tribes and parties as to the preservation, excavation, and disposition of the remains.
4. If the human remains are Indian, all subsequent proceedings, including any visits to the discovery site by affected tribes that have been authorized by the DAHP, will be conducted with dignity and respect by all employees and contractors. The State Physical Anthropologist will assess whether a buffer zone larger than 100 ft (30 meters) is needed to accommodate any excavation work, tribal visits or ceremonies, etc.
5. Construction activities will not resume within the established buffer zone of the discovery site until authorized disposition of the human remains has been completed and permission from the appropriate authority to resume work in the buffer zone has been received. In the case of Indian human remains, written permission to resume work must be obtained from the DAHP.

APPENDIX B
STANDARD OPERATING PROCEDURES

STANDARD OPERATING PROCEDURE SOP-1

CULTURAL RESOURCES COORDINATION AND REPORTING

Scope and Applicability

This standard operating procedure (SOP) described the procedures to be followed by all Teck American Incorporated (TAI) technical team field personnel, including subcontractors, if potential discoveries, including inadvertent discoveries, of cultural materials and deposits, and/or Indian burials and human remains occur during execution of the Soil Amendment Technology Evaluation Study (SATES). Cultural materials and deposits (including sacred objects, funerary objects, and objects of cultural patrimony) as well as Indian burials and human remains are defined in the Native American Graves Protection and Repatriation Act (NAGPRA).

The U. S. Environmental Protection Agency (USEPA) has responsibilities under the National Historic Preservation Act (NHPA) to consider how its undertakings would affect historic properties. To meet the NHPA requirements, the USEPA must ensure that sampling and other activities would avoid, minimize, or mitigate any adverse effects on any historic properties. The procedures detailed below were developed to assure compliance with the NHPA and the applicable requirements, procedures, and standards of the National Park Service (NPS), Bureau of Reclamation (USBR), Confederated Tribes of the Colville Reservation (CCT), and the Spokane Tribe of Indians (STI).

Archaeological and Cultural Resources Monitoring in the Sampling Program

Each of the decision units (DUs) included in the SATES program are located on Colville Tribal allotments; therefore, an archaeological monitor and tribal representative will be present at all times during ground disturbance activities. The archaeological monitor will visually examine all samples to determine if cultural resources are present. The archaeological monitor will not make physical contact with the sample unless cultural deposits are present. If cultural resources are present, the archaeological monitor will record the finding. The cultural resources materials will then be re-deposited at their original location or collected for further analysis at the discretion of the archaeological monitor.

Throughout the course of the project, the archaeological monitor will document their observations on a daily basis in their field notes and photographs. A standardized archaeological monitoring form may be substituted for the field notes referenced above.

The archaeological monitor(s) will be required to have read the applicable health and safety plan and to have complete understanding of the archaeological monitoring provisions of this plan. The archaeological monitor will also be required to meet requirements for personal protective equipment. In addition, and for safety reasons, all on-site personnel are subject to the directions of the task field supervisor at all times.

Discoveries When an Archaeological Monitor is Present

At the discretion of the archaeological monitor, ground-disturbing sampling or associated activity may be slowed or halted at any time that a suspected archaeological resource is encountered. The objective of slowing or halting the ground-disturbing cleanup activity is to allow the archaeological monitor to confirm and/or make a preliminary assessment of the discovery. The discovery and the material in which it is contained may be returned to a location distinct from, but nearby, the original location of discovery. Any such relocation will be coordinated with the field supervisor.

At the request of the archaeological monitor, the sampling personnel will either:

- Assist in securing access to the location of the discovery and take appropriate measures to protect the location of the discovery from rain, stormwater, and other possible disturbances, or
- Assist in moving the artifacts to a protected and secure area away from the immediate sampling area.

Removal of artifacts from the discovery location will be undertaken only if leaving the artifacts in place would jeopardize their integrity due to erosion or collection by unauthorized individuals, or collected for further analysis at the discretion of the archaeological monitor.

The archaeological monitor or a member of the TAI technical team will remain onsite to ensure the security of the find until more extensive efforts can be made to secure the site from further disturbance or a more extensive evaluation and documentation of the discovery can be made.

Notification of any cultural resources that have the potential to delay or halt sampling activities (i.e., human remains or those items covered under NAGPRA) must be

provided as soon as possible to USEPA for further coordination with the consulting parties.

Discovery of Human Remains

Native peoples in the study area consider the graves of their ancestors to be important in both their cultural identity and in defining their relationship with the land. These graves are therefore considered sacred and should be left undisturbed. If inadvertent disturbance occurs, the remains and associated materials (“funerary objects”) must be treated with respect and honor. All appropriate federal, tribal, and state laws, regulations, and procedures regarding burials should be rigorously enforced.

In the event that likely or confirmed human remains are encountered, all further sampling or other ground-disturbing activity will cease immediately. The protocol and notification procedures to be followed for any potential discoveries of human remains are provided in protocols of the NPS, USBR, CCT, and STI (Attachment D1 to the cultural resources coordination plan [CRCP] included as Appendix D in the Phase II soil collection work plan). Any discoveries within the boundaries of the Colville or the Spokane reservations, or other tribal lands, must also be reported immediately to the respective Tribe.

The TAI technical team will assist the archaeological monitor in securing the location of the discovery.

Other conditions for responses to discoveries of archaeological materials may be defined in the Archeological Resources Protection Act permit(s) issued for the sampling program. As detailed in the CRCP, responses to any discoveries of burials must also comply with provisions of NAGPRA and its implementing regulations, as well as the existing protocols of the NPS, USBR, CCT, and STI (Attachment 1 to the CRCP).

Discoveries When an Archeological Monitor is Not Present

As previously stated, an archaeological monitor will be present during all sampling activities. In the event, however, that suspected or evident artifacts or other archaeological deposits are encountered when an archaeological monitor is not present, the immediate vicinity of the discovery will be secured. The discovery will be mapped and photographed in place but will be otherwise left as found (other than appropriate measures to secure the find and maintain this security). In consultation with the land-managing agency or appropriate tribe, as well as other interested parties, TAI will arrange for the location of the discovery to be examined by an archaeologist or/and

tribal representative in a timely manner. If the archaeologist confirms the presence of cultural resources, the procedures defined above for discoveries made during ground-disturbing activity monitored by an archaeologist will be implemented. The archaeologist will prepare appropriate State of Washington archaeological forms to document the find.

To ensure proper recognition of artifacts and other cultural items or deposits, all TAI field personnel will be provided with training in recognizing these materials by an archaeologist prior to the initiation of any soil sampling.

Curation Artifacts and other cultural materials that may be recovered during the sampling program (with the exception of human remains and associated items subject to NAGPRA) will be curated at a facility that meets the standards of 36 CFR 79. The Tribe will designate the curation facility for cultural materials recovered from tribal lands.

Reporting within 150 days of completion of the field activity that is covered under this plan, an archaeologist will prepare a confidential written monitoring report or letter report that presents the results of the archaeological monitoring and responses to any discoveries of archaeological resources or burials. The report will include: 1) copies of field notes, descriptions, and maps of all locations at which sampling-related archaeological monitoring was conducted; 2) descriptions of any discoveries made during such monitoring and the outcomes of the discoveries (including the rationale for the decisions for the disposition of any finds); 3) descriptions and maps of all non-monitored locations at which inadvertent discoveries were made and the outcome of those discoveries; and 4) recommendations for any changes in the monitoring protocol or coordination plan that may be appropriate to address results of the monitoring or how well existing coordination procedures worked.

The monitoring report or letter report will be provided to the USEPA for dissemination to the consulting parties.

Confidentiality

In accordance with state and federal law, all field personnel are required to keep the discovery of any found or suspected human remains, other cultural items, and potential historic properties confidential. Personnel are instructed that they are prohibited from contacting the media or any third party or otherwise sharing information regarding the discovery with any member of the public, and that they should immediately notify the field supervisor of any inquiry from the media or public. The field supervisor will then notify TAI of any such inquiries. To the extent permitted by law, prior to any release of

information, TAI in coordination with USEPA and other consulting parties shall concur on the amount of information, if any, to be released to the public, any third party, and the media and the procedures for such a release.

STANDARD OPERATING PROCEDURE SOP-2

SURFACE SOIL SAMPLE COLLECTION FOR SOIL AMENDMENT BENCH-SCALE TREATABILITY TESTING

Scope and Applicability

The purpose of this standard operating procedure (SOP) is to describe the procedures for the collection of multiple discrete surface soil samples (i.e., approximately 0 to 3 inches below ground surface) for a single composite sample for the Soil Amendment Technology Evaluation Study (SATES) program. The study work plan describes the sampling locations and rationale behind each of the test plot areas from which soil samples will be collected. The procedures listed below may be modified in the field by the field supervisor and field personnel, based on field and study area conditions, after appropriate annotations have been made in the field logbook and notification of the TAI technical team coordinator and TAI project coordinator prior to implementation of the change.

Equipment and Materials

This procedure will allow accurate, representative samples to be collected, but requires diligent care and precision by each sample team member. The following is a list of equipment and materials needed by the sampling team:

- Compass
- New/unused stainless steel sampling trowel(s) and shovel(s)
- Tape measure(s)
- Survey stakes or flags
- Nylon cord (minimum 700 feet)
- Maps
- Camera and digital storage card
- Project-specific field logbook(s), pens and pencils
- Chain-of-custody records and custody seals
- Field data sheets
- Sample labels
- Field portable x-ray fluorescence (XRF) analyzer
- 5-gallon plastic buckets
- 6 mil [0.006 inch] thick plastic bags for bucket lining

- Disposable nitrile gloves for handling samples
- Radios (for communication)
- Project-specific work plan and health and safety plan
- Heavy duty zip ties (or cable ties)
- Fiber-reinforced packing tape and duct tape
- Clear plastic packing tape
- Scissors or knife
- Chain-of-custody (COC) forms: these may be produced in an electronic format using a database program (e.g., FORMS II Lite) – in which case a computer and printer would be needed as well
- COC seals
- Fragile, “This End Up,” or “Handle With Care” labels
- Mailing labels
- Airbills for overnight shipment.

Procedures for Surface Composite Sample Collection

The steps below detail sample collection procedures for this sampling effort. All field efforts should be documented consistent with steps and procedures described in SOP-5 (Field Documentation).

1. Check metrological websites to ensure that rain is not forecasted for the sample collection effort, nor has rain occurred in the study area within 48 hours prior to the sampling event. If rain is forecasted or occurs within 48 hours prior to the planned sampling event, notify the field supervisor, TAI technical team coordinator, and the TAI project coordinator. Soils collected for the bench-scale analysis are required to be relatively dry (i.e., no visible moisture present) prior to shipment.
2. Obtain new sample collection equipment (e.g., shovel and/or trowel) and fully decontaminate sample collection equipment at the start of the sampling event as described in SOP-3.
3. Transport field personnel and sampling equipment to the DU selected for sampling.
4. Locate each test plot and sub-plot corner and mark these locations with temporary pin flags.
5. Accurately mark the test plot vertical and horizontal midlines (i.e., the lines dividing the four sub-plots in each test plot) with temporary pin flags, nylon cord, or similar visible temporary markers. Lay out each midline using two measuring tapes placed orthogonally across the test plot. Verify the orientation of the measuring tapes and the

- sample position by compass measurement and comparison of the results to the relevant azimuths of the topline, bottomline, leftline and rightline.
6. For each discrete sample location, measure along the vertical or horizontal midline to the grid cells specified in Table 2-1 and shown in Figure 2-1. Measure 3 feet toward the center of the specified grid cell from the closest midline toward the center of the grid cell and the edge of the transition buffer zone. Mark the center of the soil sample location with temporary pin flags. Note that to preserve the sub-plot soil in the non-buffer areas where soil amendments will be applied in future study phases, the bench-scale treatability study discrete samples will only be collected from sub-plot areas within the 4-foot buffer between adjacent sub-plots (i.e., the transition buffer area). These areas have been designated as buffers to progress soil sample collection to address potential overspill and mixing of future remedy alternative materials across the sub-plot boundaries. Soil collection locations should be as close to the grid cell center as possible but must remain within the 4-foot transition buffer area between adjacent sub-plots. The actual soil collection location may be shifted from the planned location to target available soil and avoid obstacles such as woody vegetation or rocks. The sample relocation should be a minimum distance required to avoid the obstacle (not to exceed 2 feet from the original sample location) and the entire sample volume must be collected only from within the transition buffer zone.
 7. Document the vegetation and any anthropogenic features in the vicinity of the discrete sample location in the field notebook. Prior to beginning sampling activities, take digital photographs of the discrete sample locations and record and describe each photograph in the photo log. Note that multiple soil sample locations can be included in a single photograph.
 8. Clear loose vegetation and large surface debris (e.g., woody debris, undecomposed leaves and pine needles, and surficial rocks) from the discrete sample location with a decontaminated sampling trowel. Avoid removing materials that are incorporated into the upper layers of soil, such as partially-decomposed, matted vegetation. The resulting surface is considered the 0-inch depth. Retain surficial materials for replacement after sampling.
 9. Mark a 2-foot by 2-foot square area using flags or stakes. Make sure the entire square is as close to the grid cell center as possible but completely within the 4-foot transition buffer area between adjacent sub-plots.
 10. At each location, before any soil is collected, use a field portable XRF analyzer to obtain a measurement of the *in situ* soil lead content in the approximate center of the sample

- area. Collect a second measurement *in situ* at the same location at a depth of 1 inch beneath the first measurement. Record the results in the field notes. Ensure that the XRF unit is specifically calibrated for screening metals in soil. If measurements are less than 800 milligrams per kilogram, notify the field supervisor, TAI technical team coordinator, and the TAI project coordinator.
11. Line 5-gallon bucket with a 6 mil [0.006 inch] plastic bag.
 12. Collect soil samples from a 2-foot by 2-foot area to a depth of 3 inches using a decontaminated trowel or equivalent sampling device.
 - a. Place the discrete sample for laboratory analysis into an empty bucket.
 - b. Allow the cultural resource representative to inspect the discrete sample.
 - c. If the discrete sample passes the cultural resources review, continue sampling procedures.
 - d. If the discrete sample does not pass the cultural resources review, STOP SAMPLE COLLECTION. Notify the field supervisor for management-of-change procedures.
 13. Place the soil samples for laboratory analysis into a bucket designated for sample collection with a 6 mil [0.006 inch] plastic bag.
 14. Complete field documentation for this discrete sample location.
 15. Place previously removed vegetation/plant debris or local soil over top of sampling areas.
 16. Dry decontaminate (brush off) sample collection equipment between discrete sample locations within each sub-plot.
 17. Discard dedicated sampling equipment such as gloves, quart-sized inspection bags, and aluminum pans.
 18. The sample should be stored and shipped in accordance with the following methods. In addition, sample buckets should ship to the analytical laboratory along with all appropriate documentation following the requirements of the SOP-4 Sample Custody.

Procedures for Sample Storage Packing, and Shipment

The steps below detail sample storage, packing and shipment procedures for this sampling effort.

Sample Storage Prior to Shipment

1. Sample will be placed in secure storage (i.e., locked room or vehicle) or remain in the possession of sampling personnel before shipment. Sample storage areas will be locked and secured to maintain sample integrity and COC requirements.

Sample Packing

1. When a bucket is full, close the plastic bag within each bucket prior to shipment by fastening a zip tie and tying a knot.
2. The field supervisor will sign and date the completed COC form and retain a copy for project files. Place the signed COC form in a resealable clear plastic bag and tape the bag containing the form to the inside of the bucket. Each bucket should contain an individual COC form for the sample.
3. After the bucket is sufficiently packed to prevent soil from spilling out of the bucket, close the lid and seal it shut with fiber-reinforced packing tape. The bucket must be taped shut around the opening between the lid and the bucket and around the circumference of the bucket.
4. Apply two COC seals across opposite sides of the bucket lid to allow identification of potential unauthorized handling of the samples. Place additional clear packing tape across each seal so they are not inadvertently removed during packing.
5. Prior to shipping the sample containers, notify the analytical laboratory coordinator that samples will be shipped and the estimated arrival time. Upon completion of field activities, the field supervisor will provide copies of each COC form to the task manager and analytical laboratory coordinator.

Ship by Commercial Carrier to the Laboratory

1. Place the sealed sample bucket into a cardboard box that is sufficiently large to contain the entire bucket. The cardboard box should be designed to contain a maximum weight greater than the weight of the bucket filled with soil (e.g., maximum weight of 100 pounds).
2. Use a mailing label and label the box with destination and return addresses, and add other appropriate stickers, such as "This End Up," "Fragile," "Perishable," and "Handle With Care." Indicate on the mailing label the number of boxes that the testing laboratory should expect to receive (e.g., 1 of 2; 2 of 2). Place clear tape over the mailing label to firmly affix it to the top of the box. Make sure the clear tape covers the label to protect it from the weather. This is a secondary label in case the airbill is lost during shipment. Wrap tape completely around the box securely (on each side of the box) ensuring that the tape does not obscure shipping or tracking information.
3. Fill out the airbill as required and firmly affix it to one side of the box within a clear adhesive-backed envelope provided by the shipper. Secure airbill with extra tape if needed, ensuring that the tape does not obscure shipping or tracking information. Do

not attach the airbill or tracking documentation to the box in any manner that could result in the document detaching from the box during transport.

4. The field supervisor will notify the laboratory contact and the task analytical chemistry QA/QC coordinator that samples will be shipped and the estimated arrival date and time. All environmental samples will be shipped overnight for next morning delivery. The field supervisor will provide copies of all COC forms to the task manager the analytical chemistry laboratory coordinator upon completion of the study.

STANDARD OPERATING PROCEDURE SOP-3

DECONTAMINATION OF SOIL SAMPLING EQUIPMENT

Scope and Applicability

This standard operating procedure (SOP) describes procedures for decontaminating sampling and processing equipment contaminated by inorganic materials. To prevent potential cross contamination of samples, all reusable soil sampling and processing equipment will be decontaminated before each use. Reusable sampling equipment includes the stainless-steel trowels, soil sample punches, bowls, spoons, etc. Decontaminated equipment will be stored away from areas that may cause recontamination. When handling decontamination chemicals, field personnel will follow all relevant procedures and will wear protective clothing as stipulated in the site-specific health and safety plan (HSP). Two general types of decontamination will be used during the field program – dry decontamination and full decontamination, depending on the nature of the samples collected.

Equipment and Materials

Equipment and materials needed for decontamination are:

- Plastic bucket(s) (e.g., 5 gallon bucket)
- Tap water or site water (i.e., potable water)
- Potable water
- Properly labeled squirt bottles (or large spray bottles if needed)
- Funnels
- Liqui-Nox®, Alconox®, or equivalent industrial non - phosphate detergent
- Long handled, hard - bristle brushes
- Plastic sheeting, garbage bags, and aluminum foil
- Paper towels
- Polyethylene or polypropylene tub (to collect rinsate)
- Disposable nitrile gloves
- Safety glasses or goggles.

Dry Decontamination Procedures

Dry decontamination will be used only between each discrete soil sample collected for a single composite sample for laboratory analysis. Full decontamination procedures will be used between samples submitted for analysis under separate sample identifiers. The specific procedures for dry decontamination of soil sampling and processing equipment used to collect soil samples are as follows:

1. If needed, use a non-metallic brush to remove larger soil particles adhered to the equipment.
2. Wipe visible soil and residue from the equipment using a clean cloth or paper towel.
3. After decontaminating the sampling equipment, solid wastes such as soil residue, gloves, and cloths/paper towels will be placed in garbage bags and disposed in a solid waste landfill.

Full Decontamination Procedures

Full decontamination will be completed on reusable equipment (including new equipment) prior to collection of each sample. Always follow the procedures listed in the site-specific HSP when decontaminating sampling equipment (e.g., wear appropriate gloves and safety glasses or goggles). Containerize all decontamination fluids for proper disposal following procedures listed in this SOP.

The specific procedures for full decontamination of soil sampling equipment are as follows:

1. Rinse the equipment thoroughly with tap or site water to remove visible soil. This step should be performed on-site for all equipment. After removing visible solids, sampling equipment that does not need to be used again that day may be set aside and thoroughly cleaned in the field laboratory at the end of the day.
2. Pour a small amount of concentrated laboratory detergent into a bucket (i.e., about 1 to 2 tablespoons per 5-gallon bucket) and fill it halfway with tap or site water. If the detergent is in crystal form, all crystals should be completely dissolved prior to use.
3. Scrub the equipment in the detergent solution using a long - handled brush with rigid bristles. Be sure to clean the outside of the compositing bowls and other pieces that may be covered with soil.
4. Rinse the equipment with potable water twice and set on a stable surface to drain. Do not allow any surface that will come in contact with the sample to touch any

potentially-contaminated surface. Remove visible liquid from the equipment using a clean cloth or paper towel.

5. If the decontaminated sampling equipment is not to be used immediately, wrap small stainless steel items in aluminum foil (dull side facing the cleaned area) for cleaning at the field laboratory.
6. If the sample collection or processing equipment is cleaned at the field laboratory and transported to the sampling site, then the decontaminated equipment will be wrapped in aluminum foil (dull side facing the cleaned area) and stored and transported in a clean plastic bag (e.g., a trash bag) until ready for use.
7. After decontaminating all of the sampling equipment, the disposable gloves and used foil will be placed in garbage bags and disposed of in a solid waste landfill. Water generated during equipment decontamination will be containerized, temporarily stored at a designated staging area in 55-gallon drums or portable tanks, and disposed appropriately based on analytical results. Water generated during decontamination of new, unused sampling equipment will be disposed appropriately, and may not require analytical results.

STANDARD OPERATING PROCEDURE SOP-4

SAMPLE CUSTODY

Scope and Applicability

This standard operating procedure (SOP) describes procedures for custody management of environmental samples during the Soil Amendment Technology Evaluation Study (SATES). The procedure outlined herein will be used in conjunction with SOP-2, which covers sample collection, storage, packaging and shipping and SOP-5, which covers field documentation.

Chain-of-custody (COC) forms ensure that samples are traceable from the time of collection through processing and analysis until final disposition. A sample is considered to be in a person's custody if any of the following criteria are met:

1. The sample is in the person's possession
2. The sample is in the person's view after being in possession
3. The sample is in the person's possession and is being transferred to a designated secure area
4. The sample has been locked up to prevent tampering after it was in the person's possession.

At no time is it acceptable for samples to be outside of designated personnel's custody unless the samples have been transferred to a secure area (i.e., locked up and custody sealed) or transferred to the laboratory. If the samples cannot be placed in a secure area, then a field team member must physically remain with the samples at all times (e.g., at meal times, etc.).

Materials and Methods

- COC forms: these may be produced in an electronic format using a database program (e.g., FORMS II Lite) – in which case a computer and printer would be needed as well
- Custody seals
- Shipping air bills.

Chain-of-Custody Forms

The COC form is critical because it documents sample possession from the time of collection through the final disposition of the sample. The form also provides information to the laboratory regarding what analyses are to be performed on the samples that are shipped.

The COC form will be completed after each field collection activity and before the samples are shipped to the laboratory. Project-assigned soil sample identifiers will be recorded on the COC form. The COC form will also identify the sample collection date and time, the type of sample, the project, and the sampling personnel. Two COC form copies will be sent to the laboratory along with the sample(s). Copies of the COC form will be placed into a plastic re-sealable bag and secured to the inside top of each cooler. Another copy will be retained by the field supervisor for filing in the project files by the task manager at the completion of the study.

Sampling personnel are responsible for the care and custody of the samples until they are shipped. When transferring possession of the samples, the individuals relinquishing and receiving the samples must sign the COC form(s), indicating the time and date that the transfer occurs.

Procedures

The following guidelines will be followed to ensure the integrity of the samples:

1. Prior to sample shipping or storage, COC entries will be made electronically for all samples on a secure computer. Information on the COCs will be checked against field logbook entries.
2. At the bottom of each COC form is a space for the signatures of the persons relinquishing and receiving the samples and the time and date that the transfer occurred. The time that the samples were relinquished should match exactly the time they were received by another party. Under no circumstances should there be any time when custody of the samples is undocumented.
3. The COC form should not be signed until the information has been checked for inaccuracies by the field supervisor. All changes should be made by drawing a single line through the incorrect entry and initialing and dating the revision. Revised entries should be made in the space below the entries. Any blank lines remaining on the COC form after corrections are made should be marked out with single lines that are initialed and dated. This procedure will preclude any unauthorized additions.

4. If samples are sent by a commercial carrier not affiliated with the laboratory, such as Federal Express (FedEx) or United Parcel Service (UPS), the name of the carrier should be recorded on the COC form. Any tracking numbers supplied by the carrier should be also entered on the COC form. The time of transfer should be as close to the actual drop-off time as possible. After two copies of the COC forms are signed, they should be sealed inside the transfer container. The other signed copy will be retained by the field supervisor.
5. If errors are found after the shipment has left the custody of sampling personnel, a corrected version of the forms must be made and sent to all relevant parties. Minor errors can be rectified by making the change on a copy of the original with a brief explanation and signature. Errors in the signature block may require a letter of explanation.
6. Upon completion of the field sampling event, the field supervisor will be responsible for submitting all COC forms to be copied.

Custody Seal

As security against unauthorized handling of the samples during shipping, three custody seals will be affixed to each sample cooler. The custody seals will be placed across the front and on each side of the cooler prior to shipping. Be sure the seals are properly affixed to the cooler so they cannot be removed during shipping. Additional tape across the seal may be prudent.

Shipping Air Bills

When samples are shipped from the field to the testing laboratory via a commercial carrier (e.g., Federal Express, UPS), an air bill or receipt is provided by the shipper. Upon completion of the field sampling event, the field supervisor will be responsible for submitting the sender's copy of all shipping air bills to the task manager. The air bill number (or tracking number) should be noted on the applicable COC form before it is sealed inside the cooler.

Acknowledgement of Sample Receipt

In most cases, on the day samples are received by the testing laboratory, the laboratory will confirm receipt with the task analytical chemistry laboratory coordinator. This confirmation may be via e-mail or an official laboratory 'Acknowledgment of Sample Receipt' form that confirms the sample ID numbers and analysis to be performed. If an error is detected by the task analytical chemistry laboratory coordinator, the laboratory will be called immediately. Decisions made during any telephone conversation should be documented in writing and archived in the project file by the task manager. If necessary,

corrections should be made to the COC form and the corrected version of the COC form should be sent to the laboratory (either via e-mail or facsimile) by the task analytical chemistry laboratory coordinator.

STANDARD OPERATING PROCEDURE SOP-5

FIELD DOCUMENTATION

Scope and Applicability

This standard operating procedure (SOP) presents the general information that should be documented for all soil collection activities. Proper record keeping will be implemented in the field to allow samples to be traced from collection to final disposition. All information pertaining to field operations during sample collection must be properly documented to ensure transparency (and reproducibility) of methods and procedures. Several types of field documents will be used for this purpose by field personnel.

Equipment and Materials

- Field logbook
- Waterproof black-ink pen
- Field forms
- Digital camera

Field Logbooks

During field sampling events, field logbooks are used to record all daily field activities. The purpose of the field logbook is to thoroughly document the sampling event to ensure transparency and reproducibility. The field logbook will contain soil sampling-related information supplemental to the field data sheets. Any deviations from the project-specific field sampling plan that occur during sampling (e.g., personnel, responsibilities, sample station locations) and the reasons for these changes will be documented in the field logbook. Other types of information that may be included in the field logbook include the following:

- Project sampling name/type
- Name of person making entries and other field staff
- Onsite visitors, if any
- Observations made during sample collection, including collection complications, visible debris, and other details not entered onto the field form

- Any surface vegetation that may be removed from the sampling location prior to sampling
- A record of site health and safety meetings, updates, and related monitoring
- Presence of construction/maintenance activities or man-made features that may influence soil composition or transport
- The locations of nearby surface water features (e.g., streams, wetlands, oxbows) or anthropogenic influences (e.g., roads, houses, campsite, evidence of firearm discharge)
- Equipment calibration records (e.g., instrument type and serial number, calibration supplies used, calibration methods and calibration results, date, time, and personnel performing the calibration).

The field supervisor will maintain the field logbook and is responsible for ensuring that the field logbook and all field data forms are correct. Requirements for logbook entries will include the following:

- Entries will be made legibly with black (or dark) waterproof ink
- Unbiased, accurate language will be used
- Entries will be made while activities are in progress or as soon afterward as possible (the date and time that the notation is made should be noted, as well as the time of the observation itself)
- Each consecutive day's first entry will be made on a new, blank page
- The field supervisor must sign and date the last page of each daily entry in the field logbook
- When field activity is complete, the logbook will be entered into the Teck technical team project file.

All logbook entries must be completed at the time any observations are made. Logbook corrections will be made by drawing a single line through the original entry, allowing the original entry to be read. The corrected entry will be written alongside the original. Corrections will be initialed and dated and may require a footnote for explanation. When possible at the end of each day of sampling, backup copies of the pages having entries for the current day should be made. These copies should be stored at a secure location (e.g., the hotel room) and not returned to the field.

Upon completion of the field sampling event, the field supervisor will be responsible for submitting all field logbooks to be copied. A discussion of copy distribution is provided below.

Field Data Forms

Field data forms will be used during this field sampling event to record the relevant sample information collected during a sampling event. These forms will be filled out completely by the sampling team during collection of each soil sample and will include the following information:

- Project name and date
- Names of all members of the sampling team
- A brief description of the weather
- The time each station had soil collected
- The station number
- Station location details from the GPS: latitude, longitude, positional accuracy, and elevation (if applicable)
- The sample ID and analysis to be performed
- A list of photograph numbers of the site
- Any additional collection comments.

Upon completion of the field sampling event, the field supervisor will be responsible for submitting all field data forms to be copied. A discussion of copy distribution is provided below.

Photographs

In certain instances, digital photographs of sampling stations may be taken using a camera-lens system with a perspective similar to the naked eye. Photographs should include a measured scale in the picture, when practical (e.g., ruler, pencil, coin, etc.). Do not take a photograph without a reference. Use a whiteboard with descriptive information if necessary. Photographs may also be taken of sample characteristics and routine sampling activities. The following items should be recorded in the field logbook for each photograph taken:

1. The photographer's name or initials, the date, the time of the photograph, and the general direction faced (orientation)
2. A brief description of the subject and the field work portrayed in the picture
3. For digital photographs, the sequential number of the photograph, the file name, the file location, and back-up compact disk (CD) number (if applicable).

Upon completion of the field sampling event, the field supervisor will be responsible for submitting all photographic materials to be copied to electronic media. The electronic media will be placed in the project files (at the task manager's location). Photo logs and any supporting documentation from the field logbooks will be photocopied and placed in the project files with the disks.

Distribution of Copies

Electronic scans of the field logbooks and field data forms will be made after completion of the field sampling event and stored electronically in the project files for use by project staff. The original field logbooks and forms will be placed in a locked file cabinet at the task manager's location.

Set-up of Locking File Cabinet

Each field event will have its own dedicated section in a locking file cabinet. The section label will include the project name and work order number. The following documents may be included in this folder for each field event:

- Original Field logbook(s)
- Original Field data forms
- Photograph CDs (or other electronic media)
- Original signed COC forms

APPENDIX C
HEALTH AND SAFETY PLAN ADDENDUM

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ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
COPC	chemical of potential concern
HAZWOPER	hazardous waste operations and emergency response
OSHA	Occupational Safety and Health Administration
PFD	personal flotation device
PPE	personal protective equipment
RI/FS	remedial investigation and feasibility study
SHSP	site health and safety plan
Site	Upper Columbia River site
SATES	Soil Amendment Technology Evaluation Study
TAI	Teck American Incorporated
UCR	Upper Columbia River
WISHA	Washington Industrial Safety and Health Act

SITE HEALTH AND SAFETY PLAN ADDENDUM APPROVAL

This addendum to the general site health and safety plan (SHSP) has been reviewed and approved by Teck American Incorporated's (TAI) lead technical consultant Ramboll for the 2017 Soil Amendment Technology Evaluation Study at the Upper Columbia River (UCR) site (Site) in support of the remedial investigation and feasibility study (RI/FS) for the Site.

Ramboll Task Manager

Date

Ramboll Corporate Health and Safety Officer

Date

SITE HEALTH AND SAFETY PLAN ADDENDUM ACKNOWLEDGEMENT

This addendum to the general SHSP (TCAI 2009) is approved for use at the Site. The general SHSP and addendum are the minimum health and safety standard for the Site and will be strictly enforced for all personnel conducting sediment sampling activities at the Site. Subcontracted personnel may request to adopt a subcontractor-specific plan in lieu of this addendum to the general SHSP, but must obtain prior written approval from TAI and provide written concurrence from the subcontractor that the subcontractor will assume direct responsibility and liability for administering the plan to its employees.

I have reviewed this addendum to the general SHSP for the study. I have had an opportunity to ask any questions I may have and have been provided with satisfactory responses. I understand the purpose of the plan, and I consent to adhere to its policies, procedures, and guidelines.

_____ Employee signature	_____ Company	_____ Date

1 INTRODUCTION

This addendum to the general site health and safety plan (SHSP) for the Upper Columbia River (UCR) site (Site) remedial investigation and feasibility study (RI/FS) provides specific Site information and health and safety provisions to protect workers from potential hazards during sediment and soil sampling at locations along the UCR.

Site background information and general health and safety provisions to protect workers from potential hazards during work at the Site are presented in the general SHSP (TCAI 2009).

Subcontractors that are contracted to perform field work associated with the RI/FS may adopt this SHSP or develop and follow their own SHSPs. However, subcontractor SHSPs must be consistent with the provisions outlined in this addendum and the general SHSP, and any discrepancies will follow the most protective practices.

It is Ramboll's policy to provide a safe and healthful work environment. No aspect of the work is more important than protecting the health and safety of all workers.

Ramboll cannot guarantee the health or safety of any person entering the Site. Because of the potentially hazardous nature of the Site and the activity occurring thereon, it is not possible to regulate personal diligence or to discover, evaluate, and provide protection for all possible hazards that may be encountered. Strict adherence to the health and safety guidelines set forth herein will reduce, but not eliminate, the potential for injury and illness at the Site. The health and safety guidelines in this plan were prepared specifically for the Site and should not be used on any other site without prior evaluation by trained health and safety personnel.

A copy of this addendum and the general SHSP must be in the custody of the field team during field activities. All individuals performing field work must read, understand, and comply with this plan before undertaking field activities. Once the information has been read and understood, the individual must sign the Site Health and Safety Acknowledgment Form provided with this addendum to the general plan. Any changes to the plan will be written in the plan and initialed by all potentially affected field personnel. The signed form and any initialed changes will become part of Ramboll's project file. A copy of the form will be provided to Teck American Incorporated (TAI).

This addendum may be modified at any time based on the judgment of the site safety officer in consultation with the corporate health and safety officer and project manager or designee.

Any modification will be presented to the on-site team during a safety briefing and will be recorded in the field logbook.

1.1 ORGANIZATION

Task-specific safety procedures associated with soil sampling are presented in this addendum to the general SHSP. In addition, this addendum provides detailed field site and hospital location maps, air monitoring requirements, specific requirements for personal protective equipment (PPE), work zone definitions, and key emergency contact information.

The general SHSP (TCAI 2009) provides background site information and general health and safety provisions to protect workers from potential hazards during field activities. The information includes general safety guidelines for physical hazards, a chemical hazard evaluation, health and safety training requirements, general PPE requirements, emergency planning, general decontamination procedures, vehicle safety, and spill containment.

1.2 SCOPE OF WORK

Soil samples will be collected from tribal allotment properties previously sampled within the 2014 residential soil study area (see Site map, Attachment C-1).

1.3 DEFINITIONS

Contamination reduction zone:	Area between the exclusion and support zones that provides a transition between contaminated and clean zones
Exclusion zone:	Any area of the Site where hazardous substances are present, or are reasonably suspected to be present, and pose an exposure hazard to personnel
HAZWOPER:	Hazardous Waste Operations and Emergency Response standard, as described in 29 Code of Federal Regulations (CFR) Part 1910.120
OSHA:	Occupational Safety and Health Administration
Support zone:	Any area of the Site, so designated, that is outside the exclusion and contamination reduction zones
WISHA:	Washington Industrial Safety and Health Act, as described in Chapter 49.17 Revised Code of Washington

2 SAFETY GUIDELINES FOR PHYSICAL HAZARDS

All work will be done using the buddy system. Depending upon the time of year and the location of work, biting insects may be an issue when accessing any of the sampling locations during the sampling event. Table C-2-1 summarizes potential physical hazards posed by proposed Site activities. Table C-2-2 presents potential physical hazards that are expected to be present during sediment sampling activities.

Table C-2-1. Summary of Activities and Potential Hazards

Activity	Potential Hazard
Soil Sampling	Water hazards, slippery walking surfaces, cold/hypothermia (depending on sampling event), heat stress (depending on sampling event), material handling, adverse weather, work in remote areas

Table C-2-2. Potential Physical Hazards and Proposed Safety Procedures

Potential Hazard	Yes	No	Proposed Safety Procedure
Slippery surfaces	X		Use caution; wear properly fitting shoes or boots with good gripping capacity; keep work area orderly.
Cold/hypothermia	X		Keep warm and dry, bring changes of clothes; do not work in extreme conditions without proper equipment and training; follow cold stress information (Attachment C-2); potential for cold/hypothermia will depend on season.
Heat stress	X		Drink water frequently in hot weather; take work breaks; follow the heat-related illness information (Attachment C-3); potential for heat stress will depend on season.
Material handling	X		Lift properly; seek assistance if necessary; do not overfill coolers or boxes.
Adverse weather	X		Seek shelter during storms; work in adverse weather conditions only with proper training, clothing, and equipment.
Drowning		X	Wear personal flotation devices (PFDs) at all times when working over water. Inspect the PFDs prior to use and do not use defective PFDs. Keep sampling equipment on boats organized at all times. Boats are required to be equipped with a throwable life ring, fire extinguisher, and warning horn, and each field member will be briefed on their storage location.
Work in remote areas	X		Use the buddy system; carry radio and/or cellular phone; bring sufficient equipment in case of accident or injury (first aid kit, shelter if appropriate).
Biting insects	X		Use repellents, as needed.

3 CHEMICAL HAZARD EVALUATION

A chemical hazard evaluation is presented in the general SHSP (TCAI 2009) and incorporated herein by reference.

4 PERSONAL PROTECTIVE EQUIPMENT AND SAFETY EQUIPMENT

The following sections address PPE and safety equipment required for completing the sediment sampling activities.

4.1 PERSONAL PROTECTIVE EQUIPMENT

Based on chemical and physical hazards associated with the soil sampling activities, Tables C-4-1 and C-4-2 identify the PPE required for sampling.

Table C-4-1. Level of Protection Required for Site Activities

Site Activity	Level of Protection	
	Initial ^a	Contingency ^b
Soil sampling	MD	Leave Site, reassess situation
Sample handling	D	Leave Site, reassess situation

^a See Table C-4-2 for definitions

^b Based on unexpected change in Site conditions

Table C-4-2. Levels of Protection and Personal Protective Equipment

Protection Level	Required	Personal Protective Equipment
Level D	X	Long pants and shirt or work coveralls; safety glasses or goggles (as appropriate); and nitrile, neoprene, or Barrier® 5 layer laminate gloves (as appropriate). Hard hat and hearing protection as needed.
Level MD	X	Same as Level D with modification (M) of addition of rain gear and PFD, as needed.

Is there potential for a respirator to be donned during field work? Yes _____ No X

4.2 SAFETY EQUIPMENT

The following safety equipment will be on site during the proposed field activities.

Air Monitoring (Check the items required for this project)

- | | |
|---|---|
| <input type="checkbox"/> Photoionization Detector
<input type="checkbox"/> Lower Explosive Limit/Oxygen meter
<input type="checkbox"/> Hydrogen sulfide meter
<input type="checkbox"/> Detector pump and tubes | <input type="checkbox"/> Air sampling pumps
<input type="checkbox"/> Miniram
<input type="checkbox"/> Radiation meter
<input type="checkbox"/> Other _____ |
|---|---|

First Aid Kit (mandatory, including adhesive band-aids, gauze, tape, gloves, cardiopulmonary resuscitation shield, triangle bandage)

- | | |
|---|---|
| <input checked="" type="checkbox"/> Emergency blanket | <input checked="" type="checkbox"/> Sunscreen |
| <input checked="" type="checkbox"/> Insect repellent | <input type="checkbox"/> Other _____ |

Other (Check the items required for this project)

- | | |
|---|---|
| <input checked="" type="checkbox"/> Eyewash | <input type="checkbox"/> Fit test supplies |
| <input checked="" type="checkbox"/> Drinking water | <input checked="" type="checkbox"/> Fire extinguisher (boat) |
| <input type="checkbox"/> Stop watch for monitoring heart rate | <input type="checkbox"/> Windsock |
| <input type="checkbox"/> Thermoscan® thermometer (or equivalent) for heat stress monitoring | <input checked="" type="checkbox"/> Cellular phone |
| <input checked="" type="checkbox"/> Survival kit | <input type="checkbox"/> Radio sets |
| <input type="checkbox"/> Personal flotation device | <input checked="" type="checkbox"/> Global positioning system |
| <input type="checkbox"/> Cool vests | <input checked="" type="checkbox"/> Other: <u>Satellite phone</u> |

5 AIR MONITORING

The principal chemicals of potential concern (COPCs) at the Site are not volatile (i.e., metals). There is a small chance for the COPCs to become airborne in dust form if the sediment is dry, although the sediments are unlikely to contain a significant amount of fine particles. In addition, the chemical hazard evaluation presented in the general SHSP (TCAI 2009) concluded that, based on previous evaluations, none of the sediment or soil chemicals is expected to pose a threat to field personnel during soil sampling activities. If windblown dust becomes problematic to the field crew, operations may be suspended. Tables C-5-1 and C-5-2 provide air monitoring requirements and action levels to be used during sampling activities.

Table C-5-1. Site-specific Air Monitoring Requirements

Monitoring Instrument	Calibration Frequency	Parameters of Interest	Monitoring Frequency
Visual	N/A	Dust	Continuous

Table C-5-2. Action Levels Established to Determine the Appropriate Level of Personal Protection

Instrument	Reading	Action ^a	Comments
Visual	Visual Dust	Leave Site, if necessary	

6 EMERGENCY PLANNING

In case of any emergency affecting the Site, all affected personnel must immediately evacuate the work area and report to the Site safety officer at the following predetermined location:

DESIGNATED ASSEMBLY LOCATION: Field vehicle

In case of injury, field personnel should take precautions to protect the victim from further harm and notify local or facility emergency services. In remote areas, it will be necessary to have first aid-trained personnel on the field team. The victim may require decontamination prior to treatment—requirements will vary based on Site conditions.

Emergency medical care will be provided by:

- Local emergency medical provider (i.e., fire department; see Table C-6-1 for local contact information)
- Facility emergency medical provider
- First aid-trained field staff (for remote areas only)

Table C-6-1. Local Emergency Telephone Numbers

Local Resources	Name	Telephone	Notified Prior to Work (Yes/No)?
Fire	Varies by location	911	Yes. Notify the E911 coordinator for Stevens County (Debby McCanna; 509-684-2555) of the schedule and location of work.
Police	Varies by location	911	Yes (see above)
Ambulance	Varies by location	911	Yes (see above)
Main Hospital	Mount Carmel Hospital, Colville, WA	(509) 684-2561	No
Alternative Hospitals	Coulee Medical Center, Grand Coulee, WA	(509) 633-1753	No
	Ferry County Memorial Hospital, Republic, WA	(509) 775-3333	No
	Lincoln Hospital, Davenport, WA	(509) 725-7101	No
	Providence St Joseph's Hospital, Chewelah, WA	(509) 935-8211	No
	MultiCare Deaconess Hospital, Spokane, WA	(509) 473-7178	No
	Providence Holy Family Hospital, Spokane, WA	(509) 482-0111	No
	Providence Sacred Heart Medical Center, Spokane, WA	(509) 474-3131	No
	Veterans Affairs Medical Center, Spokane, WA	(509) 434-7000	No
Site phone	Field cellular phone. Cellular phone coverage is spotty in the vicinity of the sampling areas. If cellular phone coverage is lost due to a mountain or hill,	(503) 320-1796	NA

Local Resources	Name	Telephone	Notified Prior to Work (Yes/No)?
	drive a little farther to get coverage. If cellular phone coverage is available, the 911 system will work. A satellite phone may be necessary for areas with limited cellular phone coverage.		
Directions to Providence Mount Carmel Hospital (from Highway 395)	Begin traveling SE on Highway 395. Highway 395 becomes Main Street in Colville. Turn LEFT on E. Columbia Ave. Go 0.6 mile. Arrive at 982 E. Columbia Ave. Hospital is on right. (See detailed hospital location maps in Attachment C-1)		

In case of serious injuries, death, or other emergency, the TAI Project Coordinator and TAI Principal Investigator must be notified immediately. Contact numbers are listed in Table C-6-2.

Table C-6-2. Corporate Emergency Telephone Numbers

Corporate Resources	Name	Work/Cellular Telephone
TAI Project Coordinator	Kris McCaig	Work: (509) 623-4501 Cellular: (509) 434-8542
TAI Principal Investigator	Rosalind Schoof	Work: (206) 336-1653 Cellular: (206) 713-5449

Table C-6-3 provides local hospital contact and location information. See Attachment C-1 for a detailed hospital location map.

Table C-6-3. Project Area Hospital Information

Facility Name	Hours of Operation	Phone Number	Address	City
Coulee Medical Center	24 hours/ emergency	509-633-1753	411 Fortuyn Road	Grand Coulee
Ferry County Memorial Hospital	24 hours/ emergency	509-775-3333	36 Klondike Road	Republic
Lincoln Hospital	24 hours/ emergency	509-725-7101	10 Nichols Street	Davenport
Providence St Joseph's Hospital	24 hours/ emergency	509-935-8211	500 East Webster Street	Chewelah
Providence Mount Carmel Hospital	24 hours/ emergency	509-684-2561	982 East Columbia Street	Colville
MultiCare Deaconess Hospital	24 hours/ emergency	509-473-7178	West Fifth Avenue	Spokane
Providence Holy Family Hospital	Dependent on case	509-482-0111	North 5633 Lidgerwood Avenue	Spokane
Sacred Heart Medical Center	24 hours/ emergency	509-474-3131	West 101 Eighth Avenue	Spokane

Facility Name	Hours of Operation	Phone Number	Address	City
Veterans Affairs Medical Center	7:30 am to 4:00 pm	509-434-7032	North 4815 Assembly Street	Spokane

In the event any health or safety issue arises, after the victim(s) receive appropriate medical treatment, the relevant field crew member(s) will be interviewed to formally document the incident by, at a minimum, the field supervisor and TAI Project Coordinator. All incidents will be documented in the field logbook. If applicable, a corrective action record form will be filled out (see Appendix B to the Phase II Soil Collection Work Plan) to ensure future health and safety issues are addressed.

7 WORK ZONES

The following work zones are defined for the sediment and soil sampling activities.

Exclusion zone. The area immediately around the sampling activities will be designated as the exclusion zone. Traffic cones and/or caution tape will be used to delineate the specific area(s).

Contamination reduction zone. Not applicable. All sampling activities will occur within the exclusion zone.

Support zone. Not applicable. All sampling activities will occur within the exclusion zone.

Controls to be used to prevent entry by unauthorized persons. Sampling staff will remain cognizant of people approaching the exclusion zone. All unauthorized persons will be instructed to remain outside of the sampling area.

8 DECONTAMINATION

The field team will decontaminate all sampling equipment that comes into contact with soil prior to the commencement of sampling at each location and upon completion of the study. This will include equipment such as trowels, mixing bowls, and utensils. The decontamination will consist of thoroughly rinsing all of the equipment with potable water, then with soap (i.e., Alconox®) and rinsed with potable water after each use.

Clean gloves will be worn at each sampling location to avoid transfer of potential contaminants among samples. Otherwise, decontamination procedures will follow those presented in the general SHSP (TCAI 2009) and are incorporated herein.

9 VEHICLE SAFETY, SPILL CONTAINMENT, AND SHIPPING INSTRUCTIONS

Vehicle safety, spill containment, and shipping instructions are presented in the general SHSP (TCAI 2009) and are incorporated herein.

10 TASK-SPECIFIC SAFETY PROCEDURES

Slips, trips, and falls are anticipated to be the greatest hazards to field personnel during the soil sampling event, as well as unexpected contact with the sampling equipment. Always move about the shore or upland area with caution. Wear properly fitting shoes or boots with non-slip soles and good ankle support. Be aware of the location and movement of the grab sampler at all times.

The Site is located in a remote region with limited cellular phone coverage. All field crews will have a satellite phone to maintain communication with the field supervisor. The field crews will coordinate departure and expected return times for all field activities with the field supervisor. Field crews will provide the field supervisor with status updates at least every 4 hours while performing field collection activities.

The areas that will be sampled are accessible to the public. Always be aware of your surroundings. Use the buddy system and keep in line-of-sight contact with other sampling personnel at all times. Do not leave samples or sampling equipment unattended. If you feel threatened, or if the situation feels unpredictable, leave the area immediately.

Always wear nitrile gloves and safety glasses or goggles when handling sampling equipment, samples, or preservative chemicals (if required). Keep a 1-L eye wash bottle accessible during all field work. Avoid getting preservatives on your skin or clothes. If any preservatives are spilled or splashed on your skin or clothes, immediately rinse the affected area with potable water and get medical attention, if warranted. If any preservative is splashed in the eye, flush the eye with the eye wash solution and get immediate medical attention.

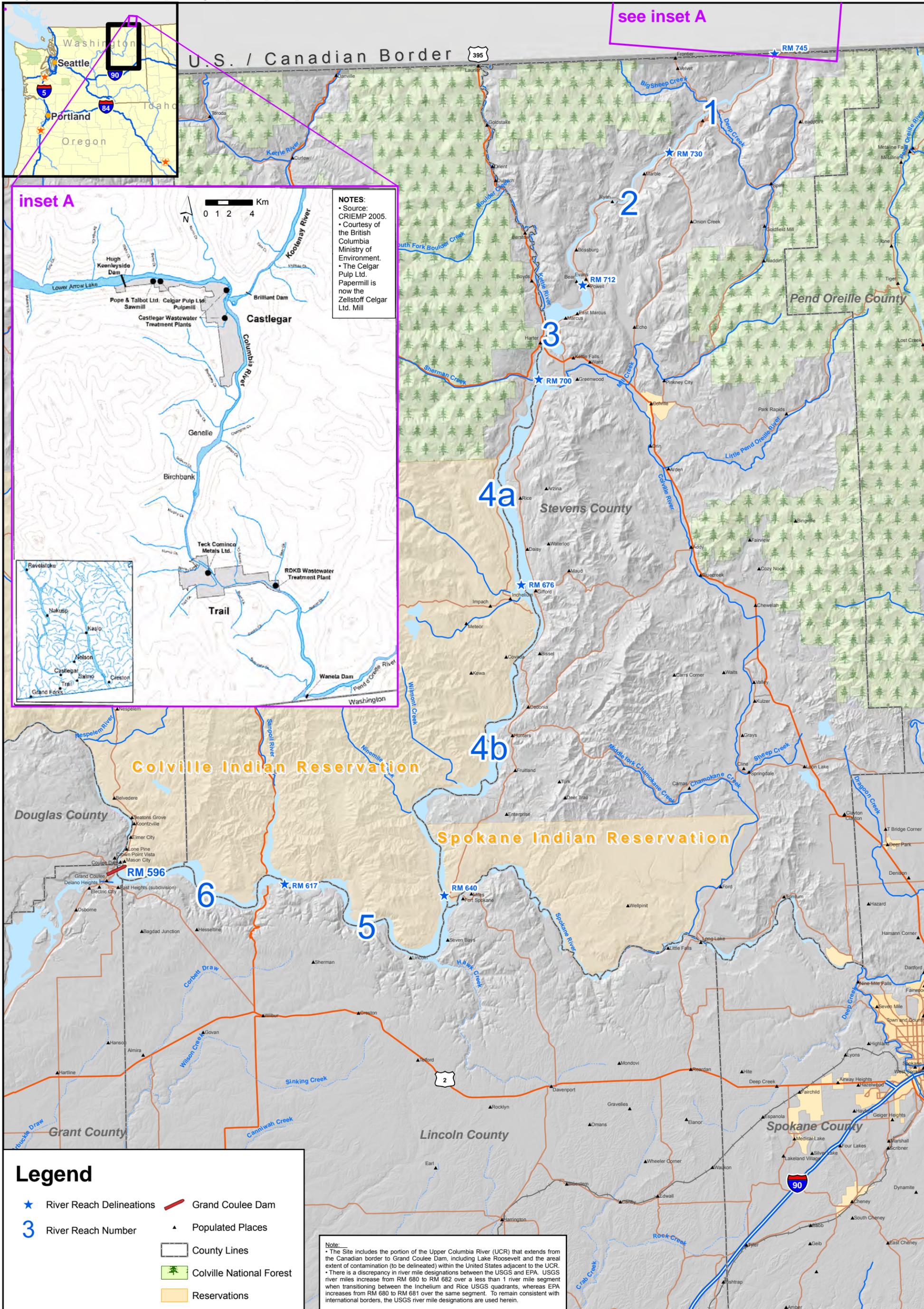
11 REFERENCE

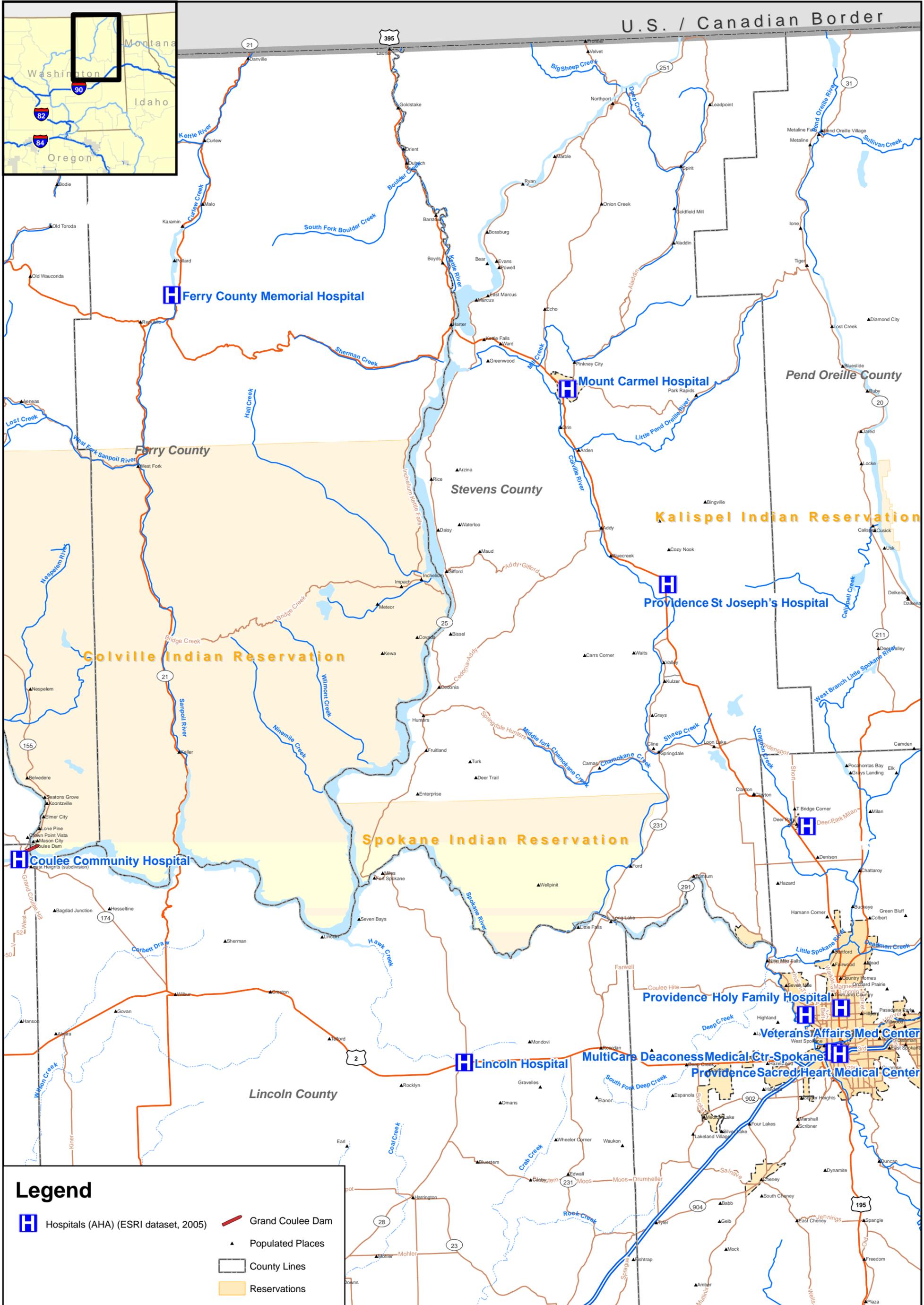
TCAI. 2009. Upper Columbia River general site health and safety plan for the remedial investigation and feasibility study. Prepared for Teck American Incorporated. Integral Consulting Inc., Mercer Island, Washington, and Parametrix, Bellevue, WA.

ATTACHMENTS

ATTACHMENT C-1

SITE MAP AND HOSPITAL LOCATION MAPS





U.S. / Canadian Border

Legend

- Hospitals (AHA) (ESRI dataset, 2005)
- Grand Coulee Dam
- Populated Places
- County Lines
- Reservations

Integral Parametrix

0 10 20 Km

0 5 10 Miles

General Hospital Location Map
Upper Columbia River, WA

ATTACHMENT C-2

COLD-STRESS FACT SHEET

FROSTBITE

What happens to the body:

Freezing in deep layers of skin and tissue; pale, waxy-white skin color; skin becomes hard and numb; usually affects fingers, hands, toes, feet, ears, and nose.

What to do: (land temperatures)

- Move the person to a warm, dry area. Don't leave the person alone.
- Remove wet or tight clothing that may cut off blood flow to the affected area.
- **Do not** rub the affected area because rubbing damaged the skin and tissue.
- Gently place the affected area in a warm water bath (105°) and monitor the water temperature to **slowly** warm the tissue. Don't pour warm water directly on the affected area because it will warm the tissue too fast, causing tissue damage. Warming takes 25-40 minutes.
- After the affected area has been warmed, it may become puffy and blister. The affected area may have a burning feeling or numbness. When normal feeling, movement, and skin color have returned, the affected area should be dried and wrapped to keep it warm.
Note: If there is a chance the affected area may get cold again, do not warm the skin. If the skin is warmed and then becomes cold again, it will cause severe tissue damage.
- Seek medical attention as soon as possible.

How to Protect Workers

- Recognize the environmental and workplace conditions that lead to potential cold-induced illnesses and injuries.
- Learn the signs and symptoms of cold-induced illnesses/injuries and what to do to help the worker.
- Train workers about cold-induced illnesses and injuries.
- Select proper clothing for cold, wet, and windy conditions. Layer clothing to adjust to changing environmental temperatures. Wear a hat and gloves, in addition to underwear that will keep water away from the skin (polypropylene.)
- Take frequent short breaks in warm, dry shelters to allow the body to warm up.
- Perform work during the warmest part of the day.
- Avoid exhaustion or fatigue because energy is needed to keep muscles warm.
- Use the buddy system (work in pairs.)
- Drink warm, sweet beverages (sugar water, sports-type drinks.)
Avoid drinks with caffeine (coffee, tea, or hot chocolate) **or alcohol.**
- Eat warm, high-calorie foods like hot pasta dishes.

Workers are at increased risk when...

- They have predisposing health conditions such as cardiovascular disease, diabetes, and hypertension.
- They take certain medications. Check with your doctor, nurse, or pharmacy and ask if medicines you take affect you while working in cold environments.
- They are in poor physical condition, have a poor diet, or are older.

HYPOTHERMIA - (Medical Emergency)

What happens to the body:

Normal body temperature (98.6°F/37°C) drops to or below 95°F/35°C; fatigue or drowsiness; uncontrolled shivering; cool, bluish skin; slurred speech; clumsy movements; irritable, irrational, or confused behavior.

What to do: (land temperatures)

- Call for emergency help (i.e., ambulance or 911).
- Move the person to a warm, dry area. Don't leave the person alone.
- Remove wet clothing and replace with warm, dry clothing or wrap the person in blankets.
- Have the person drink warm, sweet drinks (sugar water or sports-type drinks) if he is alert. **Avoid drinks with caffeine** (coffee, tea, or hot chocolate) **or alcohol.**
- Have the person move his arms and legs to create muscle heat. If he is unable to do this, place warm bottles or hot packs in the armpits, groin, neck, and head areas. **Do not** rub the person's body or place him in a warm water bath. This may stop his heart.

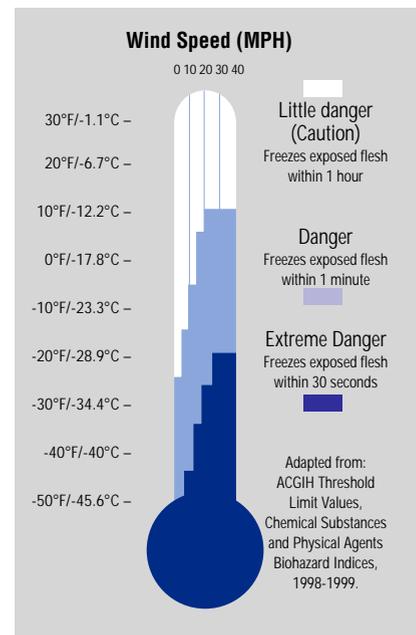
What to do: (water temperatures)

- Call for emergency help (i.e., ambulance or 911). Body heat is lost up to 25 times faster in water.
- **Do not** remove any clothing. Button, buckle, zip, and tighten any collars, cuffs, shoes, and hoods because the layer of trapped water closest to the body provides a layer of insulation that slows the loss of heat. Keep the head out of the water and put on a hat or hood.
- Get out of the water as quickly as possible or climb on anything floating. **Do not** attempt to swim unless a floating object or another person can be reached because swimming or other physical activity uses body heat and reduces survival time by about 50 percent.
- If getting out of the water is not possible, wait quietly and conserve body heat by folding arms across the chest, keeping thighs together, bending knees, and crossing ankles. If another person is in the water, huddle together with chests held closely.

THE COLD STRESS EQUATION

LOW TEMPERATURE + WIND SPEED + WETNESS = INJURIES & ILLNESS

When the body is unable to warm itself, serious cold-related illnesses and injuries may occur, and permanent tissue damage and death may result. **Hypothermia** can occur when *land temperatures* are above freezing or *water temperatures* are below 98.6°F/37°C. Cold-related illnesses can slowly overcome a person who has been chilled by low temperatures, brisk winds, or wet clothing.



ATTACHMENT C-3

HEAT-RELATED ILLNESS FACT SHEET

HEAT EXHAUSTION

What happens to the body:

Headaches, dizziness, or light-headedness, weakness, mood changes, irritability or confusion, feeling sick to your stomach, vomiting, fainting, decreased and dark-colored urine, and pale, clammy skin.

What should be done:

- Move the person to a cool shaded area. Don't leave the person alone. If the person is dizzy or light-headed, lay him on his back and raise his legs about 6-8 inches. If the person is sick to his stomach, lay him on his side.
- Loosen and remove heavy clothing.
- Have the person drink some cool water (a small cup every 15 minutes) if he is not feeling sick to his stomach.
- Try to cool the person by fanning him. Cool the skin with a cool spray mist of water or wet cloth.
- If the person does not feel better in a few minutes call for emergency help (ambulance or call 911.)

(If heat exhaustion is not treated, the illness may advance to heat stroke.)

How to Protect Workers

- Learn the signs and symptoms of heat-induced illnesses and what to do to help the worker.
- Train workers about heat-induced illnesses.
- Perform the heaviest work during the coolest part of the day.
- Slowly build up tolerance to the heat and the work activity (usually takes up to 2 weeks.)
- Use the buddy system (work in pairs.)
- Drink plenty of cool water (one small cup every 15-20 minutes.)
- Wear light, loose-fitting, breathable (like cotton) clothing.
- Take frequent short breaks in cool, shaded areas (allow your body to cool down.)
- Avoid eating large meals before working in hot environments.
- Avoid caffeine and alcoholic beverages (these beverages make the body lose water and increase the risk of heat illnesses.)

Workers are at increased risk when...

- They take certain medications. Check with your doctor, nurse, or pharmacy to see if medicines you take affect you when working in hot environments.
- They have had a heat-induced illness in the past.
- They wear personal protective equipment.

HEAT STROKE - A Medical Emergency

What happens to the body:

Dry, pale skin (no sweating); hot red skin (looks like a sunburn); mood changes; irritability, confusion, and not making any sense; seizures or fits, and collapse (will not respond).

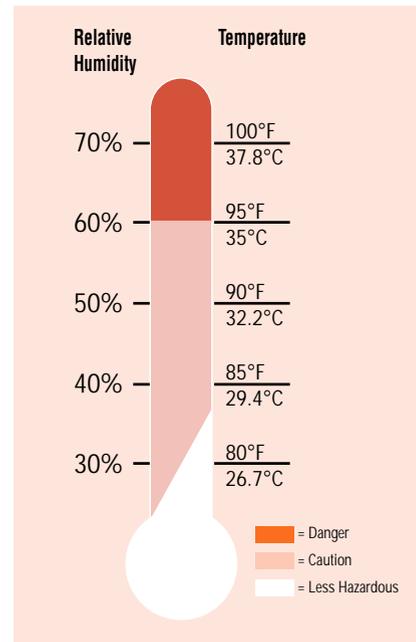
What should be done:

- Call for emergency help (i.e., ambulance or 911.)
- Move the person to a cool, shaded area. Don't leave the person alone. Lay him on his back and if the person is having seizures, remove objects close to him so he won't hit them. If the person is sick to his stomach, lay him on his side.
- Remove heavy and outer clothing.
- Have the person drink some cool water (a small cup every 15 minutes) if he is alert enough to drink anything and not feeling sick to his stomach.
- Try to cool the person by fanning him or her. Cool the skin with a cool spray mist of water, wet cloth, or wet sheet.
- If ice is available, place ice packs in armpits and groin area.

THE HEAT EQUATION

HIGH TEMPERATURE + HIGH HUMIDITY + PHYSICAL WORK = HEAT ILLNESS

When the body is unable to cool itself through sweating, **serious** heat illnesses may occur. The most severe heat-induced illnesses are **heat exhaustion** and **heat stroke**. If actions are not taken to treat heat exhaustion, the illness could progress to heat stroke and **death**.



APPENDIX D
EXAMPLES OF FIELD FORMS

Example

Project: TAI UCR Soil Sampling
Samplers: Field S. Ampler, Helper S. Amplers

Project Contact: Project Manager

Office Bellevue, Wa

Phone 555-555-5555

Ship to: Lab Name Analytical Laboratory
 Address 111 Laboratory Lane
 Seattle, WA 55555

Contact Lab Mananger

Phone 555-555-5555

ANALYSES REQUESTED

Soil Sample No.	Date	Time	Matrix	Preservative (if any)	ANALYSES REQUESTED				Extra Container	Archive	Comments
					Conventional Parameters	EPA TAL Metals	All Metal COIs	All Organic COIs			
RF1-001	2010-06-01	1300	SO	None	x	x			N	N	None
RF1-002					x	x			N	N	None
RF1-003					x	x			N	N	None
RF1-004					x	x			N	N	None
RF1-005					x	x			N	N	None
RF1-006					x		x	x	N	N	None
RF1-007					x		x	x	N	N	None
RF1-008					x		x	x	N	N	None
RF1-009					x		x	x	N	N	None
RF1-010					x		x	x	N	N	None

Analysis Turn Time: Normal Rush Rush Results Needed By:

Matrix Code:
 SO - Soil
 Other:

Shipped by: F. Sampler Shipping Tracking No.: 123456787463

Condition of Samples Upon Receipt: Custody Seal Intact?

Relinquished by: Field S. Ampler Date/Time: 2010-06-01 1644 Received by: UPS Date/Time: 2010-06-01 1644
 (signature) (signature)

Relinquished by: _____ Date/Time: _____ Received by: _____ Date/Time: _____
 (signature) (signature)

Special Instructions:

Custody Seal

CUSTODY SEAL		<i>Example</i>
Date: _____	Time: _____	
Sampler Signature: _____		

Sample Label

		<i>Example</i>
Soil		
Sample No: _____	Date: _____	
Sampler: _____	Time: _____	
	Preservative: _____	

Custody Seal

CUSTODY SEAL		<i>Example</i>
Date: <u>2010-06-01</u>	Time: <u>1630</u>	
Sampler Signature: _____	<i>Field S. Ampler</i>	

Sample Label

		<i>Example</i>
Soil		
Sample No: <u>RF1-005</u>	Date: <u>2010-06-01</u>	
Sampler: <u>FSA</u>	Time: <u>0912</u>	
	Preservative: <u>None</u>	

	Field Change Request	
--	-----------------------------	--

Field Change No.: _____
Page _____ to _____

Project number:

Project name:

CHANGE REQUEST

Applicable Reference:

Description of Change:

Reason for Change:

Impact on Present and Completed Work:

Requested by:

(Field Scientist)

Date: ___ / ___ / ___

Acknowledged by:

(Field Coordinator)

Date: ___ / ___ / ___

FIELD COORDINATOR RECOMMENDATION

Recommended Disposition:

Recommended by:

Date: ___ / ___ / ___

PROJECT MANAGER APPROVAL

Final Disposition:

Approved/Disapproved by:

Date: ___ / ___ / ___

CORRECTIVE ACTION RECORD

Page ___ of ___

Audit Report No. : _____

Date: _____

Report Originator:

Person Responsible for Response:

DESCRIPTION OF THE PROBLEM:

Date and Time Problem Recognized: _____

By: _____

Date of Actual Occurrence: _____

By: _____

Analyte: _____

Analytical Method:

Cause of Problem:

CORRECTIVE ACTION PLANNED:

Person Responsible for Corrective Action:

Date of Corrective Action:

Corrective Action Plan Approval: _____

Date:

DESCRIPTION OF FOLLOW-UP ACTIVITIES:

Person Responsible for Follow-up Activities:

Date of Follow-up Activity:

Final Corrective Action Approval: _____

Date:

