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U.S. Environmental Protection Agency

DRAFT FINAL

Phase I Sediment Sampling Data Evaluation Upper Columbia River Site CERCLA RI/FS

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Acronyms and Abbreviations

A&R Document	CH2M HILL. 2004b. *Draft Phase I Sediment Sampling Approach and Rationale – Upper Columbia River Site CERCLA RI/FS.* Prepared for USEPA Region 10, Seattle, WA. December 10, 2004.
ASTM	American Society for Testing and Materials
AVS/SEM	acid volatile sulfides/simultaneously extracted metals
BC Environment	Province of B.C. Environment
BFO	(B.C.) Fisheries and Oceans Canada
CAS	Chemical Abstracts Service
Celgar	Celgar Pulp Company
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CLP	Contract Laboratory Program [USEPA]
COI	constituent of interest
CCT	Confederated Tribes of the Colville Indian Reservation
CSM	conceptual site model
dioxin	dibenzo-p-dioxin
DOI	Department of the Interior
DQO	data quality objective
Ecology	Washington State Department of Ecology
E&E	Ecology and Environment
ESI	expanded site inspection
fps	feet per second
furan	dibenzo-p-furan
GPS	global positioning system
HSCA	Hazardous Substances Control Act
MELP	Ministry of Environment, Lands and Parks
MEPBC	B.C. Ministry of Environment
MESL	MacDonald Environmental Sciences, Ltd.
MDL	method detection level
µg/g	micrograms per gram
µm	micrometer
mg/kg	milligrams per kilogram
mm	millimeter
MS/MSD	matrix spike/matrix spike duplicate
95% UCL_{mean}	95% upper confidence limit of the mean
NA	not applicable
ND	nondetect
NOAA	National Oceanic and Atmospheric Administration
ng/kg	nanograms per kilogram
NPS	National Park Service

PAH	polycyclic aromatic hydrocarbon
PARCC	precision, accuracy, representativeness, comparability, and completeness
PCB	polychlorinated biphenyl
PEC	Probable Effects Concentration
pg/g	picograms per gram
PSEP	Puget Sound Estuary Program
PRG	Preliminary Remediation Goal
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
QC	quality control
RI	remedial investigation
RI/FS	remedial investigation/feasibility study
RM	river mile
RSCC	Regional Sample Control Coordinator
SDG	sample delivery group
SIMS	Site Information Management System
SPS	sample processing station
sq ft	square foot
STI	Spokane Tribe of Indians
SVOC	semivolatile organic compound
TAL	Target Analyte List [USEPA]
TCL	Target Compound List [USEPA]
TEC	Threshold Effects Concentration
TEQ	toxicity equivalent
TOC	total organic carbon
UCR	Upper Columbia River
USBR	U.S. Bureau of Reclamation
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UV	ultraviolet

SECTION 1

Introduction

SECTION 1

Introduction

This report has been prepared to document the completion of the Phase I sediment sampling program for the Upper Columbia River (UCR) site. The UCR site is composed of an approximately 150-mile stretch of the Columbia River between the U.S.-Canada border and Grand Coulee Dam (Figure 1-1). The sampling program was conducted in April and May 2005 as part of Phase I of a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Remedial Investigation/Feasibility Study (RI/FS) for the site.

The overall objective of the RI/FS for the UCR is to identify site contamination, assess potential risk to human or ecological receptors, and develop remedial approaches to mitigate unacceptable risk. The Phase I sediment sampling program was designed to update the preliminary conceptual site model (CSM) for sediment and to gather data in support of human health and ecological risk assessments.

The Phase I sediment sampling program was developed following the process described in the RI/FS Scoping Plan (CH2M HILL, 2004a). The approach and rationale used for development of the program are described in the Phase I Sediment Sampling Approach and Rationale Document (A&R Document) (CH2M HILL, 2004b). Development of the Phase I sediment sampling program involved creation of a preliminary sediment CSM, definition of sediment data quality objectives (DQOs), identification of data needs, assessment of existing data usability, and identification of data gaps. The Phase I sediment sampling program was developed in consideration of the specific data needs identified in the DQO process, the unique characteristics of the site, and comments received from participating stakeholders. The specific policies, organizations, objectives, and functional activities/procedures for the program are described in the Phase I Sediment Sampling Quality Assurance Project Plan (QAPP) (CH2M HILL, 2005). The field activities associated with the program are described in the Phase I Sediment Sampling Field Report (CH2M HILL, 2006a).

The scope of data evaluation presented in this report includes preliminary identification of constituents of interest (COIs) for UCR sediments, and presentation of the results of the Phase I sediment sampling program that pertain to the nature and extent and fate and transport of these COIs in the UCR. Other Phase I data evaluation components, such as evaluation of sediment bioassay sample results and assessment of potential risks posed by contaminated sediment in the UCR, are not addressed in this document. Results of the sediment bioassay tests are provided in a separate technical memorandum (CH2M HILL, 2006b). A site-specific human health risk assessment addressing UCR sediments is being conducted by the USEPA, and an ecological risk assessment addressing UCR sediments will be conducted by Teck Cominco American, Inc. The findings of these risk assessments will be presented in separate documents.

1.1 Report Organization

Information presented in this report is intended to update the preliminary CSM for contaminated sediment in the UCR. The preliminary CSM for contaminated sediment is described in Section 4 of the A&R Document. This report is organized to present the following information:

- **Section 1: Introduction.** This section describes the purpose, scope, and organization of the Phase I Sediment Data Evaluation Report. It also presents a brief description of the site and background events.
- **Section 2: Field and Analytical Program Overview.** This section summarizes the Phase I sediment field sampling and analytical program. It summarizes the objectives of the sediment sampling program, describes sampling and associated field activities and methodologies, and identifies the types and locations of samples collected. It also describes the analytical program and presents a usability assessment of the analytical data with respect to the procedures established within the QAPP.
- **Section 3: Data Evaluation Approach.** This section describes the process used to select and evaluate the data presented in this document.
- **Section 4: Sediment Constituents of Interest.** This section identifies the COIs for UCR sediment, which are discussed in Section 5.
- **Section 5: Preliminary Sediment Conceptual Site Model.** This section presents the updated preliminary CSM for sediment. The updated CSM includes discussion of the following:
  - Known and potential sources of contamination for the UCR
  - River/reservoir hydraulic relationships affecting sediment transport and deposition
  - The distribution of total organic carbon (TOC) within the UCR
  - The nature and extent of contaminated sediment
  - Fate and transport of sediment contaminants
- **Section 6: Conclusions and Recommendations.** This section summarizes the major study findings and lists data gaps identified for UCR sediments.
- **Section 7: References.** This section contains reference information for the documents cited in this report.

1.2 Site Background

The UCR site is located in north-central Washington and extends from the U.S.-Canada international border south and west to Grand Coulee Dam, a distance of approximately 147 miles downriver (Figure 1-1). The UCR site includes both a free-flowing reach of the Columbia River and Franklin D. Roosevelt Lake (Lake Roosevelt), a large reservoir maintained behind Grand Coulee Dam. The transition between the free-flowing river and Lake Roosevelt occurs within approximately the first 15-mile stretch south of the U.S.-Canada border and 132 miles upriver from Grand Coulee Dam when the reservoir is full.

Previous investigations by federal and state agencies have identified the presence of contamination within the U.S. portion of the UCR and surrounding upland areas from Grand Coulee Dam to the Canadian border. Other studies have evaluated contaminant source areas and effects north of the Canadian border. Contaminants identified in those studies include heavy metals such as antimony, arsenic, cadmium, copper, lead, mercury, and zinc, as well as organic contaminants such as polychlorinated dibenzo-p-dioxins (dioxins), polychlorinated dibenzofurans (furans), and polychlorinated biphenyls (PCBs). An overview of pre-RI investigations is provided in the A&R Document.

In August 1999, the Confederated Tribes of the Colville Indian Reservation (CCT) petitioned USEPA to conduct an assessment of hazardous substance contamination at the Upper Columbia River. The petition expressed concerns about possible risks to people's health and the environment from contamination in the river. In December 2000, USEPA completed a preliminary assessment (USEPA, 2000c). Based on a review of available information and existing data, USEPA determined that further data collection was warranted. In 2001, USEPA conducted an expanded site inspection (ESI) at the UCR and collected sediment samples to assess contaminant concentrations in river sediment and to determine whether further detailed investigation such as an RI/FS was warranted (USEPA, 2003). The results of the investigation showed that widespread contamination is present in the lake and river sediment and that an RI/FS was necessary to evaluate possible risks to human health and the environment.

The RI/FS process was initiated in April 2004 with collection and review of existing site characterization information. This information was the basis for developing the preliminary CSM for contaminated sediment presented in the A&R Document and for prioritization of initial RI data collection efforts. The top-priority data collection efforts to be conducted as part of Phase I of the RI were determined to be: (1) further assessment of contamination within sediment, and (2) further evaluation of contamination within fish tissue. The sediment sampling program was conducted in April and May 2005, and the fish tissue sampling program was conducted between July and September 2005. This report presents an evaluation of the sediment data. A separate report will present an evaluation of the fish tissue data.

FIGURE 1-1
Upper Columbia River and Vicinity
Upper Columbia River RI/FS

SPK31010224, FIELD SAMPLING PLAN VICINITY MAP (FIGURE 2-3).MXD

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SECTION 2

Field and Analytical Program Overview

SECTION 2

Field and Analytical Program Overview

This section summarizes the Phase I sediment sampling program conducted in the spring of 2005. It summarizes the DQOs for the sampling program, describes the types of samples collected and their locations, lists the analyses conducted on each sample, and presents a usability assessment of the analytical data with respect to the procedures established within the QAPP. A more detailed description can be found in the Phase I Sediment Sampling Field Report (CH2M HILL, 2006a).

2.1 Phase I Sediment Data Quality Objectives

The Phase I sediment sampling program was designed to provide information to support refinement of the preliminary sediment CSM and to assess potential risks to human and ecological receptors in the UCR. During project planning, USEPA's DQO process (USEPA, 2000a) was used to identify specific Phase I data needs for each component of the preliminary conceptual site model for sediment and to establish decision rules for the collection and evaluation of sediment data. The Phase I sediment sampling program was then designed in consideration of the specific data needs identified in the DQO process, the unique site characteristics, and comments received from affected landowners, land managers, and regulators, including CCT, the Spokane Tribe of Indians (STI), U.S. Department of the Interior (DOI) agencies, Washington State Department of Ecology (Ecology), and tribal, state, and federal cultural resource/archeology program offices. The Phase I sediment sampling program planning process, including the DQO process, is detailed in the UCR Phase I Sediment Sampling QAPP (CH2M HILL, 2005).

The DQOs relevant to the contents of this report (i.e., contaminant source identification, nature and extent characterizations, and fate and transport evaluations) are summarized in Table 2-1.

2.2 Field Program Summary

2.2.1 Sampling Timeframe

The sediment sampling program was conducted over a 6-week period, starting in April 2005 and ending in early May 2005. The March to May timeframe was selected because the U.S. Bureau of Reclamation (USBR) had scheduled a drawdown of the reservoir to an elevation of 1250 to 1255 feet for maintenance at Grand Coulee Dam (Figure 2-1). Planning and execution of the field programs was facilitated by knowing the reservoir water level in advance. This drawdown also allowed more above-water (i.e., above the waterline) access to normally submerged bank and beach areas. Sample collection began on April 4, 2005, and ended on May 3, 2005.

2.2.2 Base of Operation, Personnel, and Sampling Teams

The sampling program was conducted from two bases of operation, referred to as sample processing stations (SPSs). The first SPS was established at the Kettle Falls Marina. All sampling activities were conducted from this SPS until the SPS was disassembled and re-established at the Two Rivers Marina on April 25, 2005. While stationed at Kettle Falls Marina, field teams collected samples in the upper and middle reaches of the UCR. After the move to the Two Rivers Marina, field teams collected samples within the lower reaches of the UCR.

Sample collection field teams were composed of personnel from CH2M HILL; Ecology & Environment, Inc.; White Shield, Inc.; E2; Elcon Construction; TEG; and Zephyr Marine in coordination with the National Park Service (NPS), CCT, and STI. Up to 30 personnel were involved in the program at any given time.

Field sampling was performed by the following six field teams:

- Four water-based sampling teams working from boats
- One land-based sampling team working from cars and pickups
- One sample processing team stationed at the SPS

The water-based sampling teams used specially configured sample vessels to facilitate travel between sampling stations and sample collection. A jet boat was used for the up-river sample locations. The ground-based sampling team used cars and pickups to access several targeted beach sampling locations that were accessible by road. The sample processing team staffed the SPSs at the marinas on a daily basis and handled the processing, documentation, packaging, and shipping associated with the samples delivered each afternoon from the water-based and land-based sampling teams.

Each water-based team was composed of a CH2M HILL field team leader, a field technician, a cultural resource observer, and the vessel operator. The land-based sampling team was made up of a CH2M HILL field team leader, a field technician, and a cultural resources observer.

2.2.3 Cultural Resources Coordination

All field work was conducted in accordance with the Cultural Resource Coordination Plan (CH2M HILL, 2005). Cultural observers from CCT, NPS, and STI were present and observed all samples as they were obtained and worked with the field team leader to adjust sampling locations if necessary.

2.2.4 Sample Collection and Processing

All sample collection and processing was conducted in accordance with the Phase I Sediment QAPP (CH2M HILL, 2005). Below-water samples were collected using van Veen grab samplers deployed over the side of each boat. Above-water samples were collected using stainless steel hand tools. The upper 10 to 15 centimeters (cm) of sediment were typically sampled, with the exception of the cores, where samples were obtained from up to 9 feet below the sediment surface (see Section 2.2.5).

The global positioning system (GPS) was used to record the horizontal position of each sample except 734A1 and 741A1(X3), whose positions were estimated based upon field observations due to difficulties with the GPS. Real-time differential GPS was used to the extent the U.S. Coast Guard signal could be received from Spokane, Washington. GPS coordinates were post-processed using Trimble® GPS Pathfinder® Office software using the U.S. Coast Guard signal. The vertical position of below-water samples was determined using a fathometer, a lead line, or survey rod to record the depth to the sample location from the water surface. For locations within the reservoir pool, the elevation of the water surface was determined twice daily from the gage at Grand Coulee Dam, and from benchmarks established at each SPS. For locations upstream from the reservoir pool, the elevation of the water surface was determined from benchmarks established on the shore at each sampling transect. The vertical position of above-water samples was measured from the surface of the reservoir pool or from the transect benchmarks, depending on location.

At the end of each day, the sample teams delivered the samples under chain of custody to the SPS, where they were processed for shipment to the analytical laboratories for testing. The FORMS II Lite™ computer program was used to assist with sample management and documentation.

2.3 Samples Collected and Locations

The approach and rationale for development of the sampling program, the types of samples collected, and the locations to be sampled are documented in the A&R Document and the QAPP. This section provides a summary of each sample type, the samples collected, and their locations.

The following five sample types were collected from locations throughout the UCR; each is described in this section:

- Transect samples
- Bioassay and reference bioassay samples
- Tributary mouth samples
- Beach samples
- Core samples

Figure 2-2 is an overview of the UCR showing the general location where sediment samples were collected. Figures 2-3 through 2-12 are more detailed maps showing sampled locations. The horizontal and vertical coordinates of each sample and the number of quality assurance/quality control (QA/QC) samples associated with each are listed in Appendix A, Table A-1). The sample identification convention incorporates the river mile (RM) where it was collected followed by a 2-character code. The first character (a letter) indicates the sample type (X = Transect, A = Bioassay, R = Reference, T = Tributary, B = Beach, and C = Core). The second character (a number) indicates the specific sample along each transect, with “1” representing the left bank (when looking downstream). For example, sample 737X1 was a transect sample collected along the left bank at RM 737.

Some samples were unattainable due to the cobbly condition of the river bottom and/or swift currents. These are described in Section 2.3.6.

2.3.1 Transect Samples and Focus Areas

Transect samples, also referred to as baseline samples in the A&R Document and the QAPP, consisted of surface sediment samples collected along regularly spaced interval lines (i.e., transects) laid out perpendicular to a line drawn upstream-to-downstream through the middle of the river. Between the U.S.-Canada border and RM 720, transect samples were generally collected along transects spaced at 1-mile intervals. Between RM 720 and Grand Coulee Dam, transect samples were generally collected along transects spaced at 3-mile intervals. Some sample locations were moved upstream or downstream from the planned transect to accommodate site-specific sediment conditions encountered at the time of sampling.

A minimum of three samples were typically collected along each transect: a sample near each opposing river bank, and a sample near the center of the original pre-dam river channel. The mid-channel samples were collected near the center of the original river channel, where historical sampling had been sparse. At selected transects (RM 605, RM 633, RM 637, RM 642, RM 661, RM 678, RM 692, RM 706, RM 715, RM 723, RM 732, and RM 742), up to six additional samples were collected in different positions across the channel to further assess transverse sediment variability.

Six 4- to 5-mile-long focus areas were identified in the QAPP to assess current and future conditions within selected reaches of the river/reservoir system (see Figure 2-2). Given the large size of the site, the focus areas were intended to serve as smaller, representative subareas within the study area that potentially could be used as a gauge of sediment conditions for the larger areas that lie between focus areas. The focus areas included an increased density of sediment samples (i.e., selected transects, described above) within a discrete area.

2.3.2 Bioassay and Reference Samples

Sediment from 50 locations along the length of the UCR and from 6 reference locations near the mouth of UCR tributaries was collected from below shallow near-shore water for bioassay testing to evaluate potential toxicity of the constituents to aquatic organisms and to allow correlation of contaminant concentrations and sediment toxicity. All except one bioassay sample were co-located with the transect samples.

Reference bioassay samples were collected from the following tributaries at elevations greater than the maximum water level in the reservoir:

- Fivemile Creek (RM 732, elevation 1,410 feet)
- Crown Creek (RM 726, elevation 1,716 feet)
- Flat Creek (RM 721, elevation 1,310 feet)
- Nancy Creek (RM 705, elevation 1,360 feet)
- Barnaby Creek (RM 686, elevation 1,302 feet)
- Cheweka Creek (RM 685, elevation 1,297 feet)

In addition to whole sediment (i.e., solids and associated liquid), sediment water samples (referred to as pore water samples) were obtained from each of the bioassay and reference area samples at USEPA's Manchester laboratory. The intent of pore water sampling was to provide additional supporting data for interpretation of biotoxicity in surface sediment.

2.3.3 Tributary Mouth Samples

Tributary sediment samples were collected within the UCR near the mouths of the following six major tributaries:

- Big Sheep Creek (RM 736)
- Onion Creek (RM 729)
- Kettle River (RM 706)
- Colville River (RM 699)
- Spokane River (RM 639)
- Sanpoil River (RM 615)

The samples were collected to better understand the role of tributaries from larger watersheds in the study area as potential sources of contaminants and to assess potential contaminant dilution or enrichment effects on main UCR river channel sediments immediately downstream from the tributary mouths.

Two samples were collected from each tributary mouth area. One sample was collected approximately mid-mouth at the tributary's confluence with the UCR. The other sample was collected along the near bank of the UCR approximately 0.1 to 0.2 mile downstream from the mouth of the tributary. At the Colville River (RM 699), only one tributary mouth sample was collected: a transect sample at RM 698 served as the downstream tributary mouth sample. At Big Sheep Creek, only one tributary sample was collected; the other was unattainable because of a cobbly bottom and swift current.

2.3.4 Beach Sediment Samples

A total of 15 beach areas were sampled in order to provide a sufficient number of representative samples to assess potential risk to human and ecological receptors. These beaches were as follows:

- Black Sand Beach—RM 742, East Side
- Northport City Boat Launch—RM 735, East Side
- Dalles Orchard—RM 730, East Side
- North Gorge Campground—RM 718, East Side
- Marcus Island Campground—RM 708, East Side
- Kettle Falls Swim Beach—RM 700, East Side
- Haag Cove—RM 697, West Side
- French Rocks Boat Launch—RM 690, West Side
- Cloverleaf Beach—RM 675, East Side
- AA Campground—RM 673, East Side
- Rogers Bar Campground—RM 658, West Side
- Columbia Campground—RM 642, East Side
- Lincoln Mill Boat Ramp—RM 633, East Side
- Keller Ferry No. 2—RM 615, East Side
- Spring Canyon Campground—RM 600, South Side

Three of the 15 beaches, referred to in the QAPP as "Selected Beaches"—Northport City Boat Launch, Kettle Falls Swim Beach, and Columbia Campground Beach—were the subject

of more detailed discrete and composite sampling. The other 12 beaches, referred to in the QAPP as "Standard Beaches," were sampled by the collection of three composite samples. The locations of beach samples are shown in Figures 2-13 to 2-27. The area sampled at each beach was selected based on human use patterns and took reservoir water levels and topography into account. Where practical, depending on each beach's configuration and near-shore topography, the sample locations were laid out along three specified elevations (1,285 feet, 1,270 feet, and 1,255 feet) as described in the QAPP.

2.3.4.1 Selected Beach Samples

The sampling program for three beaches—Northport City Boat Launch, Kettle Falls Swim Beach, and Columbia Campground Beach—consisted of collecting discrete samples from nine locations at each beach. The nine samples were collected from three locations (left, right, and center) typically laid out along each of the three specified elevation contours. The planned locations at the Northport City Boat Launch were field adjusted to accommodate a higher than expected water level.

In addition to the discrete samples, three elevation-specific composite samples were also made by combining samples taken from the three locations (left, right, and center) along each of the three elevation contours. All nine locations where beach sediment was collected from the Selected Beaches are shown in Figures 2-13 to 2-15. The coordinates of the middle sample location along each elevation contour were used to represent the coordinates for that contour's composite sample for the project database. In addition, a large overall composite sample was created from the nine sample locations at these three beaches. The composite was submitted to a laboratory for particle size fractionation by sieving. Two samples were fractionated from the composite: one made up of sediment between 2 millimeters (mm) and 75 microns, and one made up of sediment less than 75 microns. This was done to provide information on contaminant concentration with respect to the particle size to be used in the human health risk assessment to gauge contaminant concentrations in the fraction of the beach sediment that may be inhaled. The coordinate of the very middle sample location of all nine samples was used to represent the coordinates for this overall composite sample for the project database (Figures 2-16 to 2-27). Standard of Practice (SOP) SEDFSP-5A within the QAPP further describes the beach sampling methodology, including a sample compositing schematic (Figure 1 of SOP SEDFSP-5A).

2.3.4.2 Standard Beach Samples

The sampling program for the other 12 beaches consisted of collecting 3 composite samples, one from each of three specified elevation contours. Each composite was made of three samples taken along each elevation contour. Similar to the Selected Beaches, the coordinates of the middle sample location along each elevation contour were used to represent the coordinates for that contour's composite sample for the project database.

2.3.5 Sediment Core Samples

Sediment cores were collected from nine locations to characterize vertical variations in contaminant concentrations within the upper sediment column and to establish the apparent thickness of the contaminated sediment layer. The cores were obtained using a vibratory corer (Vibracore). The steel core barrels were lined with 4-inch-diameter Lexan plastic tubes. The depth of water through which cores could be obtained was limited to

200 feet. Table 2-2 summarizes the collected cores. The four cores planned upriver from RM 708 were unattainable due to cobbly river bottom conditions and swift current.

The cores were divided into multiple sample intervals representing the full thickness of sediment recovered at each location, with the upper one foot of sediment divided into two 6-inch-long sample intervals, and the remainder of the core divided into 24-inch-long sample intervals.

2.3.6 Unattainable Samples

Every mid-channel transect and core sample between the U.S.-Canada border and RM 730 was unattainable due to cobbly river bottom conditions and swift current. One-half of the mid-channel transect samples between RM 729 and RM 710 were attainable. Every mid-channel transect channel downstream from RM 710 was obtained. This indicates a general lack of sampleable sediment (sand sized or smaller) in the mid-channel upstream from RM 729, pockets or discrete areas of mid-channel sampleable sediment between RM 729 and RM 710, and then continuous mid-channel sampleable sediment from RM 710 to Grand Coulee Dam.

Unattainable samples are summarized in Table 2-3 and are shown as black asterisks in Figures 2-3 through 2-12. A few of the unattainable transect samples planned for collection from mid-channel in this river stretch were relocated to a position near the banks. In addition, Transect Sample RM744X2 was collected behind a large rock located mid-river. The eddy behind the rock contained sampleable sediment, although the adjacent mid-channel areas did not.

2.4 Analytical Program

Following collection and processing at the SPSs, the samples were packaged and sent under chain of custody via FedEx overnight delivery to the analytical laboratories. The following analytical suites were conducted on various sample types:

- **Standard Analytical Suite**: Target Analyte List (TAL) metals (plus uranium), Target Compound List (TCL) semivolatile organic compounds (SVOCs), TCL pesticides/PCB Aroclors, TOC, and particle size
- **Dioxins and Furans :** Tetra- through octa-chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans
- **Bioassay Analytical Suite:** TAL metals (plus uranium), TCL SVOCs, TCL pesticides/PCB Aroclors, TOC, acid volatile sulfides/simultaneously extracted metals (AVS/SEM), and toxicity tests
- **Dissolved Metals:** Dissolved TAL metals (plus uranium) in pore water isolated from sediment

The analytical suite conducted on each sample type is listed in Table 2-4. Individual analytes and parameters associated with the listed analytical suites are listed in Table 2-1 in the main body of the QAPP. Appendix A, Table A-2, lists the analyses conducted on each sample by

sample type. Chemical analyses were conducted by Contract Laboratory Program (CLP) laboratories and the USEPA Region 10 Manchester Laboratory.

2.5 Phase I Sediment Chemical Data QA/QC Program

The objective of the Phase I sediment data collection and analyses was to generate data of known quality appropriate for project needs in terms of end decisions. This objective was accomplished through the following cycle:

- The DQO process identified project data needs and decision rules and was documented as an appendix to the QAPP (CH2M HILL, 2005).
- The QAPP defined organization, functional activities, procedures, and policy that were implemented to obtain project-specific data of known and appropriate quality.
- Laboratory statements of work referenced in Table 2-5 detailed laboratory analytical procedures and QA/QC procedures, including documentation.
- Laboratory and field QA/QC was performed through internal and external audits.
- Data quality and usability review outside the laboratory were documented in data validation reports.
- Individual data points were qualified by applying data validation report flags to the project database.
- An overall assessment of data quality was performed to evaluate the usability of the data within the context of the project objectives.

The following is a description of the analytical methodology, the data validation methodology, the associated sample/analyte-specific validation reports, and the overall data quality evaluation findings. Information about QA/QC samples is provided in this report as Appendix B. Summaries of the analytical results for each sample group are provided as Appendix C. Data quality evaluation reports for the individual method and sample results are too large for inclusion with this report, but are available upon request.

2.5.1 Analytical Program/Methodology

A listing of analytes and associated methods is provided in Table 2-5. In addition, for each analytical parameter and method, the standard USEPA analytical method references are provided in the QAPP (CH2M HILL, 2005) and the associated laboratory statements of work (also listed in Table 2-5). These documents identify the following method-specific quality control (QC) requirements:

- Method-specific QC procedure
- Level of effort (frequency of QC checks) for each QC procedure
- Quantitative acceptance limits for QC data
- Corrective action requirements for the laboratories for QC data that are outside the acceptance limits

- Documentation

These requirements, as detailed for each analytical method in the QAPP and the laboratory statements of work referenced in Table 2-5, were followed by the laboratory as the project analytical requirements.

The detection limit requirements also are shown in QAPP Tables 2-2 and 2-3. The analytical laboratories established method detection limits (MDLs) in accordance with Title 40, Part 136, Appendix B, of the Code of Federal Regulations (CFR) before start of the work to ensure that laboratory-specific limits complied with the specifications.

2.5.2 Data Validation and Findings

2.5.2.1 Data Validation Methodology

All data (100 percent) were evaluated independently of the laboratory by project chemists. All sample data were reviewed for the QC specifications identified in the project QAPP and USEPA CLP statements of work for each specific parameter and were flagged in accordance with the QAPP and USEPA functional validation guidelines as referenced in data validation reports that are available on request.

2.5.2.2 Reporting

Sample- and parameter-specific data validation reports are based on review of the individual laboratory sample delivery groups (SDGs). The SDG-based reports are organized by analytical groups as follows: SVOCs, organochlorine pesticides, polycyclic aromatic hydrocarbons (PAHs), PCB Aroclors, dioxins, and inorganics/metals. A separate report is presented for each SDG in increasing SDG number order. The cover of each report identifies individual samples included in the SDG.

Each report has subsections that correspond to the internal QC check requirements for that specific method as identified in the QAPP. If laboratory data were found to deviate from the specifications, the subsection provides quantitative details for the QC data deviation and the associated affected samples and provides flags according to defined conventions.

Field blank, matrix spike, and duplicate sample results are listed in the laboratory result data sheets.

The individual SDG reports provide a summary table at the end of each section where flags are applied, and the report is followed by flagged data sheets. The reports list all flags and their appropriate classifications as well as the reason for the flags.

2.5.2.3 Data Flagging Conventions, Data Validation Findings, and Overall Summaries

USEPA data validation functional guidelines and QAPP criteria were used to determine flagging conventions.

Sample- and analyte-specific data validation findings/qualifying flags for laboratory internal quality control data are at the end of each validation report. Data validation flags were entered into the project database.

The data meet and exceed project quality goals, as further described in Section 2.5.3.

Rejected Results

The number of results that were rejected for each analyte are listed in the summary tables in Appendix C. Data points that were rejected are in the following groups:

- SVOCs for continuing calibration (percent deviation values higher than criteria)
- Metals for low matrix spike recoveries

For the SVOCs, the rejected data points were very few, the project completeness goals were met for the overall data, and overall decisions based on use of the data are not affected.

For metals, including antimony, the rejected values were due to low matrix spike recoveries (below 30 percent) that indicated low bias in the measurement. This is not due to laboratory or field error, but is intrinsic to the nature of the site sediments. The nondetect values were flagged "R" because the low bias indicates elevated detection and potential for false nondetects. For the initial flags shown on laboratory data Form I's, the data reviewer crossed out the nondetect "U" flag and replaced it with R; thus, the data appear as rejected detect values. The U flag was reentered as UR in the project database to clarify that the data are nondetects. Thus for analytes that are mostly nondetected, such as antimony, more rejected values are observed than for analytes that were frequently detected. At large, this still amounts to a low percentage of rejected data for metals other than antimony, and completeness goals therefore were met for those metals. For antimony, however, the laboratory analytical results for 109 of the 236 transect samples were rejected during validation. Given the percentage of rejected results, the Phase I data for antimony do not provide equivalent coverage compared to other metals for the transect sample group to allow a full assessment of the nature and extent of the element.

Elevated Detection Limits

Detection limits in excess of the required levels identified in the QAPP were reported for a number of samples. However, the results for uranium appear to be the most affected by detection limit issues. The values listed for nondetect results are the CLP-required reporting limits. The laboratory-specific MDLs are significantly lower than the CLP reporting limits. For example, for uranium the MDLs are lower than the reporting limits by a factor of five. The MDLs are shown on laboratory data sheets. The elevated detection levels are due to sediment moisture correction because the data are reported on a dry weight basis. The initial laboratory detection limits prior to moisture correction were according to standard state of the art methods (inductively coupled plasma atomic emission as well as mass spectra); therefore, these levels are not due to laboratory deficiency.

The elevated detection limit for uranium affected use of uranium data as follows. Uranium was detected in 83 of 368 sediment samples, with concentrations ranging between 4.6 and 127 milligrams per kilogram (mg/kg) (Figure 2-28). More than 75 percent of the samples were reported as nondetects, with reporting limits ranging between 14.5 and 84 mg/kg (Figure 2-28). The corresponding range for laboratory-specific MDLs is 2.9 to 16.8 mg/kg. All of the nondetect reporting limits exceed the 5-mg/kg detection limit specified in the QAPP and also exceed the lowest risk-based screening level for the metal (8 mg/kg). However, if the laboratory-specific MDLs are taken into consideration, a significant number of these elevated nondetect data points can be considered as nondetect below the project criteria.

Given the ranges of detected and nondetected results relative to the screening level, the Phase I data for uranium are not usable for a quantitative assessment of the nature and extent of the chemical because of the elevated reporting levels. However, if the MDLs are considered, nondetects at reporting levels below 25 mg/kg (corresponding to the 5-mg/kg criterion) or below 40 mg/kg (corresponding to 8-mg/kg criterion) can be considered to have values below the project criteria. The distribution of samples with such results and the effect on the usability of uranium data has not been examined.

2.5.2.4 Data Storage and Documentation

Backup information for the data evaluation and validation findings includes the following:

- Laboratory hard copy packages, assembled in SDG units, which include all QC data. These packages are stored at USEPA offices as well as at the laboratories.
- An electronic database, which includes all sample concentration data with validation flags and a subset of laboratory QC data.
- Chain-of-custody forms and tracking records.
- Laboratory bench records and sample custody logs maintained by the laboratory.

2.5.3 Data Quality Assessment and Quality Control Data

DQOs are prescribed in the QAPP in terms of precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters. The following is a description of the assessment for each parameter. PARCC objectives for the project are shown in Table 2-5. Associated data for the PARCC parameters are provided in the laboratory data package.

2.5.3.1 Accuracy

Accuracy measurement data include laboratory control sample and matrix spike recovery data for both organic and inorganic analytical parameters, as well as surrogate recovery data for organic parameters. The accuracy data were provided to the project team (data users) for consideration during data evaluation because these data need to be applied to whole sites. Over 90 percent of the data are within the criteria, thus meeting project goals.

2.5.3.2 Precision

Precision measurement data include laboratory and field duplicate data expressed as relative percent deviation. The validation reports also detail duplicates outside control limits, if any. The duplicate data were provided to the project team (data users) for consideration during data evaluation because these data need to be applied to whole sites. Over 90 percent of the data are within the criteria, thus meeting project goals.

2.5.3.3 Representativeness

Representativeness is a measure of how closely the measured results reflect the actual concentration or distribution of the chemical compounds in the sampled media. Representativeness is assessed in both qualitative and quantitative terms. The project report discusses the qualitative aspects of representativeness in terms of design of the field sampling plan, sampling techniques, sample handling protocols, and associated

documentation. Quantitative measures of representativeness include field and laboratory blank measurements to identify whether contamination was introduced through field or laboratory operations. Field duplicate measurements are used to establish variability.

Laboratory and trip blank measurements were detailed on a sample- and parameter-specific basis in the validation reports. All qualifications as a result of laboratory and trip blank effects were incorporated into the project sample/analyte specific data. Field blank results are summarized in the database and provided to data users on a sitewide basis.

Field duplicate results and associated relative percent deviation data are listed in Appendix B, Table B-1, and were taken into account during data evaluation.

2.5.3.4 Comparability

Comparability expresses the confidence with which one data set can be compared to another. Comparability of data has been established through use of the following:

- Standard analytical methods and QC procedures established in the project QAPP and USEPA CLP and Manchester Regional Laboratory protocols
- Consistent reporting units for a specified procedure
- MDLs for all analytical parameters that were established in accordance with 40 CFR Part 136, Appendix B, before the start of the analyses to meet the project requirements

2.5.3.5 Completeness

This QA/QC analysis assesses completeness as a measure of the amount of valid data obtained from the analytical measurements. Field activity completeness is assessed within the context of the overall sampling design. Data completeness was found to be above 90 percent at large and meets project objectives.

2.6 Sample Management and Recordkeeping

A sample is physical evidence collected from a hazardous waste site, from the immediate environment, or from another source. Because of the potential evidentiary nature of samples, the possession of samples must be traceable from the time the samples are collected until they are introduced as evidence. Field notebooks, sampling records, chain-of-custody forms, and other field documents were used to record information about each sample collected during the Phase I sediment sampling event.

2.6.1 Field Notebooks

A bound field notebook was maintained by each sampling field team leader. The field notebook provides a daily record of significant events, observations, and measurements during the field investigation. All entries were signed and dated.

2.6.2 Field Documents

Field documents including sample custody seals, chain-of-custody records, and packing lists were obtained from the Regional Sample Control Coordinator (RSCC) in USEPA's Quality Assurance Office. Chain-of-custody procedures were used to maintain and document

sample collection and possession. After sample packaging, one or more of the following chain-of-custody forms was completed, as necessary, for the appropriate samples:

- Organic traffic report and chain-of-custody record; Forms II Lite forms as applicable
- Inorganic traffic report and chain-of-custody record; Forms II Lite forms as applicable
- USEPA Region 10 Chain-of-Custody Record
- Overnight shipping courier air bill

Copies of the above forms were filled out and distributed in accordance with the instructions for sample shipping and documentation. Completed field QA/QC summary forms were sent to the RSCC at USEPA's Region 10 Quality Assurance Office at the conclusion of the sampling event. The sampling records and other data from the sampling event are provided in the Phase I Sediment Sampling Field Report (CH2M HILL, 2006a).

2.7 Data Management Program

Data obtained during the Phase I sampling program were managed according to the processes described in the project-specific data management plan prepared for the UCR site (CH2M HILL, 2004c) and according to the procedures described in the QAPP (CH2M HILL, 2005).

Following receipt of validated data, the data and validation qualifiers were input into the site information management system (SIMS) database to facilitate queries and report preparation. The data are stored in SIMS with all laboratory and independent validator qualifiers included. Laboratory data from ASCII or equivalent files, provided by the USEPA Region X CLP Project Officer, were adapted to files compatible with the project database, as described in the project-specific data management plan. The SIMS database continues to be maintained in a manner that is compatible with, and provided to, USEPA or others at USEPA's request.

TABLE 2-1
Phase I Remedial Investigation Data Quality Objectives for Source Identification, Nature and Extent of Contaminants, and Fate and Transport of Contaminants in Sediment
Upper Columbia River RI/FS

Problem Statement	Identify the Decision	Inputs to Decisions	Study Boundaries	Decision Rule	Acceptable Limits on Decision Errors	Optimized Sampling Design
Source Identification						
Potential sources of sediment contaminants in the UCR have not been fully established.	Identify potential primary sources of sediment contaminants.	Release information from upstream UCR industry and operations Available process and historical information from the facilities Review of industry-related chemical literature All Phase I analytical results	Study boundaries are limited to the UCR Site; however, primary sources have been determined to be present north of the international border and may also be present in tributaries. These areas will not be sampled as part of Phase I.	If contaminants found in sediment are similar to chemicals/materials managed or discharged from an upstream UCR operation, that operation is a potential primary source; otherwise the operation is not a potential source.	Decision is to be made using quantitative and qualitative data.	Sample design described for human and ecological risk assessments detailed in QAPP.
Nature and Extent of Contaminants in River Sediments						
To adequately characterize impacts to public health and the environment, constituents that are most likely to contribute to risk need to be evaluated during the RI.	Confirm list of COIs for sediment.	Release information from upstream industry and operations Available process and historical information from the facilities Review of industry-related chemical literature Analytical results from prior investigations, including the PA and ESI All Phase I analytical results Appropriate benchmark or screening levels for sediment, including background concentrations, as developed for risk assessment COI selection process, as developed for risk assessment	UCR site; may be subdivided according to results of risk assessments and Phase I analytical results.	Decision rules for COI identification will be developed as part of risk assessment process.	Decision is to be made using quantitative and qualitative data.	Sample design described for human and ecological risk assessments detailed in QAPP.
To adequately characterize impacts on public health and the environment, the longitudinal, transverse, and vertical distributions of COIs need to be evaluated during the RI.	Identify longitudinal and transverse distribution of COIs in sediment along length of UCR. Identify vertical distribution of COIs in sediment at selected locations along length of UCR.	Analytical results of sufficient quality for historical surface and subsurface sediment samples All Phase I surface sediment analytical results Phase I subsurface sediment analytical results Sediment thickness measurements at core locations Longitudinal and transverse variability information Appropriate benchmark or screening levels for sediment, as developed for risk assessment	UCR site; may be subdivided according to results of risk assessment and Phase I analytical results.	If a COI in sediment poses potential unacceptable risk, further evaluation and delineation may be required to determine extent; otherwise, further evaluation and delineation may not be required.	Decision is to be made using quantitative and qualitative data.	Sample design described for human and ecological risk assessments detailed in QAPP Vertical distribution of COIs evaluated using sediment cores. Each sediment core divided into samples representing the 0- to 6- and 6- to 12-inch intervals, and every 2 feet below 12 inches until the core bottom is reached. An expanded analytical suite (includes dioxins/ furans) was used for samples collected to evaluate the possible relationship between dioxins/furans and the elevated total organic carbon (TOC) concentrations that occur downstream from Marcus Flats.

TABLE 2-1
Phase I Remedial Investigation Data Quality Objectives for Source Identification, Nature and Extent of Contaminants, and Fate and Transport of Contaminants in Sediment
Upper Columbia River RI/FS

Problem Statement	Identify the Decision	Inputs to Decisions	Study Boundaries	Decision Rule	Acceptable Limits on Decision Errors	Optimized Sampling Design
Describe Fate and Transport of Contaminants in River Sediment						
Contaminated sediments and slag in the UCR may be eroded and transported to different areas of the site.	Determine which portions of the study area pose potential risk and are susceptible to erosion under the range of hydraulic conditions that are present in the UCR.	Conceptual hydrologic model Historical analytical data, including suspended sediment data (TSS, TOC, particle size, and COI concentrations) Particle size, particle density, and shape analyses Slag weathering information All Phase I surface sediment analytical results Phase I subsurface sediment analytical results Sediment thickness measurements at core locations COI distribution relative to particle size and material type (slag versus mineral) and vertical trend analysis Critical erosion velocities	UCR site; may be subdivided according to results of risk assessment and Phase I analytical results.	If contaminated sediments pose potential risk and are located in areas that can be eroded, remedial action alternatives will need to consider potential for sediment movement; otherwise, remedial action alternatives for the area do not need to consider potential for sediment movement.	Decision is to be made using quantitative and qualitative data.	Sample design described for human and ecological risk assessments detailed in QAPP.
Contaminants in sediments and slag may be mobilized and/or transformed in such a way that other media, receptor populations, or downstream areas become contaminated at levels that pose risk.	Determine whether contaminated sediments may act as potential sources of COIs that may be remobilized to affect other media, receptor populations, or downstream areas at levels that pose risk.	All Phase I surface sediment analytical results Phase I subsurface sediment analytical results Slag weathering information COI fate and bioavailability characteristics derived from literature Conceptual hydrologic model Geochemical parameter measurements	UCR site; may be subdivided according to results of risk assessment and Phase I analytical results.	If COIs are potentially mobile under typical UCR conditions and are shown to pose unacceptable risk at the concentrations observed, assess the need to evaluate the presence of COIs in other media and take potential mobility into consideration during subsequent evaluations; otherwise, other media evaluations do not need to consider sediment as a potential source and remedial action alternatives for the area do not need to consider COI mobility.	Decision is to be made using quantitative and qualitative data.	Sample design described for human and ecological risk assessments detailed in QAPP and sampling design for vertical extent described above.

ESI = expanded site investigation
COI = constituent of interest
PA = preliminary assessment
TOC = total organic carbon
TSS = total suspended solids

TABLE 2-2
Summary of Collected Cores
Upper Columbia River RI/FS

River Mile of Core Location	Position in Channel	Length of Core (feet)
708	Within historic river channel	7
704	Within historic river channel	9
692	Within historic river channel	7
676	Within historic river channel	7
661	Within historic river channel	7
644	On submerged river terrace to right (looking downstream) of historic river channel	7
637	On submerged river terrace to left (looking downstream) of historic river channel	5
622	On bank slope just above terrace to left (looking downstream) of historic river channel	9
605	On submerged river terrace to left (looking downstream) of historic river channel	5

TABLE 2-3
Unattainable or Relocated Mid-Channel Samples
Upper Columbia River RI/FS

Sample/Type	Unattainable or Relocated	Comment
744X2 Transect	Relocated	Relocated to behind large rock in mid-channel and is not representative of adjacent channel sediment
743X2 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
742X3 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
742X2 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
741X2 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
740X2 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
739X2 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
738X2 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
737X2 Transect	Relocated	Relocated from mid-channel to left bank
736X2 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
736T2 Tributary	Unattainable	Unattainable due to cobbly bottom and swift current
735X2 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
734X1 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
734C1 Core	Unattainable	Unattainable due to cobbly bottom and swift current
734X2 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
733X2 Transect	Relocated	Relocated from mid-channel to right bank due to cobbly bottom and swift current

TABLE 2-3
Unattainable or Relocated Mid-Channel Samples
Upper Columbia River RI/FS

Sample/Type	Unattainable or Relocated	Comment
732X2 Transect	Relocated	Relocated from mid-channel to bench right of mid-channel due to cobbly bottom and swift current
731X2 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
730X3 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
730X2 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
728X2 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
727X2 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
725X2 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
723X2 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
723C1 Core	Unattainable	Unattainable due to cobbly bottom and swift current
715X2 Transect	Unattainable	Unattainable due to cobbly bottom and swift current
715C1 Core	Unattainable	Unattainable due to cobbly bottom and swift current
713X2 Transect	Unattainable	Unattainable due to cobbly bottom and swift current

TABLE 2-4
Summary of Phase I Sediment Sampling Program Analytical Suites
Upper Columbia River RI/FS

Sample Type/Group	Standard Analytical Suite: TAL Metals (plus uranium), TCL SVOCs, TCL Pesticides/PCB Aroclors, Particle Size, TOC	Bioassay Analytical Suite: Standard Analytical Suite plus AVS/SEM, and Bioassay	Dissolved TAL Metals	Dioxins and Furans
Transect Samples	X			
Bioassay and Reference Samples		X		
Pore Water Isolated from Bioassay and Reference Samples			X	
Tributary Mouth Samples	X			
Selected Beach Discrete Samples[a]	X			
Selected Beach Composite Samples[b]				X
Selected Beach Fractionated Composite Samples[c]				
As-Received, Wet Composite Samples	X			X
Air-Dried, Particle-Size-Fractionated Samples	X			X
Standard Beach Composite Samples	X			X
Core Samples	X			X

[a] Northport City Boat Launch, Kettle Falls Swim Beach, Columbia Campground Beach; nine discrete samples per beach.

[b] Northport City Boat Launch, Kettle Falls Swim Beach, Columbia Campground Beach; three composite samples per beach.

[c] Northport City Boat Launch, Kettle Falls Swim Beach, Columbia Campground Beach; one composite per beach, two particle size fractions per composite.

TABLE 2-5
Analytical Program Objectives, Procedures, and Criteria
Upper Columbia River RI/FS

Parameter	Method [b]	Reporting Limit/Target Detection Limit	Analytical Accuracy (% Recovery)	Analytical Precision (Relative % Deviation)	Overall Completeness (%)
Site Sediment					
TCL Semivolatiles[a]	CLP	CLP[c]	CLP	CLP	90
TCL Pesticides/PCBs[a]	CLP	CLP[c]	CLP	CLP	90
TAL Metals[a]	CLP	CLP[c]	CLP	CLP	90
Dioxins/Furans (tetra through octa)[a]	CLP	CLP[c]	CLP	CLP	90
Ammonia	PSEP	0.25 ppm/% Solids	65-135	35	90
Total sulfides	PSEP	0.5 ppm	65-135	35	90
TOC	PSEP	0.05 %	65-135	35	90
AVS/SEM	PSEP		65-135	35	90
Volatiles		0.5 ppm			
Antimony		0.5 ppm			
Cadmium		0.05 ppm			
Chromium		0.1 ppm			
Copper		0.1 ppm			
Lead		1 ppm			
Mercury		0.01 ppm			
Nickel		0.2 ppm			
Zinc		0.1 ppm			
Particle size	ASTM D422	NA	NA	NA	90
Bioassay analyses:					
10-day Sediment Toxicity Test with *Chironomus tentans*	ASTM Method E 1706-00 (ASTM, 2003) and USEPA Method 100.2 (USEPA, 2000b)	NA	NA	NA	90
7-Day Sediment Toxicity Test with *Ceriodaphnia dubia*	ASTM Method E 1706-00 (ASTM, 2003)	NA	NA	NA	90

TABLE 2-5
Analytical Program Objectives, Procedures, and Criteria
Upper Columbia River RI/FS

Parameter	Method [b]	Reporting Limit/Target Detection Limit	Analytical Accuracy (% Recovery)	Analytical Precision (Relative % Deviation)	Overall Completeness (%)
28-day Sediment Toxicity Test with *Hyalella azteca*	ASTM Method E 1706-00 (ASTM, 2003) and USEPA Method 100.4 (USEPA, 2000b)	NA	NA	NA	90
Investigation-Derived Waste					
TCL Semivolatiles[a]	CLP	CLP[c]	CLP	CLP	90
TCL Pesticides/PCBs[a]	CLP	CLP[c]	CLP	CLP	90
TAL Metals[a]	CLP	CLP[c]	CLP	CLP	90
Dioxins/Furans (tetra through octa)[a]	CLP	CLP[c]	CLP	CLP	90

[a] TCL and TAL analytes and dioxin/furans are listed in the CLP statements of work referenced below, Table 2-1 of the QAPP and the data tables of this document.
[b] CLP method per USEPA CLP statements of work:

- Multi-Media, Multi-Concentration, Organic Analytical Service for Superfund (OLM04.3)and the modified analysis flexibility clause MA1216.1.
- Multi-Media, Multi-Concentration, Inorganic Analytical Service for Superfund (ILM05.3).
- Multi-Media, Multi-Concentration Dioxins and Furans Analysis (DLM01.4).

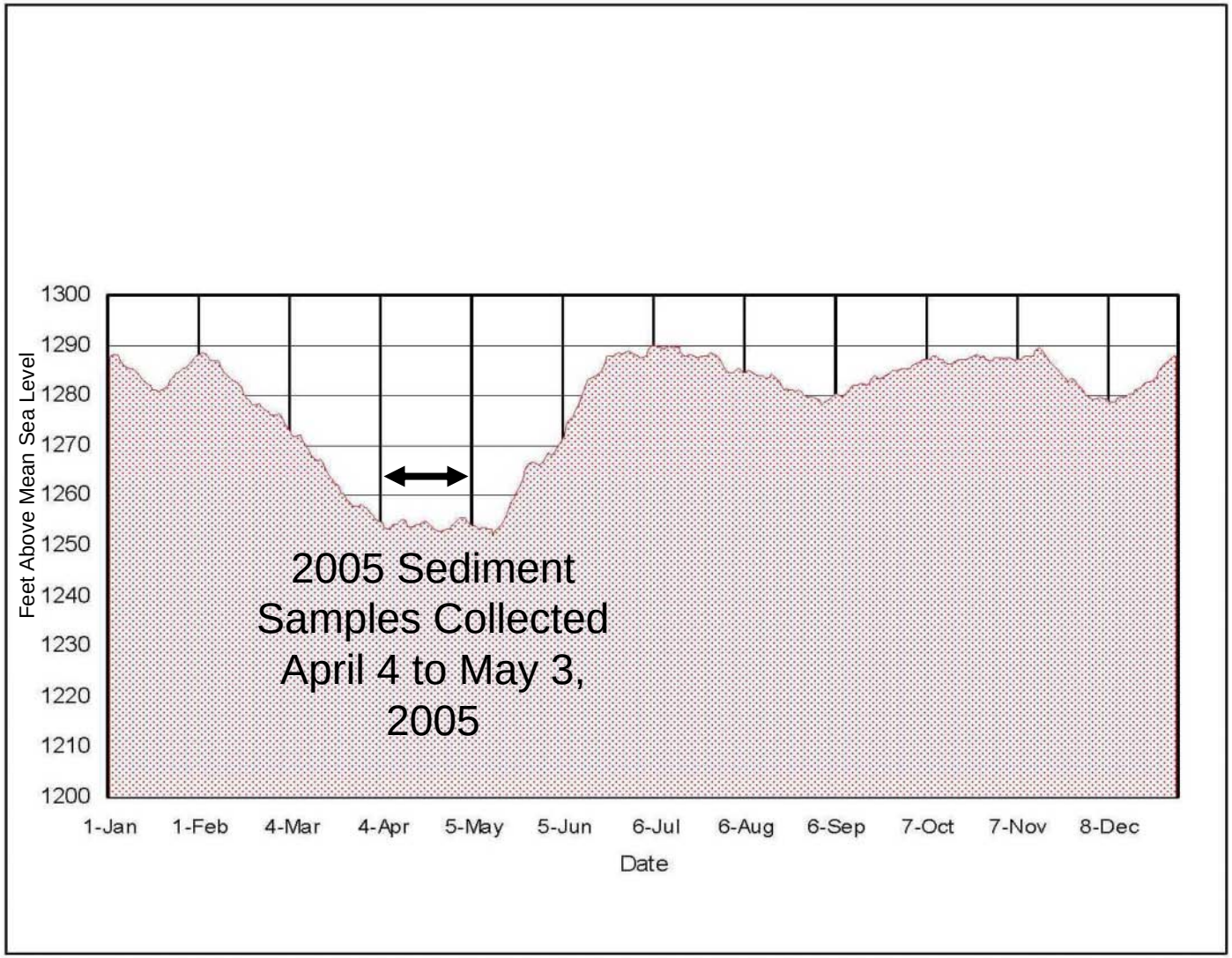
Other methods per USEPA and standard methods:

- USEPA, 1979. *Methods for Chemical Analysis of Water and Wastes*, EPA-600/4-79-020, revised March 1983.
- USEPA, 1989. *Test Methods for Evaluating Solid Waste*, SW846, *Standard Methods for the Examination of Water and Wastewater*, 17th Edition.
- *Recommended Protocols for Measuring Conventional Sediment Variables in Puget Sound* (PSEP, 1986).

[c] CLP detection limits are shown in the CLP statements of work referenced above, Tables 2-2b through 2-2e of the QAPP, as well as the data tables in this report.

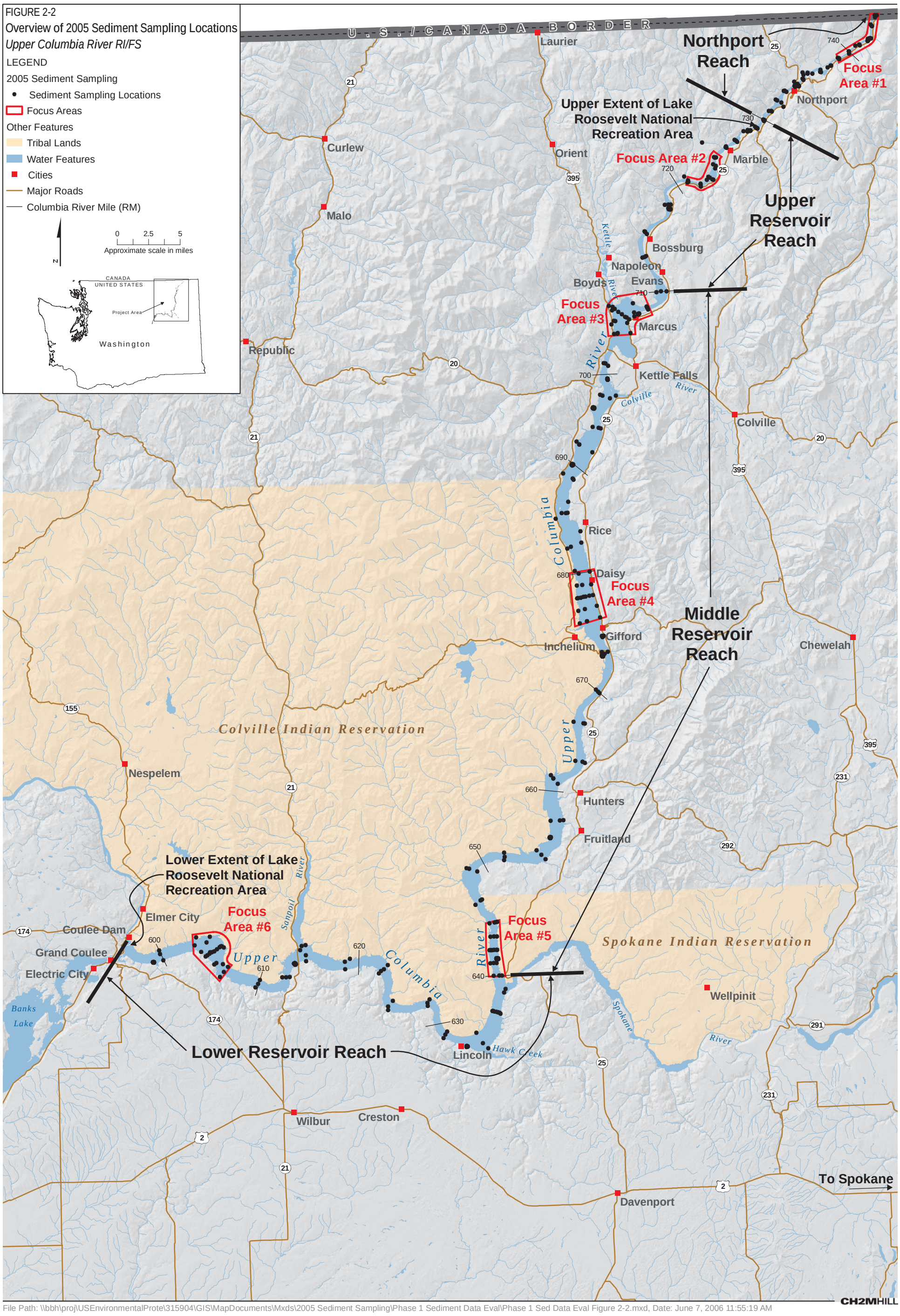
ASTM = American Society for Testing and Materials
CLP = Contract Laboratory Program
PSEP = Puget Sound Estuary Program

FIGURE 2-1
Lake Roosevelt Water Level During 2005 Sediment Sampling Program
Upper Columbia River RI/FS



CH2MHILL

FIGURE 2-2
Overview of 2005 Sediment Sampling Locations
Upper Columbia River RI/FS



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CH2MHILL

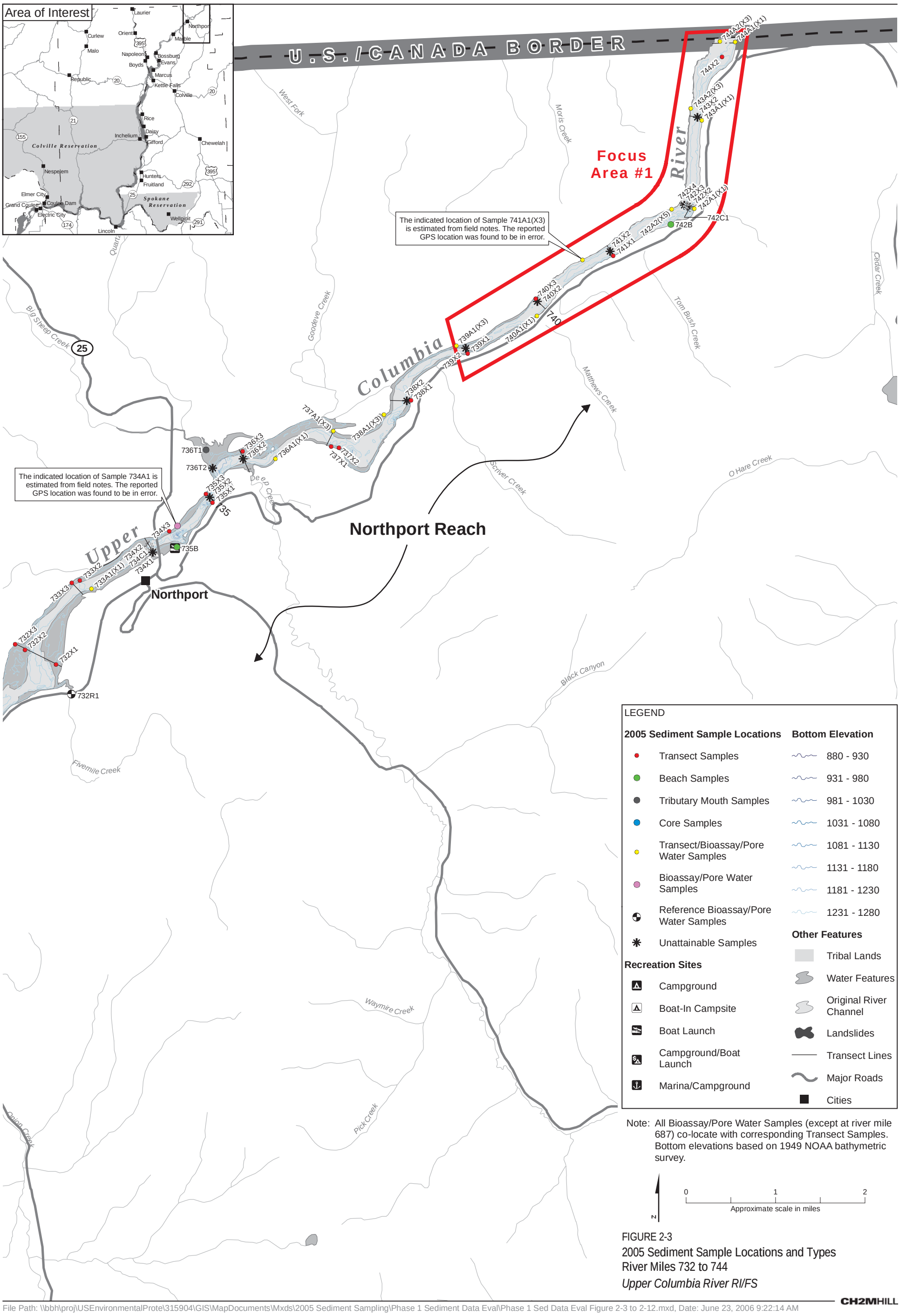

FIGURE 2-3
2005 Sediment Sample Locations and Types
River Miles 732 to 744
Upper Columbia River RI/FS

CH2MHILL

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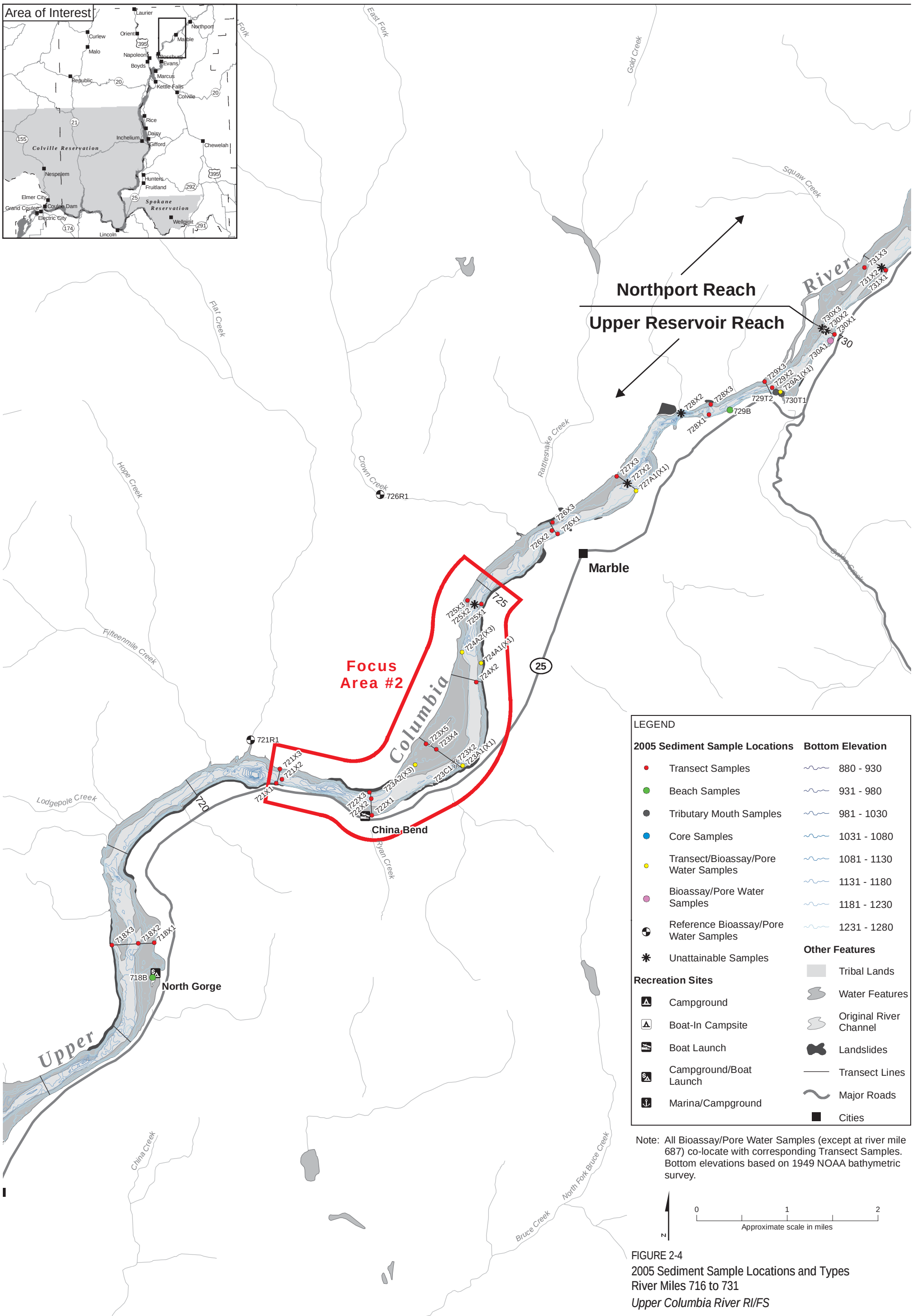

FIGURE 2-4
2005 Sediment Sample Locations and Types
River Miles 716 to 731
Upper Columbia River RI/FS

CH2MHILL

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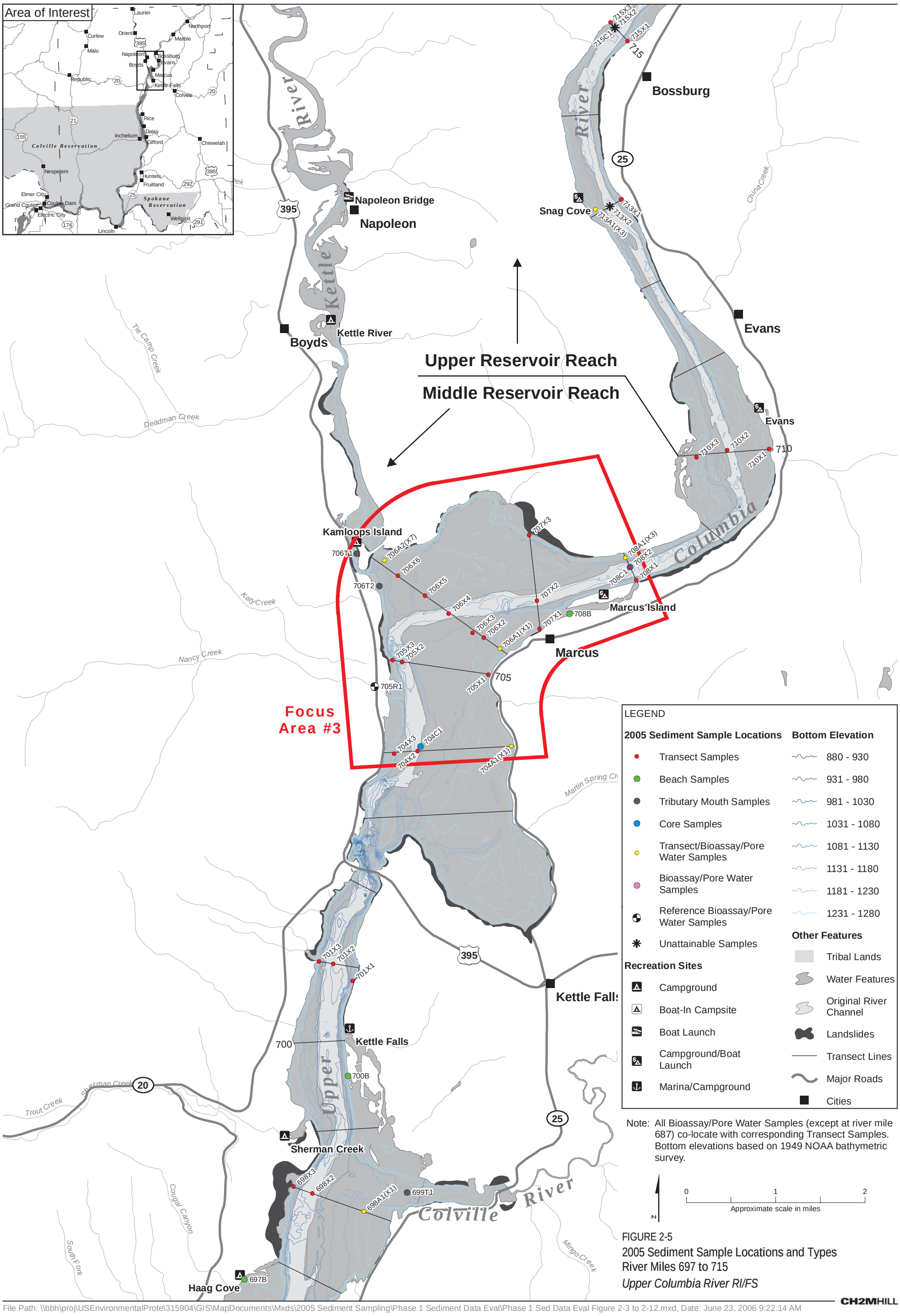

FIGURE 2-5
2005 Sediment Sample Locations and Types
River Miles 697 to 715
Upper Columbia River RI/FS

CH2MHILL

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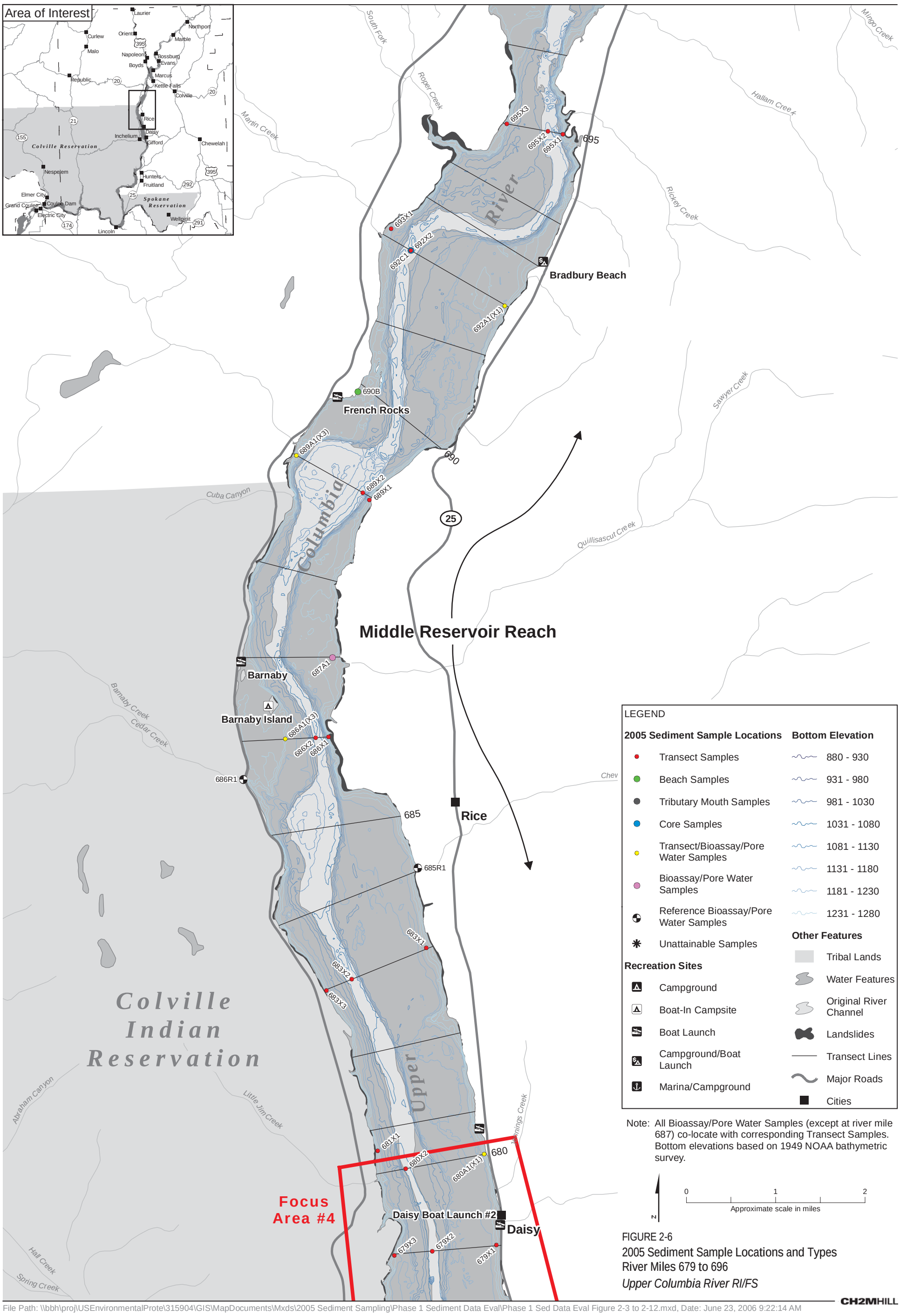

FIGURE 2-6
2005 Sediment Sample Locations and Types
River Miles 679 to 696
Upper Columbia River RI/FS

CH2MHILL

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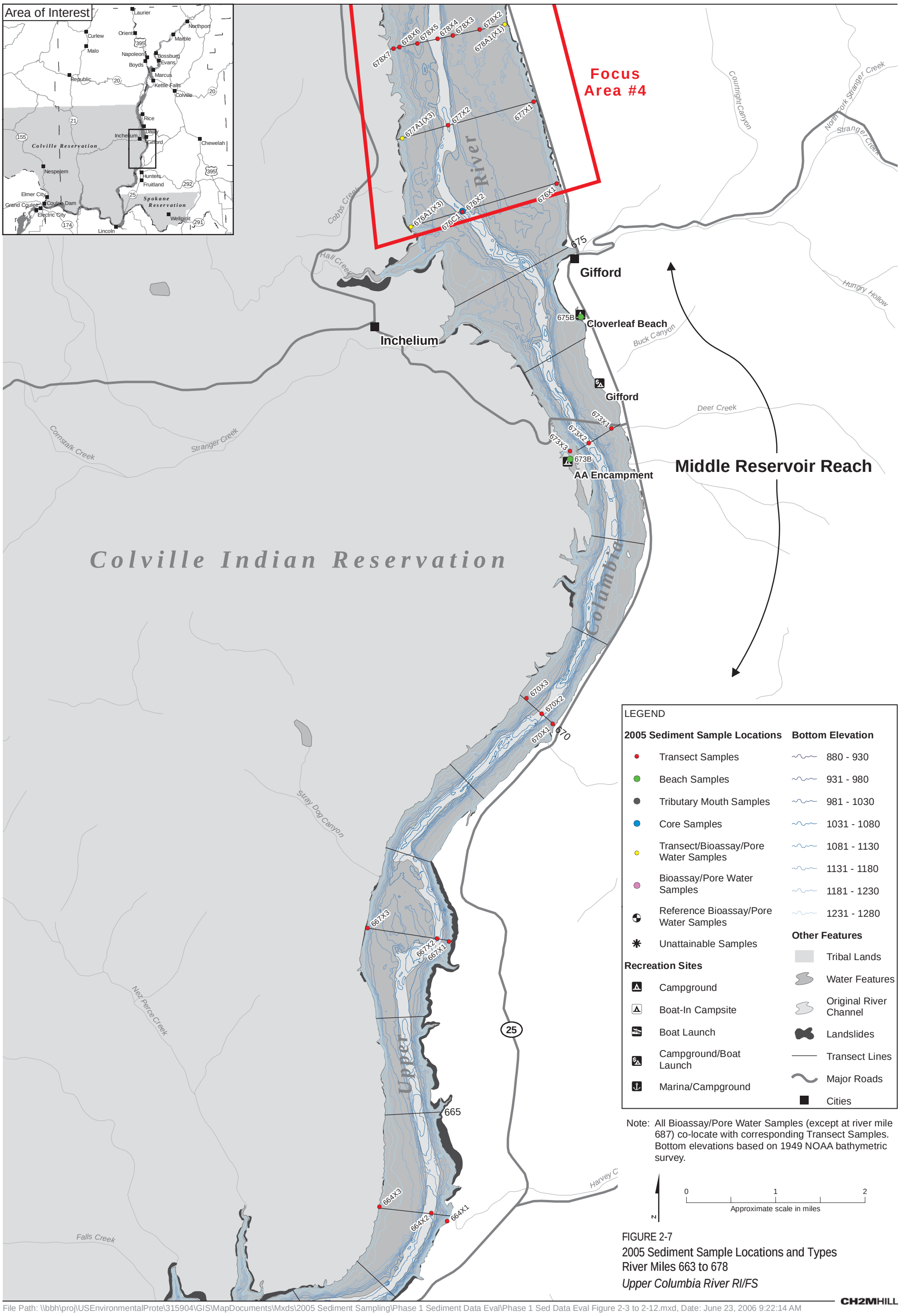

FIGURE 2-7
2005 Sediment Sample Locations and Types
River Miles 663 to 678
Upper Columbia River RI/FS

CH2MHILL

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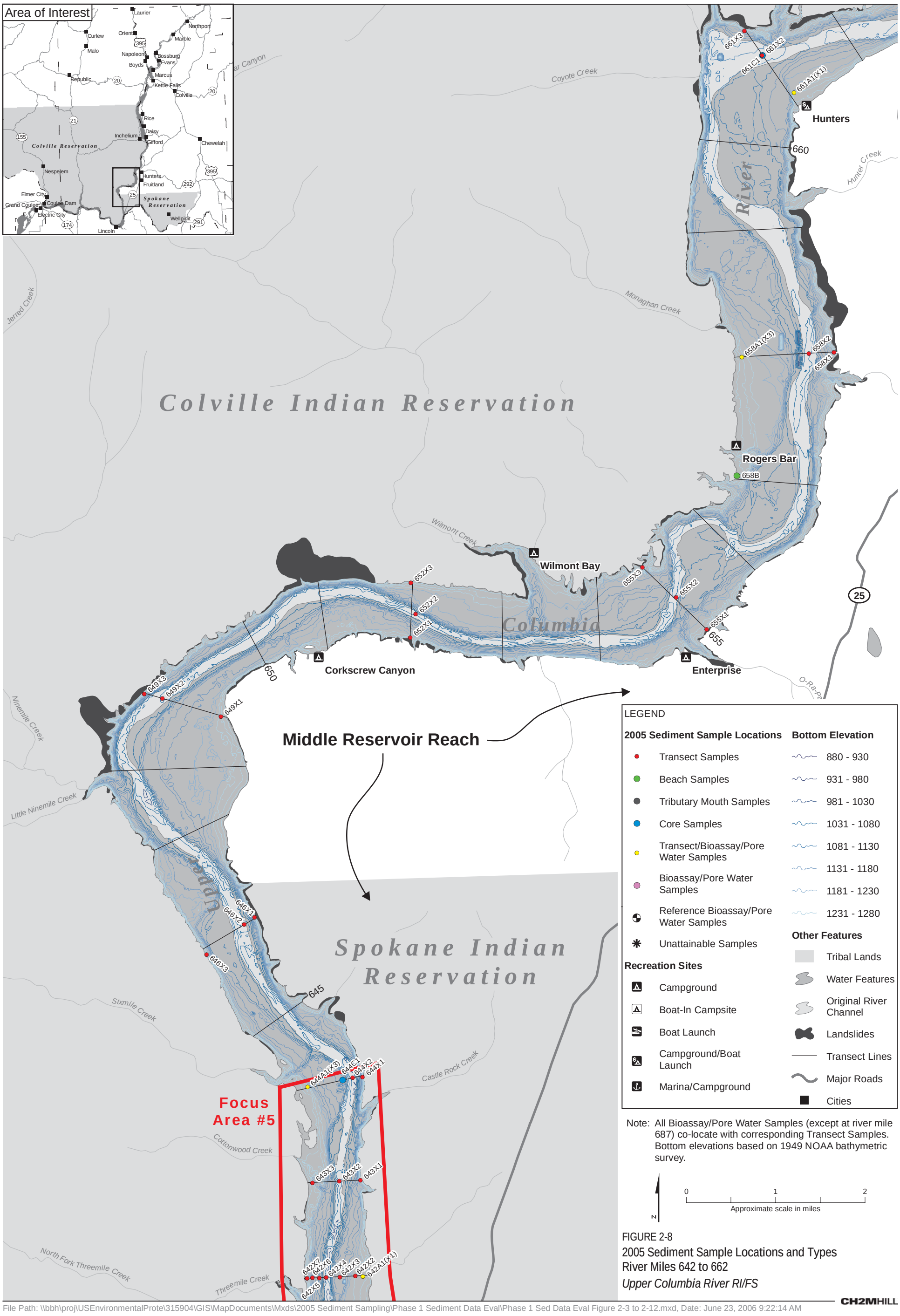

FIGURE 2-8
2005 Sediment Sample Locations and Types
River Miles 642 to 662
Upper Columbia River RI/FS

CH2MHILL

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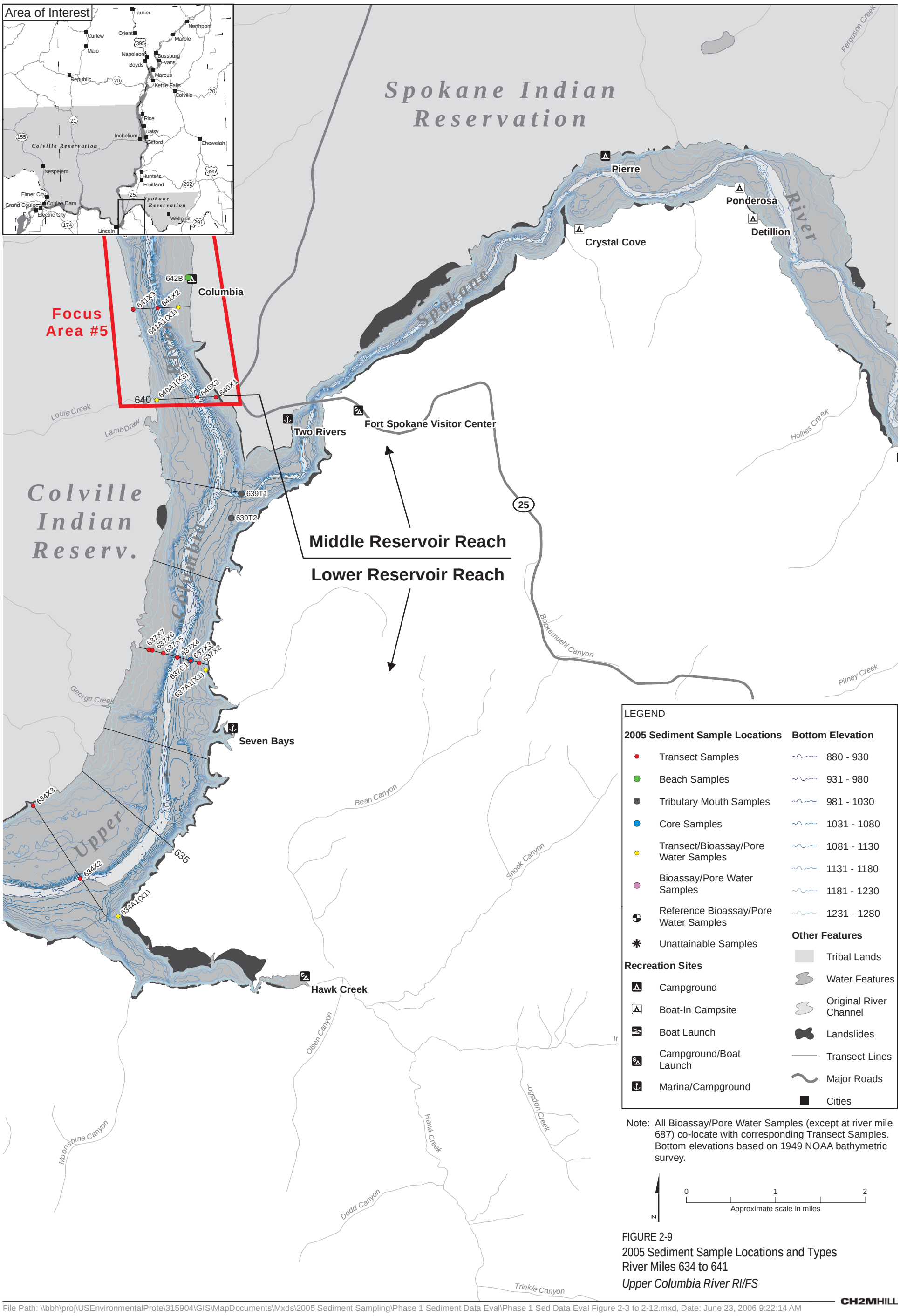

FIGURE 2-9
2005 Sediment Sample Locations and Types
River Miles 634 to 641
Upper Columbia River RI/FS

CH2MHILL

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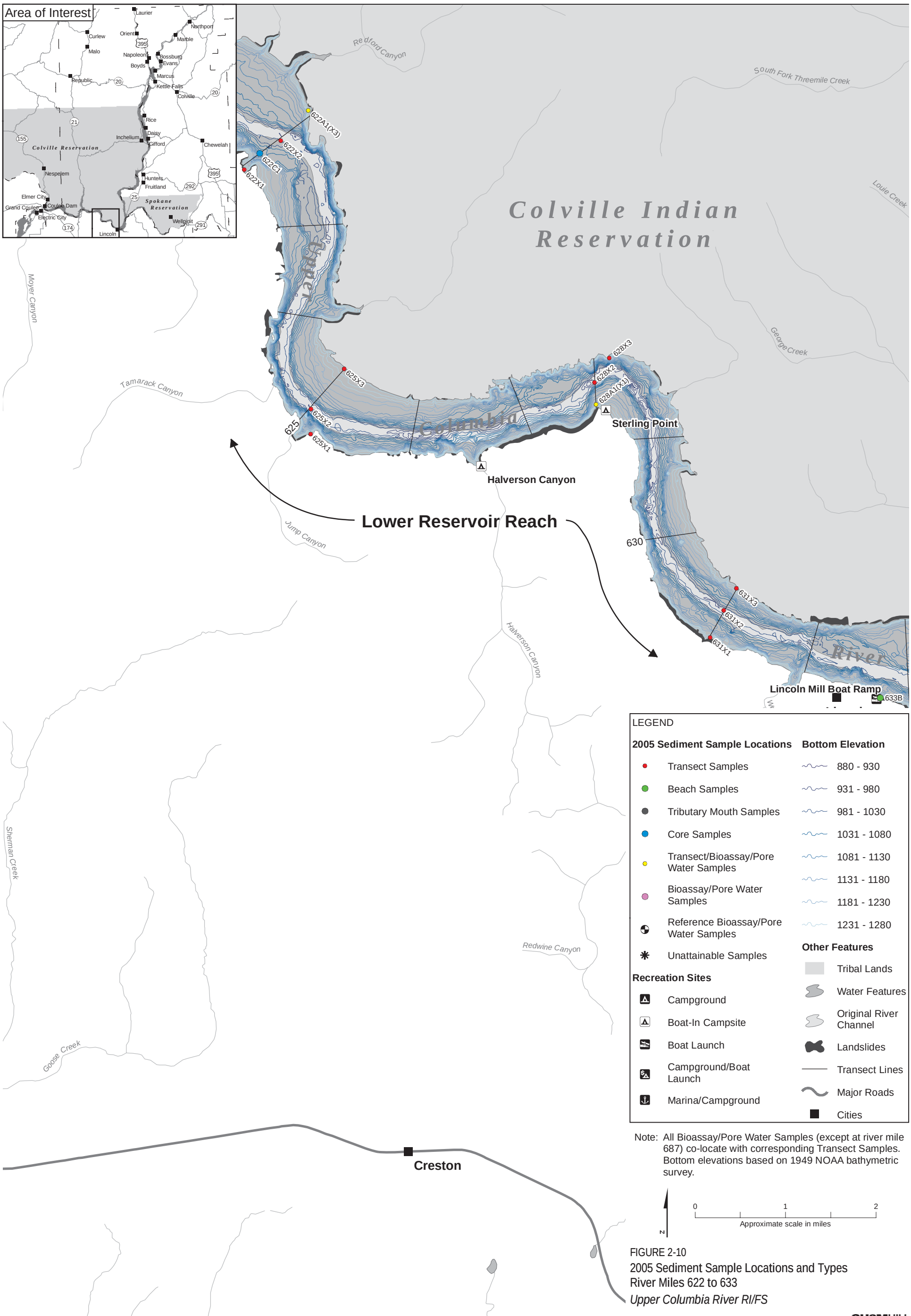

FIGURE 2-10
2005 Sediment Sample Locations and Types
River Miles 622 to 633
Upper Columbia River RI/FS

CH2MHILL

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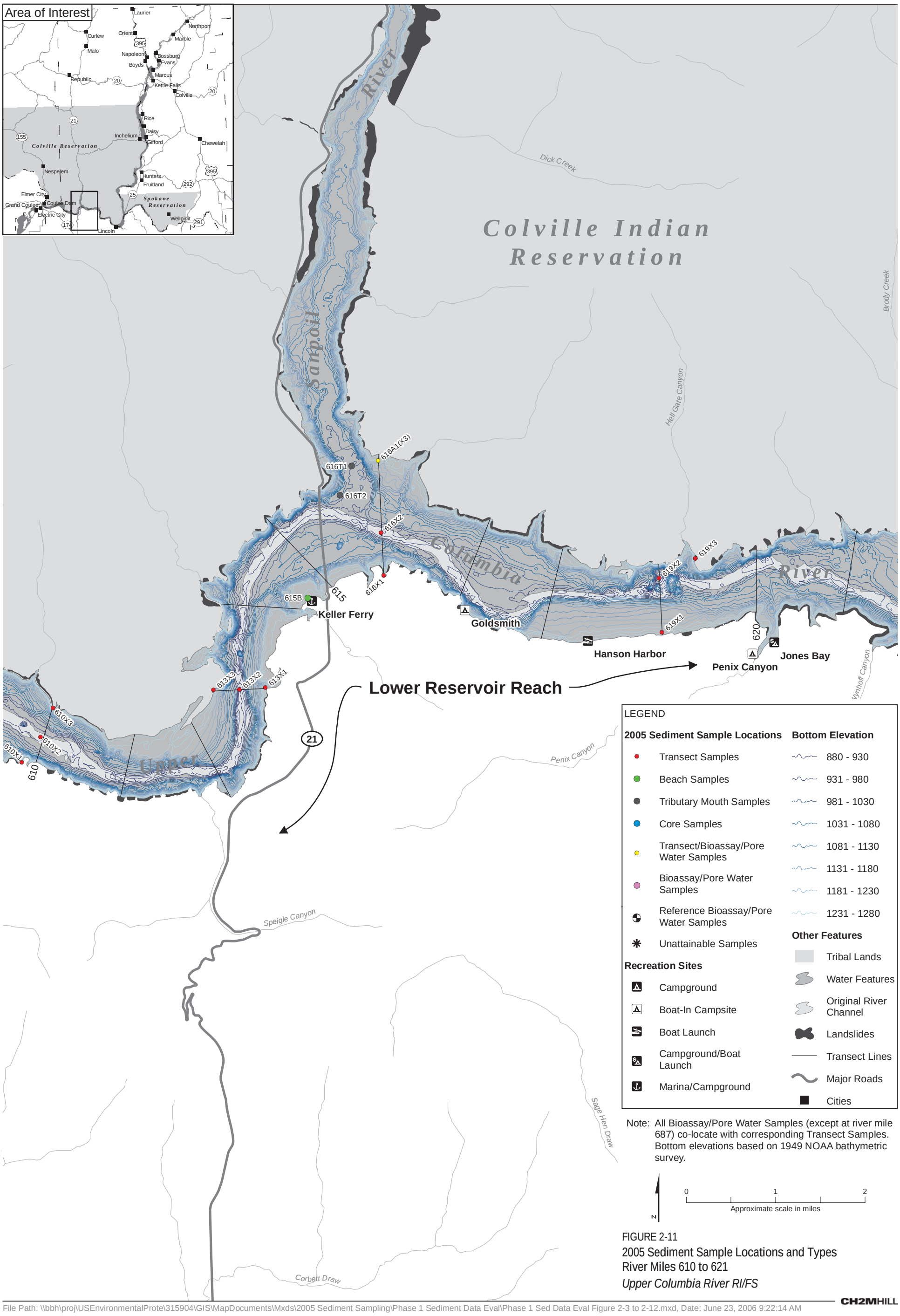

FIGURE 2-11
2005 Sediment Sample Locations and Types
River Miles 610 to 621
Upper Columbia River RI/FS

CH2MHILL

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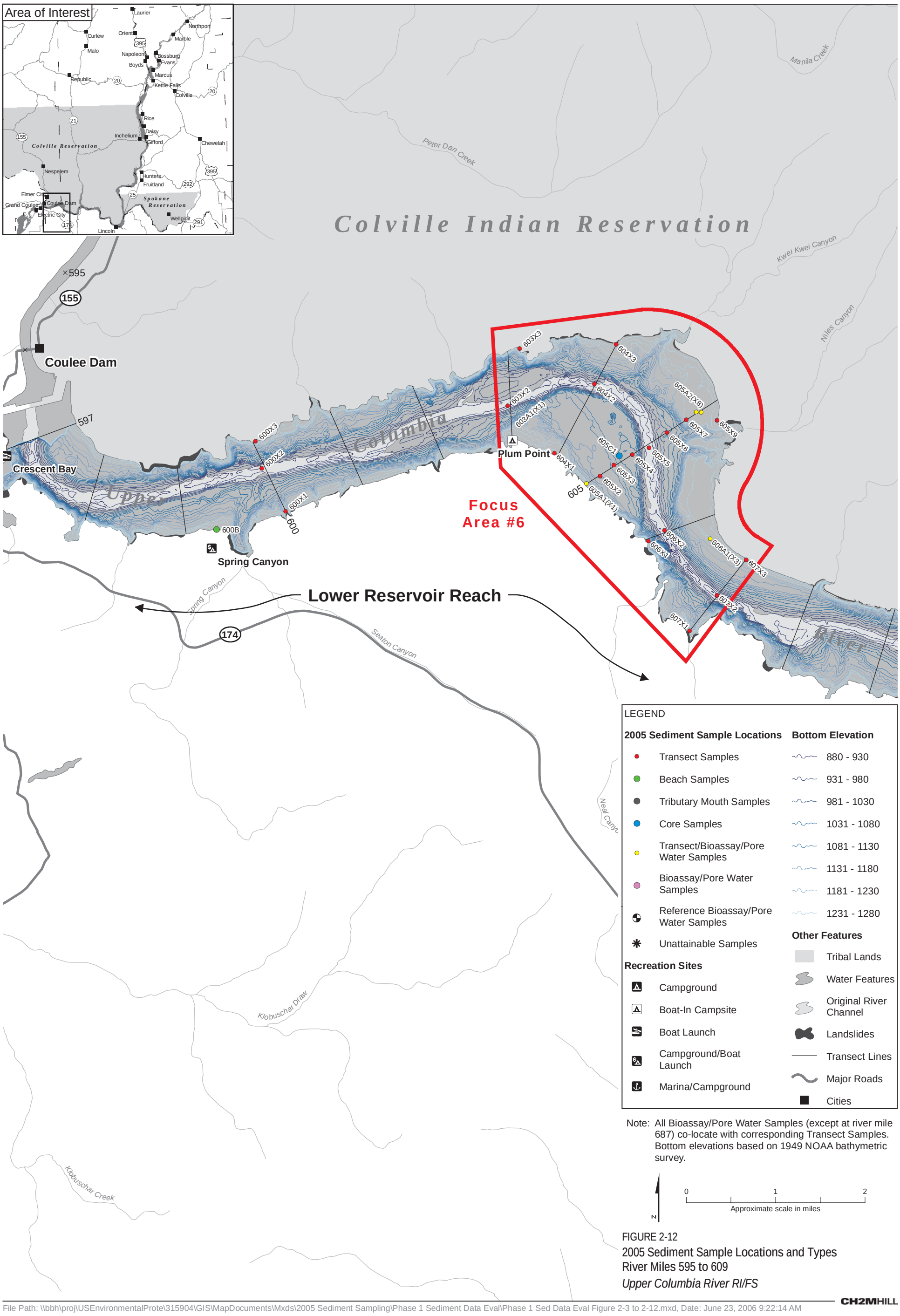

FIGURE 2-12
2005 Sediment Sample Locations and Types
River Miles 595 to 609
Upper Columbia River RI/FS

CH2MHILL

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2005 Beach Sediment Sample Locations

LEGEND

2005 Beach Sampling

- Beach Subsample Composites
- Beach Subsamples

1949 NOAA Bathymetry

- 10-foot Bottom Elevation Contours

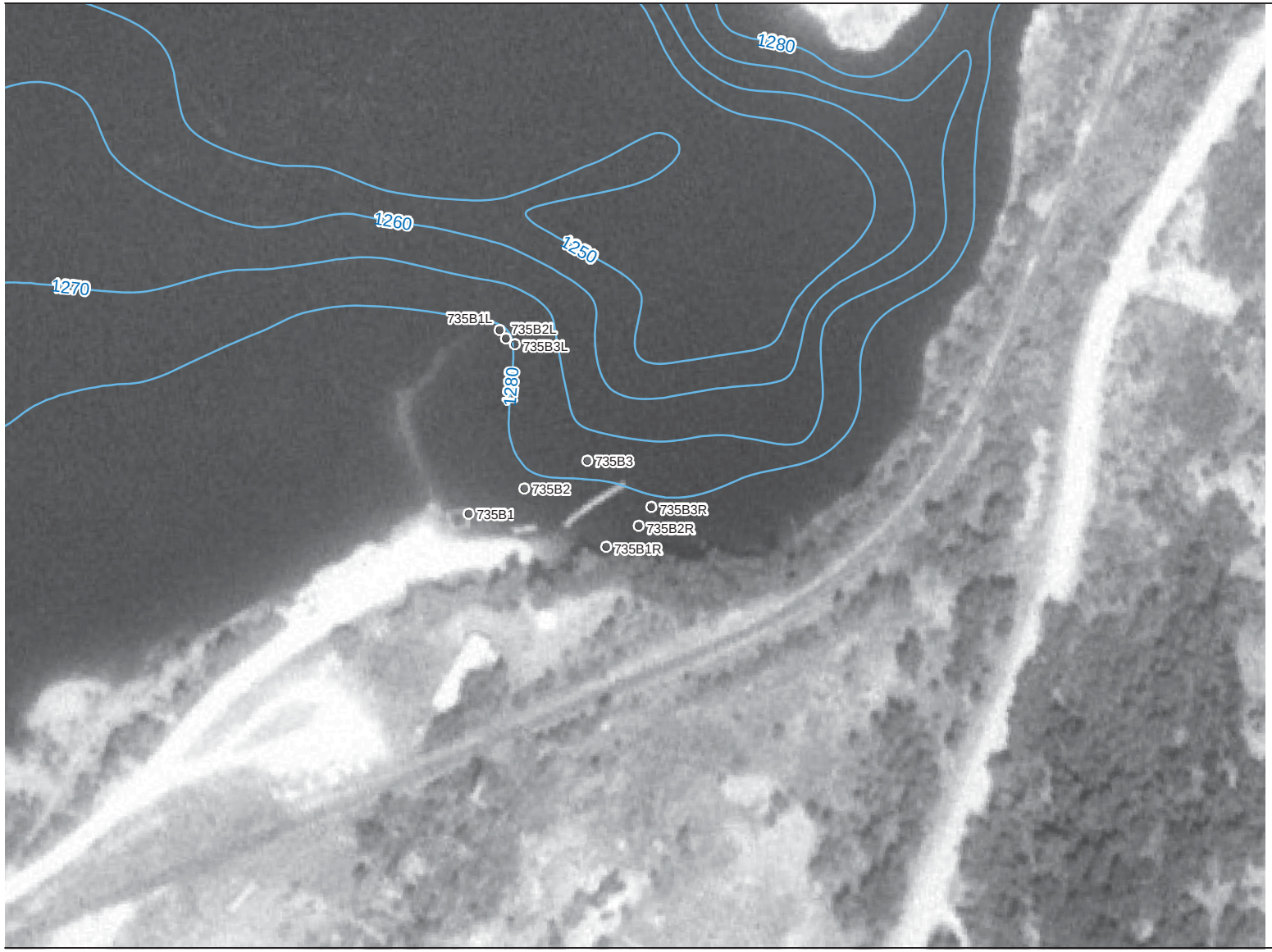
N

0 100 200
Approximate scale in feet

FIGURE 2-13
Black Sand Beach - RM 742
2005 Beach Sample Locations
Upper Columbia River RI/FS

CH2MHILL

File Path: \\bbh\proj\USEnvironmentalProte\315904\GIS\MapDocuments\Mxds\2005 Sediment Sampling\Phase 1 Sediment Data Eval\Phase 1 Sed Data Eval Beaches Figure 2-13 to 2-27.mxd, Date: June 23, 2006 9:32:19 AM



2005 Beach Sediment Sample Locations

LEGEND

2005 Beach Sampling

- Beach Subsample Composites
- Beach Subsamples

1949 NOAA Bathymetry

- 10-foot Bottom Elevation Contours

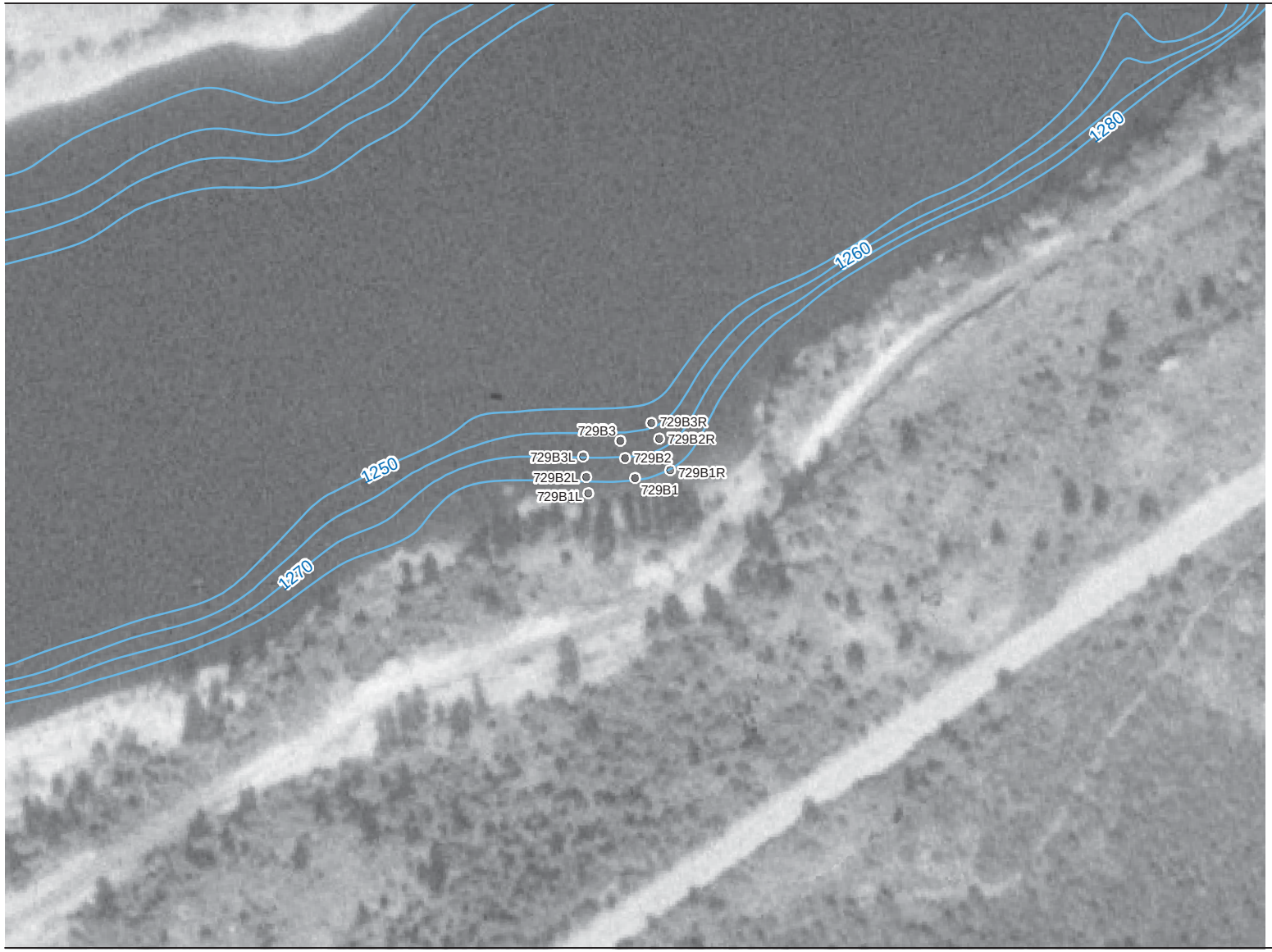
N

0 100 200
Approximate scale in feet

FIGURE 2-14
Northport City Boat Launch
2005 Beach Sample Locations
Upper Columbia River RI/FS

CH2MHILL

File Path: \\bbh\proj\USEnvironmentalProte\315904\GIS\MapDocuments\Mxds\2005 Sediment Sampling\Phase 1 Sediment Data Eval\Phase 1 Sed Data Eval Beaches Figure 2-13 to 2-27.mxd, Date: June 23, 2006 9:32:19 AM



2005 Beach Sediment Sample Locations

LEGEND

2005 Beach Sampling

- Beach Subsample Composites
- Beach Subsamples

1949 NOAA Bathymetry

- 10-foot Bottom Elevation Contours

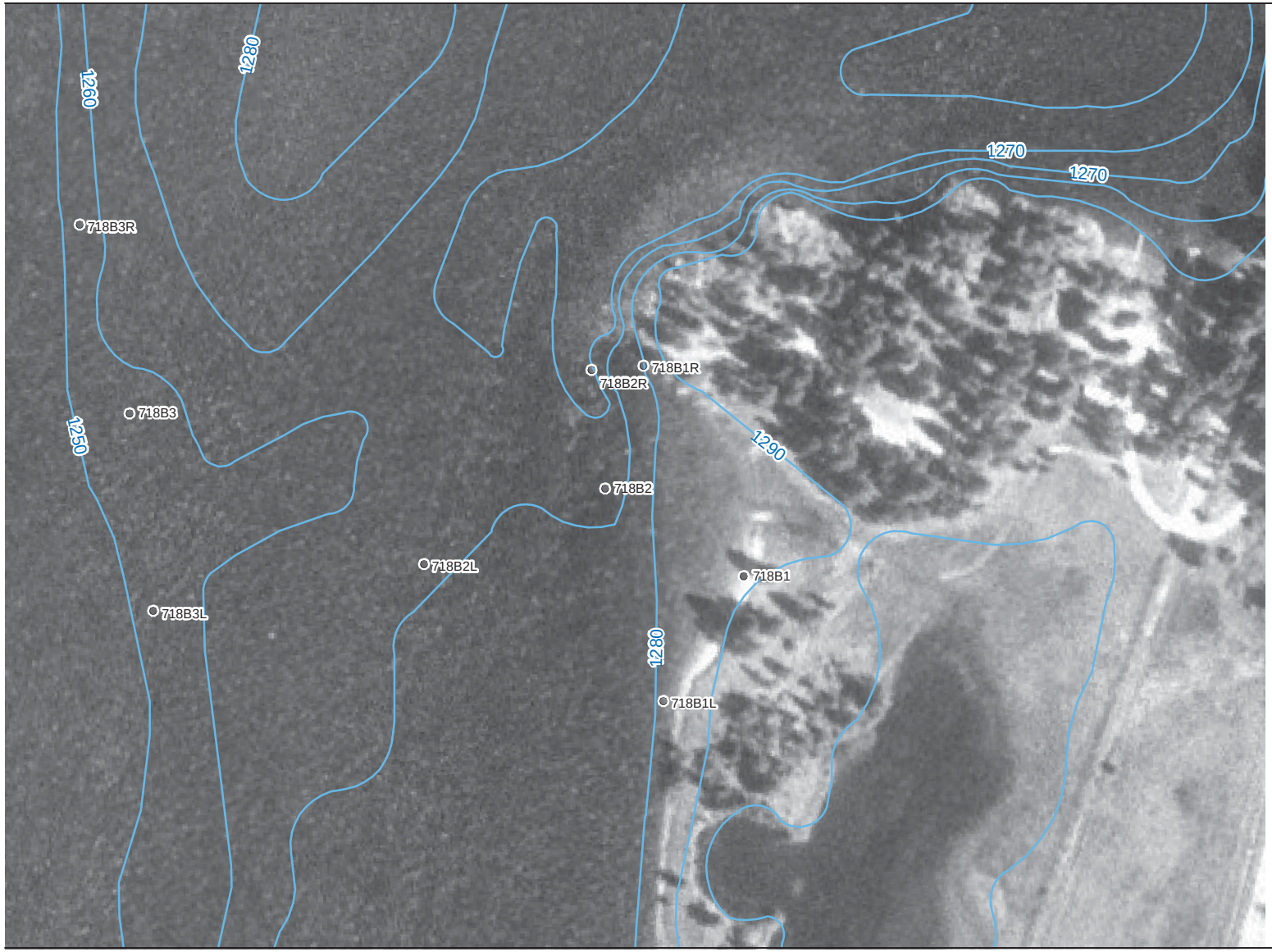
N

0 100 200
Approximate scale in feet

FIGURE 2-15
Dalles Orchard
2005 Beach Sample Locations
Upper Columbia River RI/FS

CH2MHILL

File Path: \\bbh\proj\USEnvironmentalProte\315904\GIS\MapDocuments\Mxds\2005 Sediment Sampling\Phase 1 Sediment Data Eval\Phase 1 Sed Data Eval Beaches Figure 2-13 to 2-27.mxd, Date: June 23, 2006 9:32:19 AM



2005 Beach Sediment Sample Locations

LEGEND

2005 Beach Sampling

- Beach Subsample Composites
- Beach Subsamples

1974 USBR Bathymetry

- 10-foot Bottom Elevation Contours

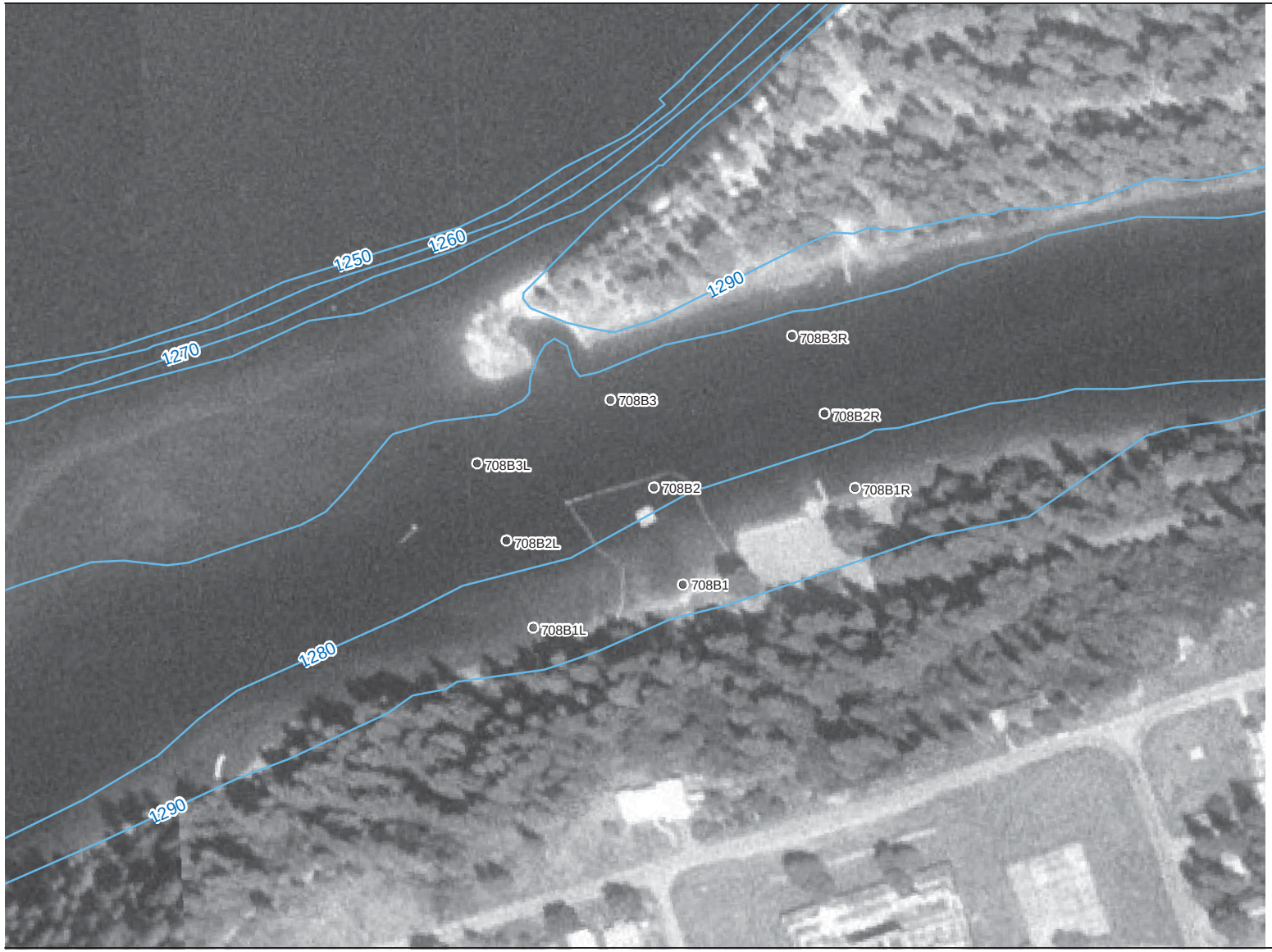
N

0 100 200
Approximate scale in feet

FIGURE 2-16
North Gorge Campground
2005 Beach Sample Locations
Upper Columbia River RI/FS

CH2MHILL

File Path: \\bbh\proj\USEnvironmentalProte\315904\GIS\MapDocuments\Mxds\2005 Sediment Sampling\Phase 1 Sediment Data Eval\Phase 1 Sed Data Eval Beaches Figure 2-13 to 2-27.mxd, Date: June 23, 2006 9:32:19 AM



2005 Beach Sediment Sample Locations

LEGEND

2005 Beach Sampling

- Beach Subsample Composites
- Beach Subsamples

1974 USBR Bathymetry

- 10-foot Bottom Elevation Contours

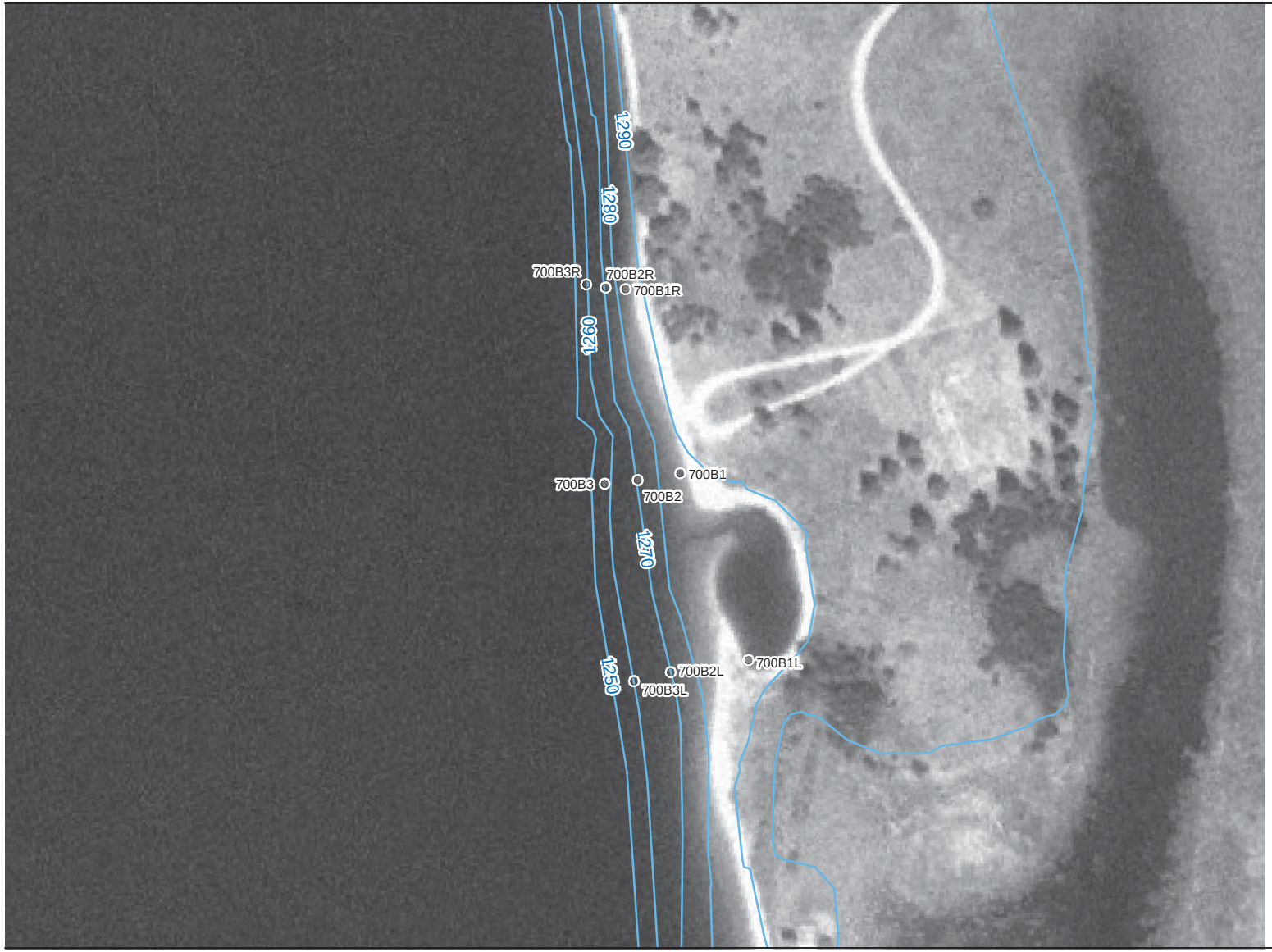
N

0 100 200
Approximate scale in feet

FIGURE 2-17
Marcus Island Campground
2005 Beach Sample Locations
Upper Columbia River RI/FS

CH2MHILL

File Path: \\bbh\proj\USEnvironmentalProte\315904\GIS\MapDocuments\Mxds\2005 Sediment Sampling\Phase 1 Sediment Data Eval\Phase 1 Sed Data Eval Beaches Figure 2-13 to 2-27.mxd, Date: June 23, 2006 9:32:19 AM



2005 Beach Sediment Sample Locations

LEGEND

2005 Beach Sampling

- Beach Subsample Composites
- Beach Subsamples

1974 USBR Bathymetry

- 10-foot Bottom Elevation Contours

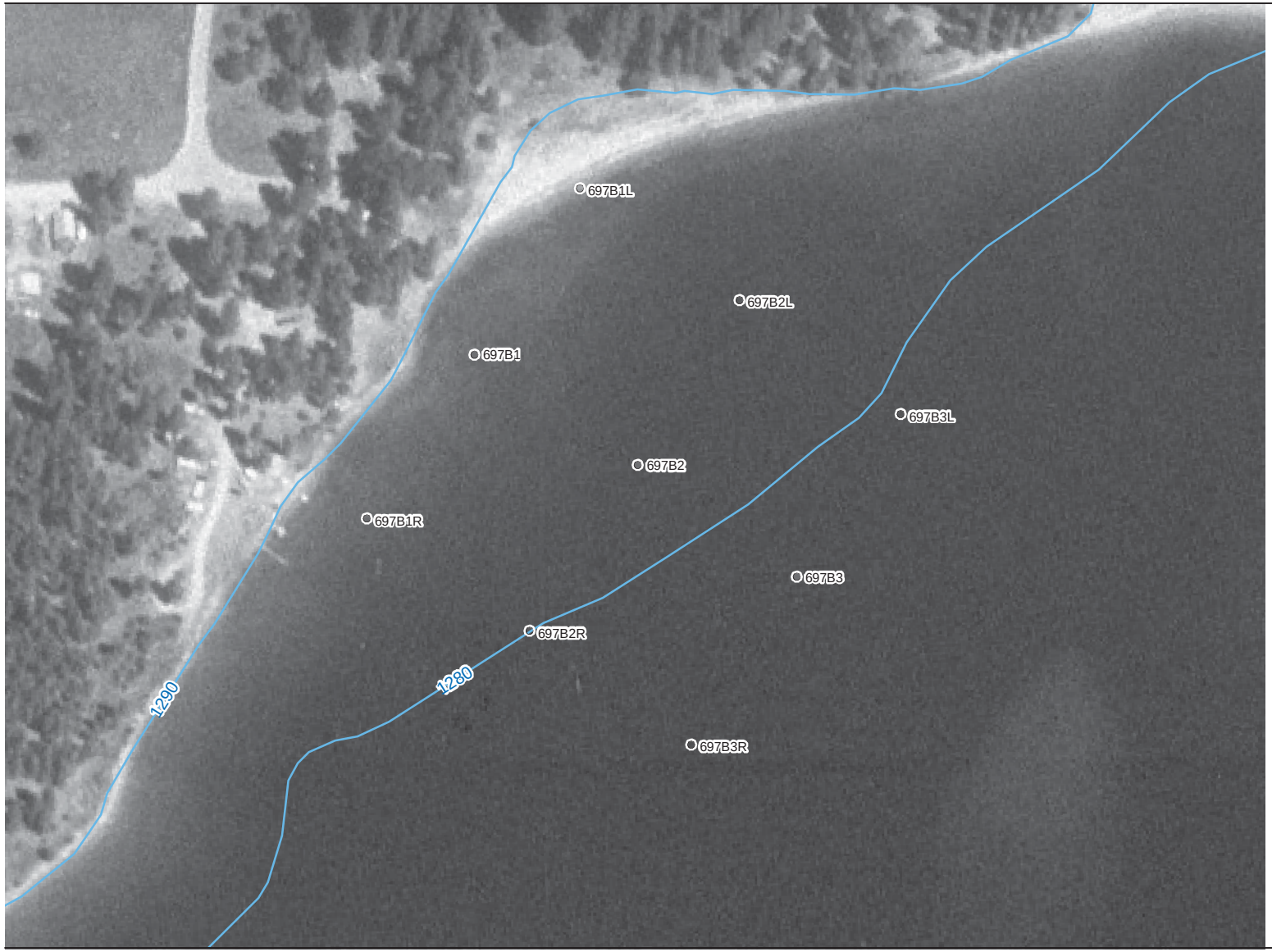
N

0 100 200
Approximate scale in feet

FIGURE 2-18
Kettle Falls Swim Beach
2005 Beach Sample Locations
Upper Columbia River RI/FS

CH2MHILL

File Path: \\bbh\proj\USEnvironmentalProte\315904\GIS\MapDocuments\Mxds\2005 Sediment Sampling\Phase 1 Sediment Data Eval\Phase 1 Sed Data Eval Beaches Figure 2-13 to 2-27.mxd, Date: June 23, 2006 9:32:19 AM



2005 Beach Sediment Sample Locations

LEGEND

2005 Beach Sampling

- Beach Subsample Composites
- Beach Subsamples

1974 USBR Bathymetry

- 10-foot Bottom Elevation Contours

N

0 100 200

Approximate scale in feet

FIGURE 2-19

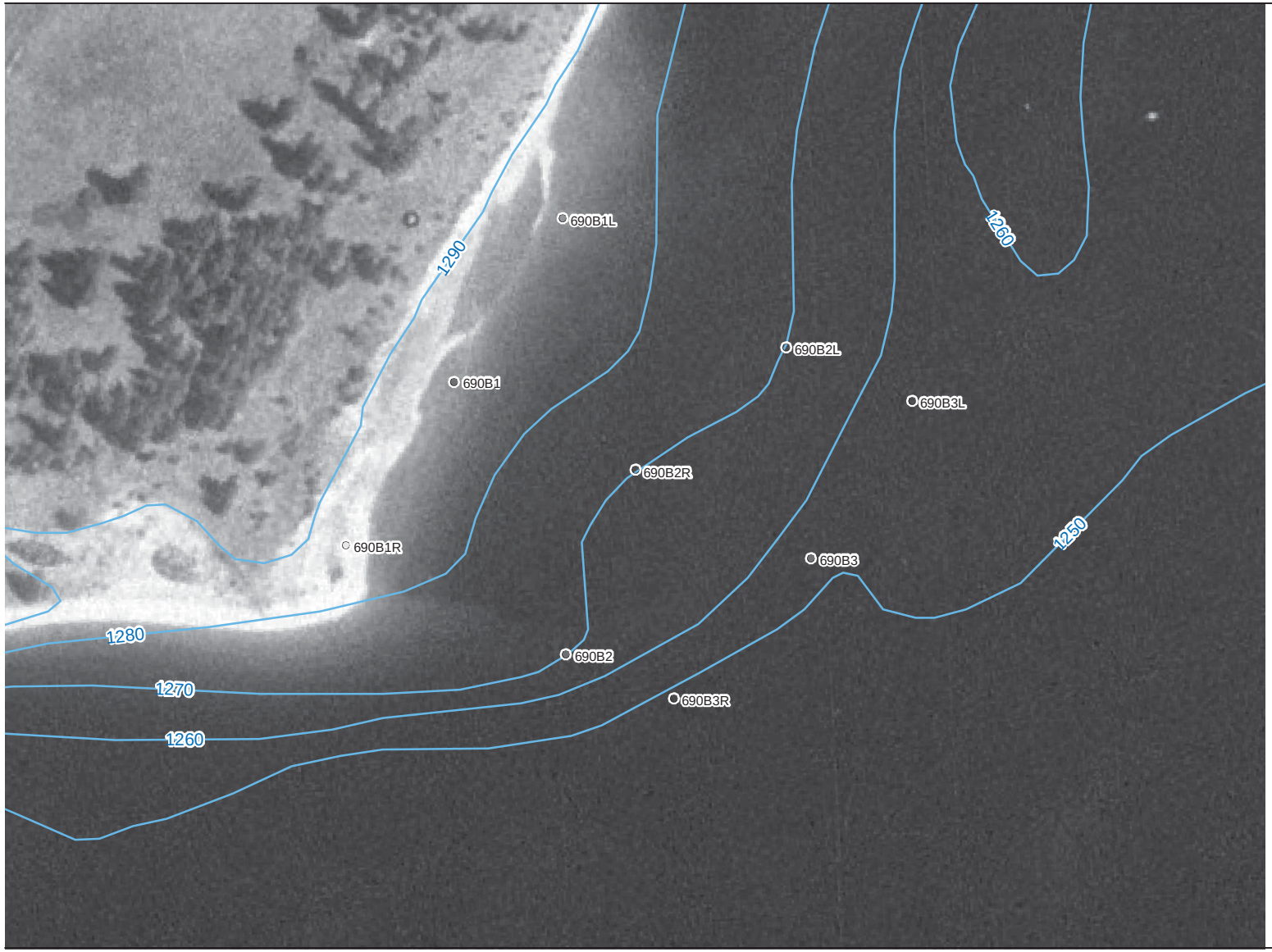
Haag Cove

2005 Beach Sample Locations

Upper Columbia River RI/FS

CH2MHILL

File Path: \\bbh\proj\USEnvironmentalProte\315904\GIS\MapDocuments\Mxds\2005 Sediment Sampling\Phase 1 Sediment Data Eval\Phase 1 Sed Data Eval Beaches Figure 2-13 to 2-27.mxd, Date: June 23, 2006 9:32:19 AM



2005 Beach Sediment Sample Locations

LEGEND

2005 Beach Sampling

- Beach Subsample Composites
- Beach Subsamples

1974 USBR Bathymetry

- 10-foot Bottom Elevation Contours

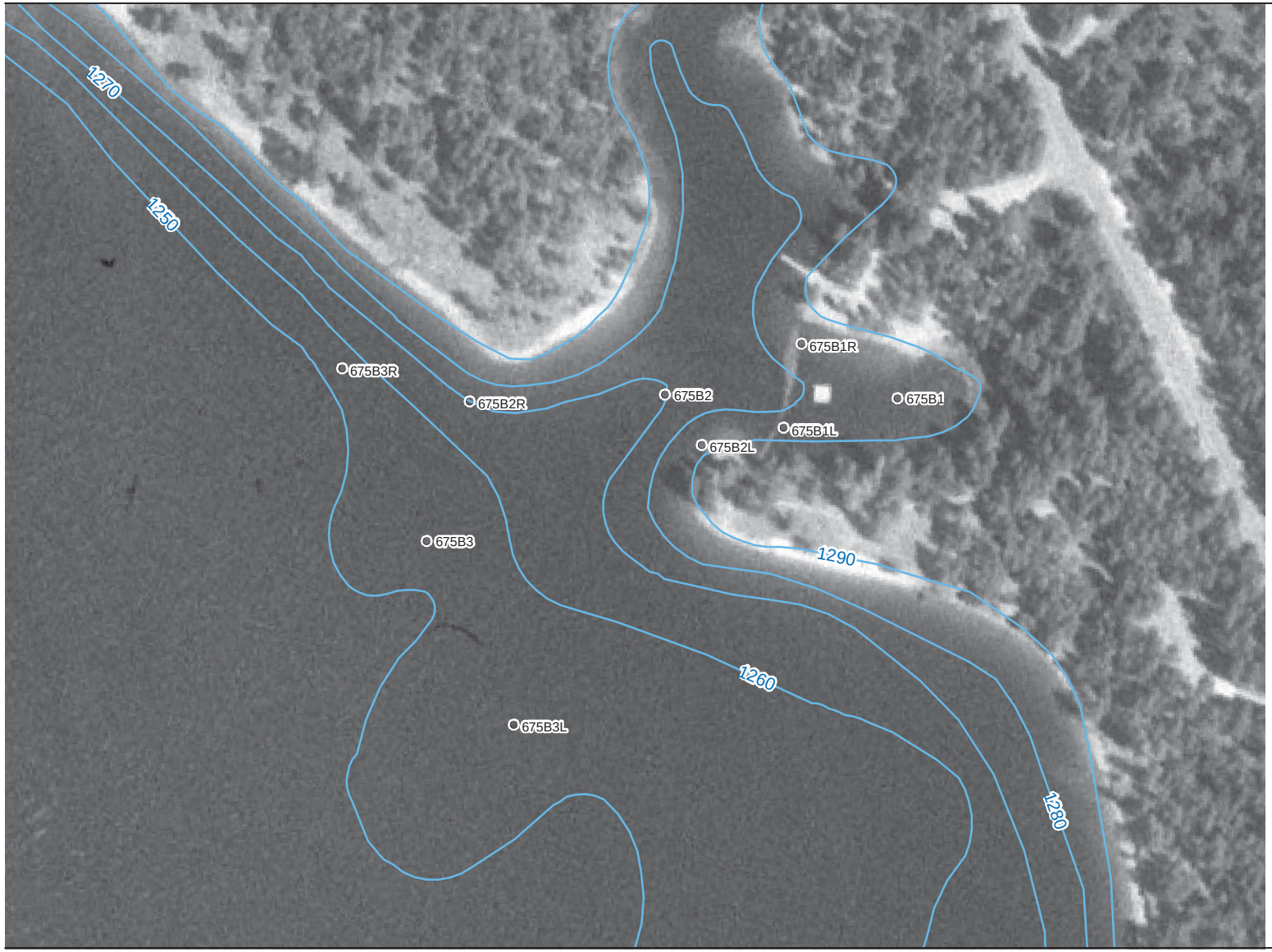
N

0 100 200
Approximate scale in feet

FIGURE 2-20
French Rocks Boat Launch
2005 Beach Sample Locations
Upper Columbia River RI/FS

CH2MHILL

File Path: \\bbh\proj\USEnvironmentalProte\315904\GIS\MapDocuments\Mxds\2005 Sediment Sampling\Phase 1 Sediment Data Eval\Phase 1 Sed Data Eval Beaches Figure 2-13 to 2-27.mxd, Date: June 23, 2006 9:32:19 AM



2005 Beach Sediment Sample Locations

LEGEND

2005 Beach Sampling

- Beach Subsample Composites
- Beach Subsamples

1974 USBR Bathymetry

- 10-foot Bottom Elevation Contours

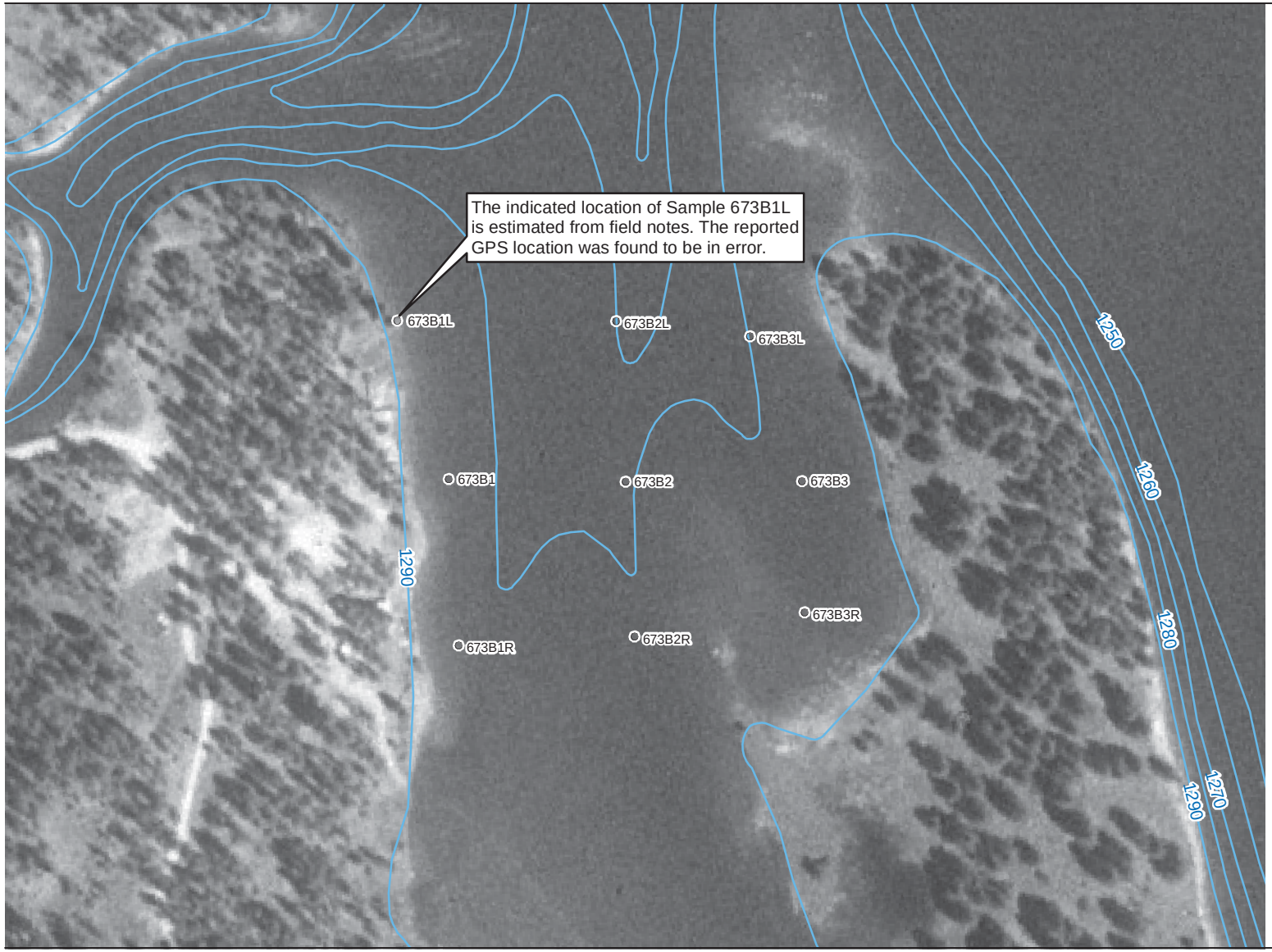
N

0 100 200
Approximate scale in feet

FIGURE 2-21
Cloverleaf Beach
2005 Beach Sample Locations
Upper Columbia River RI/FS

CH2MHILL

File Path: \\bbh\proj\USEnvironmentalProte\315904\GIS\MapDocuments\Mxds\2005 Sediment Sampling\Phase 1 Sediment Data Eval\Phase 1 Sed Data Eval Beaches Figure 2-13 to 2-27.mxd, Date: June 23, 2006 9:32:19 AM



2005 Beach Sediment Sample Locations

LEGEND

2005 Beach Sampling

- Beach Subsample Composites
- Beach Subsamples

1974 USBR Bathymetry

- 10-foot Bottom Elevation Contours

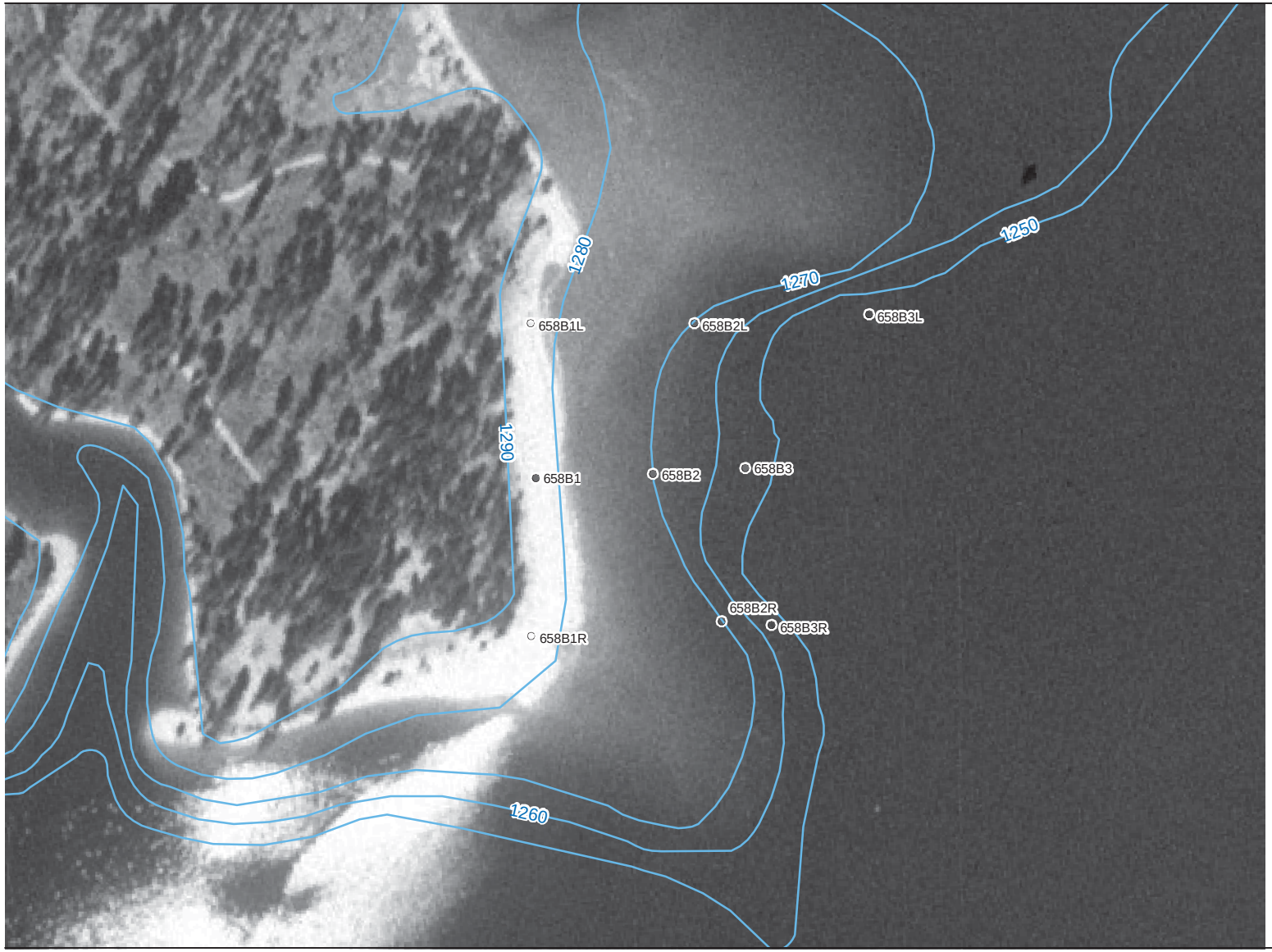
N

0 100 200
Approximate scale in feet

FIGURE 2-22
AA Campground
2005 Beach Sample Locations
Upper Columbia River RI/FS

CH2MHILL

File Path: \\bbh\proj\USEnvironmentalProte\315904\GIS\MapDocuments\Mxds\2005 Sediment Sampling\Phase 1 Sediment Data Eval\Phase 1 Sed Data Eval Beaches Figure 2-13 to 2-27.mxd, Date: June 23, 2006 9:32:19 AM



2005 Beach Sediment Sample Locations

LEGEND

2005 Beach Sampling

- Beach Subsample Composites
- Beach Subsamples

1974 USBR Bathymetry

- 10-foot Bottom Elevation Contours

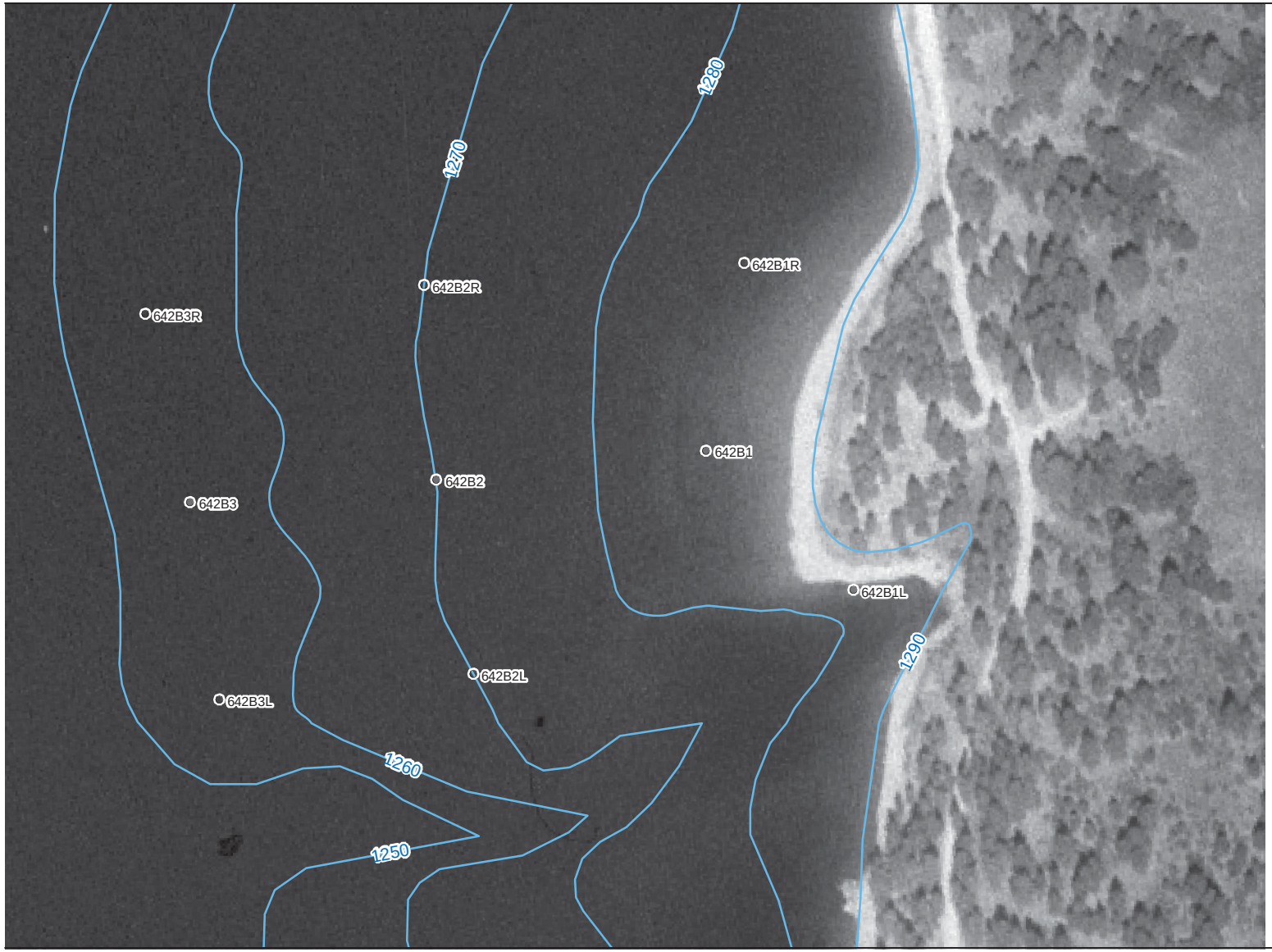
N

0 100 200
Approximate scale in feet

FIGURE 2-23
Rogers Bar Campground
2005 Beach Sample Locations
Upper Columbia River RI/FS

CH2MHILL

File Path: \\bbh\proj\USEnvironmentalProte\315904\GIS\MapDocuments\Mxds\2005 Sediment Sampling\Phase 1 Sediment Data Eval\Phase 1 Sed Data Eval Beaches Figure 2-13 to 2-27.mxd, Date: June 23, 2006 9:32:19 AM



2005 Beach Sediment Sample Locations

LEGEND

2005 Beach Sampling

- Beach Subsample Composites
- Beach Subsamples

1974 USBR Bathymetry

- 10-foot Bottom Elevation Contours

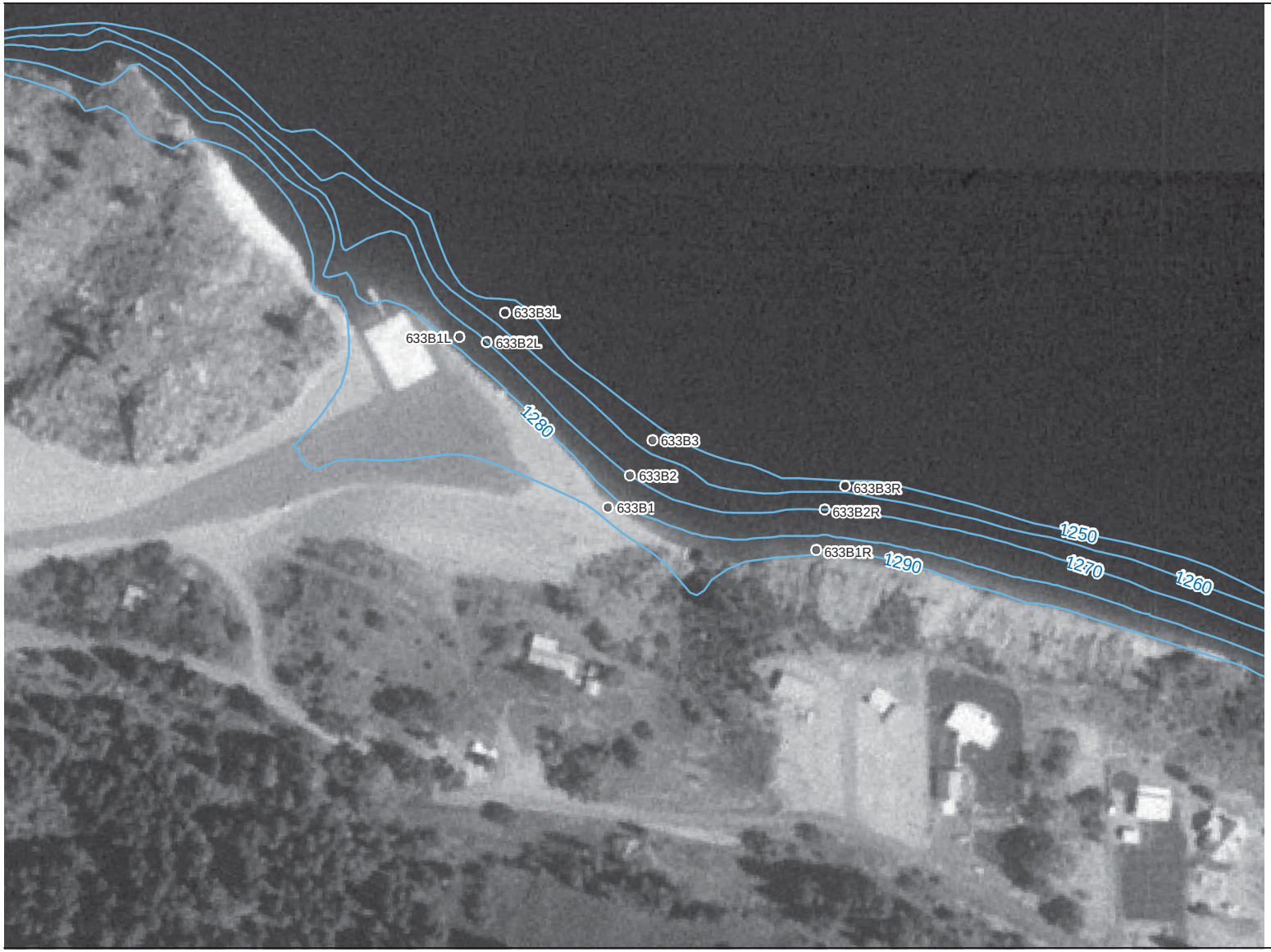
N

0 100 200
Approximate scale in feet

FIGURE 2-24
Columbia Campground
2005 Beach Sample Locations
Upper Columbia River RI/FS

CH2MHILL

File Path: \\bbh\proj\USEnvironmentalProte\315904\GIS\MapDocuments\Mxds\2005 Sediment Sampling\Phase 1 Sediment Data Eval\Phase 1 Sed Data Eval Beaches Figure 2-13 to 2-27.mxd, Date: June 23, 2006 9:32:19 AM



2005 Beach Sediment Sample Locations

LEGEND

2005 Beach Sampling

- Beach Subsample Composites
- Beach Subsamples

1974 USBR Bathymetry

- 10-foot Bottom Elevation Contours

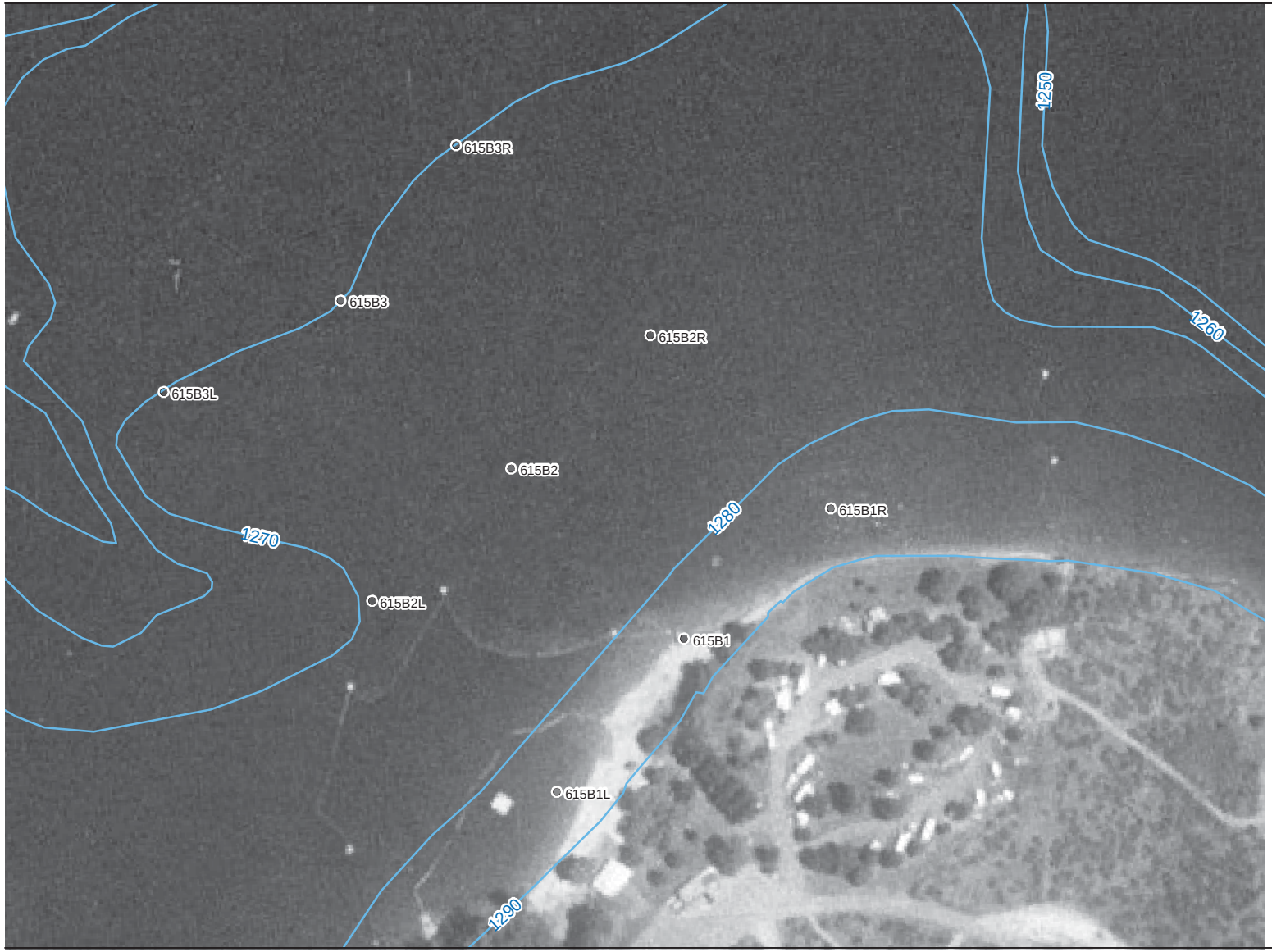
N

0 100 200
Approximate scale in feet

FIGURE 2-25
Lincoln Mill Boat Ramp
2005 Beach Sample Locations
Upper Columbia River RI/FS

CH2MHILL

File Path: \\bbh\proj\USEnvironmentalProte\315904\GIS\MapDocuments\Mxds\2005 Sediment Sampling\Phase 1 Sediment Data Eval\Phase 1 Sed Data Eval Beaches Figure 2-13 to 2-27.mxd, Date: June 23, 2006 9:32:19 AM



2005 Beach Sediment Sample Locations

LEGEND

2005 Beach Sampling

- Beach Subsample Composites
- Beach Subsamples

1974 USBR Bathymetry

- 10-foot Bottom Elevation Contours

N

0 100 200
Approximate scale in feet

FIGURE 2-26
Kellers Ferry
2005 Beach Sample Locations
Upper Columbia River RI/FS

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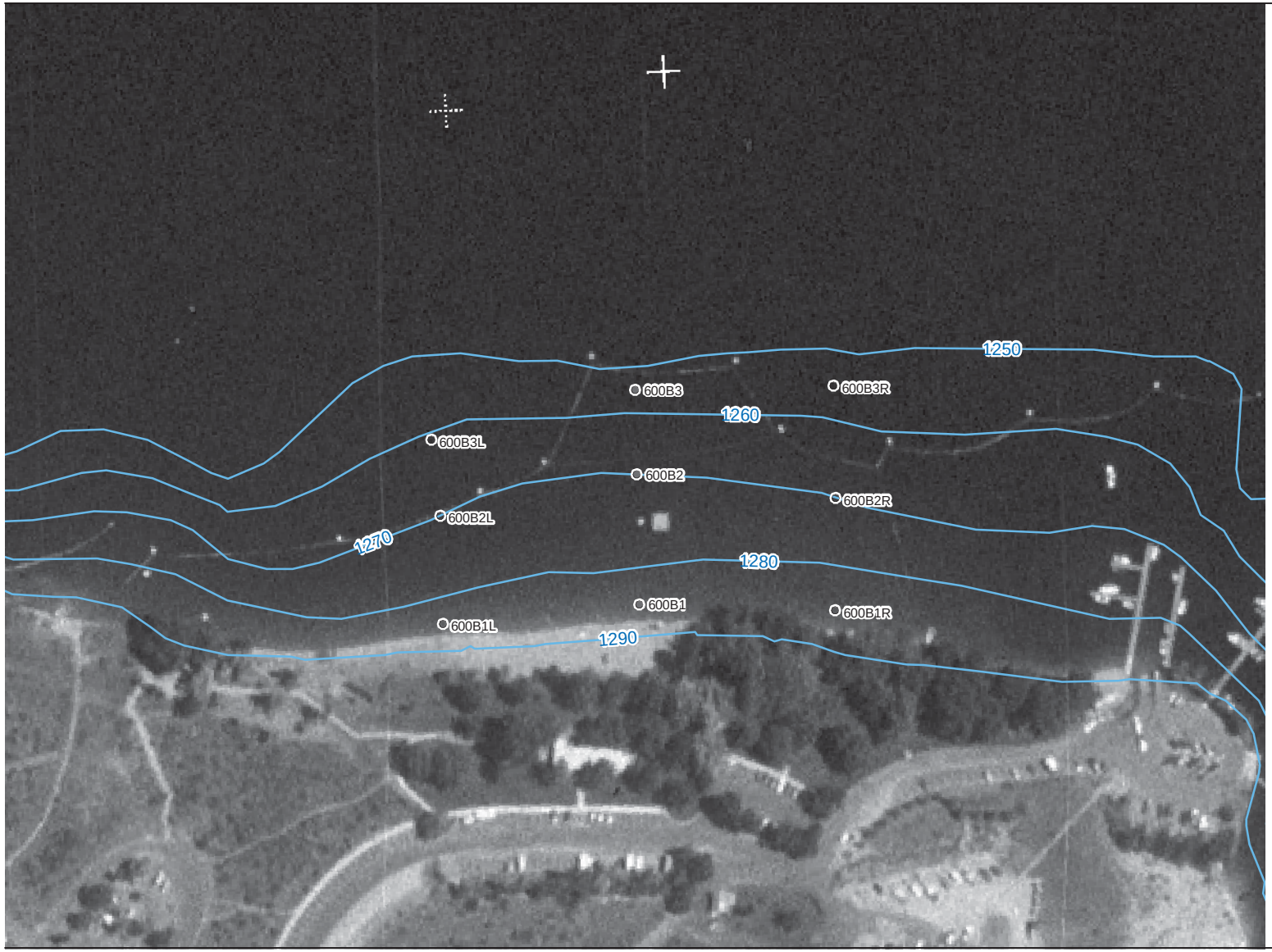

2005 Beach Sediment Sample Locations

LEGEND

2005 Beach Sampling

- Beach Subsample Composites
- Beach Subsamples

1974 USBR Bathymetry

- 10-foot Bottom Elevation Contours

N

0 100 200
Approximate scale in feet

FIGURE 2-27
Spring Canyon Campground
2005 Beach Sample Locations
Upper Columbia River RI/FS

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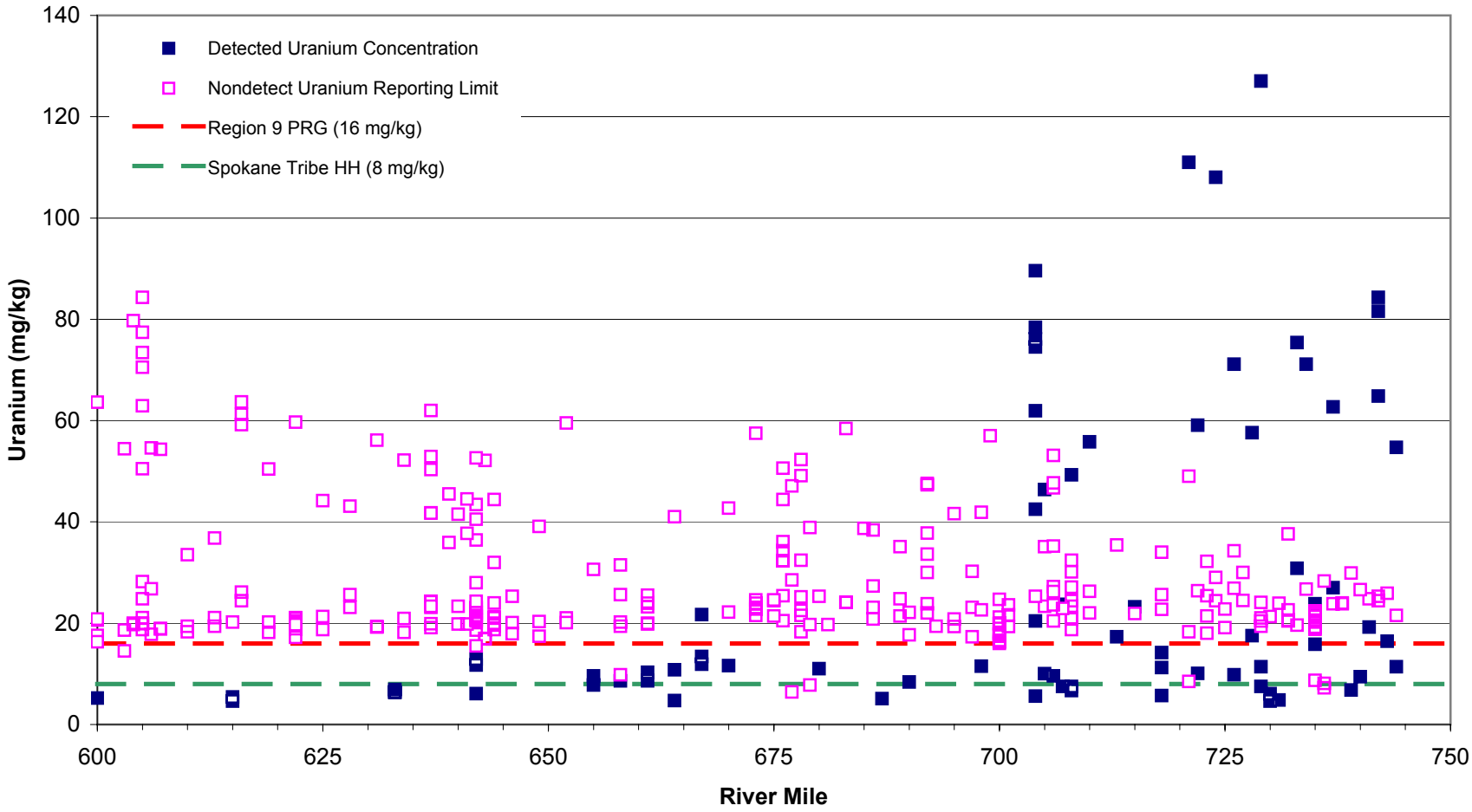
Figure 2-28
Distribution of Uranium Results for 2005 Phase I Sediment Samples - Detected Concentrations and Nondetect Reporting Limits by River Mile
Upper Columbia River RI/FS



HH = human health
mg/kg = milligrams per kilogram
PRG = Preliminary Remediation Goal

UCR_Sediment_DE_Figure_2-28_REV.xls

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SECTION 3

Data Evaluation Approach

SECTION 3

Data Evaluation Approach

This section describes the general approach used for selecting and evaluating the analytical data presented in this document. Specifically, this section identifies the data sources that were considered and the sediment quality screening values that were used to select the COIs that were evaluated for presentation in this report. The data evaluated and presented in this report are limited to those used to assess the nature and extent and fate and transport components of the sediment CSM.

3.1 General Approach to Data Evaluation

The Phase I sediment data evaluation presented in this document was conducted according to the following general approach:

1. Identify COIs for sediment based on review of release information, historical information about the facilities, and industry-related chemical literature and comparison of analytical data to screening levels.
2. Update the preliminary conceptual site model for sediment, including the following elements:
   - Characterize the sources potentially associated with the release and transport of the sediment COIs to the site
   - Evaluate the hydraulic processes affecting the transport and deposition of the identified sediment COIs within the site
   - Describe the longitudinal, transverse, and vertical distributions of the identified COIs within the UCR sediments
   - Analyze the distribution of the sediment COIs in localized areas of interest, such as focus areas, beaches, and tributaries
   - Evaluate the potential for the sediment COIs and contaminated sediments to become mobile and contaminate other media or other portions of the site.

More detail is provided in Sections 4 and 5 regarding the specific methods used for each of these activities.

3.2 Data Sources

Numerous studies have been conducted over the years to assess various media and contaminants of interest at the UCR site dating back to the 1970s. The majority of these investigations focused on metals in bed sediment, suspended sediment, surface water, and fish tissue. A limited number of investigations were also conducted to assess dioxins/furans in suspended sediment, surface water, and fish tissue. PCBs were evaluated in two bed

sediment investigations and in one fish tissue investigation. Bioassay testing was conducted in three investigations. A thorough review of the data associated with these studies was conducted as part of planning for the RI. The quality and usability of the different data sets were classified with respect to DQOs developed for RI. For the most part, the data from the more recent studies were found to be of known quality, but incomplete analyte lists, elevated detection limits, and/or inadequate areal coverage limited full use of the data for RI/FS purposes. The results of the review were documented in *Assessment of the Quality and Usability of Analytical Electronic Data – Upper Columbia River Site RI/FS* (CH2M HILL, 2004c).

The Phase I sediment data were collected to provide a data set of known quality for the entire UCR, including banks, beaches, mid-channel areas, tributaries, and reference areas. The Phase I samples were analyzed for an extensive list of potential contaminants, and the analyses were conducted such that detection limits for the different contaminants were sufficiently low to compare to human and ecological screening values. As indicated in Section 2.5, the analytical data from the Phase I sampling were found to be usable for most RI purposes. Data quality issues associated with uranium and antimony analysis may limit quantitative uses of the results in detailed evaluations. However, the data for these metals are usable for COI identification, evaluation of general distribution and concentrations within the UCR, and assessment of risk posed by the sediment COIs to human and ecological receptors.

The Phase I analytical data were compared to historical data to determine whether the Phase I results were consistent with the concentration ranges and spatial trends reported in previous investigations. Figures 3-1 and 3-2 show the concentrations of zinc and mercury in samples collected along the length of the UCR during the different investigations conducted between 1992 and 2005. These two metals were selected for presentation because they have been included in a variety of investigations and because they exhibit the different types of spatial trends that have been previously reported. The 2005 Phase I RI samples are depicted by solid purple squares, and samples from the previous investigations are also indicated by different symbols. These plots show that the ranges and spatial trends exhibited by the historical data are generally encompassed by the 2005 Phase I data set.

Because of the known quality of the Phase I data and because the Phase I data generally encompass the ranges and spatial trends of the historical data, the evaluations presented in Sections 4 and 5 of this report rely solely on Phase I sediment data to draw conclusions about the list of COIs for sediment and about the distribution of COIs in UCR sediment. The introduction to each evaluation presented in Sections 4 and 5 indicates which data were considered in that particular evaluation and whether the data were grouped into different sets and subsets.

3.3 Screening Levels

The selection of COIs described in Section 4 is based on comparison of Phase I RI/FS sediment analytical results for target analytes to sets of published risk-based screening levels. It should be noted that the COI selection process did not involve an assessment of risk, site-specific or otherwise. Nor did the COI selection process entail consideration of the selected published sediment screening values as applicable or relevant and appropriate requirements (ARARs). Rather, the process constituted an initial screening of the large body

of sediment analytical data generated during the Phase I sediment sampling program in order to identify chemicals or locations of possible interest. Site-specific constituents of concern (COCs) for UCR sediments will be identified as part of the human health risk assessment being conducted by USEPA and an ecological risk assessment that will be conducted by Teck Cominco American, Inc.

The screening levels used in identifying COIs are published values comprising a subset of the potential regulatory values for UCR sediment presented in Table A-4 of the QAPP (CH2M HILL, 2005). The sources of the screening levels used are as follows:

- Human Health Criteria
  - EPA Region 9 Preliminary Remediation Goals (PRGs) (USEPA, 2004a)
  - CCT Sediment Cleanup Levels for Protection of Human Health (CTLOC Chapter 4-16, Appendix C). These are carbon-normalized levels; individual sample results must be adjusted to account for organic carbon content prior to comparison to these values.
  - STI Hazardous Substances Control Act (HSCA), Sediment Cleanup Levels Protective of Human Health (SLOC Resolution 2004-85, Appendix B)
- Ecological Criteria
  - Probable Effects Concentrations (PECs), developed as part of consensus-based sediment quality guidelines for freshwater ecosystems (MacDonald et al., 2000)
  - Threshold Effects Concentrations (TECs), developed as part of consensus-based sediment quality guidelines for freshwater ecosystems (MacDonald et al., 2000)

The screening levels for all of the Phase I sediment target analytes are listed in Table 3-1.

TABLE 3-1

Sediment Screening Levels Used for Phase I Data Evaluation

Upper Columbia River RI/FS

				Human Health Screening Levels			Ecological Screening Levels	
Method Type	**Analyte**	**CAS Number**	**Units**	**PRG Soil Residential[a]**	**Spokane Tribe Human Health Value[b]**	**CCT Human Health Value[c]**	**TEC[d]**	**PEC[e]**
CLP TAL TotMetals	Aluminum	7429905	mg/Kg	76142	40000	-	--	--
CLP TAL TotMetals	Antimony	7440360	mg/Kg	31	16	-	--	--
CLP TAL TotMetals	Arsenic	7440382	mg/Kg	0.39	0.117	-	9.79	33
CLP TAL TotMetals	Barium	7440393	mg/Kg	5375	2800	-	--	--
CLP TAL TotMetals	Beryllium	7440417	mg/Kg	154	80	-	--	--
CLP TAL TotMetals	Cadmium	7440439	mg/Kg	37	20	-	0.99	4.98
CLP TAL TotMetals	Calcium	7440702	mg/Kg	--	--	-	--	--
CLP TAL TotMetals	Chromium	7440473	mg/Kg	210[f]	200	-	43.4	111
CLP TAL TotMetals	Cobalt	7440484	mg/Kg	903	2400	-	--	--
CLP TAL TotMetals	Copper	7440508	mg/Kg	3129	1490	-	31.6	149
CLP TAL TotMetals	Iron	7439896	mg/Kg	23463	--	-	--	--
CLP TAL TotMetals	Lead	7439921	mg/Kg	400	--	-	35.8	128
CLP TAL TotMetals	Magnesium	7439954	mg/Kg	--	--	-	--	--
CLP TAL TotMetals	Manganese	7439965	mg/Kg	1762	1870	-	--	--
CLP TAL TotMetals	Mercury	7439976	mg/Kg	23	12	-	0.18	1.06
CLP TAL TotMetals	Nickel	7440020	mg/Kg	1564	800	-	22.7	48.6
CLP TAL TotMetals	Potassium	7440097	mg/Kg	--	--	-	--	--
CLP TAL TotMetals	Selenium	7782492	mg/Kg	391	200	-	--	--
CLP TAL TotMetals	Silver	7440224	mg/Kg	391	200	-	--	--
CLP TAL TotMetals	Sodium	7440235	mg/Kg	--	--	-	--	--
CLP TAL TotMetals	Thallium	7440280	mg/Kg	5.2	--	-	--	--
CLP TAL TotMetals	Uranium	7440611	mg/Kg	16	8	-	--	--
CLP TAL TotMetals	Vanadium	7440622	mg/Kg	78	280	-	--	--
CLP TAL TotMetals	Zinc	7440666	mg/Kg	23463	12000	-	121	459
CLP TCL PAH	2-Methylnaphthalene	91576	µg/Kg	--	--	-	--	--
CLP TCL PAH	Acenaphthene	83329	µg/Kg	3680000	2400000	-	--	--
CLP TCL PAH	Acenaphthylene	208968	µg/Kg	--	--	-	--	--
CLP TCL PAH	Anthracene	120127	µg/Kg	21900000	12000000	-	57.2	845
CLP TCL PAH	Benzo(a)anthracene	56553	µg/Kg	621	240	21.6	108	1050
CLP TCL PAH	Benzo(a)pyrene	50328	µg/Kg	62	24	21.6	150	1450
CLP TCL PAH	Benzo(b)fluoranthene	205992	µg/Kg	621	240	21.6	--	--
CLP TCL PAH	Benzo(ghi)perylene	191242	µg/Kg	--	--	-	--	--
CLP TCL PAH	Benzo(k)fluoranthene	207089	µg/Kg	6215	2400	21.6	--	--
CLP TCL PAH	Chrysene	218019	µg/Kg	62146	24000	13.8	166	1290
CLP TCL PAH	Dibenzo(a,h)anthracene	53703	µg/Kg	62	24	21.6	33	--
CLP TCL PAH	Dibenzofuran	132649	µg/Kg	145263	160000	-	--	--
CLP TCL PAH	Fluoranthene	206440	µg/Kg	2290000	1600000	-	423	2230
CLP TCL PAH	Fluorene	86737	µg/Kg	2750000	1600000	-	77.4	536
CLP TCL PAH	Indeno[1,2,3-cd]pyrene	193395	µg/Kg	621	240	21.6	--	--
CLP TCL PAH	Naphthalene	91203	µg/Kg	55916	800000	-	176	561
CLP TCL PAH	Phenanthrene	85018	µg/Kg	--	--	-	204	1170
CLP TCL PAH	Pyrene	129000	µg/Kg	2320000	1200000	-	195	1520
CLP TCL PCBs	PCB-1016	12674112	µg/Kg	3933	2800	1.54	59.8	676

TABLE 3-1
Sediment Screening Levels Used for Phase I Data Evaluation
Upper Columbia River RI/FS

				Human Health Screening Levels			Ecological Screening Levels	
Method Type	**Analyte**	**CAS Number**	**Units**	**PRG Soil Residential[a]**	**Spokane Tribe Human Health Value[b]**	**CCT Human Health Value[c]**	**TEC[d]**	**PEC[e]**
CLP TCL PCBs	PCB-1221	11104282	µg/Kg	222	--	-	--	--
CLP TCL PCBs	PCB-1232	11141165	µg/Kg	222	--	-	--	--
CLP TCL PCBs	PCB-1242	53469219	µg/Kg	222	--	0.533	--	--
CLP TCL PCBs	PCB-1248	12672296	µg/Kg	222	--	0.533	--	--
CLP TCL PCBs	PCB-1254	11097691	µg/Kg	222	800	0.533	--	--
CLP TCL PCBs	PCB-1260	11096825	µg/Kg	222	--	0.533	59.8	676
CLP TCL PCBs	Total PCBs	Total PCB	µg/Kg			0.533		
CLP TCL Pesticides	2,4'-DDD	53190	µg/Kg	2437	--	-	--	--
CLP TCL Pesticides	2,4'-DDE	3424826	µg/Kg	1720	--	-	3.16	31.3
CLP TCL Pesticides	2,4'-DDT	789026	µg/Kg	1720	--	-	4.16	62.9
CLP TCL Pesticides	4,4'-DDD	72548	µg/Kg	2437	729	2.85	4.88	28
CLP TCL Pesticides	4,4'-DDE	72559	µg/Kg	1720	515	1.72	3.16	31.3
CLP TCL Pesticides	4,4'-DDT	50293	µg/Kg	1720	515	2.04	4.16	62.9
CLP TCL Pesticides	Aldrin	309002	µg/Kg	29	10.3	0.0408	--	--
CLP TCL Pesticides	alpha-BHC	319846	µg/Kg	90	27.8	-	--	--
CLP TCL Pesticides	alpha-Chlordane	5103719	µg/Kg	1624	--	-	3.24	17.6
CLP TCL Pesticides	beta-BHC	319857	µg/Kg	316	97.2	1	--	--
CLP TCL Pesticides	cis-Nonachlor	5103731	µg/Kg	--	--	-	--	--
CLP TCL Pesticides	delta-BHC	319868	µg/Kg	--	--	-	--	--
CLP TCL Pesticides	Dieldrin	60571	µg/Kg	30	10.9	0.0439	1.9	61.8
CLP TCL Pesticides	Endosulfan I	959988	µg/Kg	--	--	-	--	--
CLP TCL Pesticides	Endosulfan II	33213659	µg/Kg	--	--	-	--	--
CLP TCL Pesticides	Endosulfan sulfate	1031078	µg/Kg	--	--	-	--	--
CLP TCL Pesticides	Endrin	72208	µg/Kg	18331	12000	172	2.22	207
CLP TCL Pesticides	Endrin aldehyde	7421934	µg/Kg	--	--	-	--	--
CLP TCL Pesticides	Endrin ketone	53494705	µg/Kg	--	--	-	--	--
CLP TCL Pesticides	gamma-BHC (Lindane)	58899	µg/Kg	437	135	1.44	2.37	4.99
CLP TCL Pesticides	gamma-Chlordane	5566347	µg/Kg	1624	--	-	3.24	17.6
CLP TCL Pesticides	Heptachlor	76448	µg/Kg	108	38.9	0.408	--	--
CLP TCL Pesticides	Heptachlor epoxide	1024573	µg/Kg	53	19.2	0.204	--	--
CLP TCL Pesticides	Hexachlorobenzene	118741	µg/Kg	304	109	-	--	--
CLP TCL Pesticides	Hexachlorobutadiene	87683	µg/Kg	6236	2240	-	--	--
CLP TCL Pesticides	Methoxychlor	72435	µg/Kg	305515	200000	-	--	--
CLP TCL Pesticides	Oxychlordane	27304138	µg/Kg	1624	--	-	3.24	17.6
CLP TCL Pesticides	Toxaphene	8001352	µg/Kg	442	159	5.08	--	--
CLP TCL Pesticides	trans-Nonachlor	39765805	µg/Kg	--	--	-	--	--
CLP TCL SVOC	1,1'-Biphenyl	92524	µg/Kg	3010000	2000000	-	--	--
CLP TCL SVOC	1,2,4-Trichlorobenzene	120821	µg/Kg	62160	400000	-	--	--
CLP TCL SVOC	1,2-Dichlorobenzene	95501	µg/Kg	600000	3600000	-	--	--
CLP TCL SVOC	1,3-Dichlorobenzene	541731	µg/Kg	531349	1200000	-	--	--
CLP TCL SVOC	1,4-Dichlorobenzene	106467	µg/Kg	3447	7290	-	--	--
CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	108601	µg/Kg	2884	2500	-	--	--
CLP TCL SVOC	2,4,5-Trichlorophenol	95954	µg/Kg	6110000	4000000	-	--	--

TABLE 3-1
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Upper Columbia River RI/FS

				Human Health Screening Levels			Ecological Screening Levels	
Method Type	**Analyte**	**CAS Number**	**Units**	**PRG Soil Residential[a]**	**Spokane Tribe Human Health Value[b]**	**CCT Human Health Value[c]**	**TEC[d]**	**PEC[e]**
CLP TCL SVOC	2,4,6-Trichlorophenol	88062	µg/Kg	6110	15900	-	--	--
CLP TCL SVOC	2,4-Dichlorophenol	120832	µg/Kg	183309	120000	-	--	--
CLP TCL SVOC	2,4-Dimethylphenol	105679	µg/Kg	1220000	800000	-	--	--
CLP TCL SVOC	2,4-Dinitrophenol	51285	µg/Kg	122206	80000	-	--	--
CLP TCL SVOC	2,4-Dinitrotoluene	121142	µg/Kg	122206	80000	-	--	--
CLP TCL SVOC	2,6-Dinitrotoluene	606202	µg/Kg	61103	40000	-	--	--
CLP TCL SVOC	2-Chloronaphthalene	91587	µg/Kg	4940000	3200000	-	--	--
CLP TCL SVOC	2-Chlorophenol	95578	µg/Kg	63398	200000	-	--	--
CLP TCL SVOC	2-Methylphenol	95487	µg/Kg	3060000	2000000	-	--	--
CLP TCL SVOC	2-Nitroaniline	88744	µg/Kg	182772	2400	-	--	--
CLP TCL SVOC	2-Nitrophenol	88755	µg/Kg	--	--	-	--	--
CLP TCL SVOC	3,3'-Dichlorobenzidine	91941	µg/Kg	1081	389	-	--	--
CLP TCL SVOC	3-Nitroaniline	99092	µg/Kg	18331	--	-	--	--
CLP TCL SVOC	4,6-Dinitro-2-methylphenol	534521	µg/Kg	6110	--	-	--	--
CLP TCL SVOC	4-Bromophenyl-phenylether	101553	µg/Kg	--	--	-	--	--
CLP TCL SVOC	4-Chloro-3-methylphenol	59507	µg/Kg	--	--	-	--	--
CLP TCL SVOC	4-Chloroaniline	106478	µg/Kg	244412	160000	-	--	--
CLP TCL SVOC	4-Chlorophenyl-phenyl ether	7005723	µg/Kg	--	--	-	--	--
CLP TCL SVOC	4-Methylphenol	106445	µg/Kg	305515	200000	-	--	--
CLP TCL SVOC	4-Nitroaniline	100016	µg/Kg	23161	--	-	--	--
CLP TCL SVOC	4-Nitrophenol	100027	µg/Kg	--	2480000	-	--	--
CLP TCL SVOC	Acetophenone	98862	µg/Kg	--	4000000	-	--	--
CLP TCL SVOC	Atrazine	1912249	µg/Kg	2191	788	-	--	--
CLP TCL SVOC	Benzaldehyde	100527	µg/Kg	6110000	4000000	-	--	--
CLP TCL SVOC	Benzoic acid	65850	µg/Kg	100000000	160000000	-	--	--
CLP TCL SVOC	Benzyl alcohol	100516	µg/Kg	18300000	12000000	-	--	--
CLP TCL SVOC	bis(2-Chloroethoxy)methane	111911	µg/Kg	--	--	-	--	--
CLP TCL SVOC	Bis(2-chloroethyl)ether	111444	µg/Kg	218	159	-	--	--
CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	117817	µg/Kg	34741	12500	-	--	--
CLP TCL SVOC	Butyl benzyl phthalate	85687	µg/Kg	12200000	8000000	-	--	--
CLP TCL SVOC	Caprolactam	105602	µg/Kg	30600000	20000000	-	--	--
CLP TCL SVOC	Carbazole	86748	µg/Kg	24319	8750	-	--	--
CLP TCL SVOC	Diethyl phthalate	84662	µg/Kg	48900000	32000000	-	--	--
CLP TCL SVOC	Dimethyl phthalate	131113	µg/Kg	100000000	400000000	-	--	--
CLP TCL SVOC	Di-n-butyl phthalate	84742	µg/Kg	6110000	4000000	-	--	--
CLP TCL SVOC	Di-n-octylphthalate	117840	µg/Kg	2440000	800000	-	--	--
CLP TCL SVOC	Hexachloroethane	67721	µg/Kg	34741	12500	-	--	--
CLP TCL SVOC	Isophorone	78591	µg/Kg	511979	184000	-	--	--
CLP TCL SVOC	Nitrobenzene	98953	µg/Kg	19641	20000	-	--	--
CLP TCL SVOC	N-Nitrosodi-n-propylamine	621647	µg/Kg	69	25	-	--	--
CLP TCL SVOC	N-Nitrosodiphenylamine	86306	µg/Kg	99261	35700	-	--	--
CLP TCL SVOC	Pentachlorophenol	87865	µg/Kg	2979	1460	-	--	--
CLP TCL SVOC	Perchlorocyclopentadiene	77474	µg/Kg	365487	280000	-	--	--

TABLE 3-1

Sediment Screening Levels Used for Phase I Data Evaluation

Upper Columbia River RI/FS

				Human Health Screening Levels			Ecological Screening Levels	
Method Type	**Analyte**	**CAS Number**	**Units**	**PRG Soil Residential[a]**	**Spokane Tribe Human Health Value[b]**	**CCT Human Health Value[c]**	**TEC[d]**	**PEC[e]**
CLP TCL SVOC	Phenol	108952	µg/Kg	18300000	24000000	-	--	--
CLP TCL SVOC	Pyrene	129000	µg/Kg	2320000	1200000	-	195	1520
Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	35822469	PG/G	--	--	3760	--	--
Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562394	PG/G	--	--	3760	--	--
Dioxins and Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673897	PG/G	--	--	3760	--	--
Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzodioxin	39227286	PG/G	--	--	14.4	--	--
Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	70648269	PG/G	--	--	14.4	--	--
Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzodioxin	57653857	PG/G	--	--	14.4	--	--
Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	57117449	PG/G	--	--	14.4	--	--
Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzodioxin	19408743	PG/G	--	28.2	14.4	--	--
Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	72918219	PG/G	--	--	14.4	--	--
Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzofuran	57117416	PG/G	--	--	8.15	--	--
Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321764	PG/G	--	--	2.88	--	--
Dioxins and Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	60851345	PG/G	--	--	14.4	--	--
Dioxins and Furans	2,3,4,7,8-Pentachlorodibenzofuran	57117314	PG/G	--	--	0.972	--	--
Dioxins and Furans	2,3,7,8-Tetrachlorodibenzodioxin	1746016	PG/G	--	1.17	0.047	--	--
Dioxins and Furans	2,3,7,8-Tetrachlorodibenzofuran	51207319	PG/G	--	--	4.08	--	--
Dioxins and Furans	Heptachlorodibenzodioxin (Total)	37871004	PG/G	--	--	-	--	--
Dioxins and Furans	Heptachlorodibenzofuran (Total)	38998753	PG/G	--	--	-	--	--
Dioxins and Furans	Hexachlorodibenzodioxin (Total)	34465468	PG/G	--	--	-	--	--
Dioxins and Furans	Hexachlorodibenzofuran (Total)	55684941	PG/G	--	--	-	--	--
Dioxins and Furans	Octachlorodibenzodioxin	3268879	PG/G	--	--	3760	--	--
Dioxins and Furans	Octachlorodibenzofuran	39001020	PG/G	--	--	3760	--	--
Dioxins and Furans	Pentachlorodibenzodioxin (Total)	36088229	PG/G	--	--	-	--	--
Dioxins and Furans	Pentachlorodibenzofuran (Total)	30402154	PG/G	--	--	-	--	--
Dioxins and Furans	TEQ WHO-98	TEQ	PG/G	3.9	--	-	--	--
Dioxins and Furans	Tetrachlorodibenzodioxin (Total)	41903575	PG/G	--	--	-	--	--
Dioxins and Furans	Tetrachlorodibenzofuran (Total)	55722275	PG/G	--	--	-	--	--

[a]USEPA, 2004a.

[b]SLOC Resolution 2004-85, Appendix B. It should be noted that application of these values to assessment of risk is limited where multiple contaminants are present, multiple media are contaminated, or multiple pathways are affected. In addition, application of the values requires consideration of background concentrations and sediment particle size fractionated data.

[c]Values must be carbon-normalized for use as screening levels (see Section 4). Source: CTLOC Chapter 4-16, Appendix C.

[d] Threshold effects concentration (MacDonald et al., 2000), adopted by Colville Confederated Tribes and Spokane Tribe.

[e] Probable effects concentration (MacDonald et al., 2000).

[f] PRG value presented is for total chromium, based on assumption of 1:6 ratio of chromium (VI):chromium (III). Phase I sediment samples were not analyzed for chromium species; therefore, Phase I sediment results are compared only to the PRG value for total chromium.

CAS = Chemical Abstracts Service

CCT = Confederated Tribes of the Colville Reservation

PRG = Preliminary Remediation Goal

Figure 3-1
Consistency of 2005 Phase I Sediment Results with Previous Investigations Results - Detected Concentrations of Zinc by River Mile
Upper Columbia River RI/FS

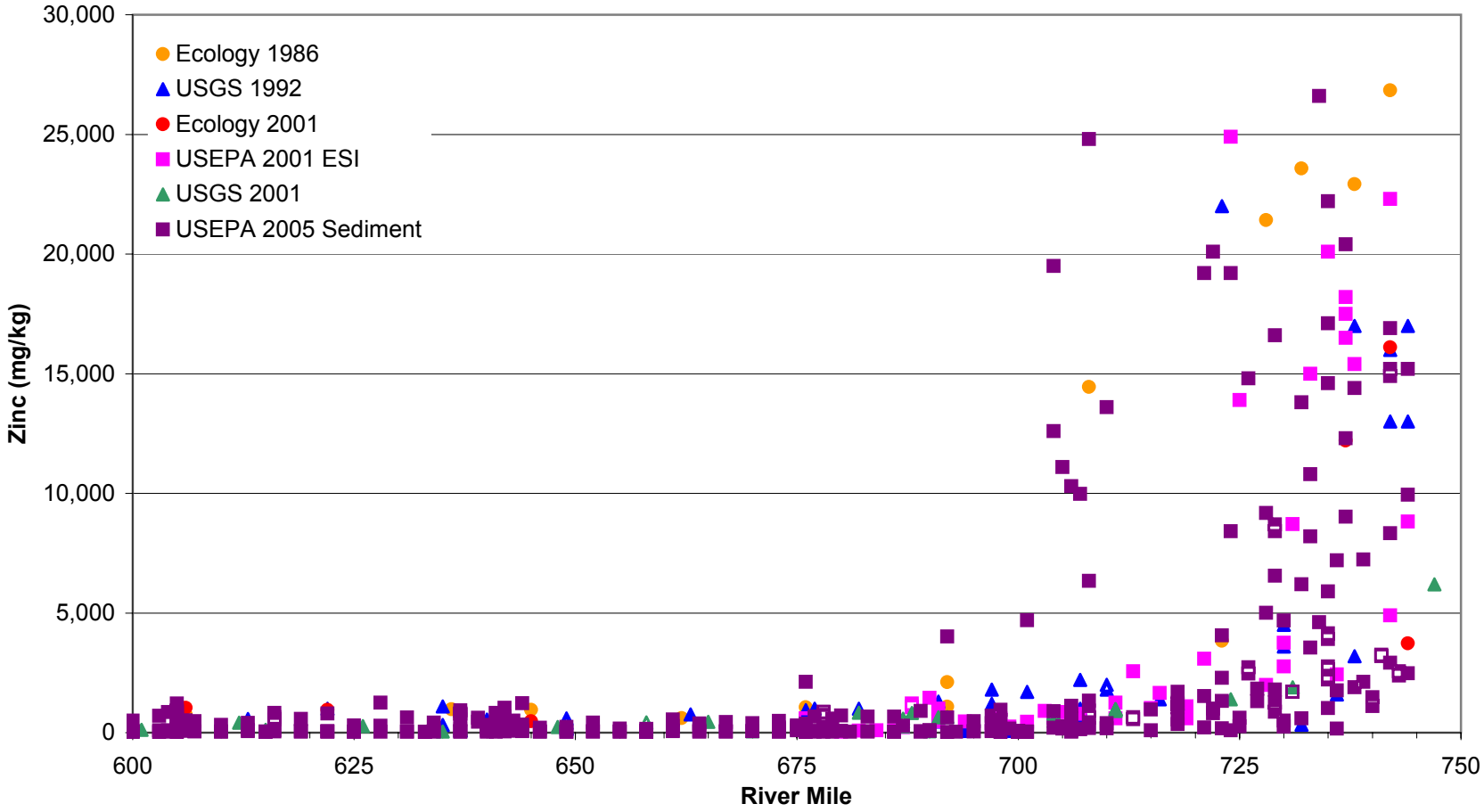
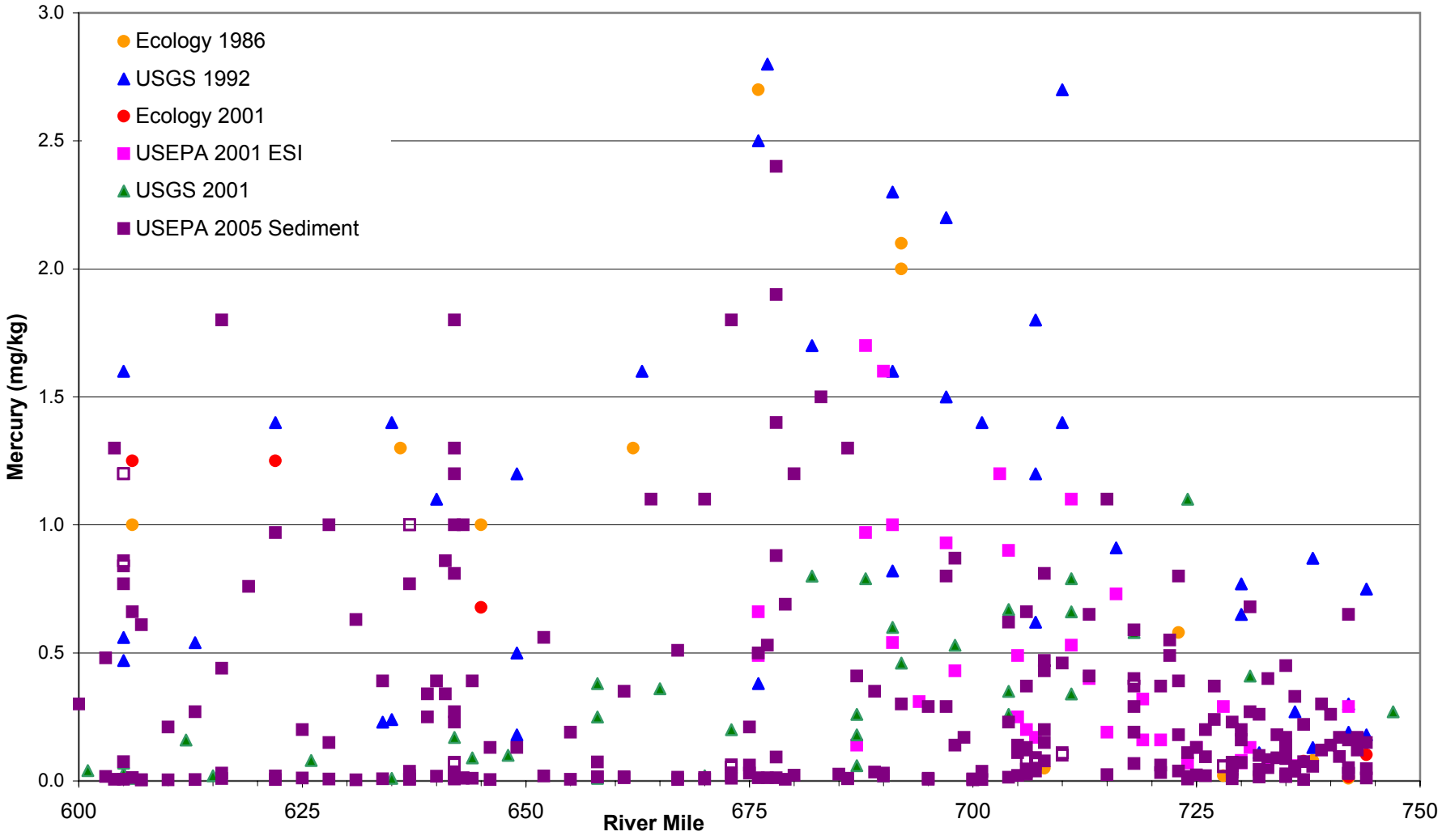


Figure 3-2
Consistency of 2005 Phase I Sediment Results with Previous Investigations Results - Detected Concentrations of Mercury by River Mile
Upper Columbia River RI/FS



SECTION 4

Sediment Constituents of Interest

SECTION 4

Sediment Constituents of Interest

This section describes the process employed to identify the COIs evaluated in this document. These COIs comprise a subset of the target analytes that were sampled and analyzed for during the Phase I RI/FS sediment sampling program and that are considered in the nature and extent and fate and transport of contaminants evaluations for UCR sediments as presented in this document. Identification of a constituent as a COI does not necessarily signify that the constituent poses unacceptable risk to human or ecological receptors. A list of site-specific risk-based sediment COCs for UCR sediments will be developed as part of the human health risk assessment being conducted by USEPA and an ecological risk assessment that will be conducted by Teck Cominco American, Inc . The COCs and results of those risk assessments will be presented in separate documents.

4.1 Identification Process

The process for identifying COIs for UCR sediment began with development of a comprehensive target analyte list (TAL) for the Phase I sediment investigation. The TAL presented in the QAPP (CH2M HILL, 2005) was based on historical information about upstream facilities, industry-related chemical literature, and information about releases, as well as results from previous investigations and the preliminary conceptual site model for sediment. The TAL included metals (plus uranium), SVOCs, pesticides, and PCBs; dioxins and furans were also analyzed for in samples collected from beaches and sediment cores. A full listing of TAL constituents was presented in Table 2-1 of the QAPP.

The COIs are a subset of the TAL chemicals. The process for identifying TAL constituents as COIs consisted of grouping analytical data of similar sample types and comparing the analytical results for each group to the selected screening levels. Any constituent that was detected above one or more selected screening level was identified as a COI for evaluation and presentation in this document. The following subsections provide more information about the sources of data and screening levels used in the COI identification process.

4.1.1 Data Sources

Only Phase I sediment analytical data were used for identification of COIs because that data set provides full areal coverage of the site and includes a complete target analyte list with detection limits that are sufficiently low to compare to the screening levels being used. Samples collected during previous investigations were not included in the evaluation because of incomplete coverage, missing target analytes, and/or inadequate detection limits.

Four separate evaluation groups were established for the COI identification process:

- **River Group.** Transect, bioassay, and tributary samples obtained along the UCR.

- **Beach Group.** Composite, discrete, and size-fractionated samples obtained at UCR beaches. This group was separated from the River Group to allow identification of COIs that are specific to locations where recreational use may be concentrated.
- **Core Group.** Samples obtained at surface and subsurface intervals from cores taken at mid-channel locations in the middle and lower reaches of the UCR. This group was separated from the River Group to allow identification of COIs that may be related to historical transportation and deposition of contaminated sediments.
- **Reference Group**. Samples collected from near-UCR tributary sediment at elevations that are expected to be unaffected by UCR contaminants. This group was not considered in development of the COI list. Its use was limited to assessment of the sediment bioassay test results, which are reported in a separate document (CH2M HILL, 2006b).

The assigned COI evaluation group for each sample is listed in Appendix C, Table C-5.

4.1.2 Screening Levels

The screening levels used in identifying COIs are a subset of the potential regulatory values for UCR sediment presented in Table A-4 of the QAPP. The sources of these values are listed in Section 3.3. For human exposure, the USEPA Region 9 PRGs, CCT sediment cleanup levels, and STI sediment cleanup levels were used; for ecological exposure, the PECs and TECs developed as part of consensus-based sediment quality guidelines (MacDonald et al., 2000) were used.

All of these screening criteria were used for the COI identification process irrespective of the sample type (e.g., beach, bank, mid-channel, core). Comparison of each of the sediment sample types to each of these screening criteria is considered conservative because the likely exposure scenarios that each of the screening criteria was developed for do not necessarily apply to the environmental settings from which the sample types were collected. For example, human contact with UCR sediment is more likely to occur in bank areas and beaches than in the mid-channel portions of the river; nonetheless, all sediment samples, including mid-channel and core sediment samples, were compared to all the selected screening criteria values, including those developed to screen for human contact. This conservative COI selection approach accounts for potential future remobilization of the contaminants.

4.2 COI Identification Results

The analytical data and results of comparisons to the screening values are summarized by sample group and analyte in Table 4-1. The table provides statistical descriptions of the constituents, including frequency of detection, range of detected concentrations, range of reporting limits (for nondetects), and the number of screening level exceedances for all constituents that were detected above screening levels in one or more sample groups.

A full listing of summary statistics for all chemicals, including those that were not detected, is provided in Appendix C, Tables C-1 through C-4.

COIs were identified for each group and consist of constituents for which one or more sample results exceeded at least one screening level. The COI list for each sample group was then consolidated into a single list of COIs for sediment, as follows:

- Metals: antimony, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, uranium, and zinc
- Organics
  - Pesticides: 2,4-DDE, 2,4-DDT 4,4-DDD, 4,4-DDE, 4,4-DDT, and aldrin
  - PCBs: Aroclor1016 and Aroclor 1260
  - Dioxins and furans: including 2,3,7,8 TCDD toxicity equivalent (TEQ) and 14 congeners, as listed in Table 4-1
  - PAHs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene

The distributions and fate and transport characteristics of these compounds are discussed in Section 5 of this report.

4.3 Reference Area Results

Samples were collected at six upstream locations that are expected to be unaffected by UCR contaminants. Reference sample locations are illustrated in Figures 2-3 through 2-6. The summarized results and comparisons to human and ecological screening levels are presented at the bottom of Table 4-1. As indicated in the table, arsenic, cadmium, nickel, benzo(a)anthracene, and chrysene were detected in the reference samples at concentrations above screening levels, although the concentrations are much lower in the reference area samples than the UCR samples in which these are detected. However, it is emphasized that the purpose of the reference area samples was to support the interpretation of the sediment bioassay test results. The reference area samples were not intended to define background concentrations of COIs in sediment.

TABLE 4-1
Summary of Analytical Results and Comparison to Screening Levels
Upper Columbia River RI/FS

			Summary Statistics							Comparisons to Screening Levels									
Size Fraction	Analyte	Units	Number of Detects	Number of Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value	PRG Soil Residential[a]	Number of Detects > PRG	STI HSCA HH[b]	Number of Detects > STI HSCA HH	TEC[c]	Number of Detects > TEC	PEC[d]	Number of Detects > PEC	CCT HH Value[e]	Number of Carbon-Normalized Detects > CCT HH Value
Beach Group (Discrete, composite, and size fractionated samples collected from beaches)																			
Whole	Antimony	mg/Kg	35	57	61%	0.29	8.1	0.53	53	31	7	16	9	--	--	--	--	NA	--
Whole	Arsenic	mg/Kg	64	66	97%	0.97	3.9	0.97	36	0.39	64	0.12	64	9.8	14	33	1	NA	--
Whole	Cadmium	mg/Kg	57	66	86%	0.058	0.52	0.056	7.8	37	--	20	--	0.99	26	5.0	3	NA	--
Whole	Chromium	mg/Kg	66	66	100%	--	--	5.6	145	211[f]	--	200	--	43	10	111	4	NA	--
Whole	Copper	mg/Kg	66	66	100%	--	--	4.2	3,290	3,129	1	1,490	6	32	21	149	16	NA	--
Whole	Iron	mg/Kg	66	66	100%	--	--	4,930	254,000	23,463	18	--	--	--	--	--	--	NA	--
Whole	Lead	mg/Kg	66	66	100%	--	--	3.1	535	400	1	--	--	36	27	128	22	NA	--
Whole	Manganese	mg/Kg	66	66	100%	--	--	95	4,780	1,762	9	1,870	9	--	--	--	--	NA	--
Whole	Mercury	mg/Kg	45	66	68%	0.098	0.11	0.0040	0.81	23	--	12	--	0.18	9	1.1	--	NA	--
Whole	Nickel	mg/Kg	66	66	100%	--	--	4.1	30	1,564	--	800	--	23	2	49	--	NA	--
Whole	Uranium	mg/Kg	19	66	29%	9.8	30	4.6	84	16	3	8.0	9	--	--	--	--	NA	--
Whole	Zinc	mg/Kg	66	66	100%	--	--	21	22,200	23,463	--	12,000	6	121	35	459	21	NA	--
< 75 um	Arsenic-Sieved <75 um	mg/Kg	3	3	100%	--	--	2.0	10	0.39	3	0.12	3	9.8	1	33	--	NA	--
< 75 um	Cadmium-Sieved <75 um	mg/Kg	3	3	100%	--	--	0.82	5.5	37	--	20	--	0.99	2	5.0	1	NA	--
< 75 um	Copper-Sieved <75 um	mg/Kg	3	3	100%	--	--	24	278	3,129	--	1,490	--	32	1	149	1	NA	--
< 75 um	Iron-Sieved <75 um	mg/Kg	3	3	100%	--	--	21,000	35,100	23,463	2	--	--	--	--	--	--	NA	--
< 75 um	Lead-Sieved <75 um	mg/Kg	3	3	100%	--	--	22	325	400	--	--	--	36	2	128	1	NA	--
< 75 um	Mercury-Sieved <75 um	mg/Kg	3	3	100%	--	--	0.031	0.32	23	--	12	--	0.18	1	1.1	--	NA	--
< 75 um	Nickel-Sieved <75 um	mg/Kg	3	3	100%	--	--	19	27	1,564	--	800	--	23	1	49	--	NA	--
< 75 um	Zinc-Sieved <75 um	mg/Kg	3	3	100%	--	--	106	1,860	23,463	--	12,000	--	121	2	459	1	NA	--
> 75 um	Antimony-Sieved >75 um	mg/Kg	1	1	100%	--	--	47	47	31	1	16	1	--	--	--	--	NA	--
> 75 um	Arsenic-Sieved >75 um	mg/Kg	3	3	100%	--	--	1.2	10	0.39	3	0.12	3	9.8	1	33	--	NA	--
> 75 um	Cadmium-Sieved >75 um	mg/Kg	3	3	100%	--	--	0.34	4.8	37	--	20	--	0.99	1	5.0	--	NA	--
> 75 um	Chromium-Sieved >75 um	mg/Kg	3	3	100%	--	--	13	80	211[f]	--	200	--	43	1	111	--	NA	--
> 75 um	Copper-Sieved >75 um	mg/Kg	3	3	100%	--	--	9.8	1,530	3,129	--	1,490	1	32	1	149	1	NA	--
> 75 um	Iron-Sieved >75 um	mg/Kg	3	3	100%	--	--	12,800	126,000	23,463	1	--	--	--	--	--	--	NA	--
> 75 um	Lead-Sieved >75 um	mg/Kg	3	3	100%	--	--	7.5	267	400	--	--	--	36	1	128	1	NA	--
> 75 um	Manganese-Sieved >75 um	mg/Kg	3	3	100%	--	--	187	2,380	1,762	1	1,870	1	--	--	--	--	NA	--
> 75 um	Zinc-Sieved >75 um	mg/Kg	3	3	100%	--	--	45	10,100	23,463	--	12,000	--	121	2	459	1	NA	--
Whole	Benzo(a)anthracene	µg/Kg	20	66	30%	4.0	8.0	0.30	12	621	--	240	--	108	--	1,050	--	21.6	20
Whole	Benzo(a)pyrene	µg/Kg	17	66	26%	4.0	8.0	0.40	13	62	--	24	--	150	--	1,450	--	21.6	17
Whole	Benzo(b)fluoranthene	µg/Kg	16	66	24%	4.0	8.0	0.30	9.0	621	--	240	--	--	--	--	--	21.6	16
Whole	Benzo(k)fluoranthene	µg/Kg	9	66	14%	4.0	13	0.30	7.0	6,215	--	2,400	--	--	--	--	--	21.6	9
Whole	Chrysene	µg/Kg	37	66	56%	4.0	8.0	0.20	17	62,146	--	24,000	--	166	--	1,290	--	13.79	37
Whole	Dibenzo(a,h)anthracene	µg/Kg	12	66	18%	3.7	8.0	0.40	3.0	62	--	24	--	33	--	--	--	21.6	12
Whole	Indeno[1,2,3-cd]pyrene	µg/Kg	17	66	26%	4.0	8.0	0.20	11	621	--	240	--	--	--	--	--	21.6	17
< 75 um	Benzo(a)anthracene-Sieved <75 um	µg/Kg	2	2	100%	--	--	0.30	3.0	621	--	240	--	108	--	1,050	--	21.6	2
< 75 um	Chrysene-Sieved <75 um	µg/Kg	2	2	100%	--	--	1.0	6.0	62,146	--	24,000	--	166	--	1,290	--	13.79	2
> 75 um	Benzo(a)anthracene-Sieved >75 um	µg/Kg	1	3	33%	4.0	4.0	1.0	1.0	621	--	240	--	108	--	1,050	--	21.6	1
> 75 um	Benzo(a)pyrene-Sieved >75 um	µg/Kg	1	3	33%	4.0	4.0	2.0	2.0	62	--	24	--	150	--	1,450	--	21.6	1
> 75 um	Benzo(b)fluoranthene-Sieved >75 um	µg/Kg	1	3	33%	4.0	4.0	2.0	2.0	621	--	240	--	--	--	--	--	21.6	1
> 75 um	Benzo(k)fluoranthene-Sieved >75 um	µg/Kg	1	3	33%	4.0	4.0	2.0	2.0	6,215	--	2,400	--	--	--	--	--	21.6	1
> 75 um	Chrysene-Sieved >75 um	µg/Kg	3	3	100%	--	--	0.20	2.0	62,146	--	24,000	--	166	--	1,290	--	13.79	3
Whole	2,4'-DDE	µg/Kg	4	66	6%	0.68	1.3	0.32	17	1,720	--	--	--	3.2	1	31	--	1.72	4
Whole	2,4'-DDT	µg/Kg	8	66	12%	0.68	1.3	0.33	57	1,720	--	--	--	4.2	1	63	--	2.04	8
Whole	4,4'-DDD	µg/Kg	1	66	2%	0.68	1.3	2.1	2.1	2,437	--	729	--	4.9	--	28	--	2.85	1
Whole	4,4'-DDE	µg/Kg	8	66	12%	0.68	1.3	0.12	63	1,720	--	515	--	3.2	1	31	1	1.72	8
Whole	4,4'-DDT	µg/Kg	22	66	33%	0.68	1.1	0.12	200	1,720	--	515	--	4.2	3	63	1	2.04	22
< 75 um	2,4'-DDT-Sieved <75 um	µg/Kg	--	2	0%	0.69	0.69	--	--	1,720	--	--	--	--	--	--	--	2.04	2
< 75 um	4,4'-DDT-Sieved <75 um	µg/Kg	1	2	50%	0.69	0.69	3.5	3.5	1,720	--	515	--	4.2	--	63	--	2.04	2

TABLE 4-1
Summary of Analytical Results and Comparison to Screening Levels
Upper Columbia River RI/FS

			Summary Statistics							Comparisons to Screening Levels									
Size Fraction	Analyte	Units	Number of Detects	Number of Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value	PRG Soil Residential[a]	Number of Detects > PRG	STI HSCA HH[b]	Number of Detects > STI HSCA HH	TEC[c]	Number of Detects > TEC	PEC[d]	Number of Detects > PEC	CCT HH Value[e]	Number of Carbon-Normalized Detects > CCT HH Value
> 75 um	2,4'-DDT-Sieved >75 um	µg/Kg	2	3	67%	0.68	0.68	0.19	0.54	1,720	--	--	--	4.2	--	63	--	2.04	2
> 75 um	4,4'-DDT-Sieved >75 um	µg/Kg	2	3	67%	0.68	0.68	0.98	1.9	1,720	--	515	--	4.2	--	63	--	2.04	2
Whole	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	25	49	51%	0.10	2.0	0.95	11	--	--	--	--	--	--	--	--	3,760	1
Whole	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	26	49	53%	0.047	0.42	0.076	11	--	--	--	--	--	--	--	--	3,760	1
Whole	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	20	49	41%	0.034	0.16	0.026	0.23	--	--	--	--	--	--	--	--	14.4	9
Whole	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	6	49	12%	0.018	0.28	0.022	0.24	--	--	--	--	--	--	--	--	14.4	3
Whole	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	24	49	49%	0.035	0.67	0.051	0.84	--	--	--	--	--	--	--	--	14.4	17
Whole	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	10	49	20%	0.027	0.20	0.019	0.19	--	--	--	--	--	--	--	--	14.4	6
Whole	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	20	49	41%	0.034	0.51	0.036	0.60	--	--	28	--	--	--	--	--	14.4	17
Whole	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	13	49	27%	0.024	0.17	0.022	0.26	--	--	--	--	--	--	--	--	8.2	7
Whole	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	10	49	20%	0.019	0.27	0.026	0.33	--	--	--	--	--	--	--	--	8.2	11
Whole	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	7	49	14%	0.018	0.24	0.016	0.079	--	--	--	--	--	--	--	--	14.4	4
Whole	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	16	49	33%	0.024	0.19	0.028	0.61	--	--	--	--	--	--	--	--	8.2	13
Whole	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	7	49	14%	0.032	0.11	0.094	0.28	--	--	1.2	--	--	--	--	--	0.047	7
Whole	2,3,7,8-Tetrachlorodibenzofuran	PG/G	33	49	67%	0.057	0.20	0.072	24	--	--	--	--	--	--	--	--	4.1	26
Whole	Octachlorodibenzodioxin	PG/G	30	49	61%	1.3	7.9	4.0	87	--	--	--	--	--	--	--	--	37,600	1
< 75 um	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	2	2	100%	--	--	0.19	0.29	--	--	--	--	--	--	--	--	14.4	2
< 75 um	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	1	2	50%	0.083	0.083	0.30	0.30	--	--	--	--	--	--	--	--	14.4	1
< 75 um	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	2	2	100%	--	--	0.34	0.72	--	--	--	--	--	--	--	--	14.4	2
< 75 um	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	1	2	50%	0.095	0.095	0.29	0.29	--	--	--	--	--	--	--	--	14.4	1
< 75 um	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	2	2	100%	--	--	0.30	0.50	--	--	28	--	--	--	--	--	14.4	2
< 75 um	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	1	2	50%	0.13	0.13	0.30	0.30	--	--	--	--	--	--	--	--	8.2	1
< 75 um	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	1	2	50%	0.14	0.14	0.20	0.20	--	--	--	--	--	--	--	--	8.2	1
< 75 um	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	1	2	50%	0.13	0.13	0.27	0.27	--	--	--	--	--	--	--	--	14.4	1
< 75 um	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	1	2	50%	0.24	0.24	0.29	0.29	--	--	--	--	--	--	--	--	8.2	1
< 75 um	2,3,7,8-Tetrachlorodibenzofuran	PG/G	2	2	100%	--	--	1.6	4.0	--	--	--	--	--	--	--	--	4.1	2
> 75 um	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	2	4	50%	0.084	0.17	0.15	0.17	--	--	--	--	--	--	--	--	14.4	2
> 75 um	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	1	4	25%	0.085	0.16	0.13	0.13	--	--	28	--	--	--	--	--	14.4	1
> 75 um	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	1	4	25%	0.11	0.15	0.073	0.073	--	--	--	--	--	--	--	--	8.2	1
> 75 um	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	2	4	50%	0.060	0.086	0.059	0.081	--	--	--	--	--	--	--	--	14.4	1
> 75 um	2,3,7,8-Tetrachlorodibenzofuran	PG/G	4	4	100%	--	--	0.12	1.2	--	--	--	--	--	--	--	--	4.1	3
Core Samples																			
Whole	Antimony	mg/Kg	13	28	46%	0.82	15	0.71	43	31	3	16	5	--	--	--	--	NA	--
Whole	Arsenic	mg/Kg	40	44	91%	1.2	1.9	0.95	18	0.39	40	0.12	40	9.8	11	33	--	NA	--
Whole	Cadmium	mg/Kg	39	44	89%	0.48	0.52	0.050	18	37	--	20	--	0.99	23	5.0	13	NA	--
Whole	Chromium	mg/Kg	44	44	100%	--	--	9.0	109	211[f]	--	200	--	43	6	111	--	NA	--
Whole	Copper	mg/Kg	44	44	100%	--	--	9.2	2,240	3,129	--	1,490	4	32	28	149	12	NA	--
Whole	Iron	mg/Kg	44	44	100%	--	--	12,500	266,000	23,463	25	--	--	--	--	--	--	NA	--
Whole	Lead	mg/Kg	44	44	100%	--	--	4.4	1,230	400	16	--	--	36	29	128	28	NA	--
Whole	Manganese	mg/Kg	44	44	100%	--	--	189	4,690	1,762	11	1,870	11	--	--	--	--	NA	--
Whole	Mercury	mg/Kg	37	44	84%	0.0040	0.014	0.0050	3.2	23	--	12	--	0.18	17	1.1	8	NA	--
Whole	Nickel	mg/Kg	44	44	100%	--	--	6.6	33	1,564	--	800	--	23	15	49	--	NA	--
Whole	Uranium	mg/Kg	6	44	14%	17	53	20	90	16	6	8.0	6	--	--	--	--	NA	--
Whole	Zinc	mg/Kg	44	44	100%	--	--	30	24,800	23,463	2	12,000	8	121	29	459	26	NA	--
Whole	Benzo(a)anthracene	µg/Kg	15	44	34%	4.0	11	0.30	6.0	621	--	240	--	108	--	1,050	--	21.6	15
Whole	Benzo(a)pyrene	µg/Kg	14	44	32%	4.0	12	0.80	7.0	62	--	24	--	150	--	1,450	--	21.6	14
Whole	Benzo(b)fluoranthene	µg/Kg	1	44	2%	4.0	12	3.0	3.0	621	--	240	--	--	--	--	--	21.6	1
Whole	Benzo(k)fluoranthene	µg/Kg	1	44	2%	4.0	12	2.0	2.0	6,215	--	2,400	--	--	--	--	--	21.6	1
Whole	Chrysene	µg/Kg	21	44	48%	4.0	11	0.20	12	62,146	--	24,000	--	166	--	1,290	--	13.79	21
Whole	Dibenzo(a,h)anthracene	µg/Kg	3	44	7%	4.0	12	0.60	2.0	62	--	24	--	33	--	--	--	21.6	3
Whole	Indeno[1,2,3-cd]pyrene	µg/Kg	11	44	25%	4.0	9.0	0.20	3.0	621	--	240	--	--	--	--	--	21.6	11
Whole	2,4'-DDE	µg/Kg	1	44	2%	0.69	1.9	0.32	0.32	1,720	--	--	--	3.2	--	31	--	1.72	1

TABLE 4-1
Summary of Analytical Results and Comparison to Screening Levels
Upper Columbia River RI/FS

			Summary Statistics							Comparisons to Screening Levels									
Size Fraction	Analyte	Units	Number of Detects	Number of Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value	PRG Soil Residential[a]	Number of Detects > PRG	STI HSCA HH[b]	Number of Detects > STI HSCA HH	TEC[c]	Number of Detects > TEC	PEC[d]	Number of Detects > PEC	CCT HH Value[e]	Number of Carbon-Normalized Detects > CCT HH Value
Whole	4,4'-DDE	µg/Kg	4	44	9%	0.70	1.9	0.16	0.81	1,720	--	515	--	3.2	--	31	--	1.72	4
Whole	4,4'-DDT	µg/Kg	2	44	5%	0.69	1.9	1.0	2.6	1,720	--	515	--	4.2	--	63	--	2.04	2
Whole	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	17	23	74%	0.16	0.29	0.27	45	--	--	--	--	--	--	--	--	3.76	1
Whole	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	11	23	48%	0.055	0.16	0.050	0.66	--	--	--	--	--	--	--	--	0.0144	8
Whole	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	10	23	43%	0.020	0.24	0.12	0.94	--	--	--	--	--	--	--	--	0.0144	9
Whole	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	13	23	57%	0.051	0.10	0.12	2.6	--	--	--	--	--	--	--	--	0.0144	13
Whole	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	6	23	26%	0.020	0.63	0.074	0.66	--	--	--	--	--	--	--	--	0.0144	4
Whole	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	13	23	57%	0.051	0.10	0.091	1.9	--	--	28	--	--	--	--	--	0.0144	13
Whole	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	11	23	48%	0.032	0.12	0.060	0.67	--	--	--	--	--	--	--	--	0.0082	10
Whole	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	6	23	26%	0.020	0.29	0.37	0.72	--	--	--	--	--	--	--	--	0.0082	6
Whole	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	15	23	65%	0.022	0.16	0.021	0.94	--	--	--	--	--	--	--	--	0.0144	11
Whole	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	10	23	43%	0.023	0.27	0.18	1.5	--	--	--	--	--	--	--	--	0.0082	10
Whole	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	11	23	48%	0.023	0.064	0.11	0.59	--	--	1.2	--	--	--	--	--	4.70E-05	11
Whole	2,3,7,8-Tetrachlorodibenzofuran	PG/G	21	23	91%	0.089	0.10	0.076	53	--	--	--	--	--	--	--	--	0.0041	21
Whole	TEQ WHO-98	PG/G	23	23	100%	--	--	0.013	7.6	3.9	5	--	--	--	--	--	--	NA	--
River Group (transect, bioassay samples, and tributary samples collected within river/reservoir)																			
Whole	Antimony	mg/Kg	88	131	67%	0.27	19	0.35	63	31	17	16	35	--	--	--	--	NA	--
Whole	Arsenic	mg/Kg	231	246	94%	0.73	4.5	0.65	74	0.39	231	0.12	231	9.8	74	33	4	NA	--
Whole	Cadmium	mg/Kg	216	246	88%	0.047	0.62	0.036	16	37	--	20	--	0.99	131	5.0	28	NA	--
Whole	Chromium	mg/Kg	246	246	100%	--	--	1.2	156	211[f]	--	200	--	43	43	111	7	NA	--
Whole	Copper	mg/Kg	241	246	98%	6.0	8.7	3.0	3,030	3,129	--	1,490	13	32	140	149	55	NA	--
Whole	Iron	mg/Kg	246	246	100%	--	--	5,140	248,000	23,463	126	--	--	--	--	--	--	NA	--
Whole	Lead	mg/Kg	246	246	100%	--	--	2.6	2,760	400	8	--	--	36	149	128	103	NA	--
Whole	Manganese	mg/Kg	246	246	100%	--	--	92	4,920	1,762	26	1,870	25	--	--	--	--	NA	--
Whole	Mercury	mg/Kg	203	242	84%	0.0070	0.14	0.0040	2.4	23	--	12	--	0.18	90	1.1	17	NA	--
Whole	Nickel	mg/Kg	246	246	100%	--	--	0.68	53	1,564	--	800	--	23	67	49	2	NA	--
Whole	Uranium	mg/Kg	51	246	21%	6.4	84	4.6	127	16	24	8.0	41	--	--	--	--	NA	--
Whole	Zinc	mg/Kg	246	246	100%	--	--	16	26,600	23,463	1	12,000	13	121	158	459	115	NA	--
Whole	Benzo(a)anthracene	µg/Kg	129	246	52%	4.0	17	0.20	32	621	--	240	--	108	--	1,050	--	21.6	128
Whole	Benzo(a)pyrene	µg/Kg	71	246	29%	4.0	18	0.20	16	62	--	24	--	150	--	1,450	--	21.6	71
Whole	Benzo(b)fluoranthene	µg/Kg	68	246	28%	4.0	18	0.20	38	621	--	240	--	--	--	--	--	21.6	68
Whole	Benzo(k)fluoranthene	µg/Kg	68	246	28%	4.0	18	0.20	30	6,215	--	2,400	--	--	--	--	--	21.6	68
Whole	Chrysene	µg/Kg	157	246	64%	4.0	16	0.20	77	62,146	--	24,000	--	166	--	1,290	--	13.79	156
Whole	Dibenzo(a,h)anthracene	µg/Kg	37	246	15%	4.0	18	0.20	4.0	62	--	24	--	33	--	--	--	21.6	36
Whole	Indeno[1,2,3-cd]pyrene	µg/Kg	83	246	34%	4.0	16	0.20	13	621	--	240	--	--	--	--	--	21.6	83
Whole	PCB-1016	µg/Kg	1	243	0%	0.83	4.8	25	25	3,933	--	2,800	--	60	--	676	--	1.54	1
Whole	PCB-1260	µg/Kg	1	243	0%	0.83	4.8	9.4	9.4	222	--	--	--	60	--	676	--	0.533	1
Whole	2,4'-DDE	µg/Kg	4	246	2%	0.67	2.8	0.090	0.48	1,720	--	--	--	3.2	--	31	--	1.72	4
Whole	2,4'-DDT	µg/Kg	13	246	5%	0.67	2.8	0.090	6.5	1,720	--	--	--	4.2	1	63	--	2.04	13
Whole	4,4'-DDD	µg/Kg	2	246	1%	0.67	2.8	0.35	2.1	2,437	--	729	--	4.9	--	28	--	2.85	2
Whole	4,4'-DDE	µg/Kg	26	246	11%	0.67	2.8	0.072	5.2	1,720	--	515	--	3.2	1	31	--	1.72	26
Whole	4,4'-DDT	µg/Kg	54	246	22%	0.67	2.8	0.080	20	1,720	--	515	--	4.2	4	63	--	2.04	54
Whole	Aldrin	µg/Kg	1	246	0%	0.33	1.4	0.17	0.17	29	--	10	--	--	--	--	--	0.0408	1

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Size Fraction	Analyte	Units	Number of Detects	Number of Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value	PRG Soil Residential[a]	Number of Detects > PRG	STI HSCA HH[b]	Number of Detects > STI HSCA HH	TEC[c]	Number of Detects > TEC	PEC[d]	Number of Detects > PEC	CCT HH Value[e]	Number of Carbon-Normalized Detects > CCT HH Value
Reference Samples																			
Whole	Arsenic	mg/Kg	3	6	50%	1.4	1.9	3.1	3.4	0.39	3	0.12	3	9.8	--	33	--	NA	--
Whole	Cadmium	mg/Kg	6	6	100%	--	--	0.16	1.3	37	--	20	--	0.99	1	5.0	--	NA	--
Whole	Nickel	mg/Kg	6	6	100%	--	--	4.9	24	1,564	--	800	--	23	1	49	--	NA	--
Whole	Benzo(a)anthracene	µg/Kg	3	6	50%	7.0	9.0	0.30	1.0	621	--	240	--	108	--	1,050	--	21.6	2
Whole	Chrysene	µg/Kg	2	6	33%	7.0	9.0	1.0	2.0	62,146	--	24,000	--	166	--	1,290	--	13.79	2

[a] USEPA Region 9 Preliminary Remediation Goal (USEPA, 2004a).
[b] SLOC Resolution 2004-85, Appendix B. It should be noted that application of these values to assessment of risk is limited where multiple contaminants are present, multiple media are contaminated, or multiple pathways are impacted. In addition, application of the values requires consideration of background concentrations and sediment particle fractionated data.
[c] Threshold effects concentration (MacDonald et al., 2000), adopted by Colville Confederated Tribes and Spokane Tribe.
[d] Probable effects concentration (MacDonald et al., 2000).
[e] Confederated Tribes of the Colville Indian Reservation (CTLOC Chapter 4-16, Appendix C).
[f] PRG value presented is for total chromium, based on assumption of 1:6 ratio of chromium (VI):chromium (III). Phase I sediment samples were not analyzed for chromium species; therefore, Phase I sediment results are compared only to the PRG value for total chromium.

HH = human health
CCT = Confederated Tribes of the Colville Indian Reservation
mg/kg = milligrams per kilogram (parts per million)
NA = not applicable
ND = nondetect
pg/g = picograms per gram (parts per trillion)
PEC = Probable Effects Concentration
TEC = Threshold Effects Concentration
STI = Spokane Tribe of Indians
µg/kg = micrograms per kilogram (parts per billion)
um = micrometer

SECTION 5

Preliminary Sediment Conceptual Site Model

SECTION 5

Preliminary Sediment Conceptual Site Model

This section presents the updated preliminary CSM for contaminated sediment in the UCR. It includes descriptions of known and potential sources of contamination, the river/reservoir hydraulic relationship, the nature and extent of COIs, and an evaluation of fate and transport of COIs. The information presented here builds on information about the CSM presented in the A&R Document (CH2M HILL, 2004b).

This preliminary sediment CSM provides a broad-scale framework for assessing UCR sediment contamination. It is anticipated that future studies conducted during the RI/FS will augment this understanding and will supply additional detail within specific areas or locations. Data gaps are summarized at the end of each of the following subsections. Filling these data gaps may be useful to further refine the sediment conceptual site model; however, a determination of whether the data gaps constitute data needs for the RI/FS will be evaluated through subsequent application of the DQO process.

5.1 Sources of Contamination

Known and potential sources of contamination in UCR sediments were identified in the ESI conducted for a portion of the UCR (Ecology and Environment [E&E], 2003). These known and potential sources of contamination were evaluated as part of the development of the RI/FS preliminary sediment CSM in accordance with the DQOs developed for source identification detailed in the QAPP and summarized in Section 2 of this document. The source identification process entailed evaluation of available information on releases from upstream industry and operations, process and historical information from the facilities, and review of applicable industry-related literature. Results of that evaluation are summarized in the A&R Document. The source identification process also involved review of Phase I RI sediment sampling results. Evaluation of the data from the Phase I RI sediment sampling program did not result in identification of new sources of sediment contaminants. The Phase I sediment sampling results support the previous evaluation of contaminant sources presented in the A&R Document.

The known and potential sources include mining and milling operations, smelting operations, pulp and paper production, sewage treatment plants, and other industrial activities. These known and potential sources are briefly summarized in the following subsections.

5.1.1 Mining, Milling, and Smelting

Numerous mining and milling operations have operated since the late 1800s within the drainage area of the UCR in the U.S. and Canada. Although claims were staked earlier, development of mineral resources in the area did not become economically feasible until approximately the 1890s, when ore concentration processes were introduced. Ores were concentrated in mills built at or in the vicinity of the mines and transported to smelters for

further refining. Mining and ore processing wastes containing arsenic, cadmium, copper, lead, mercury, and zinc were generated during these operations (E&E, 2000). In addition to hard rock mines, placer gold mining using mercury amalgamation reportedly occurred within the drainage of Big Sheep Creek, a tributary to the Columbia River (USEPA, 1991).

5.1.1.1 Former Le Roi/Northport Smelter

The Le Roi/Northport smelter is a former smelter located on the east bank of the Columbia River just northeast of the town center of Northport, Washington. Smelter operations began in 1896 by processing copper and gold ores. By 1908 it was processing 500 tons of ore per day. It closed in 1909 because of competition with the Cominco smelter (see Section 5.1.1.2). It restarted in 1914 and processed lead ores sporadically until 1922. The smelter produced slag, which was reportedly placed in piles for disposal or discharged directly to the river by underground launders. Contaminants detected at significant concentrations in soil samples collected at the smelter site include arsenic, cadmium, copper, lead, mercury, and zinc (E&E, 2003). The site was the subject of an USEPA soil removal action during the summer of 2004.

5.1.1.2 Cominco Smelter

The Cominco smelter is located approximately 10 river miles upstream from the U.S.-Canada border in Trail, B.C., Canada. Smelter operations have been underway in Trail since 1896. The smelter is owned by a company which became known as Consolidated Mining and Smelting Company of Canada, Ltd., in 1906, was officially renamed Cominco in 1966, and merged with Teck Ltd. to become Teck Cominco Metals, Ltd., in 2001 (also referred to as "Cominco" in this document).

The facility primarily produced lead and silver during the first decade of operation, with zinc production initiated in 1915. Plants for production of nitrogen- and phosphorus-based fertilizers were built in 1930. Although the smelter was originally built to process materials from local mines, it currently processes ore concentrates obtained from mining operations throughout the world. In addition to lead, zinc, cadmium, silver, gold, bismuth, antimony, indium, germanium, and arsenic, this facility produces sulfuric acid and liquid sulfur dioxide. It also produced ammonia, ammonium sulfate, and phosphate fertilizers until August 1994, at which time production of the phosphorus-based fertilizer was terminated. The fertilizer plant was found to be a major source of mercury at the Trail operations largely because mercury is a constituent of the phosphate rock obtained from the Warm Springs Mine, Montana. The smelter complex has discharged liquid effluent and water-granulated fumed slag into the Columbia River and has experienced a number of accidental spills and releases to the river. Another source of contamination to the Columbia River is the Stoney Creek drainage located just north of the smelter.

Liquid Effluent Discharges

Available information about liquid effluent discharges from Cominco to the Columbia River was presented in the A&R Document and is briefly summarized below.

Cominco first applied for permits to discharge industrial effluent to the Columbia River in 1973. In 1978, the Province of B.C. issued effluent discharge permit PE-2753 for metallurgical plant operations (Province of B.C. Environment, 1991a). Aqueous discharges of various constituents, including lead, zinc, cadmium, arsenic, mercury, antimony, copper, manganese, ammonia, phosphate, and fluoride were monitored under the permit.

Information on pre-1977 discharges from Cominco to the Columbia River is not available. Since 1977, Cominco has monitored and reported discharges from permitted outfalls, as well as spills and leaks. This includes calculated average daily discharge data (by year) for outfalls discharging into the Columbia River.

Available discharge data for the period 1977 through 1996 were compiled from a combination of information sources (Evergreen State College, 1993; Cominco, 1995; Cominco, 1997). Dissolved metals effluent data are available for arsenic, cadmium, lead and zinc for 1977 through 1996, and total metals data are available for arsenic, cadmium, lead, and zinc for 1991 through 1996. Total mercury data are available for 1977 through 1996. Mercury loading data for the metallurgical operations are available for the period 1977 through 1996, but, for the fertilizer operations, mercury data are available only for the period 1980 through 1996. Discharge data for dissolved fluoride, nitrate, and phosphate from the fertilizer operations also are available for the period 1980 through 1996. Except for mercury, the available data are presented only in histogram format; mercury data are available in tabular format (1980 to 1994) and histogram format (1977 to 1996) (Evergreen State College, 1993; Cominco, 1995; Cominco, 1997).

Environment Canada provides data regarding surface water discharges to the Columbia River for Cominco for 1994 through 2002 via the National Pollutant Release Inventory (NPRI) (Environment Canada, 2004). Surface water discharge is defined to include discharges, spills, and leaks (Environment Canada, 2004). Discharge data are provided for total metals in metric tons per year.

Comparison between the Environment Canada (2004) data and Cominco (1997) data for the years of data overlap (1994 through 1996) reveals apparent discrepancies in reported discharge loading values. It is not clear how discharge values were calculated by Environment Canada (2004) and Cominco (Evergreen State College, 1993; Cominco, 1995; Cominco, 1997).

Data for selected constituent discharges to the Columbia River are summarized below. Numerical values of the graphically presented Cominco data (Evergreen State College, 1993; Cominco, 1995; Cominco, 1997) are estimated. No attempt was made in this evaluation to convert daily and yearly discharge units to compare the Cominco data and the Environment Canada data. It should be noted that the permitted liquid effluent discharges discussed below may not be representative of the magnitude or frequency of discharges from the facility between 1896 and 1978, prior to the establishment of monitoring requirements under the effluent discharge permit. It also should be noted that the chemical form (e.g., particulate, colloidal, sorbed, complexed, dissolved) of the liquid constituents is not known based on available information.

- **Lead.** Dissolved lead loading decreased between 1980 and 1996, from a high of approximately 205 kilograms per day (kg/day) to as low as approximately 12 kg/day (Cominco, 1995; Cominco, 1997). After 1991, total lead effluent ranged between approximately 85 kg/day (in 1994) and 235 kg/day in 1992 (Cominco, 1995; Cominco, 1997). Annual discharges of lead and its compounds decreased between 1994 and 2002 from 149 metric tons in 1994 to as low as 1.76 metric tons in 2001 (Environment Canada, 2004).

- **Zinc.** Dissolved zinc loading decreased steadily (1980 to 1994), from approximately 7,400 kg/day to several hundred kg/day. After 1991, total zinc decreased (data only for 1991 to 1994) from approximately 500 to 200 kg/day (Cominco, 1995; Cominco, 1997). Annual discharges of zinc and its compounds decreased steadily from 4,444 metric tons in 1994 to as low as 18.38 metric tons in 2001 (Environment Canada, 2004).
- **Cadmium.** Dissolved cadmium loading decreased steadily (1980 to 1994) from a high of approximately 64 kg/day (in 1982) to approximately 3 kg/day. Total cadmium decreased (data only for 1991 to 1994) from a high of approximately 13 kg/day to a low of approximately 4 kg/day (Cominco, 1995; Cominco, 1997). Annual discharges of cadmium and its compounds decreased steadily from 6 metric tons in 1994 to as low as 0.17 metric ton in 2001 (Environment Canada, 2004).
- **Arsenic.** Dissolved arsenic loading generally decreased (1980 to 1994) from a high of approximately 18 kg/day to a low of approximately 4 kg/day. Total arsenic exhibited no trend (data only for 1991 to 1994), ranging from approximately 6 kg/day to 10 kg/day (Cominco, 1995; Cominco, 1997). Annual discharges of arsenic and its compounds decreased steadily from 41.5 metric tons in 1994 to as low as 0.52 metric ton in 2000 (Environment Canada, 2004).
- **Mercury.** Total mercury loading generally decreased (1980 to 1994), ranging from 7.24 to 0.39 kg/day. Results were analyzed separately for metallurgical and fertilizer operations. Average discharges from the two operations were approximately equal over the reporting period (Cominco, 1995; Cominco, 1997). Annual discharges of mercury and its compounds decreased steadily from 0.14 metric ton in 1994 to as low as 0.0126 metric ton in 2002 (Environment Canada, 2004).
- **Antimony.** Annual discharges of antimony and its compounds for the period 1994 to 2002 ranged from a low of 2.25 metric tons in 2000 to a high of 7.92 metric tons in 1995 (Environment Canada, 2004).
- **Copper.** Annual discharges of copper and its compounds decreased from a high of 898 metric tons in 1994 to 0.31 metric tons in 2002 (Environment Canada, 2004).
- **Manganese.** Annual discharges of manganese and its compounds decreased from a high of 16.95 metric tons in 1995 to 0.54 metric tons or less for the period from 1997 through 2002 (Environment Canada, 2004).
- **Ammonia.** Dissolved NH_3/N loading generally decreased after 1989. Discharges (1980 to 1994) ranged from approximately 2,900 kg/day to less than 1,000 kg/day (Cominco, 1995; Cominco, 1997). Annual discharges of total ammonia generally decreased over the period 1994 to 2002 ranging from a high of 500.4 metric tons in 1995 to a low of 89.4 metric tons in 2001 (Environment Canada, 2004).
- **Phosphate.** Total PO_4/P loading generally decreased after 1988. Discharges (1980 to 1994) ranged from approximately 7,000 kg/day to 1,500 kg/day. Ortho PO_4/P generally comprised most of the total PO_4/P (Cominco, 1995; Cominco, 1997).
- **Fluoride.** Dissolved fluoride loading generally decreased (1980 to 1994) from a high of approximately 9,500 kg/day to less than 1,000 kg/day (Cominco, 1995; Cominco, 1997).

Water-Granulated Fumed Slag Discharges

Slag has been generated as part of the smelting processes at the Trail facility over most of its history. Blast furnace slag, generated by the lead smelters, contained appreciable quantities of zinc and lead (Cominco, 1991). Because of the remaining high metals concentrations, the blast furnace slag was reportedly never discharged directly into the Columbia River (Ministry of Environment, Lands and Parks [MELP], 1990).

Since 1930, blast furnace slag has been fumed to recover residual zinc and lead (Cominco, 1991). Following fuming, the molten slag was tapped and granulated with water. This water-granulated fumed slag generally consists of black, glassy material, the bulk of which has the texture of sand. The particles are highly angular. A small proportion consists of fines that have a broken eggshell or needle-like morphology (Cominco, 1991). From the beginning of the slag fuming process in 1930, the water-granulated fumed slag was discharged to the Columbia River. From 1973 to 1995, water-granulated fumed slag was discharged to the Columbia River under effluent permit PE-2753. In 1995, the permit to discharge water-granulated fumed slag to the river expired, and the water-granulated fumed slag has since been collected onsite (MacDonald Environmental Sciences, Ltd. [MESL], 1997). In 1994, Cominco evaluated potential uses of water-granulated fumed slag. These included its use in the manufacture of cement; in concrete aggregate (less than or equal to 4 mesh component); as a pozzolanic additive, as partial replacement for Portland cement; in “Slagcrete” (combining water-granulated fumed slag, sulfur, and a proprietary ingredient); and for paving (Cominco, 1994).

Information documenting the quantity of water-granulated fumed slag discharged by Cominco to the Columbia River has not been located. However, the water-granulated fumed slag discharge may be estimated based on the amount of lead produced (Cominco, 1990). Cominco has reported that the weight of blast furnace slag generated is equal to approximately 140 percent of the weight of lead produced, and the weight of water-granulated fumed slag generated and discharged to the Columbia River is equal to approximately 85 percent of the weight of blast furnace slag generated (Cominco, 1990). Based on these ratios and lead production information, it is estimated that more than 13,000,000 tons of water-granulated fumed slag were generated and discharged to the Columbia River. Since completion of Grand Coulee Dam in 1940, it is estimated that approximately 10,000,000 tons of water-granulated fumed slag were generated and discharged to the Columbia River.

The chemical and physical nature of the water-granulated fumed slag may vary depending on the chemical composition of the fumed slag material and the granulation process. The composition of the fumed slag material will have varied over the period of operations as a result of variations in ore concentrate composition, the specific processes employed to recover metal values and remove impurities, and the effectiveness of those processes over time. In 1991, Cominco reported that chemical analyses were conducted on each fumed slag batch to provide information on chemical composition. Slag tapping was reportedly initiated at a point beyond that warranted by economic parameters in order to minimize the amount of metals released into the environment (Cominco, 1991).

Several studies were conducted between 1974 and 1992 by Cominco (Cominco, 1990, 1991), by B.C. Ministry of Environment (MEPBC, 1979), and Fisheries and Oceans Canada (BFO, 1992) to evaluate the bulk chemistry, leachability under various laboratory conditions,

grain size distribution, and various physical properties of water-granulated fumed slag. The results are summarized in the A&R Document. Based on the available grain size data presented in the studies listed above, water-granulated fumed slag consists predominantly of fine to coarse sand, with silt-size (0.074 mm) or smaller particles comprising up to 0.6 percent of the total. Also according to these studies, the following metals have been detected in bulk samples of water-granulated fumed slag:

- Antimony at concentrations ranging from less than 25 mg/kg (below detection limits) to 326 mg/kg
- Cadmium at concentrations ranging from less than 1 mg/kg (below detection limits) to 300 mg/kg
- Chromium at concentrations ranging from 210 to 311 mg/kg
- Copper at concentrations ranging from 1,800 to 11,900 mg/kg
- Iron at concentrations ranging from 279,000 to 339,000 mg/kg
- Lead at concentrations ranging from 14 to 6,650 mg/kg
- Manganese at concentrations ranging from 5,330 to 11,500 mg/kg
- Nickel at concentrations ranging from 17.2 to 41.1 mg/kg
- Zinc at concentrations ranging from 19,900 to 48,200 mg/kg

Arsenic was analyzed in two of the previous studies (Cominco, 1990; BFO, 1992), but was not detected above the detection limits (30 mg/kg and 100 mg/kg, respectively).

Fine-grained fractions of water-granulated fumed slag also were analyzed in one of the studies (Cominco, 1991). Results indicate that lead is present in the finer grained fractions of water-granulated fumed slag at concentrations higher than in the associated bulk sample.

Each of these metals (antimony, arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel, and zinc) has been identified as a COI in UCR sediment based on the process described in Section 4. The other two metal COIs identified for the site are mercury and uranium. Mercury was analyzed in water-granulated fumed slag in only one of the previous studies (BFO, 1992) and was not detected above the detection limit of 0.005 mg/kg. None of the previous studies analyzed uranium in water-granulated fumed slag.

Of the metal COIs identified for the UCR sediment, some of the metals detected in water-granulated fumed slag samples—antimony, chromium, copper, iron, manganese, and zinc—display broadly similar trends in their distribution within UCR sediment, as discussed in sections that follow. On the basis of these observations, these metals are referred to as "coarse-grained slag-associated metals" in this document. Arsenic, although not detected in water-granulated fumed slag samples (detection limits of 30 mg/kg and 100 mg/kg), also is considered a coarse-grained slag associated metal in this document based on broadly similar trends in distribution. Lead has been reported at widely varying concentrations in samples of water-granulated fumed slag. As described in Section 5.4, the distribution of lead is similar in some, though not all, respects to the distribution of coarse-grained slag-associated metals. Above Marcus Flats, the distribution of lead is broadly similar to the coarse-grained

slag-associated metals listed above; below Marcus Flats, the distribution of lead in sediments shares fewer similarities with the coarse grained slag-associated metals listed above. Therefore, lead is treated in this evaluation as both a coarse-grained, slag-associated metal and as an "other metal."

As stated above, the chemical and physical characteristics of the water-granulated fumed slag likely have varied over the period of time the material has been discharged into the Columbia River, as indicated by variations in the chemical composition of the fumed slag material and the granulation process. The chemical characteristics of the fumed slag would be expected to vary based upon composition or the ores processed, the smelting and refining processes used to recover metal values and remove impurities, and the effectiveness of those processes. Specific information regarding these variations was not available for evaluation.

As indicated in the discussion of liquid effluent discharges above, COIs identified as coarse-grained slag associated metals have also been discharged to the UCR in liquid effluent. Thus, identification of a COI in the UCR as a coarse-grained slag associated metal in this document is not intended to exclude from consideration other chemical forms of that COI. Identification of a metal COI as a coarse-grained slag-associated metal is intended primarily to aid in the understanding of broad-scale distributions of these metal COIs in the UCR.

Other Possible Sources

In addition to the discharges described above, several other possible sources of contamination at Cominco have been identified. These possible sources include the following:

- Spills, bypasses, and emergency releases, including a single 6,300-pound spill of mercury in March 1980
- Groundwater and surface water runoff associated with waste dumping and operational practices in the vicinity of Stoney Creek
- Groundwater discharge
- Discharges to the air
- Runoff impacted by particulates deposited as a result of air discharges from stacks

More information about these possible sources is provided in the A&R Document.

5.1.2 Celgar Pulp Company

Since 1960, the Celgar Pulp Mill, an integrated wood mill and bleach kraft pulp mill, has operated in Castlegar, B.C., approximately 30 river miles upstream from the U.S.-Canada border. The mill began operations as the Celgar Pulp Company (Celgar) (U.S. Geological Survey [USGS], 1994). Celgar Pulp Company was in bankruptcy in 2004 (Environment Canada, 2004), but was reported to have operated continuously since 1960 (Celgar, 2004). The Celgar pulp mill currently is owned and operated by the Zellstoff Celgar Limited Partnership (Environment Canada, 2006). Between the time the mill began operation and mid-1993, the mill used elemental chlorine in its bleaching process (USGS, 1994). Celgar was identified as a source of dioxin/furan discharges to the Columbia River prior to

modernization (Evergreen State College, 1993; USGS, 1994). More information about effluent discharges from the plant is provided in the A&R Document.

5.1.3 Potential Sources of PCBs in UCR Sediments

In general, PCBs may be found in electrical insulators, transformers and capacitors, inks, paints, lubricants, and plastics (USGS, 2000). Several sources of PCB releases have been identified within the Spokane River, a tributary to Lake Roosevelt. Many of these sources are in the vicinity of Spokane, Washington, located about 65 river miles upstream from the confluence with Lake Roosevelt (Ecology, 1995).

Specific locations in the Columbia River system where the presence of PCBs has been identified include the Cominco Smelter operations at Trail and Celgar. In March of 2001, Cominco documented a 10-liter PCB oil spill. The spill reportedly did not reach the Columbia River. However, it indicates the existence of PCBs at that location (Environment Canada, 2003). As of 1993, Celgar was still storing PCBs onsite, reporting the storage of five PCB containers at its facility (Celgar, 1993).

5.1.4 Other Potential Sources of Contamination

Other potential sources of contaminants include municipal storm sewers and nonpoint sources. The ESI report (E&E, 2003) identified the presence of 54 storm sewers from the City of Trail, B.C., that drain into the Columbia River. It also identified effluents from the municipal sewage treatment plants at Castlegar, B.C., and Trail, B.C., that discharge directly into the Columbia River, and effluent from municipal sewage treatment plants at Colville, Washington, and Chewelah, Washington, that discharge into the Colville River.

5.1.5 Data Gaps

Data gaps pertaining to known and potential sources of contaminants in UCR sediments have been identified. Whether these data gaps constitute data needs for the RI/FS will be evaluated through the DQO process or future RI/FS phases. These data gaps are as follows:

- Additional information on the chemical and physical properties of liquid effluent discharged from Cominco
- Additional information on historic discharges from Cominco, including pre-1977 discharges
- Additional information on the chemical and physical characteristics of the water-granulated fumed slag over the period of time the material has been discharged into the Columbia River
- Additional information on other liquid and solid discharges from Cominco and associated operations and facilities, including Stoney Creek, over its history
- Information on current and anticipated future discharges from Cominco and associated operations and facilities, including Stoney Creek

5.2 River/Reservoir Hydraulic Relationship and Sediment Grain Size

This section presents an evaluation of the hydraulic characteristics of the combined river/reservoir UCR system and of sediment grain size. The relationship between hydraulic characteristics and sediment grain size is fundamental for understanding the processes that affect the distribution of sediment grain size and contaminated sediments within the UCR since the construction of Grand Coulee Dam in 1940. This section provides an overview of this relationship to help lay the framework for the interpretation of the nature and extent of contaminated sediment discussed in Section 5.4 and fate and transport of contaminated sediment discussed in Section 5.5. Additional discussion of the relationship between the river and reservoir may be found in the A&R Document.

5.2.1 River/Reservoir Hydraulic Relationship

This section describes the relationship between Lake Roosevelt water levels measured at Grand Coulee Dam and Columbia River flows measured at the international border station (USGS Station 12399500). It describes annual reservoir level changes, river flows at the international border station, the cyclical relationship between reservoir levels at Grand Coulee Dam and river flows at the international border station, and the average cross-sectional flow velocity through the reservoir. This information contributes to the understanding of how water and sediment move through the UCR.

5.2.1.1 Reservoir Levels

Figure 5-1 shows Lake Roosevelt water elevations for 1992, 1997, and 2002. These three years illustrate how the reservoir level fluctuates between a full pool elevation of 1,290 feet (U.S. Bureau of Reclamation [USBR] 1937 vertical datum) and an annual low pool elevation that can be as low as 1,208 feet during a wet year (1997) or as high as 1,263 feet during a dry year (1992). Elevation 1,208 is the lowest level to which the USBR prefers to draw down the reservoir. Water level drawdown for flood control typically begins in January and reaches maximum drawdown in May. After spring drawdown, the reservoir refills relatively rapidly during snowmelt and spring runoff. Typically the reservoir is filled to near full pool (near elevation 1,290) by the Fourth of July weekend and maintained within 10 feet of full pool (between 1,280 and 1,290 feet) through the summer and fall.

Figure 5-2 plots the percentage of time the reservoir level has been at or lower than a given elevation. The plot was made by using the daily water level records kept by the USBR for the period between July 1, 1940, and August 4, 2004. The total number of days that the reservoir has been at or lower than a specific elevation is also shown. Two periods of record are shown: the complete 1940 to 2004 time period, and the last 20 years (1984 to 2004). The 1984 to 2004 time period is the time period since completion of Revelstoke Dam, the last major dam built on the Columbia River system that influences control of spring runoff above Grand Coulee Dam.

Figure 5-2 shows that the reservoir level has been maintained above 1,208 feet on a continual basis over the last 20 years. The 60-year data set shows that the reservoir water surface has been lower than 1,208 feet for only a small percentage of its history. This corresponds to times when either major work was occurring at the dam, such as the 1974

completion of the third powerhouse, or during the early operational years when water levels were varied more widely than under current management practices. Figure 5-2 also shows that the reservoir level has been above 1,240 feet about 90 percent of the time. Put another way, the water surface has been below 1,240 feet 10 percent of the time since 1940. Since 1984 the water surface has been below about 1,250 feet 10 percent of the time. Looked at from the perspective of bank exposure, the upper portion of the bank is exposed a greater percentage of the time than the lower portions. This portion also receives the most exposure to rain, snowmelt, wave action, and the rising and falling reservoir water level. This exposure results in the hydraulic washing of fine-grained sediment, such as silt- and clay-sized particulates, with resultant migration of the fine-grained sediment from higher elevations on the bank to lower elevations. Fine-grained contaminants and contaminants that are attached to or incorporated within the fine-grained sediment are similarly transported to lower bank elevations.

5.2.1.2 Inflow to Lake Roosevelt

The Columbia River, Spokane River, and Kettle River contribute 99 percent of the flow entering Lake Roosevelt. On average, the Columbia River represents 89 percent of the flow to the lake, the Spokane River provides 7 percent, and the Kettle River provides 3 percent. The remaining 1 percent is provided by numerous small streams and the Colville and the Sanpoil Rivers (Stober et al., 1981). The Pend Oreille River, which flows into the mainstem of the Columbia River just north of the U.S.-Canada border, contributes 27 percent of the mean annual flow in the Columbia River at that location (Ecology, 1997). Outflow from Lake Roosevelt occurs via flow through the dam to the Columbia River or through a pumped discharge to Banks Lake (the pumps are adjacent to Grand Coulee Dam) for irrigation storage (Welch et al., 1992).

USGS has operated the international border Columbia River flow gage continuously since March 1, 1938. The average river flow since 1938 has been about 100,000 cubic feet per second (cfs). The highest flow ever recorded is 680,000 cfs, which occurred in June 1894. The second highest flow was 550,000 cfs in June 1948, and the third highest flow was 492,000 cfs in June 1961. The highest flow to occur in the last 20 years (1984 to 2004) was 305,000 cfs in June 1997. The general effect of the upriver dams is a reduction in peak flow (because water is intentionally held to reduce peak flows) and an increase in median flow (because the stored water is released more gradually).

5.2.1.3 Reservoir Level and River Flow

The reservoir level is managed to provide storage for the high spring flows. The reservoir water level rises as Columbia River and tributary flows increase. This is shown in Figure 5-3, which is a plot of Columbia River daily mean streamflow measured at the border and reservoir water level for the 1997 water year, a wet year. The peak flow occurred when the reservoir was near elevation 1,267.

Another effect of the reservoir management practices is that peak annual Columbia River flows tend to occur at higher reservoir levels than at lower. This is because peak annual flow typically occurs in mid- to late-spring when snowmelt runoff is highest, and which occurs well after the annual reservoir fill cycle has begun. Figure 5-4 is a plot of the highest recorded river flow since 1940 to have occurred at various reservoir water levels. The period

of record is from July 1940 to August 2004. The plotted data consist of the highest recorded flow to have occurred within discreet 10-foot reservoir level increments beginning at 1,120 to 1,130 feet and ending at 1,280 to 1,290 feet. The flows are plotted at the midpoint of the 10-foot increment; e.g., at 1,125 feet and 1,285 feet. The trend of higher flow occurring at higher reservoir level is apparent for the complete period of record from July 1940 to August 2004. Since October 1, 1984, the highest flows occurred in water year 1997 and are of lower magnitude than the complete time period due to the combined upstream water storage effect of the dams on the Columbia River and its tributaries built after Grand Coulee Dam. This data set, and the same data set excluding the 1997 water year data, shows a trend of increasing maximum flow up to the 1,260- to 1,270-foot range, then lesser flows at higher water levels. The post-1984 data set likely more typifies current reservoir operations and is likely more representative of future operations.

The timing of peak river flow and reservoir water levels is important because of its impact on sediment transport. Transport of sediment longitudinally at any point along the UCR will be highest when the water velocity is highest, and the highest water velocities occur when the flow area is low and the flow rate is high, as discussed in Section 5.2.1.4.

5.2.1.4 Reservoir Flow Velocity

As discussed above, reservoir pool level and flow rate are determined by a combination of snowpack/snowmelt and reservoir management practices at Grand Coulee Dam and upstream dams. Another related reservoir element of importance to the RI/FS is flow velocity. Flow velocity variations in the reservoir play a large role in determining the nature and extent and fate and transport of contaminated sediments within the UCR. Flow velocity at any given location in the reservoir is a function of reservoir level and river flow. Other important factors determining flow velocity include turbulence, differential momentum, proximity to the sides and bottom, surface roughness of the sides and bottom, channel shape and orientation, secondary currents, density currents, inflow from numerous tributaries along the reservoir, and many other factors that make precise calculation of actual flow velocity difficult.

Determination of actual flow velocities throughout the UCR is beyond the scope of Phase I of the RI. However, in order to help with the understanding of broad-scale sediment transport within the UCR, an initial simplified assessment was performed using average flow velocities across transects. Average flow velocity at any transect across the reservoir is a function of both flow rate and reservoir level. For any given reservoir level and location along the length of the UCR, there is a unique cross-sectional configuration and cross-sectional area through which the reservoir flow occurs.

Figures 5-5, 5-6, and 5-7 present the results of the simplified analysis of historical average cross-sectional water flow velocity in Lake Roosevelt at three reservoir levels (elevations 1,290 1,255, and 1,208) (CH2M HILL, 2004b). Figure 5-5 depicts full pool, 1,290 feet. Figure 5-6 depicts the minimum maintenance level of 1,255 feet for routine dam drum gate maintenance. This elevation was chosen because it is an intermediate level between full pool and the typical lowest pool level of 1,208 feet. Figure 5-7 depicts the reservoir level at 1,208 feet. Each figure shows the calculated average reservoir cross-sectional area by river mile for the selected pool level in square feet (sq ft) (y-axis left scale) and the average cross-sectional flow velocity in feet per second (fps) (y-axis right scale) for a range of river flow

rates for each river mile beginning at the U.S.-Canada border (RM 744) and descending downriver to RM 668. The range of flow rates for each plot reflects the historical range of flows that have occurred when the reservoir was at each of the three water levels (1,290, 1,255, and 1,208 feet). The calculated flow velocities represent the average velocity through a cross section taken perpendicular to the reservoir centerline at each river mile. They were calculated by dividing the river flow rate by the cross-sectional area (that is, use of the continuity equation assuming a constant water surface level).

The calculated average cross-sectional flow velocities provide only general estimates of the actual river flow velocity at each point within any of the cross sections. In general, the velocity in any cross section will be higher than the average calculated value near the middle of the channel, and lower at the sides and bottom. Velocities will also be higher on the outside of bends compared to the inside of bends. Although the calculated average flow velocities are subject to these uncertainties, they provide insight into how the reservoir flow velocity changes from upriver to downriver, and from high to low flow on a broad scale.

Transportation of sediments by flowing water is governed by many factors, the most important of which are flow velocity and sediment grain size. Other factors include grain density, grain shape, sediment sorting, riverbed morphology, and turbulence. Determination of actual flow velocities and the other principal factors that determine sediment transport in the UCR was not within the scope of Phase I of the RI/FS. However, in order to perform a first-pass analysis of sediment transport to assist with interpretation of the nature and extent and fate and transport components of the preliminary sediment CSM, a generalized relationship between average flow velocity and grain size was estimated. For this purpose, as a general approximation, movement of sand-sized sediment is considered to be unlikely within the system at average cross-sectional flow velocities of less than 2 to 3 fps. An average cross-sectional flow velocity band from 2 fps to 3 fps has been placed on Figures 5-5, 5-6, and 5-7 to provide a general indication of where further downriver movement of sand-sized bed sediment (such as water-granulated fumed slag) is unlikely at the indicated pool level. As with all flow rates shown in the figures, the velocity band of 2 to 3 fps is an average cross-sectional velocity for each river mile transect represented. The actual velocity near the sediment interface at the bottom of the river would typically be significantly less than the average cross-sectional flow velocity.

The reservoir flow velocity and its frequency of occurrence significantly influence the longitudinal movement of sediment within the reservoir along with the distribution of sediment grain size and associated contaminants. Based on the results of the simplified average cross-sectional flow velocity analysis, transport of sand-sized material is expected to be very limited in the UCR downstream from Marcus Flats, as illustrated in Figures 5-5, 5-6, and 5-7. The results also suggest that movement of such sediment has largely not occurred since 1940. The actual distribution of sand-sized sediment found within the UCR, based on the results of the 2005 sampling program, generally agrees with this prediction and is discussed in the next section.

5.2.2 Grain Size Distribution

Section 5.2.2 describes observed variations and patterns in sediment grain size based on the particle size analysis results from the UCR 2005 Phase I sediment investigation. Observations of longitudinal, transverse, and vertical grain size variations and patterns are

important to the overall understanding of sediment transport, distribution of COIs, variations in sedimentation rates, and the potential association between selected COIs and certain grain size classes.

The UCR 2005 Phase I sediment sampling program included collection of sediment samples from throughout the entire UCR river and reservoir system. As discussed in Section 5.2.1, variations in the flow velocity and reservoir pool elevation and/or river stage influence and control the transport and deposition of bed sediment throughout the UCR. Information on sediment grain size variation gained from the Phase I sampling program greatly aids in the overall understanding of the nature and extent of certain COIs and their associated fate and transport under different hydraulic conditions that can be expected based upon the historical flow and stage data.

Only a limited body of particle size data has been generated by previous investigations. Although some particle size data for beach, side-bank, and side-channel sediments have been generated, few representative data are available from the mid-channel portions of the UCR. A significant data gap from the previous investigations also was identified with respect to the longitudinal, transverse, and vertical variations in sediment grain size throughout the system.

Particle size data were identified as an essential component of the Phase I sediment sampling program through the DQO process. In particular, the QAPP identified the need for additional particle size data to better assess the potential for transport and deposition of contaminated sediments in the UCR system. Particle size data also are useful for understanding specific hydraulic processes that control the nature and extent of COIs. For the Phase I investigation, particle size analysis included quantification of sediment sizes ranging from pebble gravel to colloid. Particles sizes for each specific size class are as follows:

- Gravel: 4.75 mm and greater
- Sand: 4.74 mm to 0.075 mm
- Silt: 0.074 mm to 0.005 mm
- Clay: 0.004 to 0.001 mm
- Colloid: <0.001 mm

Although the grain size classes established for the UCR sediment investigation differ slightly from standard Wentworth scale convention (Wentworth, 1922) due to soil testing laboratory considerations, the deviations in grain sizes (namely for sand and silt) are minor and do not significantly affect the overall assessment, interpretation, and comparability of the Phase I sediment data. Although larger sediment sizes (large gravel, cobbles, boulders) are present throughout the site, the selected grain size range represents the typical size range that was readily recoverable using the methods employed by this study (i.e., van Veen and Ponar), and which coincided with the size fractions where COIs were believed to be most concentrated. As discussed in Section 5.4, a subset of sediment samples collected from specific beaches in the UCR were segregated by grain size (75 micrometers [μm] to 2 millimeters [mm], and <75 μm) for separate chemical analysis to assess the distribution of COIs in the respective coarse-grained and fine-grained size fractions. Sections 5.4.1.4 and 5.4.2.4 discuss the observed relationship between sediment grain size and COI concentrations in the selected beach samples.

One important grain size observation from historical sampling efforts was the presence of black, glassy, sand-sized material interpreted to comprise water-granulated fumed slag in sediment samples collected from the upper portions of the UCR system, particularly in the reaches above Marcus Flats. Sand-sized sediment containing a high percentage of water-granulated fumed slag has been observed in various locations along the river (e.g., the black sand beach, and the large point bar sediment deposit located just upstream from Sheep Creek). As described in the A&R Document, water-granulated fumed slag from the Cominco Smelter consists primarily of black, glassy sand-sized particles with less than 1 percent by weight of silt-sized or smaller particles.

Understanding the grain size characteristics of water-granulated fumed slag and the associated potential for mobilization and transport of this material in the UCR system was an important part of the assessment presented in Section 5.2.1. The discussion of particle size observations and relationships that follow in this section, used in conjunction with the information presented in Section 5.2.1, highlights on a broad scale how the river system hydrodynamics have had a direct impact on the distribution water-granulated fumed slag in UCR bottom and side-bank sediments. Due to the low percentage (<10 percent) of gravel-sized material in most of the sediment samples, the grain size discussions that follow focus largely on observed broad-scale variations in the sand, silt, clay, and colloid size fractions of sediment.

5.2.2.1 Longitudinal Variations in Particle Size Distribution

Figure 5-8 presents plots of grain size variations (gravel, sand, fines [< 75 µm] for sediment samples collected from mid-channel, left-bank, and right-bank locations along the entire project area (U.S.-Canada border to Grand Coulee Dam). The fines fraction consists of silt, clay, and colloids. The distribution of silt, clay, and colloids within the fines fraction for mid-channel samples is also displayed in Figure 5-8.

The following broad-scale points and observations can be drawn from these longitudinal plots:

- The percentage of sand in the mid-channel samples drops off abruptly below Marcus Flats (approximately RM 706), suggesting the importance of Marcus Flats as a zone of transition from a predominantly riverine system capable of transporting sand to a lower velocity reservoir system in which sand-sized and coarser sediment tends to be deposited. It should be noted, nonetheless, that sand-sized sediment is present in mid-channel samples below Marcus Flats, and it is possible that some of this sand was transported downstream from the Marcus Flats area during very low reservoir drawdowns, high river flow rates, or prior to construction of Grand Coulee Dam.
- The percentage of fine-grained (<75 µm) sediment in mid-channel samples is notably lower (typically <20 percent) above Marcus Flats than below, and rises abruptly to 70 percent or greater in the mid- and lower-reservoir reaches below Marcus Flats. This observation is consistent with the understanding that this portion of the reservoir is dominated by lower velocity flows, which allow for the deposition of fine-grained sediment.

- After peaking just below Marcus Flats, the percentage of silt in mid-channel samples declines progressively downstream toward the dam, suggesting gradual settlement and deposition of this particular size fraction over the lower 100 miles of the reservoir.
- Mid-channel samples collected above Marcus Flats contained little or no measurable quantity of clay or colloids based on laboratory particle size analysis. Below Marcus Flats, the percentage of clay and colloids increases steadily with distance downstream, with as much as 60 to 70 percent of the sediment collected in the lower reaches of the reservoir composed of clay and colloids.
- Side-bank samples (defined as either the left- or right-most sample from each sample transect) consistently exhibit a higher percentage of sand (typically 50 to 90 percent) than the mid-channel samples throughout the entire length of the project area.
- Comparison of the trends for the right bank and left bank sand and fines (<75 µm) fractions indicates a similar sediment size distribution in the two banks. Of particular note is the apparent decrease in the percentage of sand, and increase in the percentage of finer grained sediments in the mid-reservoir area between approximately RM 725 and RM 675.
- Side-bank samples collected throughout the study area typically contained less than 20 percent gravel. As discussed above, sampling protocols used for the Phase I sediment sampling program selectively avoided collection of coarse-grained sediment. Side-bank sediments throughout the UCR commonly contain a larger percentage of gravel and larger material than is represented by the grain size distribution information presented in the samples.

The abrupt decrease in mid-channel sand content below Marcus Flats highlights and supports some of the observations and conclusions presented in Section 5.2.1; namely, that Marcus Flats marks the transition from predominantly riverine to reservoir conditions. Calculated average flow rates decrease markedly within Marcus Flats and, based on the preliminary analysis of sediment transport discussed in Section 5.2.1.4, favor the deposition of sand. The observed peak in silt-sized material just below Marcus Flats is thought to be caused by both the reduction in river flow velocity (sufficient to promote silt deposition) and additional contributions of silt-sized sediment from the Kettle River, whose confluence with the Columbia River is located at Marcus Flats, and the Colville River, whose confluence with the Columbia River lies just downstream from Marcus Flats. The progressive increase in the percentage of clay and colloid-sized sediment in mid-channel samples downstream from Marcus Flats demonstrates that sedimentation in this portion of the river is dominated by settlement and deposition of fine-grained sediment particles. Sections 5.4.1.1 and 5.4.2.1 discuss the observed relationship between sediment grain size and observed concentrations for selected COIs. Section 5.5 further discusses the fate and transport implications of sediment particle size, including the role that particle size (and TOC content) has on the sorption and binding affinity of selected COIs found in UCR sediment.

5.2.2.2 Transverse Changes in Particle Size Distribution

Transverse variations in particle size distribution also were evaluated at selected river reaches (i.e., high-density focus area transects) to identify any observable particle size

changes across the river channel. Figures 5-9 through 5-14 present cross sections of the river channel that show the locations of the high-density transect samples. Historical sampling efforts tended to collect samples only from the side-bank or side-channel areas of the river. The high-density focus area transects that were established as part of the Phase I sediment sampling program included from five to nine samples along a given transect, rather than the usual left bank, middle, right bank samples collected from typical transects. The expanded focus area transect samples provided a greater ability to observe variations in particle size distribution as a function of sample depth and/or elevation at discrete locations within the river/reservoir system.

At several upriver sampling stations, no mid-channel samples were collected. Sediment samples from this reach were largely unattainable due to the high river flow velocities and/or the presence of predominantly coarser grained sediment (gravels, cobbles, boulders) that could not be sampled with the methods of collection employed by this study. Transverse profiles for these up-river reaches, if constructed, would include coarser grained sediments throughout most of the mid-channel area. Sand-sized material, including some percentage of water-granulated fumed slag, is expected to be present locally in the mid-channel area, where it would be lodged in the interstices between the larger sized sediment, or present in small, localized eddies behind larger boulders and other obstructions. Side-bank samples from this area would vary, but typically would be dominated by sand and gravel-to-cobble sized material.

Figure 5-15 presents observed variations in the percentage of fines (silt, clay, colloids) and sand at three selected transects: RM 706 (Marcus Flats), RM 678 (mid-reservoir) and RM 605 (lower reservoir). These plots help to highlight some important observations regarding transverse changes in particle size distribution at specific locations.

In the vicinity of Marcus Flats (approximately RM 706), the transverse profiles (Figures 5-15) show that the mid-channel area is dominated by sand-sized sediment, with very little fine-grained material. The highest percentage of sand is observed in the sample collected from the old river channel. Side-bank samples typically contain from 60 to 70 percent fines, composed mainly of silt and clay. These observations reinforce the fact that, as mentioned above, the mid-channel area in this reach of the river (and upstream) is dominated by sand-sized and coarser sediment. Sample RM 706X4 was described in the field sample log as being a "black medium sand…slag-like material appears to be present." This description is consistent with the sediment chemistry information (discussed in Section 5.4.1) that found the sediments from RM 706X4 to be enriched in coarse-grained slag-associated metals.

The particle size observations for samples collected along the expanded transects at RM 678 and RM 605 (Figure 5-15) are notably similar to each other, but very different than those at RM706 in Marcus Flats. Mid-channel sediment samples along these transects show a high percentage of fines (>97 percent), and a low percentage of sand (typically <2 percent). Based on the results of the simplified average cross-sectional flow velocity analysis, transport of sand-sized material is expected to be limited in the UCR downstream from Marcus Flats, a finding that is consistent with grain size observations. The percentage of fine-grained sediment fractions at RM 678 and RM 605 is notably similar, further demonstrating the relative consistency in the processes controlling sediment deposition in this portion of the reservoir. One noteworthy difference is the progressive increase in the colloidal fraction from RM 678 to RM 605. The general similarity in overall proportion of fine-grained

sediment in these transect profiles, although 73 miles apart, attests to the dominant sediment depositional regime in the middle and lower reservoir area below Marcus Flats.

A comparison of the side-bank samples collected from the normal and high-density transects with samples from the mid-channel area further highlights another important sediment transport and distribution phenomenon: soil washing and remobilization of fines. As described in Section 5.2.1, selective washing and remobilization of fine-grained sediments from the side bank areas of the reservoir due to the combined effects of rising and falling reservoir water level, wave action, and exposure to rainfall and localized sheet runoff is thought to be an ongoing process that further contributes to the concentration of finer grained sediments into the lower, deeper portions of the reservoir.

5.2.2.3 Tributary Particle Size Distribution

As described in Section 2.2.3, sediment samples were collected from the mouths of six major UCR tributaries. Sediment samples specifically were collected from the mid-channel tributary mouth area at the immediate confluence with the UCR, and a short distance downstream (typically within 0.5 miles) from the tributary mouths. Figure 5-16 presents a comparative distribution of particle sizes (gravel, sand, and fines [<75 µm]) for tributary samples collected during the Phase I investigation. Figure 5-16 also presents additional refinement on the distribution of the fine-grained particles sizes (silt, clay, and colloids) in these same samples. In general, the size distribution data indicate that coarser grained sediments (sands and gravel) are more predominant in the mouths (T1 samples) and proximal delta areas (T2 samples) of the upstream tributaries such as Sheep Creek and Onion Creek. In contrast, tributary samples from the mid- and lower-reservoir areas such as the Sanpoil River, Spokane River, and Colville River were dominated by finer grained sediments (silt, clay, and colloids). From this observation, it can be concluded that the sediment distribution in the vicinity of the tributary mouths is influenced by the degree to which the tributaries, at their confluence with the UCR, are free-flowing rivers or are part of the reservoir. The tributary samples from the mouth of the Kettle River (RM 706) were dominated by fines near the mouth (T1) and by sands in the proximal delta area (T2). Sections 5.4.1.5 and 5.4.2.5 provide additional discussion of the observed COI concentrations in the tributary samples as compared to nearby samples within the UCR.

5.2.2.4 Vertical Changes in Particle Size Distribution

The van Veen sampler provided subaqueous sediment samples from the upper 6 inches or so of the sediment column. Additional information on sediment characteristics at greater depths within the sediment column, including particle size variations with depth, was obtained from UCR core samples. The DQO for subsurface sediment was developed in response to the uncertainties associated with potential scour/redistribution of contaminated sediment, the depth to which sediment contamination may exist, the influence that sediment grain size can have on the nature and extent of COIs, and the environmental fate and transport of subsurface sediments.

The Vibracore drilling method was used to obtain sediment core samples from mid-channel and submerged side-bank locations of the reservoir bed at nine discrete locations. Due to equipment constraints associated with the Vibracore method, cores were not obtained from areas in the reservoir having a depth of 200 feet or more. The recovered cores, ranging in

length from 5 to 9 feet, were segregated into discrete depth intervals for subsequent analytical testing. Because of the vibratory action of the Vibracore drilling method, it is suspected that some of the core samples from locations having a high percentage of fines (<75 µm) may have become slightly agitated during collection. The unavoidable vibratory agitation potentially liquefied and resuspended the uppermost portions (upper 0.5 to 1.0 foot) of the loose and highly liquid sediment column. At one core location (RM 622), uniform sandy sediment was encountered throughout the full length of the core. It is uncertain whether the RM622 core sample provides a representative indication of sediment conditions in this portion of the reservoir and accurately portrays the vertical distribution of in-place sediment immediately below the sediment/water interface. The RM622 core is located next to a steep side bank, and landslides have been mapped upslope from this location (see Figure 2- 10). Section 5.4.1.3 further discusses the observed metal concentrations in the RM 622 core.

The following depth intervals were selected from each core for preparation of individual samples:

- 0 to 0.5 foot
- 0.5 to 1.0 foot
- 1.0 to 3.0 feet
- 3.0 to 5.0 feet
- 5.0 to 7.0 feet
- 7.0 to 9.0 feet

Samples from RM 708, 704, 692, 676, and 661 were collected from the mid-channel portion of the river where the bottom sediment interface was at a depth of 200 feet or less. Core samples collected farther downstream (RM 644, 637, 622, and 605) were collected from submerged side-bank areas where the sediment interface was at a depth less than 200 feet.

Core samples had been proposed for RM 723, 734, and 742. These samples were not collected, however, because of the coarse-grained nature of the bed sediments and the elevated river flow velocities that prevented the establishment of a stable drilling platform for the Vibracore drilling equipment. It is inferred, based on visual observations of the river bottom by the field sampling team and the lack of mid-channel samples attained by the van Veen sampler, that the upper several feet of the sediment column in the mid-channel portion of the river at and above RM 723 consists predominantly of gravel, cobbles, and boulders.

Figure 5-17 presents particle size versus depth plots for the following three distinct areas of the river/reservoir system:

- The mid-channel area of Marcus Flats
- The mid-channel area of the middle reservoir below Marcus Flats where core samples were collected in water depths less than 200 feet
- The side terrace areas of the old river channel, slightly away from mid-channel, where reservoir water depths are less than 200 feet

At RM 708, the most upstream core sample location, 7 feet of relatively uniform, black sand was observed. A similar sediment distribution pattern was observed slightly downstream at RM 704. The RM 704 and 708 cores demonstrate that the mid-channel portion of Marcus Flats is a primary depositional zone for sandy, water-granulated fumed slag-enriched sediment. This observation further reinforces the sediment transport and deposition concepts discussed in Section 5.2.1; namely, that Marcus Flats tends to act as a significant transition zone within which deposition of sandy sediment (including water-granulated fumed slag) is predicted due to changes in the flow channel configuration and associated changes in flow velocity.

The cores from RM 676 (Gifford/Inchelium area) and RM 661 (Hunters) show a similar particle size distribution pattern with depth. Sediment from both of these locations is composed predominantly of finer grained material (<75 μm) over the entire 7-foot length of the core. Both cores showed a fairly uniform distribution of fines (approximately 80 to 90 percent) and approximately 10 to 20 percent sand. At RM 676, a small amount (<10 percent) of gravelly material also was present in the lower portion of the core.

Table 5-1 summarizes the distribution of silt, clay, and colloids in the core samples from RM 676 and RM 661. It can be seen that the fine-grained fraction at RM 661 contains a higher percentage of silt than RM 676, and a lower percentage of clay and colloids. The comparative distribution of fines in the RM 676 core is reasonably consistent with the fines distribution observed along the nearby expanded transect at RM 678, particularly the four mid-channel samples RM 678X2 through RM 678X5. The distribution of fines in these two cores, however, is somewhat in contrast with the observed longitudinal distribution of fines in the mid-channel transect samples (see Figure 5-8), which shows a progressive increase in the percentage of clay and colloids and a corresponding decrease in the percentage of silt with increasing distance downriver. The greater percentage of silt-sized material in the RM 661 sample may be attributable to local sediment influx from nearby Nez Perce Creek, enhanced mobilization of silt-sized material from washing of side-bank areas, or other sediment depositional processes such as landslide contributions.

Core samples from RM 644 and RM 637 were collected from side terrace areas of the old river channel, and not from the deepest, mid-channel portion of the reservoir. The RM 644 core extended to a depth of 7 feet, and the RM 637 core extended only to a depth of 5 feet. The observed vertical variations in grain size are somewhat similar at these two locations. The upper 1 to 3 feet of the sediment column consists predominantly of fines, underlain by sandy material. As discussed in Sections 5.4.1.3 and 5.4.2.3, the concentration of COI metals in these deeper, sandier horizons at RM 644 and RM 637 are significantly lower than concentrations observed in the finer grained sediments in the uppermost portions of the sediment column. These observations suggest that the sandier sediments encountered in the lower portions of these cores may represent pre-reservoir side-bank material.

5.2.3 Data Gaps

Several data gaps are recognized to exist with respect to the overall understanding of the UCR river/reservoir hydraulics and sediment transport, based on review of the findings from the Phase I sediment investigation. Whether these data gaps constitute data needs for the RI/FS will be evaluated through the DQO process during future RI/FS phases. The data gaps are as follows:

- Geomorphological features and environments that are present in the UCR floodplain (both submerged and exposed portions) have not been mapped or evaluated in detail. Additional categorization and mapping of specific geomorphological features and landform positions may be required to better understand the potential influence these features could have on river hydrodynamics and the distribution of COIs.
- An analysis of changes in the areal extent of exposed reservoir side-bank areas under various pool operating levels has not been conducted. Such an analysis may be important to better address possible concerns associated with wind-borne mobilization of COIs in fine grained sediment.
- Calculation of average cross-sectional flow velocity provides only a limited broad understanding of sediment transport within the UCR. In order to better assess the characteristics of sediment transport in the UCR, to identify active areas of sediment scour and/or deposition and the rate to which they occur, and to provide a more detailed understanding of local-scale variations in river hydrodynamics, additional data collection and analysis may be required (e.g., high-resolution bathymetry, cross-sectional Doppler flow velocity profiling, sediment sub-bottom profiling, supplemental grain size analysis, and sediment transport modeling).
- Little is known regarding the existing sediment load entering the UCR system. In particular, there is considerable uncertainty regarding the sediment flux (suspended and bedload transport) from UCR tributaries versus the Columbia River itself at the U.S.-Canada border. Sediment loading information is important for understanding sediment transport and accumulation. Additional sediment load information for the Columbia River and its major tributaries may need to be gathered to support any detailed sediment transport analysis or modeling.
- In general, a large proportion of sediment transport in riverine systems occurs under episodic extreme events. The UCR reservoir is a component of a managed system in which reservoir level and river flow are largely controlled by operation of Grand Coulee Dam and dams located upstream on the Columbia River and tributaries, which greatly reduces the extremes of flow events that would otherwise strongly affect sediment transport within the UCR. Nonetheless, it is recognized that, even within the managed UCR system, extremes of flow and reservoir level may occur. The degree to which these extremes may affect sediment transport in the UCR have not been addressed by the first-pass analyses presented in this document.
- The potential role that wave action and seasonal reservoir fluctuations have on the mobilization of fine-grained sediment (possibly containing COIs) from side-bank portions of the reservoir is not well understood. Similarly, for the more riverine portion of the UCR site near the U.S.-Canada border, uncertainty remains regarding the degree to which fine-grained sediment in river side-bank areas (containing variable concentrations of COIs) is scoured and eroded during high-flow or low-stage conditions.

5.3 Total Organic Carbon Distribution

This section summarizes the results of TOC sample analyses and the distribution of TOC in the UCR. The concentration of TOC was determined for every sediment sample. TOC refers to the total amount of organic carbon in the sediment and does not include mineralized carbon present as carbonates or bicarbonates. Concentrations of organic contaminants (particularly nonpolar, nonionizable chemicals) and the toxicity of these contaminants in sediments have been observed to correlate with organic carbon content of the sediments. Nonpolar contaminants in sediments or water preferentially partition into the organic material in sediments because of the similar chemical nature of the organic material to the nonpolar organic contaminants (Michelsen, 1992). As discussed in Section 4, the Colville Confederated Tribes use a TOC-normalized approach to determine sediment cleanup levels for organics.

Previous UCR sediment investigations also analyzed for TOC. Figure 5-18 shows the results from the previous studies plotted with respect to river mile longitudinally along the UCR. Figure 5-18 also shows the USEPA 2005 TOC data from the Phase I sediment sampling**.** As described in the A&R Document, previous studies have shown similar longitudinal patterns between TOC and cadmium and mercury. Insufficient organic COI data were available from previous studies to evaluate with respect to TOC content.

5.3.1 Longitudinal Changes in TOC Distribution

Figure 5-19 shows USEPA 2005 TOC concentrations longitudinally along the UCR and differentiates between samples collected from the right or left banks and mid-channel locations. It is apparent that the distribution of TOC is similar to that of the fine sediment as described in Section 5.2 and illustrated in Figure 5-9. Downstream from Marcus Flats, concentrations of TOC are much higher at mid-channel locations than on the left and right banks. Mid-channel TOC concentrations appear to follow a trend similar to that for the distribution of silt (Figure 5-8), particularly with respect to the relatively high concentrations near RM 695. This may be partially attributable to TOC input from the Kettle (mouth near RM 706) and Colville Rivers (mouth near RM 698), and from the Upper Columbia River. TOC input from the Spokane River, which enters the UCR at RM 639, and from Hawk Creek (RM 634) may contribute to the gradual mid-channel UCR rise in TOC downstream of RM 645. Although previous studies did not preferentially sample the mid-channel, the plots of longitudinal distribution of TOC from these studies are generally comparable with the plots of USEPA 2005 data (Figure 5-18).

5.3.2 Transverse Variations in TOC Distribution

Figure 5-20 presents observed variations in the concentration of TOC at three selected transects: RM 706 (Marcus Flats), RM 678 (mid-reservoir), and RM 605 (lower reservoir). The concentrations vary across each transect in a manner similar to the percentages of fine-grained sediment discussed in Section 5.2, which is expected given the UCR sediment TOC is likely associated with slow-settling particles. At RM 706, TOC is found at significantly higher concentrations outside the old river channel compared to within, which is dominated by sand-sized sediment. Below Marcus Flats at RM 678, and also much farther downstream at RM 605, the reverse is apparent, as also discussed previously for fine-grained sediment.

5.3.3 Vertical Variations in TOC Distribution

The vertical distribution of TOC in core samples are presented in Table 5-2. Similar to mid-channel surface sediment, the core with the highest TOC concentration (RM 692) was collected downstream from Marcus Flats and below the confluence of the Kettle and Colville Rivers. TOC in the core from RM 692 varied from a high of 32,200 mg/kg in the upper 6-inch horizon to a low of 4,020 mg/kg in the 3- to 5-foot horizon. Downstream cores had lower TOC, with concentrations varying between about 12,000 and 600 mg/kg, and with the highest concentrations occurring predominantly in the upper horizons.

5.3.4 Data Gaps

Data gaps pertaining to the distribution of TOC in UCR sediments have been identified. Whether these data gaps constitute data needs for the RI/FS will be evaluated through the DQO process during future RI/FS phases. These data gaps are summarized as follows:

- Sources or conditions that influence the spatial variations in TOC concentrations in UCR sediment are not well understood. Additional TOC sediment data may be required to better characterize TOC variations and sources and the role TOC plays within the fate and transport of sediment contaminants.

5.4 Nature and Extent of COIs in Sediment

This section describes the current understanding, based on the 2005 Phase I sediment sampling, of the distribution of individual COIs throughout the UCR and Lake Roosevelt. The distributions of the COIs were evaluated as part of the development of the RI/FS preliminary sediment CSM in accordance with the DQOs developed for nature and extent of contamination detailed in the QAPP and summarized in Section 2 of this report. The nature and extent evaluation considers the longitudinal, transverse, and vertical distributions of the COIs according to the sitewide scale of the Phase I sediment sampling program, which was designed to provide a general overview of the distributions of sediment COIs within the UCR. Consequently, the distribution information presented in this subsection does not account for smaller scale variations in COI distribution that may be present in the UCR. Section 5.4.1 discusses the distribution of metals COIs, and Section 5.4.2 discusses the distribution of organic COIs.

5.4.1 Distribution of Metals

This section describes the general longitudinal, transverse, and vertical distributions of metals, and also provides details about the distributions of metals in the focus areas, at beaches, and in the vicinity of tributaries.

One important element in understanding the general distributions of metals in UCR sediments is the relationships between the metal COIs identified in Section 5.1 and coarse-grained sediment and between other metals and finer grained and organic-carbon-rich sediment. This is because, as described in Section 5.1, the sources of metal COI sediment contamination released from Cominco originated primarily as either a component of liquid effluent (possibly including fine particulate, colloidal, sorbed, complexed, and/or dissolved forms) or as coarser particulates discharged into the water (e.g., water-granulated fumed

slag). As noted in Sections 5.2 and 5.3, the distributions of different sediment sizes and TOC concentrations are influenced by river and reservoir hydrodynamic processes. The coarse-grained bed sediment and water-granulated fumed slag are predominant in the hydrodynamically more active upper reaches of the UCR, and sediment that is finer grained and richer in TOC is predominant in the quiescent lower reaches of the UCR.

Copper, iron, manganese, and zinc are strongly associated with water-granulated fumed slag, as discussed in Section 5.1. The highest concentrations of these coarse-grained slag-associated metals occur predominantly in the portion of the river upstream from Marcus Flat above RM 700, where coarse-grained materials predominate. Antimony, arsenic, chromium, and lead also appear to be associated with water-granulated fumed slag based on chemical analyses of water-granulated fumed slag (BFO, 1992; Cominco, 1990) and/or distribution patterns that are similar to copper, iron, manganese, and zinc, as described in Section 5.4.1.1. Uranium concentrations also appear to follow a similar trend, but the high percentage of nondetect results with elevated reporting limits, described in Section 2, hinders a more complete understanding of distribution patterns relative to screening levels.

Although antimony, arsenic, chromium, copper, iron, lead, manganese, and zinc are components of water-granulated fumed slag, they likely were also discharged into the UCR as dissolved-phase metals associated with liquid effluent and/or other nonslag solid-phase discharges. Cominco began operation of an effluent treatment plant in 1951. The results of various metals extraction tests performed on water-granulated fumed slag, listed in Tables 4-3 through 4-5 of the A&R Document (CH2M HILL, 2004b), show that cadmium, copper, lead, zinc, and other metals can be removed from water-granulated fumed slag by rinsing/leaching.

Visual evidence and grain size information from historical sediment sampling indicate that black, sand-sized material indicative of coarse-grained water-granulated fumed slag, was not visually evident in the surficial bed sediment collected downstream from Marcus Flats. Furthermore, grain-size analysis results also indicate that mid-channel UCR sediment samples collected downstream from Marcus Flats contain relatively less coarse-grained materials than samples collected from within, and upstream from, Marcus Flats. In the middle and lower reaches of the reservoir, finer grained sediments (consisting of silt, clay, and/or organic particulates) are more dominant and typically contain a higher TOC concentration. Metals such as mercury and cadmium (and to lesser degrees lead and nickel) appear to be less correlated with sediment affected by the coarse-grained water-granulated fumed slag, and are instead associated more with the finer grained sediments.

These plots clearly show the differing distributions for the coarse-grained slag-associated metals and the other metals.

5.4.1.1 Longitudinal Distribution

This section describes the longitudinal distributions of the coarse-grained slag-associated metals and the other metal COIs along the length of the UCR. The evaluations discussed in this section are based on the results for samples collected at transect, beach, and tributary locations listed in Appendix C, Table C-6. Each of the samples was assigned to a longitudinal distribution subgroup based on its position relative to the UCR channel (i.e.,

left bank, mid-channel, right bank) in order to identify possible distribution patterns and trends along the longitudinal axes of these channel positions.

The longitudinal distributions of metallic COIs along the length of the UCR are shown in Figure 5-21. For each sample, the figures indicate the detected chemical concentration on the y-axis and the sample location by river mile on the x-axis. Different symbol shapes are used to indicate sample subgroupings (i.e., beach and tributary), which are discussed in further detail in subsequent sections. Symbols for samples collected along the same longitudinal axis share a common color: blue for left-bank samples; green for right-bank samples; and pink for mid-channel samples. Only detected concentrations are indicated; samples where the indicated chemical was not detected are not shown on the graphs.

The following conclusions about the distribution of metals were derived from review of Figure 5-21 and integration of grain size distribution information presented in Section 5.2.2:

- Concentrations of coarse-grained slag-associated metals are generally highest near the U.S.-Canada border and lowest near Grand Coulee Dam. In right- and left-bank samples, concentrations of most coarse-grained slag-associated metals decline sharply between RM 720 and RM 725, located upstream from Marcus Flats. In the mid-channel samples, elevated concentrations of coarse-grained slag-associated metals extend several miles farther downstream to Marcus Flats, as shown in the distribution graph for zinc.
- Concentrations of cadmium, mercury, and nickel are generally higher in the reservoir section than the river above Northport at RM 734. The cadmium and mercury plots have similar patterns, which are also similar to the TOC plots described in Section 5.3.
- The longitudinal distribution of lead differs from those of cadmium, mercury, and nickel and from the other coarse-grained slag-associated metals. Like the other coarse-grained slag-associated metals, lead concentrations are elevated in samples above Marcus Flats. However, elevated concentrations of lead continue in mid-channel samples well past Marcus Flats into portions of the system dominated by reservoir depositional processes. Lead has been documented to be a component of water-granulated fumed slag, which may explain its distribution above Marcus Flats (i.e., associated with coarse-grained slag), and can also be subject to aqueous-phase transport and association with organic carbon and suspended sediments, which may explain its distribution below Marcus Flats (i.e., associated with finer grained material).
- The river upstream from Marcus Flats is faster flowing, particularly during reservoir drawdown, and typically the bed sediment consists of coarser grained materials. The hydrodynamics of the system influence transport and deposition of different grain size materials. Above the vicinity of Onion Creek (RM 734), the mid-channel of the river is dominated by cobbles and boulders; sand and coarse-grained slag-associated metals occur predominantly along the shore in eddies, point bars, and beaches. Finer grained material is carried downstream. Between Onion Creek and Marcus Flats, coarse-grained slag-associated metals are present in both mid-channel and bank samples, suggesting broader deposition of sand-sized materials in this portion of the river.
- Marcus Flats appears to be a transition area for coarse-grained slag-associated metals and other metals. Sediment transport and deposition in the Marcus Flats area is affected by the hydrodynamics of the river (both existing and historical) and by water level

changes in Lake Roosevelt. In areas such as the former river channel with faster flow velocities (at times of low pool elevations), coarse-grained materials and coarse-grained slag-associated metals are present. Finer grained materials and other metals such as mercury are found in portions of Marcus Flats that are typically covered by the quiet waters of Lake Roosevelt at times of high pool elevations.

- Downstream from Marcus Flats, metals distribution is a function of reservoir deposition of finer-grained sediment that is transported as suspended load to Lake Roosevelt. Sifting and washing processes along the banks of the lake also carry finer grained materials into the lake, leaving coarse-grained materials behind. Landslides and slumping along the lake shore also serve to redistribute sediments and may locally influence the distribution of metals.

5.4.1.2 Transverse Distribution of Metals

The Phase I sediment sampling program included collection of sediment samples along a number of transects that cross the river and reservoir. Previous sampling programs did not collect cross-channel (transverse) sediment samples along transects. The need for this type of information was identified through the DQO process as an essential component of the Phase I sediment sampling program. The establishment of regularly spaced transects by river mile was the fundamental approach for establishment of sample locations to characterize the distribution of COIs in UCR sediment.

Transect samples are described in Section 2.2, and the locations sampled are shown in Figures 2-2 to 2-12. Typical transects included three samples: one on the left bank, one in the middle of the old river channel, and one on the right bank. A higher number of sample locations was established for the center transect of each of the six focus areas to better define the transverse variability of sediment contamination. These transects are referred to as high-density focus area transects and are located at RM 742, 723, 706, 678, 642, and 605. An additional high-density transect was established at RM 637, 2 miles downstream from the Spokane River confluence. The high-density transects provided a greater ability to observe variations in sediment metal distribution as a function of sample depth and/or elevations compared to the standard transect samples at discrete locations.

Transverse variations in metal concentration were analyzed by dividing the site into three subareas that were defined based on the conclusions from the longitudinal distribution evaluation. These areas consist of the portions of the UCR upstream from Marcus Flats (upstream from RM 707), within Marcus Flats (between RM 707 and 702), and downstream from Marcus Flats (downstream from RM 702). Coarse-grained slag-associated metals are discussed separately from the other metals.

In the discussion of the transverse distribution of metals, general descriptive terms are used to identify specific locations within the reservoir transect. These terms include the following:

- Side bank: Sample stations located at the outer ends of the transects; side-bank samples typically lie above elevation 1208 and are above the pre-reservoir Holocene river channel/floodplain.

- Side channel: Sample stations located between the mid-channel sample and the side-bank areas, but still in the deeper portions of the river/reservoir at elevations below 1208.
- Mid-channel: Sample station (or stations) located at the deepest portion of the transect within the original pre-reservoir river channel.

Above Marcus Flats (Upstream from RM 708)

The transverse distribution of sediment metal concentrations upstream from Marcus Flats is quite, variable as indicated in the plots of longitudinal metal concentration presented previously. This is especially the case for coarse-grained slag-associated metals.

Coarse-Grained Slag-Associated Metals

The concentration of coarse-grained slag-associated metals (antimony, arsenic, chromium, copper, iron, lead, manganese, and zinc) in the samples containing sand-sized water-granulated fumed slag varies significantly within the UCR between the U.S.-Canada border and Marcus Flats. As previously discussed, sediment samples from mid-channel upstream from RM 729 were unattainable due to the high river flow velocities and/or the presence of coarse-grained sediment (gravels, cobbles, boulders) that could not be sampled with the methods of collection employed by this study. Sand-sized material, including some percentage of water-granulated fumed slag, is expected to be present in the mid-channel region, where it would be lodged in the interstices between the larger sized sediment, or localized in small, localized eddies behind larger boulders and other obstructions. Mid-channel river velocities are periodically high enough in this area to transport water-granulated fumed slag downstream.

The variability in metals concentration above RM 729 is largely attributable to the relative proportion of coarse-grained water-granulated fumed slag and native sediment (having a naturally lower concentration of the coarse-grained slag-associated metals) that is present in the sediment from that particular area. The actual amount of coarse-grained water-granulated fumed slag that is present in a given area depends on many factors, including the proximity to a tributary depositing cleaner sediment, location within the channel (i.e., in a backwater area or closer to mid-channel), and proximity to bank erosion and/or bank slump areas.

Below RM 729 and above RM 707, mid-channel samples were attainable at 50 percent of the planned locations. With the exception of the sample 718X2, all mid-channel samples that could be obtained downstream from RM 729 had notably higher coarse-grain slag-associated metal concentrations than the corresponding left or right bank samples collected along the same transect. The sample from 718X2 was collected on the outermost edge of the old river channel (see Figure 2-4) and may not be representative of the main mid-channel corridor, where coarse-grained water-granulated fumed slag preferentially accumulates and is mobilized as bedload sediment.

Table 5-3 provides a summary of zinc concentrations in mid-channel samples between RM 729 and RM 710. The elevated zinc concentration in these mid-channel sediment samples demonstrate that coarse-grained water-granulated fumed slag is preferentially distributed and transported within the present-day main flow channel (thalweg). Sandy water-granulated fumed slag-enriched sediment is most likely to settle and accumulate in

areas of the old river channel where flow velocities are locally reduced due to channel morphology or eddy areas that develop behind submerged obstructions. These localized accumulations of water-granulated fumed slag-enriched sediment most likely become mobilized and transported as bedload during seasonal or episodic high-flow periods when flow velocities are highest.

Other Metals

The concentrations of cadmium, lead, mercury, and nickel in sediment also vary within the UCR between the U.S.-Canada border and Marcus Flats. However, these metals show a less distinct and discernable concentration difference between the mid-channel and side-bank samples than is observed for the coarse-grained slag-associated metals. In addition, the concentrations of these metals are comparatively lower than the concentrations of the major coarse-grained slag-related metals.

Within Marcus Flats (Between RM 708 and RM 701)

The transverse distribution of sediment metal concentrations within the vicinity of Marcus Flats is distinct and variable, particularly for the coarse-grained slag-associated metals. The transverse distribution of other metals is less apparent. Notable observations are highlighted and discussed below.

Coarse-Grained Slag-Associated Metals

Coarse-grained slag-associated metals within the Marcus Flats area display transverse variability that appears to be strongly tied to the sediment transport and depositional characteristics of this unique hydraulic feature of the UCR. More specifically, the observed concentration pattern for these metals provides some important insights into the apparent distribution and fate of coarse-grained water-granulated fumed slag that is transported into this area under past and present reservoir conditions. Figure 5-22 displays the cross-channel variations in coarse-grained slag associated metal concentrations along the expanded transect in Focus Area 3. The concentration pattern in these figures illustrates that the coarse-grained slag-associated metals are preferentially enriched in the single sample (RM 706X4) collected from the area of the old river channel. The other transect samples collected within Marcus Flats (RM 708, RM 707, RM 705, and RM704) show a similar concentration pattern, with the mid-channel "X2" sample consistently showing preferential metals enrichment. For certain metals such as zinc and copper, the concentrations of mid-channel and side-bank sediments differ by as much as two orders of magnitude. Section 5.4.1.3 provides additional discussion on the importance of the old river channel within Marcus Flats as a primary depositional area for coarse-grained water-granulated fumed slag.

Other Metals

For the case of cadmium and mercury, the highest concentrations are present in the side-bank samples (RM706X1 and 706X2). The lead concentration pattern along this same transect shows some general similarity to the other slag-associated metals (i.e., relatively higher concentrations in the mid-channel sample from the old pre-reservoir channel). However, lead concentrations in the X1 and X2 transect samples also were a factor of 3 to 4 higher than the other corresponding transect samples (excluding the mid-channel sample RM706X4), similar to what is observed for cadmium and mercury. No pattern is discernable for nickel. Although sediment from the side-bank and nearshore areas is recognizably finer grained than the mid-channel sample (see Figure 5-15), sediment grain size considerations

alone do not appear to explain the observed concentration pattern for cadmium, mercury, nickel or lead. It is also worth noting that station RM706X7 is located close to the mouth of the Kettle River; river hydraulics (i.e., eddy currents) in this portion of Marcus Flats may affect the distribution and mobilization of COIs in sediment.

Below Marcus Flats (Downstream from RM 701)

Review of the longitudinal and transverse grain size information discussed in Section 5.2.2 demonstrates that silt, clay, and colloids are the predominant mid-channel sediment sizes observed throughout the lower 100 miles of the reservoir. Sediment samples (transect grabs and cores) collected downstream from Marcus Flats showed no visual evidence of black, coarse-grained water-granulated fumed slag. Review of the longitudinal distribution of metals in sediments from the middle and lower reservoir area (Section 5.4.1.1) indicates that concentrations of coarse-grained slag-associated metals decrease progressively with increasing distance downstream from Marcus Flats.

The conceptual model describing sediment deposition in the reservoir area below Marcus Flats is that finer grained sediments are gradually settling out (in general conformance with the principles of Stokes' Law) based on the size and shape of the sediment particles and the flow velocity in the reservoir. The Phase I sediment investigation did not specifically attempt to quantify sediment deposition rates in the middle and lower reservoir area, or to quantify the proportion of sediment contributed by local tributaries versus through-flow contributions (as suspended sediment) from the Columbia River at the U.S.-Canada border. The Phase I investigation did, however, include the collection of samples along a series of high-density transects (included within each focus area) to better understand the nature and extent of metal contaminants across the width of the reservoir. Evaluation of the transverse distribution of sediment contamination in the lower reservoir area enhances the understanding of how metal COIs are distributed in the lower reservoir areas and helps identify the depositional processes that most likely influence the distribution of these contaminants in UCR sediments.

The transverse distribution of sediment metal concentrations downstream from Marcus Flats is characteristically different from the patterns observed in Marcus Flats. The discussion that follows focuses on a reduced suite of coarse-grained slag-associated indicator metals (defined for the purpose of this evaluation as zinc, arsenic, and manganese) and other metals (cadmium, mercury, and lead) to highlight, compare, and contrast the transverse distributions of these different COIs.

Coarse-Grained Slag-Associated Metals

Figures 5-23a, 5-24, and 5-25 display transverse variations in concentrations of the coarse-grained slag-associated indicator metals zinc, arsenic, and manganese at three high-density transects downstream from Marcus Flats: RM 678, 642, and 605. The transects at RM 678 and 642 included seven separate samples across the channel, whereas nine samples were collected at RM 605. Side-bank samples are represented by the "X1" and "X7" samples at the two upstream transects; at RM 605, the transect includes three side-bank samples (X7, X8, and X9), two of which were collected from shallow water along a broad, gently sloping beach/side-bank area.

In general, the concentration distribution pattern is similar for all three metals and generally mimics the corresponding transverse plots of fine-grained sediment (<75 µm) (see

Figure 5-15) presented in Section 5.2.2. Although some concentration variability does occur in the deeper side-channel and mid-channel samples, the differences are within a factor of two. Minor differences in sample collection (e.g., inadvertent variations in the actual depth of sample recovery within the sediment column, particularly in areas containing a high percentage of soft, fine-grained sediment) can affect the characterization and understanding of apparent transverse concentration variations.

As previously described in Section 5.4.1.1, there is a general similarity in the observed concentrations of most of the coarse-grained slag-associated metals over the lower 75 miles of the reservoir. Comparison of zinc, arsenic, and manganese concentrations at RMs 678, 642, and 605 shows little difference between the metals. Table 5-4 provides a summary of average concentrations of the mid-channel and side-channel samples from the three transect locations. The overall similarity in both the transverse and longitudinal concentration patterns demonstrates that transport and deposition of COI metals in the reservoir area below Marcus Flats is relatively uniform and is controlled primarily by the natural hydrodynamic dispersion and settling of fine suspended particulates (clays, colloids, fine organic carbon-enriched detritus) with which these trace metals likely are sorbed or otherwise associated (e.g., possible fine particulate components of liquid effluent) in this portion of the site, rather than being associated with coarse-grained water-granulated fumed slag particles. The discussion below demonstrates that transverse concentrations of other metals are very similar to the coarse-grained slag associated metals, which further supports the concept that the principal source of all the metals is likely associated with liquid effluent discharges or rinsing/leaching of water-granulated fumed slag.

Other Metals

Figures 5-23b, 5-24, and 5-25 also display transverse variations in cadmium, mercury, and lead concentrations at the same three high-density transects (RM 678, RM 642, and RM 605) discussed above. Overall, the transverse distributions of these metals in the reservoir area below Marcus Flats show marked similarity to the concentration patterns observed for the coarse-grained slag-associated metals. As noted above for the coarse-grained slag-associated metals, some concentration variability does occur between the deeper side-channel and mid-channel samples, but the differences typically are within a factor of two. Likewise, average concentrations of the other metals (Table 5-5) remain relatively similar, differing by less than a factor of two over the entire 70-mile interval spanned by these three transects.

As described in Section 5.2, the side-bank samples from these transects are characteristically more coarse-grained than the associated side-channel and mid-channel samples due to the washing effect of reservoir level fluctuations combined with wave action and sub-aerial erosion processes. As shown in the transverse distribution plots, COI metal concentrations in the side-bank samples are consistently lower than concentrations observed in the deeper side-channel and mid-channel samples. A direct correlation appears to exist between the concentration of certain COI metals concentrations and the corresponding percentage of fine-grained sediment and/or the TOC concentration that is present in the samples. Figures 5-26, 5-27, and 5-28 present a series of correlation plots that compare the measured concentrations of mercury and cadmium in mid-channel and side-channel transect samples collected below Marcus Flats to the amounts of clay, colloids, and TOC in these same samples. The figures include a program-defined trendline through the data set to help highlight apparent correlation trends. The data in Figures 5-26 and 5-27 suggest that the

cadmium concentration displays a slight to moderate association with increasing TOC concentration and colloid percentage. Figure 5-28 also shows that a slight to moderate association may exist between the mercury concentration and measured TOC concentration. These relationships are expected, given the known sorption affinity that these metals typically have for fine-grained sediment and organic carbon.

5.4.1.3 Vertical Distribution of Metals

The DQO process for the Phase 1 sediment investigation identified the need for additional information on the vertical distribution of COI metals in UCR sediments. Specifically, the DQO for subsurface sediment was developed in response to the uncertainties associated with the vertical distribution of COIs in UCR sediment, the potential for scour/ redistribution of contaminated sediment, and the potential environmental fate and transport of these contaminants.

Historical information on the vertical distribution of metal contaminants in UCR sediments is limited. Previous UCR sediment studies by Ecology and USGS included collection of shallow core samples (typically <4 feet long) from a limited number of locations within the reservoir. The Ecology core sample was collected in 1986 from the area of Frenchman Rocks (RM 692). In 2002, the USGS collected core samples from five locations (RMs 705, 692, 668, 643, and 624) within Lake Roosevelt. The purpose of the USGS study was to evaluate the trace-element concentrations within the accumulated bed sediments of Lake Roosevelt and evaluate whether metallurgical slag was present. A discussion of methods, findings, and conclusions from the recent USGS investigation are presented in *Vertical Distribution of Trace Element Concentrations and Occurrence of Metallurgical Slag Particles in Accumulated Bed Sediments of Lake Roosevelt, Washington, September 2002* (USGS, 2005).

As discussed in earlier sections, nine core samples were collected between Marcus Flats (RM 708) and the area just upriver from Grand Coulee Dam (RM 605) as part of the Phase I sediment investigation. The core locations are shown in Figures 2-5 through 2-12. Figures 5-29 through 5-36 show the locations of these cores on cross-sectional transect plots of the river channel to better depict the core location with respect to river channel morphology. Section 5.2.2 provides additional discussion on the methods of core sample collection, potential disruption/liquefaction of the uppermost sediment horizon (particularly in mid- and lower reservoir areas containing soft, weakly consolidated clay- and colloid-enriched sediment) caused by Vibracore operations, and the sample depth intervals that were established to assess the vertical distribution of COIs and variations in grain size. Section 5.2.2 also describes river conditions above Marcus Flats that prevented the collection of sediment core samples.

The vertical distributions of arsenic, cadmium, lead, mercury, iron, and zinc at the nine core locations are summarized in Table 5-6. The distribution information illustrates the following important concepts regarding the vertical and longitudinal distribution of COIs in UCR sediments:

- Coarse-grained slag associated metals such as zinc and iron are notably enriched in the Marcus Flats core samples (RM 708 and 704). As discussed in Section 5.2.2, black, sand-sized water-granulated fumed slag particles were visually evident throughout the full 7 foot length of the Marcus Flats cores. The concentration of zinc and iron in the most

upstream core collected above Marcus Flats core suggests that the sediment in the pre-reservoir river channel may contain as much as 50 percent water-granulated fumed slag, based on a comparison to the typical metal concentrations in water-granulated fumed slag (BFO, 1972; Cominco, 1990).

- Differences in the concentration and vertical distribution of coarse-grained slag-associated metals such as iron and zinc in the core samples from RM 708 and RM 704 (Marcus Flats) indicate variability in the depositional environment of the pre-reservoir river channel.
- Concentrations of the coarse-grained slag-associated metals iron and zinc decline by approximately an order of magnitude between Marcus Flats and RM676.
- Cores obtained from RMs 692 and 676 show elevated concentrations of coarse-grained slag-associated metals, but no visual evidence of sand-sized water-granulated fumed slag. Concentrations of coarse-grained slag-associated metals were highest in the deeper intervals of these cores (5 to 7 feet below the top of core).
- The core from RM 676 contained the highest concentrations of arsenic, cadmium, lead, and mercury. Of these metals, arsenic is considered a coarse-grained slag-associated metal. The other metals have been associated with aqueous effluent discharges from the Cominco smelter and generally exhibit an affinity for sediments and/or organic matter. These metals show a lower degree of concentration variability throughout the site as compared to the more coarse-grained slag-associated metals. The highest concentrations in the RM 676 core typically occur in the 3- to 5-foot or 5- to 7-foot core interval samples. Given their general fate and transport characteristics, it is expected that these metals would be preferentially sorbed to fine-grained organic or inorganic particulates (i.e., clays, colloids, or organic detritus).
- Cores from the lower portion of the site (RM 661 and below) did not contain visual evidence of water-granulated fumed slag, and elevated metals concentrations appear to be associated with the soft, clay- and colloid-enriched layer nearer the top of these cores.
- Sediment samples from the RM 622 core consistently contain the lowest observed concentrations of COI metals as compared to the other eight cores. As discussed in Section 5.2.2.4, it is uncertain whether the RM622 core sample provides a representative indication of sediment conditions in this portion of the reservoir and accurately portrays the vertical distribution of in-place sediment immediately below the sediment/water interface. As shown in Figure 5-30, the RM622 core is located next to a steep side bank, and landslides (identified by USBR) have been mapped upslope from this location (see Figure 2-10). It is possible that the materials at this core location may consist of clean bank slump sediments that have been recently introduced into the reservoir.

Figures 5-37, 5-38, and 5-39 display vertical variations in COI concentrations for selective metals (arsenic, lead, mercury, and zinc) at three individual core locations (RM 704, 676, and 605) representing sediment conditions in Marcus Flats, the mid-reservoir, and the lower reservoir, respectively. These plots further illustrate and reinforce some of the key concepts discussed above regarding the vertical distribution of COI metals in UCR sediments.

5.4.1.4 Distribution of Metals on Beaches

The term "beach" as used in this report and the Phase I Sediment QAPP describes areas that are located between the high- and low-water marks along the shores of the river and reservoir and may be subject to high use by human receptors. A total of 15 separate beach areas were selected for sampling in order to provide a sufficient number of representative samples to assess conditions in these high-use areas. The following beaches were sampled:

- Black Sand Beach—RM 742, East Side
- Northport City Boat Launch—RM 735, East Side
- Dalles Orchard—RM 730, East Side
- North Gorge Campground—RM 718, East Side
- Marcus Island Campground—RM 708, East Side
- Kettle Falls Swim Beach—RM 700, East Side
- Haag Cove—RM 697, West Side
- French Rocks Boat Launch—RM 690, West Side
- Cloverleaf Beach—RM 675, East Side
- AA Campground—RM 673, East Side
- Rogers Bar Campground—RM 658, West Side
- Columbia Campground—RM 642, East Side
- Lincoln Mill Boat Ramp—RM 633, East Side
- Keller Ferry No. 2—RM 615, East Side
- Spring Canyon Campground—RM 600, South Side

Three of the beaches—Northport City Boat Launch, Kettle Falls Swim Beach, and Columbia Campground Beach—were identified as areas of interest based on recreational use, where more detailed discrete and composite sampling was conducted, including collection of samples for size-fractionation analysis. Conditions at the other 12 beaches are represented by elevation-based composite samples.

Longitudinal Trends

Concentrations of COI metals in beach samples were plotted by river mile to evaluate longitudinal trends for beaches along the length of the UCR site (Figure 5-40).

The beach longitudinal trends for antimony, chromium, copper, iron, manganese, uranium, and zinc are similar to those observed in the overall longitudinal trend analysis for coarse-grained slag-associated metals described in Section 5.4.1.1; beaches with the highest concentrations of these metals are located above Marcus Flats. The plot for arsenic is similar, but also shows a slight increase in concentrations in the lower portion of site. The highest concentrations of cadmium, lead, mercury, and nickel extend farther downstream to the vicinity of the AA Campground Beach at RM 673.

Elevation-Based Trends

The beach sampling program was also set up to evaluate possible relationships between elevation and chemical concentrations at the selected beaches, with three elevation-based composite samples being collected at each beach. Table 5-7 summarizes the distribution of metals in discrete grab and elevation-based composite samples collected at beaches. The following elevation-based trends were observed in samples collected from the beaches:

- Black Sand Beach. Concentrations of most metals are lower in the samples collected from the middle and lower parts of the beach (elevation 1293). This trend was not observed on any of the other beaches above Marcus Flats.
- Northport City Boat Launch. Concentrations of all metals are higher in samples collected from the middle and lower parts of the beach.
- Dalles Orchard and North Gorge Campground. Concentrations of coarse-grained slag associated metals are higher in samples collected from the middle and lower parts of the beach. Concentrations of other metals do not appear to vary across the different elevations at the beach.
- Marcus Island Campground. Concentrations of copper, iron, and zinc are higher in samples collected from the middle and lower parts of the beach. Concentrations of cadmium, lead, and mercury also are higher in the lower portions of the beach.
- Kettle Falls Swim Beach, Haag Cove, French Rocks Campground, and Cloverleaf Beach. Concentrations of most metals tend to increase in samples collected from the middle and lower portions of the beach.
- AA Campground. No clear trends in concentrations were observed. This is likely because of the beach layout; sample locations were established in known "high use" portions of the beach/inlet area at elevations between approximately 1270 and 1290 feet, laid out in a general grid-like pattern. As such, the AA Campground beach samples do not wholly coincide with the typical beach sampling protocol involving collection of samples from three discrete elevations (1285, 1270, and 1255 feet).
- Rogers Bar Campground. Concentrations of all metals decline somewhat in the lower portions of the beach.
- Columbia Campground. Concentrations of most metals are higher in samples collected from the middle and lower portions of the beach.
- Lincoln Mill Boat Ramp. Concentrations of most metals decline in the lower portions of the beach.
- Keller Ferry No.2 and Spring Canyon Campground. No clear trends in concentrations were observed.

Comparison of Beach Results to Nearby Bank Sample Results

The average concentration of metals at each beach are compared in Table 5-8 to concentrations at nearby (i.e., within 3 miles up or downstream) individual transect sample locations. For the most part, the average concentration of metals at the beaches is bracketed within the range of concentrations detected in the nearby transect bank samples. A statistical evaluation of potential beach/bank relationships was not conducted because of the limited number of bank samples associated with each beach (typically fewer than four) and the variability of detected results for the nearby transect samples.

Grain-Size Trends

Selected beach composite samples were analyzed for particle size fractionation of metals. Figures 5-41 illustrates analytical results for select COI metals (arsenic, cadmium,

chromium, copper, iron, lead, manganese, mercury, and zinc) in particle size fractions of <75 µm and 75 µm to 2 mm for samples collected at the Columbia Campground (RM 642), Kettle Falls Swim Beach (RM 700), and Northport City Beach (RM 735).

In general, all the metal COIs were detected at higher concentrations in the finer grained fraction (<75 µm) in the downstream beaches (Columbia Campground and Kettle Falls Swim Beach). However, in the Northport City Beach sample, chromium, copper, iron, manganese, and zinc were detected at higher concentrations in the coarser fraction (75 µm to 2 mm) than in the <75 um fraction. This finding is consistent with the observation that these metals are associated with coarse-grained water-granulated fumed slag deposited locally in the upper reach such as the Northport City Beach. The coarse fraction of the downstream beach samples thus likely consists of pre-reservoir bank sediment (terrace deposits) or re-worked colluvial material. At the downstream beaches, the fine grained materials with comparatively higher metals concentrations likely were deposited under reservoir conditions and subjected to limited sifting and washing effects described above. The higher concentrations of metal COIs in the finer fraction at the downstream beaches is consistent with the general tendency of the metal COIs to associate with fine-grained sediment and TOC.

5.4.1.5 Distribution of Metals at Tributary Mouths

Tributary sediment samples were collected within the UCR near the mouths of six major tributaries (Sanpoil River, Spokane River, Colville River, Kettle River, Onion Creek, and Big Sheep Creek) to better understand the role that tributaries from larger watersheds in the study area may play as potential sources of COIs, and to assess potential COI dilution or enrichment effects on main UCR river channel sediments immediately downstream from the tributary mouths. Sediment conditions at the tributary mouths may be complex and dynamic due to chemical, hydraulic, and other physical processes that may be active in these environments. The evaluation of the Phase I tributary mouth surface sediment sample results is limited to a comparison of the tributary mouth samples results to nearby mid-channel sample results. These sample results are illustrated in Figure 5-22. Results of the limited evaluation of potential impacts of the major tributaries are as follows:

- **Big Sheep Creek.** Arsenic and cadmium concentrations were lower, while chromium, copper, lead, manganese, and zinc concentrations were much lower, in Big Sheep Creek tributary samples than in nearby mid-channel samples.
- **Onion Creek.** Antimony and uranium concentrations were lower, while chromium, copper, lead, manganese, and zinc concentrations were much lower, in Onion Creek tributary samples than in nearby mid-channel samples. Nickel and mercury concentrations were not appreciably different.
- **Kettle River. A**ntimony, arsenic, cadmium, chromium were lower; copper, lead, manganese, and zinc concentrations were much lower; and nickel concentrations were higher in the Kettle River tributary than in nearby mid-channel samples. Mercury concentrations were not demonstrably different.
- **Colville River.** Arsenic, chromium, copper, lead, and zinc concentrations were lower, and nickel concentrations were slightly higher, in Colville River tributary samples than

nearby mid-channel samples. Cadmium, manganese, and mercury concentrations were not demonstrably different.

- **Spokane River.** Mercury concentrations were lower in the Spokane River tributary samples than in nearby mid-channel samples. No demonstrable difference was noted for the other metal COIs.
- **Sanpoil River.** Mercury concentrations were lower in the Sanpoil River tributary samples than in nearby mid-channel samples. No demonstrable difference was noted for the other metal COIs.

In summary, based on this limited analysis of potential impacts from major tributaries, none of the tributaries appear to contribute to loading of metal COIs in mid-channel sediments, with the possible exception of nickel from the Colville River and Kettle River. In general, it appears that tributary sediment contributions tend to dilute concentrations of the other metal COIs in mid-channel sediments.

5.4.2 Distribution of Organics

The organic COIs identified as a result of the Phase I sampling are listed in Table 4-1. The longitudinal, transverse, and vertical distributions of the organic COIs, as well as distributions on beaches, are briefly summarized by analytical group (e.g., dioxins/furan, pesticides, PCBs) in the following subsections.

5.4.2.1 Dioxins/Furans

Dioxin/furan analysis was conducted only on samples collected at beach and core locations. All 17 dioxin/furan congeners were detected in Phase I sediment core and beach samples. Of these, 2,3,7,8-tetrachlorodibenzofuran (2,3,7,8-TCDF) is the congener with the greatest number of detects and the greatest number of exceedances of criteria (Table 4-1). Results for 2,3,7,8-TCDF are presented below. The longitudinal distribution, areal distribution on beaches, and vertical distribution of 2,3,7,8-TCDF in cores are discussed below. Trends for 2,3,7,8-TCDF concentrations associated with size-fractionated beach samples, and trends for TOC, clay, and colloids in beach and core samples, also are discussed below.

Longitudinal Distribution in Beaches and Cores

2,3,7,8-TCDF was detected in samples from 11 beaches, with the highest concentrations detected in samples from Marcus Island (RM 708), North Gorge (RM 718), and Haag Cove (RM 697). The longitudinal distribution of 2,3,7,8-TCDF in beach sediment samples is summarized in Table 5-9. 2,3,7,8-TCDF was also detected in samples from three cores collected at RM 605, RM 637, and RM 692. The highest concentrations in beach samples were detected in samples from RM 708 (Marcus Island), RM 697 (Haag Cove), and RM 718 (North Gorge). The highest concentrations in core samples were detected in cores collected at RM 637 and RM 692.

Areal Distribution on Beaches

For beaches below Marcus Flats, 2,3,7,8-TCDF concentrations in beach samples were generally highest in B3 samples, which were collected at the lowest elevations, and decreased with increase in elevation. Distribution of 2,3,7,8-TCDF with respect to elevation in beach sediment samples is summarized in Table 5-10.

Vertical Distribution in Cores

2,3,7,8-TCDF exhibited generally decreasing concentrations with depth for the cores collected at RM605, RM637, RM661, and RM692, with the highest concentrations consistently detected in samples from the upper one foot of the core except for the core collected at RM 704, in which concentrations were low for all sample depths. The relationship of 2,3,7,8-TCDF concentrations and sample depth for cores is presented in Table 5-10. The comparatively low concentrations in samples from all depths in the core from RM 704 may be attributable to the comparatively high proportion of sand and low proportions of silt and finer particles throughout the core. The association of particle size and 2,3,7,8-TCDF concentrations in core samples is discussed further below.

Size Fractionation

Samples from beaches at RM 642, RM 700, and RM 735 were analyzed for particle size fractionation of dioxins/furans. As indicated in Table 5-11, 2,3,7,8-TCDF concentrations for the <75 um particle size fractions were notably higher than those for the 75 µm–2 mm size fractions for each of the beaches.

Association with TOC, Clay, and Colloids

As discussed in Section 5.3, nonpolar organic compounds such as dioxins/furans exhibit an affinity for organic matter in sediments. The concentrations of 2,3,7,8-TCDF in Phase I sediment samples shows a general association with concentrations of TOC in sediment. For example, in the core collected from RM 692, TOC exhibited the highest concentrations in the upper 6-inch interval, and decreased downward (Table 5-2). A similar downward decrease in 2,3,7,8-TCDF concentrations is observed in the core, as discussed above and presented in Table 5-10. A similar association between 2,3,7,8-TCDF and TOC is observed in samples from cores collected from RM 605, RM 637, and RM 661, and in beach samples. Figure 5-42 shows 2,3,7,8-TCDF concentrations versus TOC concentrations for all beach composite samples and core samples in which 2,3,7,8-TCDF was detected.

As discussed in Sections 5.2 and 5.3, the distribution of TOC concentrations in the Phase I sediment samples is similar to the distribution of clay and colloid fractions of sediment, likely because TOC is associated with these slow-settling sediments. As illustrated in Figure 5-43, there is also a general association of 2,3,7,8-TCDF concentrations and clay/colloid content in sediment, particularly for core samples.

5.4.2.2 PCBs

The PCB Aroclors identified as COIs are Aroclor-1016 and Arochlor-1260, each of which was detected once at a concentration exceeding its respective screening level. The detected exceedances occurred at the same sample location, RM 687A1, located 13 miles downstream from Marcus Flats. PCBs were detected at low concentrations in bed sediment samples collected from nearby locations during previous investigations by Ecology in 1990 (Ecology, 1991) and USEPA (E&E, 2003). In 1990, PCBs (as tetra-, penta-, and hexachlorinated biphenyls) were detected at low concentrations in a single sample collected near French Point Rocks, near RM 690 (Ecology, 1991). In 2001, PCBs (Aroclors 1254 and 1260) were detected at low concentrations in a single sample collected at RM 688 (E&E, 2003). The observation that detection of PCBs has been limited to the general area between RMs 687 and 690 suggests the possibility of a local PCB source or a nearby source or localized zone of accumulation.

5.4.2.3 Pesticides

Several pesticides, including 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and aldrin, were identified as COIs in sediments (see Table 4-1). Of these, the pesticides that exhibited the greatest number of screening criteria exceedances were 2,4'-DDE, 2,4'-DDT, 4,4'-DDE, and 4,4'-DDT. Longitudinal profiles of concentrations of these pesticides in sediment are illustrated in Figure 44. The highest concentrations of these pesticides were detected in beach samples collected at Columbia Beach (RM 642), possibly indicating a nearby local source of these pesticides. Of the samples collected at Columbia Beach, the discrete sample B3R (corresponding to the lowest elevation and right-hand side) contained the highest concentrations of all four pesticides.

5.4.2.4 PAHs

PAHs identified as COIs in sediments are benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, indeno[1,2,3-cd]pyrene, and chrysene (see Table 4-1). Of these PAHs, chrysene exhibited the greatest number of detects and exceedances of sample-specific carbon-adjusted CCT values. A longitudinal profile of concentrations of chrysene in sediment is illustrated in Figure 5-45. Chrysene was detected in beach, core, and river group sediment samples throughout the UCR, with most concentrations below 10 micrograms per kilogram (µg/kg). The highest chrysene concentrations were detected in beach or bank samples from RM 740 (left bank), RM 735 (Northport City Beach), RM 730 (Onion Creek tributary sample), RM 708 (Marcus Island Campground Beach), RM 678 (left bank), and RM 628 (right bank). In general, the bank and beach samples exhibit the highest chrysene concentrations overall, although mid-channel samples tend to have higher concentrations than the adjacent transect samples between RM 695 and RM 678. No sources of chrysene or other PAH COIs have been identified in the UCR.

5.4.3 Data Gaps

Data gaps pertaining to the nature and extent of metal and organic COIs in UCR sediments have been identified. Whether these data gaps constitute data needs for the RI/FS will be evaluated through the DQO process or future RI/FS phases. These data gaps are as follows:

- Limited data are available from previous UCR sediment studies to perform a robust and defensible analysis of temporal changes in COI concentrations. Evaluation of temporal changes in COI concentrations, although not specifically included as a DQO of the Phase I sediment sampling program, likely will be necessary as part of future RI/FS phases.
- Analytical uncertainties resulted in incomplete characterization of antimony and uranium as part of the Phase I sediment investigation. Additional antimony and uranium data may be required to more fully assess the nature, extent and magnitude of these constituents in UCR sediment.
- The observed concentration pattern for nickel suggests a possible natural geologic source within the limits of the UCR watershed system. Additional evaluation of nickel in UCR sediments may be necessary to determine whether concentrations in UCR sediment are more attributable to natural or anthropogenic sources.

- Certain sediment samples were unattainable during the Phase I sediment investigation, especially mid-channel samples from the riverine and reservoir reaches above Marcus Flats. The absence of sediment samples from these areas limits the understanding of how sediment COIs are distributed in these portions of the UCR. Additional sediment samples may need to be collected (perhaps using different methods of sediment collection) to more fully characterize the distribution of COIs in this portion of the UCR.
- The evaluation and discussion of the findings from the Phase I sediment investigation was focused, by necessity, on a limited suite of COIs that served as primary indicator constituents. Additional analysis and evaluation of the Phase I data set (inorganics and organics) could be performed, if determined to be important for purposes of risk assessment, remedy selection, or ARARs analysis, to better understand, or further refine, the nature and extent of various trace elements and COIs in UCR sediment that were not discussed in detail herein.
- Results from the Phase I sediment investigation suggested that transport of sand-sized sediment—including water-granulated fumed slag—was limited in areas downstream from Marcus Flats, whereas within Marcus Flats considerable quantities of slag were evident in the mid-channel core and grab samples. Other large accumulations of slag have been documented in other areas of the UCR upstream from Marcus Flats. Additional investigation of the lateral and vertical extent of slag-impacted sediment, both upstream and downstream from, as well as within Marcus Flats, may be necessary to better refine the primary depositional zones for slag, and the extent over which the larger sized slag particles are distributed.
- The spacing of the Phase I sediment samples is appropriate for gaining a general understanding of longitudinal, transverse, and vertical distribution of COIs in sediment from throughout the UCR study area. Additional characterization samples may be needed to further refine locations of greatest sediment contamination by mass and concentration.
- The various factors that influence the spatial concentration patterns for mercury and cadmium in the Marcus Flats area sediments are not well understood based on available source information, river/reservoir hydrodynamics, and the existing distribution of sediment samples. Refining the overall understanding of mercury and cadmium in UCR sediment is important to the sediment CSM and to future risk assessment efforts. Additional characterization samples from the Marcus Flats area may be necessary to better refine the nature and extent of these constituents, and to identify what factors may be controlling their distribution in this area.
- Metal COIs, including coarse-grained slag-associated metals and other metals, are documented to have been discharged into the UCR in liquid effluent. The chemical and physical characteristics of the metals in liquid effluent are not known based on review of available data. Additional information on the characteristics of the liquid effluent discharges may be required to better understand the nature and extent, as well as fate and transport and potential risk, of these COIs.

- The Phase I sediment investigation did not include a DQO related to the determination of background levels of COIs. Establishing background concentrations for selected COIs may be important, especially for purposes of risk assessment and/or when considering any possible future remedial actions.
- The Spokane River potentially has an influence on the concentrations of certain COIs that are measured in UCR sediments. However, ascribing a definitive cause/effect relationship to certain COIs without having a corresponding set of comparable data for the Spokane Arm of Lake Roosevelt limits the ability to assess this possible relationship. Additional evaluation of the Spokane River as a potential source of COIs to the lower reaches of the UCR reservoir may be necessary.
- Dioxin and furan data are limited to cores and beaches and thus provide only limited spatial coverage. Additional sampling and analysis for dioxins and furans may be necessary to provide a more complete characterization of these organic constituents in sediment samples from throughout the UCR.
- Organic COIs have been detected in UCR sediment but have not been attributed to a particular source. Additional evaluation of organic COIs in UCR sediments may be necessary to determine whether concentrations in UCR sediment appear to be related to a specific source, or possibly due to other causes (e.g., atmospheric deposition of combustion byproducts).

5.5 Fate and Transport of COIs in Sediment

Section 4.4 of the A&R Document (CH2M HILL, 2004b) provided a detailed description of proposed hypotheses regarding the fate and transport of contaminants within the UCR. The fate and transport concepts described in the A&R Document were based on a review of historical data and an assessment of hydraulic relationships that exist between the river and reservoir; in particular, flow velocities in the river under different stage and discharge conditions.

Overall, the observations and findings from the Phase I sediment sampling program support the fate and transport concepts presented in the A&R Document. The data and findings from the Phase I sediment sampling have, however, helped to refine the understanding of the physical characteristics, chemical processes, and hydraulic factors that affect the fate and transport of environmental contaminants in the UCR. This section summarizes the current conceptual model concepts concerning fate and transport.

5.5.1 Contaminant Transport Mechanisms

Environmental contaminants in the UCR system are thought to be present in one of three primary forms: solid phase, particulate sorbed, or dissolved phase. The solid-phase form would include, for example, water-granulated fumed slag from the Cominco smelter that contains various trace metals, metalloids, and common earth-crust metals such as aluminum and iron. These contaminants would be present within the mineral matrix of the sand-sized or finer water-granulated fumed slag material. Other possible solid-phase forms of COIs could potentially include fine particulates associated with liquid effluent discharges. Particulate-sorbed contaminants include both inorganic and organic constituents that are

preferentially bound to fine-grained solid-phase materials (clay, colloids, organic carbon-enriched detritus) that are present in the UCR system. Dissolved-phase contaminants would either remain in solution from their source of origin, or become leached or dissolved from a solid-phase material.

The A&R Document described the following four general transport mechanisms for mobilization of contaminants within the UCR:

- Solution transport
- Suspended transport
- Surface transport
- Bed transport

In brief, **solution transport** involves the movement of dissolved contaminants in UCR surface water until chemical conditions result in precipitation, or sorption to particulates, or sorption to hydroxides or oxyhydroxides that are present on some mineral surfaces, or biological uptake. The Cominco smelter, its fertilizer plants, and other facility operations are known to have contributed aqueous discharges to the Columbia River. The Phase I sediment investigation did not directly investigate the concentration of contaminants in Columbia River surface water. However, results from the Phase I sediment sampling program provide some inferences regarding possible mechanisms by which these aqueous-phase metals were transported, dispersed, and deposited into the UCR sediments—especially where they are found in greater concentrations within the finer grained sediments below Marcus Flats.

Suspended transport involves movement of silt- to clay-sized particles of source material such as water-granulated fumed slag, and/or mineral-based or organic particulates to which contaminants are bound via sorption or other surface-binding mechanism. Previous UCR investigations have included sampling and analysis programs to evaluate the concentration of organic and inorganic contaminants in suspended particulates from the river. The Phase I investigation did not directly investigate suspended transport of contaminants. However, inferences regarding the transport and deposition of fine-grained suspended particulates have been drawn from the Phase I investigation findings. In particular, it appears evident that much of the contamination found in the finer grained (<200 mesh) sediments from the mid-channel portions of the reservoir downstream from Marcus Flats was, and continues to be, transported there in association with suspended particulate material. Flow velocities below Marcus Flats become low enough to allow settlement and deposition of these particulate-bound contaminants. As discussed below, suspended transport is the primary transport mechanism for the very fine-grained fraction of water-granulated fumed slag and for contaminants associated with very fine-grained particulates, such as those found in the Middle Reservoir and Lower Reservoir reaches.

Surface transport involves the movement of small aggregated mats of water-granulated fumed slag or woody, fibrous materials containing water-granulated fumed slag and/or organic contaminants along the water surface. In this form, the contaminants are transported along the water surface and tend to remain there because of water surface tension. When the surface tension is broken, the floating particulate materials will sink or become suspended in the water column. The Phase I investigation did not directly investigate surface transport of contaminants; however, some small floating mats appearing to contain fine, black water-granulated fumed slag material were observed along the river's

edge in selected up-river locations (above Northport) by field personnel and other investigators during the course of the Phase I field investigation and planning efforts. The mechanism(s) that currently contribute to the formation of these small, floating mats of material are not well understood.

Bed transport involves the movement of sediment along the bottom of the river or reservoir through the processes of traction or saltation. As described in previous sections, visual observations and chemical data demonstrate that water-granulated fumed slag has been preferentially deposited in the upper, free-flowing reaches of the Columbia River and is present in considerable quantity in the old river channel in the vicinity of Marcus Flats. The fate and transport of water-granulated fumed slag depends on its particle size, density (specific gravity), shape, and chemical stability in the river and reservoir environment. Section 5.2.1.4 provides detailed discussion of the flow velocity considerations that influence the mobilization and transport of sand-sized bed sediment under various river flow and reservoir stage conditions.

Findings and observations from the Phase I sediment investigation support the belief that these four processes serve as the dominant mechanisms affecting the transport of contaminants within the UCR system. Section 4.4 in the A&R Document provides a detailed discussion of the fate and transport characteristics of specific COIs (metals and organic constituents) that are present in UCR sediment.

5.5.2 Primary Processes Affecting the Fate and Transport of Sediment COIs

Section 5.5.1 gave a general overview of the primary UCR sediment transport mechanisms, based primarily on the analysis presented in the A&R Document. This section provides additional discussion of specific physical and chemical processes and anthropogenic activities that further affect the fate and transport of COIs in UCR sediment. The particular processes and activities discussed below include:

- Grand Coulee Dam Operations and Regional Management of Columbia River Discharge. Discusses the role and importance of river flow and stage, bank slumping and side-bank washing on the mobilization and distribution of sediment COIs.
- Reduction of Known Upstream Sources of Sediment COIs. Discusses how documented changes in COI source contributions and loading to the UCR affect the fate and transport of these constituents.
- Water-Granulated Fumed Slag Distribution, Accumulation, and Potential Remobilization. Discusses the current understanding of water-granulated fumed slag distribution within UCR sediments, and the potential for future remobilization of the coarse-grained water-granulated fumed slag, and/or coarse-grained slag-associated metal COIs.
- Sediment Accretion and Burial. Discusses how certain reaches of the river/reservoir system serve as a sediment "sink" wherein certain COIs would tend to accumulate and have limited propensity for remobilization and transport.
- Benthic Flux and Biological Uptake and Conversion. Discusses the possible role that benthic flux and biological uptake/conversion may play in remobilizing COIs that are

buried in the near-surface sediment column, and/or become chemically transformed or mobilized by biological processes or biological uptake.

- Effects of TOC on Sorption and Contaminant Mobility. Discusses the possible association of specific COIs with TOC in sediment, and the effect that TOC can have on bioavailability of sorbed constituents.

5.5.2.1 Grand Coulee Dam Operations and Regional Management of Columbia River Discharge

With the construction of Grand Coulee Dam, a large reach of the Columbia River was transformed from a free-flowing riverine system to a managed reservoir system that displays a more lacustrine-like hydraulic environment for much of its length between Grand Coulee dam and the U.S.-Canada border. Creation of a reservoir environment changed the pre-reservoir sedimentation processes and patterns and produced other associated effects that influence the fate and transport of inorganic and organic COIs. Some of the natural and operation-dependent conditions that directly affect sediment transport, mobilization, and deposition are briefly discussed below.

Stage and Discharge

Discharge rates and stage height within the UCR are strongly influenced by the operation of U.S. and Canadian dams. Ongoing operations at Grand Coulee Dam since 1984 and associated hydraulic controls exerted by Canadian dams on the Columbia and Pend Oreille Rivers have maintained a fairly controlled set of stage and discharge conditions in Lake Roosevelt and in the riverine reaches immediately upstream from the reservoir. Seasonal changes in stage and discharge are influenced primarily by seasonal hydrologic conditions, flood control, power demand requirements, and fish management strategies. Section 5.2 discusses river/reservoir hydraulic relationships and the role that managed reservoir levels and flows have on the potential mobilization and transport of sediment within the UCR. These existing operational conditions exert considerable control over the current distribution, transport and deposition of sediment within the UCR river/reservoir system and influence the eventual fate and transport of associated contaminants, both in sediment and in solution.

An example of how flow velocity changes influence the distribution and transport of COIs in UCR sediment is in the observed quantity of coarse-grained (sand-sized) water-granulated fumed slag that has been deposited within the pre-reservoir river channel through Marcus Flats. Section 5.2 discusses how changes in river flow velocity will affect where certain particle sizes are deposited within the UCR. Section 5.2.2 specifically describes longitudinal, transverse, and vertical variations in sediment grain size, including a discussion of observations within Marcus Flats. While variations in river flow velocity are seen to exert a significant influence on the longitudinal distribution of sediment COIs in the river/reservoir system, seasonal changes in the reservoir pool elevation also can affect the vertical distribution and transport of COIs. In particular, higher elevation side-bank and beach areas are known to be submerged less frequently (see Figures 5-2 through 5-4) and therefore would be less able to accumulate finer-grained suspended sediment and associated COIs. Evidence from the Phase I sediment study also suggests that routine operational changes in the reservoir pool elevation contributes to the transport and movement of COIs from the side-bank areas (i.e., side-bank washing) into deeper portions of the reservoir.

Bank Slumps

Normal operational changes in the Lake Roosevelt pool level have caused bank slumps and landslides to occur along many portions of the reservoir shoreline. The more significant bank slump and landslide areas have been mapped by USBR. The locations of these areas are shown in Figures 2-3 through 2-12. Many of the larger slumps occurred in the early years immediately following establishment of Lake Roosevelt. These slumps and landslides typically occurred as a result of lowering of the reservoir pool level and inability of the nearshore sediments to dewater at the same rate, resulting in slope failure of the saturated sediments/soils.

One effect of the slope failures is the transportation of "clean" native sediment/soil from the upland side banks into the reservoir. The frequency and magnitude of bank slumpage is believed to have declined significantly as a result of current reservoir management practices. As a result, the influx of "clean" sediment is thought to be considerably less today than occurred during the first decade or so of reservoir operations. Recent studies by the USGS (USGS, 2005) identified sediment horizons in selected core samples within the reservoir that were inferred to represent materials that likely originated from historical bank slumps. From a fate and transport perspective, bank slump sediments can either cover and bury earlier sediments known to contain COIs, or could disrupt and remobilize COIs that are present in the soft, fine-grained horizon near the top of the sediment column.

Side-Bank Washing

In addition to promoting possible bank instability as discussed above, reservoir level fluctuations, coupled with wave action on the side banks and beaches and sub-aerial erosional processes contribute to the washing and mobilization of fine-grained sediment particles from these areas. In particular, as the reservoir is raised and lowered over its current operational range (approximately 1208 to 1290 feet), the finer grained sediment fraction (containing either elevated or comparatively low concentrations of COIs) is preferentially washed and eroded from these reservoir side-bank areas. Once eroded and mobilized, these finer-grained sediments will settle into deeper levels of the reservoir. In side-bank areas where finer-grained sediments are present and contain measurable concentrations of COIs, this washing and erosion process can influence the mobilization and distribution of COIs.

Seasonal exposure of the bank areas during periods of reservoir drawdown also can affect volatilization and/or ultraviolet (UV) degradation of any organic constituents that may be present in the side-bank areas of the reservoir.

Given the understanding of current and historical reservoir management practices, there appears to be little potential for large-scale broadcasting of sand-sized or finer contaminated sediment into higher elevation side-bank areas, particularly in the reservoir areas below Marcus Flats. Airborne transport of dust-related contaminants from exposed beach and side-bank areas during intermittent high wind events is a potential concern that is being addressed by other investigations and studies. Under current reservoir management practices, reservoir levels would typically remain at a pool level below 1270 during seasonal high-flow conditions (see Figures 5-3 and 5-4). As a result, contamination of the upper 20 feet of the side-bank area due to large-scale broadcasting of contaminated suspended sediments would not be expected. Similarly, evidence from Phase I transect samples indicates that side-bank sediment samples collected between elevation 1290 and 1250

typically show much lower concentrations of COIs compared to sediment samples collected from a lower elevations within the reservoir below Marcus Flats.

5.5.2.2 Reduction of Known Upstream Sources of Sediment COIs

According to a summary report prepared by consultants to Cominco, the routine discharge of water-granulated fumed slag into the Columbia River was discontinued in mid-1995. According to Celgar, in the process of modernization, which included reduction of chlorine usage, the plant reduced discharges of furans and by 1993 had reduced dioxin and furan concentrations in effluent to below minimum detection limits (E&E, 2003).

Liquid effluent discharges from Cominco have reportedly been significantly reduced since the early 1980s. Section 5.1 provides an overview of these various operations and historical source contributions to the Columbia River. The reported reduction in contaminant contributions from these sources could have a positive effect on the loading and distribution of COIs into the UCR. The Phase I investigation did not specifically address sediment loading rates at or below the border. Uncertainty still remains over the quantity of water-granulated fumed slag that remains within the river system between the Trail facility and the U.S.-Canada border, and the degree to which this sediment is susceptible to scour and remobilization during future high-flow discharge events.

Reduction in effluent discharges from the Celgar facility also would be expected to reduce the dioxin and dibenzofuran contaminant load to the Columbia River.

5.5.2.3 Water-Granulated Fumed Slag Distribution, Accumulation, and Potential Remobilization

As described in Section 5.1.1.2, an estimated 13,000,000 tons of water-granulated fumed slag was generated and discharged to the Columbia River from the Cominco smelter, with about 10,000,000 tons being discharged since construction of Grand Coulee Dam. Lesser quantities of water-granulated fumed slag have been discharged to the Columbia River from the former Le Roi/Northport smelter. The size of the water-granulated fumed slag generated by the Cominco smelter allowed it to be transported (as bedload and suspended load) downriver and become dispersed with other naturally derived UCR sediments. Black, glassy, sand-sized material, having the appearance of water-granulated fumed slag, was observed in some beach, core, transect and bioassay sediment samples collected as part of the Phase I sampling program. Some small quantities of black, ferromagnesian minerals (e.g., amphiboles, pyroxenes) also are expected to be present in the UCR sediments from erosion of bedrock within the drainage system and can show some general similarities to water-granulated fumed slag. However, water-granulated fumed slag is readily differentiated from ferromagnesian minerals based on chemical composition, specific gravity, particle shape, optical and magnetic properties, and weathering characteristics.

Coarse-grained water-granulated fumed slag was visually evident in various samples collected as far downstream as Marcus Flats, where core samples from RM 708 and 704 encountered up to 7 feet of water-granulated fumed slag-impacted sediment. Below Marcus Flats, coarse-grained water-granulated fumed slag was not visually evident in any of the Phase I sediment samples collected. These observations and findings support the observation that coarse-grained water-granulated fumed slag is primarily distributed throughout the upper 40 miles of the UCR. The water-granulated fumed slag, however, is not evenly or uniformly distributed, either longitudinally or transversely, in this reach due

to river morphology and hydrodynamic considerations. Primary accumulation areas within the UCR for sand-sized water-granulated fumed slag include the following:

1. Side-bank beach and point bar areas in the upriver reaches (e.g., Black Sand Beach at RM 742; large point bar deposit at RM 738) deposited during historical high river flow events
2. Marcus Flats, concentrated in the old river channel
3. Dispersed to an unknown depth within the interstices of the coarse, cobbly sediments in the old river channel upstream from approximately RM 729 (Onion Creek)
4. Localized accumulations within the old river channel downstream from approximately RM 729 to approximately RM 710 (near the entrance to Marcus Flats)
5. Within the old river channel downstream from Marcus Flats, but buried at depth by finer-grained post-reservoir sediments that have accumulated since construction of Grand Coulee Dam

Historical information indicates that, at the point of discharge, 90 percent or more of the Cominco water-granulated fumed slag consisted of sand-sized (fine to coarse sand) material (Table 4-1 of the A&R Document). This size fraction would move predominantly via bed transport mechanisms and would be subject to the sediment transport limitations and conditions described above and in Section 5.2. The finer grained water-granulated fumed slag particles (smaller than sand size), which consists of less than one percent by weight of the water-granulated fumed slag according to historical information, would display potentially greater longitudinal and transverse mobilization in the UCR system. Water-granulated fumed slag-associated particles that are silt-sized or finer likely would be transported further downstream from Marcus Flats, and would settle to the reservoir bottom at locations governed by their size and density. Additional sources or mechanisms contributing to the dispersion of coarse-grained slag-associated metals in these finer grained sediments below Marcus Flats include (1) natural influx from local tributary sources, and (2) ongoing remobilization, transport, and deposition of these metals, as true fine-grained particles of water-granulated fumed slag, or as metal ions sorbed to suspended particles, or as fine-grained particulates discharged as a component of liquid effluent.

Although these topics were not addressed by the Phase I sediment sampling program, USGS has recently conducted an evaluation of the role that weathering and decrepitation may play on the potential for remobilization of metals from coarser grained water-granulated fumed slag (USGS, 2005). Findings from the USGS study may help better define the degree to which coarse-grained water-granulated fumed slag can or will serve as an ongoing source of metals contamination to the UCR via resuspension and transport of weathering products from the water-granulated fumed slag particle surface and/or direct solubilization of metal ions into ambient water. However, the degree and rate which these processes are occurring throughout the UCR is unknown.

5.5.2.4 Sediment Accretion and Burial

Previous discussions have touched upon general areas within the UCR river and reservoir where active sediment scouring, side-bank washing, deposition, and accumulation are expected to occur. Sand-sized sediment (containing appreciable quantities of water-

granulated fumed slag) is known to have accumulated in the old pre-reservoir river channel area within Marcus Flats. Deposition of the sand-sized material in this area results primarily from the reduction in river flow velocity below what is needed to sustain bedload transport of most sand-sized material. The transverse grain size plots (see Figure 5-15) also indicate that some fine-grained sediment is deposited in the side-channel and side-bank areas within Marcus Flats. The long-term potential for erosion and transportation of these finer grained sediments within Marcus Flats is not known. Compared to the coarser grained sandy sediments from the mid-channel area, these finer grained Marcus Flats side-bank and side-channel samples have considerably lower concentrations of COIs, reducing the potential concern over remobilization and transport of COIs from these sediments.

In areas downstream from Marcus Flats, fine-grained sediment (silt size and finer) is actively accumulating in the quiescent reservoir areas. Little resuspension and mobilization of the fine-grained sediment is believed to occur in this portion of the reservoir, particularly in areas that are submerged at all times. Bank slumps or bioturbation may cause some remobilization of fine-grained sediments, and bank washing likely remobilizes some fine-grained materials from side-bank areas that are periodically exposed. Existing bottom sediment in the middle and lower reservoir areas is expected to become progressively buried through the steady, ongoing influx and deposition of new fine-grained sediment. A reduction in sediment COI concentrations within the uppermost portion of the sediment column (where biological exposure is most likely to occur) would be expected to occur over time if the influx of COIs in the suspended sediment fraction were to decrease.

5.5.2.5 Benthic Flux and Biological Uptake and Conversion

The Phase I sampling program did not investigate or characterize in-situ sediment pore water concentrations or the possible remobilization of sediment-bound COIs by benthic flux. Benthic flux represents the transport of dissolved chemical species across the solid-liquid interface at the bottom of aquatic systems. The flux of solutes can be either positive (into the water column from the sediment) or negative (out of the water column into the sediment) and can vary over multiple temporal and spatial scales (USGS Toxic Substances Hydrology Program website definition).

COIs that are present in UCR sediment are potentially subject to geochemical processes that can affect their long-term stability, mobility, recalcitrance, and bioavailability. Reservoir pool fluctuations and other natural hydraulic and/or chemical processes that occur within the reservoir environment may affect sediment porewater and the associated benthic flux. The potential role that benthic flux plays on the mobilization of COIs into the water column from the bottom sediment is not known and was not investigated as part of the Phase I sediment sampling. It is known, for example, that physical and chemical processes and reactions within the sediment column can create chemical gradients that may encourage the diffusion of metals and metalloids upward toward the sediment-water interface, thereby increasing the potential for release into the overlying water. For example, a recent study by Toevs et al. (2006) has documented these conditions in metal-affected sediments from Lake Coeur d'Alene in northern Idaho. Biological uptake of COIs and in-place chemical conversion of certain metals (e.g., mercury methylation) can also affect the fate and transport of selected sediment-bound constituents.

The eventual fate of contaminants buried in sediment will differ depending on the constituent and site of deposition. Some constituents are expected to remain effectively immobilized and chemically stable in the sediment column for long time periods. Conversely, some constituents may be more chemically active and influenced by physical and chemical processes and/or biological uptake mechanisms that cause them to experience a shorter residence time in the sediment column.

The Phase I bioassay testing program used both burrowing macroinvertebrates (*Hyalella azteca* and *Chironomus tentans*) and an aquatic macroinvertebrate (*Ceriodaphnia dubia*) to assess the possible impact that exposure to UCR sediment could have on the growth, development, and mortality of these organisms. A detailed discussion of the results from the bioassay testing is presented in a separate technical memorandum, including the results of the bioassay water (porewater) associated with the sediment samples used for the tests (CH2M HILL, 2006b).

5.5.2.6 Effects of TOC and Sediment Fines on Sorption and Contaminant Mobility

The sorption affinity and bioavailability of certain organic and inorganic constituents can be strongly influenced by the concentration of TOC and/or the percentage of clay/colloid-sized material that is present in the sediment. Section 5.3 describes the distribution of TOC in UCR sediments. Section 5.2.2 discusses observed variations in sediment grain size throughout the UCR study area.

The concentrations of organic contaminants (particularly, nonpolar, nonionizable chemicals) and the toxicity of these contaminants in sediments have been observed to correlate with organic carbon content in sediments. For example, the CCT human health sediment screening values presented in Table 3-1 are carbon normalized. Carbon normalizing the screening values takes into account the fact that higher concentrations of TOC in sediment result in lower anticipated bioavailability and toxicity. As discussed in Section 5.3, nonpolar contaminants in sediments or water preferentially partition into the organic material in sediments because of the similar chemical nature of the organic material to the nonpolar organic contaminants. Humic acid is often a significant component of these organic materials. Humic acid is known to act as a complexing agent with various heavy metals.

Figure 5-19 shows the longitudinal distribution of TOC within mid-channel and side-bank samples. Figure 5-20 shows the transverse distribution of TOC at three selected high-density transects: RM 706 (Marcus Flats), RM 678 (mid-reservoir), and RM 605 (lower reservoir). These plots indicate that TOC varies both longitudinally and transversely. These observed variations in TOC show some direct correlation to the concentrations of some COIs. Figures 5-26, 5-27, and 5-28 present correlation plots for cadmium, mercury, and TOC. The data suggest that the cadmium concentration displays a slight to moderate association with increasing TOC; a slight to moderate association also appears to exist between the mercury concentration and measured TOC content.

Section 5.4.2 provides additional discussion on the role that TOC plays in the occurrence and distribution of organic contaminants in UCR sediment. In particular, as shown in Figure 5-42, the concentration of 2,3,7,8-TCDF appears to show a strong positive association with TOC. A similar type of general association between 2,3,7,8-TCDF and clay/colloid content also was observed (see Figure 5-43). These apparent positive associations between

TOC and/or the percentage of sediment fines and the concentrations of selected organic and inorganic COIs are consistent with the known affinity that these constituents have for organic matter and fine-grained sediments. The degree to which the COIs are associated with, and bound to, the organic matter and/or mineral matrices in the sediments will potentially affect the long-term stability and bioavailability of these constituents in the UCR environment.

5.5.3 Data Gaps

Data gaps pertaining to the fate and transport of metal and organic COIs in UCR sediments have been identified. Whether these data gaps constitute data needs for the RI/FS will be evaluated through the DQO process or future RI/FS phases. These data gaps are as follows:

- Uncertainties remain with respect to the chemical processes that affect the potential remobilization and/or solubilization of COIs that occur in association with the fine-grained sediment fraction. Although processes such as chemical oxidation, desorption, dissolution of contaminants, and benthic flux may be influencing the fate and transport of COIs in UCR sediment, specific details regarding these mechanisms are lacking, and investigation of them was not a DQO of the Phase I sediment investigation program. Additional information on metals remobilization may be necessary to better understand the importance of these mechanisms on the fate and transport of COIs in UCR sediment.
- Uncertainties remain with respect to the chemical processes and kinetics that affect the weathering/degradation of water-granulated fumed slag in the UCR environment. Evaluation of slag weathering was not a DQO of the Phase I sediment investigation program; initial investigations of this process have been conducted by USGS. Additional information on slag weathering may be necessary to better understand the importance of this process on the fate and transport of COIs in UCR sediment.
- Metal COIs, including coarse-grained slag-associated metals and other metals, are documented to have been discharged into the UCR in liquid effluent. The chemical and physical characteristics of the metals in liquid effluent are not known based on review of available data. Additional information on the characteristics of the liquid effluent discharges may be required to better understand the fate and transport of these COIs.
- Tributary mouth areas can be complex and dynamic due to a variety of hydraulic, chemical, and physical processes that occur in these localized environments. Information collected during the Phase I sediment investigation provided important information on the apparent nature and extent of COIs in the immediate vicinity of major tributary mouths. Additional data collection may be required to address specific fate and transport considerations or risk assessment concerns associated with tributary mouth areas.
- Consistent with project DQOs, the spacing of the Phase I sediment samples was designed, at large, to provide a general understanding of longitudinal, transverse, and vertical distribution of COIs in sediment from throughout the UCR study area. As discussed in Section 5.4.3, additional characterization samples may be needed to further refine locations of greatest sediment contamination by mass and concentration at a smaller scale of resolution if determined to be important for purposes of risk assessment

or remedy selection. Similarly, if it appears that high chemical variability occurs over small lateral or vertical distances, additional investigation also may be necessary to better assess local-scale variations in fate and transport processes.

- The sediment CSM discusses the potential role of liquid-phase sorption/desorption to fine-grained sediments and TOC. The Phase I investigation did not include specific DQOs that were intended to address the degree to which liquid-phase COIs are sorbed to clay minerals and/or plankton. The specific role that suspended clay minerals and/or organic debris play in controlling the fate and transport of COIs in the UCR environment may need to be further evaluated.
- Findings from the Phase I sediment investigation suggest a slight to moderate positive association between the concentration of certain COIs and the associated TOC and sediment fines percentages. Additional information on the role that TOC and fine-grained particulates have on contaminant mobility and bioavailability may be necessary.
- Little information is available on sediment deposition rates within the UCR system. Establishing sediment deposition rates at several different locations within the system may be useful for understanding variations in sediment transport and the fate and transport of COIs. Age dating of sediments may also be useful to better understand variations in sedimentation rates and magnitudes.

TABLE 5-1
Range of Fine-Grained Size Fraction Percentages in Cores from RM 676 and RM 661
Upper Columbia River RI/FS

	Size Fraction Percentages	
Particle Size Fraction	**RM 676**	**RM 661**
Silt	44-56	66-80
Clay	26-30	9-14
Colloids	8-16	4-9

TABLE 5-2
Vertical Distribution of Total Organic Carbon in Phase I Core Samples
Upper Columbia River RI/FS

	TOC Concentration (mg/kg)								
Depth (ft)	**RM 605 Core**	**RM 622 Core**	**RM 637 Core**	**RM 644 Core**	**RM 661 Core**	**RM 676 Core**	**RM 692 Core**	**RM 704 Core**	**RM 708 Core**
0 - 0.5		1,740	11,800	7,880	7,010	10,100	32,200	534	899
0 - 1	11,400	2,470	10,300	3,700	4,290	7,190	24,800	261	2,050
1 - 3	5,140	2,730	4,070	632	3,990	6,340	16,500	833	2,770
3 - 5	1,770	3,960	2,560	1,090	1,770	7,560	4,030	778	991
5 - 7		1,790		626	1,120	5,530	17,400	918	842
7 - 9		937						2,120	

ft = feet
RM = river mile

TABLE 5-3
Summary of Left-, Mid-Channel, and Right-Bank Zinc Concentrations Between RM 729 and RM 710
Upper Columbia River RI/FS

Sample River Mile	Left-Bank Zinc (mg/kg)	Mid-Channel Zinc (mg/kg)	Right-Bank Zinc (mg/kg)
729	1,250	16,600	1,800
726	2,470	14,800	2,730
724	93	19,200	8,410
722	1,000	20,100	809
721	210	19,200	1,520
718	1,180	1,240	545
710	392	13,600	182

mg/kg = milligrams per kilogram

TABLE 5-4
Average Concentration of Selected Coarse-Grained Slag-Associated Metals at Selected High-Density Transects Below Marcus Flats
Upper Columbia River RI/FS

Transect Location	Average Zinc (mg/kg)	Average Arsenic (mg/kg)	Average Manganese (mg/kg)
RM 678[a]	783	13.8	837
RM642[b]	663	10.1	891
RM605[c]	712	9.5	1266

[a] Mid-channel and side-channel samples at RM 687 include X2, X3, X4, and X5.
[b] Mid-channel and side-channel samples at RM 642 include X2, X3, X4, X5, and X6.
[c] Mid-channel and side-channel samples at RM 605 include X2, X3, X4, X5, and X6 and the X5 duplicate.

mg/kg = milligrams per kilogram

TABLE 5-5
Average Concentration of Other Metals at Selected High-Density Transects Below Marcus Flats
UCR Phase I Sediment Data Evaluation Report

Transect Location	Average Cadmium (mg/kg)	Average Mercury (mg/kg)	Average Lead (mg/kg)
RM 678[a]	6.5	1.6	331
RM642[b]	5.9	1.2	237
RM605[c]	5.8	0.9	186

[a] Mid-channel and side-channel samples at RM 687 include X2, X3, X4, and X5.
[b] Mid-channel and side-channel samples at RM 642 include X2, X3, X4, X5, and X6.
[c] Mid-channel and side-channel samples at RM 605 include X2, X3, X4, X5, and X6 and the X5 duplicate.

mg/kg = milligrams per kilogram

TABLE 5-6
Vertical Distribution of Metals Detected in Phase I Core Samples
Upper Columbia River RI/FS

Arsenic (mg/kg)

Depth (ft)	RM 605 Core	RM 622 Core	RM 637 Core	RM 644 Core	RM 661 Core	RM 676 Core	RM 692 Core	RM 704 Core	RM 708 Core
0 - 0.5	--	6.6	9.9	15.9	8.1	9	5.3	5.8	12.8
0 - 1	15.5	6	12.7		6.9	17.5	4.4	6.1	11
1 - 3	4.8	6	2.4		8.9	14.3	2.9	5.3	2.9
3 - 5	4.6	7.4	3.1		7.4	17.8	7.5	7.7	3.2
5 - 7		5.8			7.1	17.3	9	10.3	0.95
7 - 9		6.3						8.8	

Cadmium (mg/kg)

Depth (ft)	RM 605 Core	RM 622 Core	RM 637 Core	RM 644 Core	RM 661 Core	RM 676 Core	RM 692 Core	RM 704 Core	RM 708 Core
0 - 0.5	--	0.08	5.4	12.7	3.6	5.5	8	0.25	4.4
0 - 1	11.3		9.3	0.34	3.8	14.2	5	0.23	4.4
1 - 3	0.43	0.053	0.09	0.1	4.9	13.2	5.4	0.38	3.9
3 - 5	0.11	0.051	0.079		1.6	14.1	3.6		3.5
5 - 7		0.05		0.058	0.46	17.9	9.8		4.4
7 - 9								0.47	

Iron (mg/kg)

Depth (ft)	RM 605 Core	RM 622 Core	RM 637 Core	RM 644 Core	RM 661 Core	RM 676 Core	RM 692 Core	RM 704 Core	RM 708 Core
0 - 0.5	--	13700	33100	34500	24400	29400	28700	128000	256000
0 - 1	34000	15400	26900	13700	19700	28800	27000	127000	266000
1 - 3	18700	14200	14700	14300	22000	29300	22300	119000	168000
3 - 5	17300	15300	13600	15600	23100	30000	40100	127000	227000
5 - 7		13900		12500	20100	30400	31200	126000	206000
7 - 9		13400						128000	

Lead (mg/kg)

Depth (ft)	RM 605 Core	RM 622 Core	RM 637 Core	RM 644 Core	RM 661 Core	RM 676 Core	RM 692 Core	RM 704 Core	RM 708 Core
0 - 0.5	--	9	180	841	162	330	288	382	1150
0 - 1	462	6.7	261	10.8	165	690	214	378	1140
1 - 3	20	6.5	7.9	5.4	234	1010	216	431	471
3 - 5	8.9	7.1	6.2	5.3	96.2	1050	550	439	524
5 - 7		6.6		4.4	22.6	1230	367	542	633
7 - 9		5.2						498	

Mercury (mg/kg)

Depth (ft)	RM 605 Core	RM 622 Core	RM 637 Core	RM 644 Core	RM 661 Core	RM 676 Core	RM 692 Core	RM 704 Core	RM 708 Core
0 - 0.5	--	0.036	0.81	1.5	0.47	1.5	1.6	0.015	0.035
0 - 1	1		0.83	0.022	0.6	2.4	0.52	0.011	0.021
1 - 3	0.052			0.005	0.6	2.7	1.7	0.016	0.029
3 - 5	0.009			0.006	0.4	3.2	0.063	0.015	0.013
5 - 7				0.007	0.049	2.3	0.98	0.013	0.027
7 - 9								0.013	

Zinc (mg/kg)

Depth (ft)	RM 605 Core	RM 622 Core	RM 637 Core	RM 644 Core	RM 661 Core	RM 676 Core	RM 692 Core	RM 704 Core	RM 708 Core
0 - 0.5	--	38.4	635	1230	457	1040	1120	11700	23500
0 - 1	1210	37.5	927	55.2	439	1710	981	11700	24800
1 - 3	80.5	35.3	46.1	30.9	545	1890	1450	11100	13800
3 - 5	48.3	39.8	37.1	35.8	193	2120	4020	12100	18100
5 - 7		35.5		32.8	75.3	1960	1530	12500	17300
7 - 9		30						12600	

-- Sample was not collected at the indicated sample depth

TABLE 5-7
Summary of Metals Results by Position on Beach
Upper Columbia River RI/FS

Beach/River Mile	Concentration (mg/kg)											
	Black Sand Beach RM 742			Northport Boat RM 735[a]			Dalles Orchard RM 729			North Gorge RM 718		
Position	Lower	Middle	Upper	Lower	Middle	Upper	Lower	Middle	Upper	Lower	Middle	Upper
Analyte												
Antimony	18.6	52.3	47.7	22.93	27.23	21.53	24.8	32.4	11.2	6.4	3.6	--
Arsenic	16.1	25.2	27.3	17.33	14.33	10.67	18.1	22.5	13.7	10.7	9.6	5
Cadmium	1	1.2	1.4	2.99	2.39	2.25	2.1	1.9	2.5	4.2	4.2	1.1
Chromium	101	123	128	68.43	66.20	50.73	71.9	77.6	51.3	24.9	22.8	15.1
Copper	1620	2240	2350	1382	1182	833	1300	1380	802	216	132	22.9
Iron	197000	187000	211000	113367	108233	75267	108000	110000	82100	29500	23500	16000
Lead	276	231	266	309	256	186	205	190	214	216	223	68.8
Manganese	3080	3680	3680	2138	2004	1446	2110	2200	1660	434	270	171
Mercury	0.028	0.03	0.65	0.10	0.10	0.07	0.034	0.044	0.073	0.37	0.4	0.068
Nickel	9.3	12.1	12.4	13.33	13.03	12.80	10.4	12.1	10.4	15.3	17.2	9.6
Uranium	64.8	84.3	81.6	--	--	--	--	--	--	14.2	11.2	5.7
Zinc	14900	15200	16900	9623	8543	5947	8700	8410	6560	1700	1060	352

Beach/River Mile	Marcus Island RM 708			Kettle Falls Swim RM 700[a]			Haag Cove RM 697			French Rocks RM 690		
Position	Lower	Middle	Upper	Lower	Middle	Upper	Lower	Middle	Upper	Lower	Middle	Upper
Analyte												
Antimony	--	2	--	--	--	--	1.8	1.8	--	--	--	--
Arsenic	6.5	8.6	-	1.87	1.27	1.57	2.3	1.4	1	2.6	2.4	2.4
Cadmium	7.3	5.6	1.6	0.26	0.16	0.15	7.8	4.4	0.32	0.45	0.33	0.51
Chromium	19.7	19.9	14	22.93	9.77	9.80	24.8	14.6	5.6	12.7	12.4	12.8
Copper	50.3	57.8	14.1	17.60	9.50	10.13	34	16.5	4.2	13.8	14.5	10.9
Iron	17600	23400	12700	17433	9647	9530	18100	11800	5180	12000	9960	11000
Lead	297	202	52.3	8.9	6.0	5.2	222	136	16.5	21.9	18.7	20.7
Manganese	214	246	170	381	151	177	267	158	111	260	171	208
Mercury	0.81	0.47	0.078	0.01	--	--	0.8	0.29	--	0.03	0.019	--
Nickel	16.3	16.8	12.9	18.73	7.77	7.77	19.7	11.2	4.1	10.9	9.6	15
Uranium	--	6.7	7.5	--	--	--	--	--	--	--	8.4	--
Zinc	915	620	186	55.4	36.2	34.0	700	391	53.8	97.1	67.2	91.8

Beach/River Mile	Cloverleaf Branch RM 675			AA Campground RM 673			Rogers Bar RM 658			Columbia RM 642[a]		
Position	Lower	Middle	Upper	Lower	Middle	Upper	Lower	Middle	Upper	Lower	Middle	Upper
Analyte												
Antimony	1.6	1.1	1	1.1	1.5	1.2	--	--	--	0.79	0.96	1.04
Arsenic	7	3.6	2.3	3.6	5.3	4.1	--	1.9	2.2	4.70	5.40	3.83
Cadmium	2.4	0.63	3.1	1	0.74	0.17	0.056	0.11	0.22	1.63	0.45	0.33
Chromium	28	17.7	19.5	18	24.2	14.8	5.7	13.2	9.6	16.93	14.27	12.13
Copper	28.7	16.1	14.8	14.7	20	12.1	4.9	9	7.4	19.07	11.40	8.70
Iron	22600	15200	13300	16000	21100	14800	4930	9800	9720	16700	15933	14400
Lead	102	15.8	51.1	33.7	19.7	6.7	3.1	5.4	5.1	58.20	18.47	10.57
Manganese	526	194	145	167	383	248	95.3	157	134	283	190	167
Mercury	0.21	0.03	0.062	0.053	0.031	0.01	--	--	--	0.14	0.03	0.02
Nickel	23.8	15.9	14	15.5	21.1	12.8	5.1	10.2	9	14.57	11.77	10.23
Uranium	--	--	--	--	--	--	--	--	--	9.50	--	--
Zinc	295	90.3	220	158	118	48.9	21.3	33	47.4	233.33	142.67	119.90

Beach/River Mile	Lincoln Mill RM 633			Keller Ferry RM 615			Spring Canyon RM 600		
Position	Lower	Middle	Upper	Lower	Middle	Upper	Lower	Middle	Upper
Analyte									
Antimony	--	--	--	--	--	--	--	--	--
Arsenic	5.9	6.7	5.9	4.7	4.9	4	10.3	7.5	8.5
Cadmium	--	--	--	--	--	--	--	--	--
Chromium	6.2	9.1	9.6	12.5	11.2	9.8	9.6	9.7	9
Copper	7.3	10	11.5	9.1	8.6	6.7	7.1	5.5	6.5
Iron	10200	12600	14200	15600	15500	13100	15400	14900	14300
Lead	4.4	4.7	6.2	5.9	6.3	4.5	6.7	7.1	6.1
Manganese	217	224	334	248	230	214	227	208	226
Mercury	--	--	--	--	--	--	--	--	--
Nickel	6.1	7.8	8.5	10.1	9.4	8.5	8.2	7.5	7.5
Uranium	6.3	6.4	6.9	5.4	4.6	--	--	5.2	--
Zinc	26.5	30.1	35.5	39.2	44.2	36.9	48	54.6	39.7

[a] Selected beach and concentrations listed are averages for discrete grab and composite samples.
-- = metal was not detected
mg/kg = milligrams per kilogram

TABLE 5-8
Comparison of Average Concentrations of Metals at Beaches to Metals Concentrations in Nearby Transect Samples
Upper Columbia River RI/FS

Concentration (mg/kg)

Black Sand Beach RM742

	Black Sand Beach Avg	RM739X1	RM740A1(X1)	RM741X1	RM742A1(X1)	RM743A1(X1)	RM744A1(X1)
Antimony	40	23.2 J	6.2 J	21.8 J	19 J	20.7 J	21.2 J
Arsenic	23	14.7	5.2	9.9	6.3	8.7	6.9
Cadmium	1	3	2	1.9	3.4	2	1.5
Chromium	117	64.8 J	21.5	29.2	29.6	28.5	26.4
Copper	2070	1050	181	449	399	356	390
Iron	198333	86400 D	25200	42100	39200	42500	35800
Lead	258	273	118 J	172	182 J	201 J	141
Manganese	3480	1630	429	805	745	616	718
Mercury	0.24	0.12 J	0.14 J	0.095 J	0.16	0.17	0.15
Nickel	11	13	11	9	10.6	11.1	9.7
Uranium	77	6.8 J	9.4 J	19.2 J	25.3 U	25.9 U	11.4 J
Zinc	15667	7240 D	1480	3250	2920	2560	2480

Northport Boat Launch RM735

	Northport Boat Launch Avg	RM733A1(X1)	RM735X1	RM736A1(X1)	RM737X1	RM738X1
Antimony	24	17.4 J	29.1 J	5.1 J	42.9 J	20.2 J
Arsenic	14	6.6	15.9	4.8	30.8	9.5
Cadmium	3	2.9	1.8	4.3	1.2	1.3
Chromium	62	38.6	42.3	20.7	74.5	26.8
Copper	1132	641	650	129	1270	281
Iron	98956	88400 D	53400	27400	109000 D	30900
Lead	250	1390	134	214	196	107
Manganese	1862	2490 J	1130	378	2000	600
Mercury	0.09	0.083 J	0.087 J	0.33 J	0.075 J	0.057 J
Nickel	13	9.5	10	15.1	11.7	12.4
Uranium	-	19.6 U	8.7 U	28.3 U	27	24 U
Zinc	8038	8200 D	4150	1760	9020 D	1900

Dalles Orchard RM 729

	Dalles Orchard Avg	RM726X1	RM727A1(X1)	RM728X1	RM729A1(X1)	RM730X1	RM731X1	RM732X1	
Antimony	23	16.2 J	5.6 J	53.9 J	9.9 J	1.1 UR	8.9 J	37.8	J
Arsenic	18	10.6	9.1	20.3	2	2.8 U	8.9	32.6	
Cadmium	2	2	3	0.8	1.1	0.52	2.2	0.44	J
Chromium	67	28.5	20.1	84.5	14.5	12.9	20.7	97.4	
Copper	1161	369	126	1420	183	26	202	1710	
Iron	100033	36500	24900	112000 D	16200	12000	27300 J	159000	JD
Lead	203	130	170	195	68.4	33.6	146	476	
Manganese	1990	698	374	2380	371 J	208	443	3100	D
Mercury	0.05	0.2	0.37 J	0.06 J	0.06 J	0.2	0.68	0.099	J
Nickel	11	12.7	12.6	11.3	6.3	9.4	12.4	12.5	
Uranium	--	26.9 U	24.5 U	57.6	24.1 U	4.6 J	4.8 J	20.4	UJ
Zinc	7890	2470	1310	9180 J	1250	249	1710	13800	D

North Gorge RM 718

	North Gorge Avg	RM715X1	RM718X1	RM721X1
Antimony	5	2.7 J	2.5 UR	1.3 UR
Arsenic	8	8.9	12.6	4.3
Cadmium	3	5.6	6.7	0.76
Chromium	21	25.9	21.2	15.7
Copper	124	105	61.3	31.8
Iron	23000	24000	24000	13800
Lead	169	275	335	36.6
Manganese	292	315	326	272
Mercury	0.28	1.1	0.59 J	0.032 J
Nickel	14	20.9	19.8	15
Uranium	10	23.2 J	22.7 U	18.3 U
Zinc	1037	971	1180	210

TABLE 5-8
Comparison of Average Concentrations of Metals at Beaches to Metals Concentrations in Nearby Transect Samples
Upper Columbia River RI/FS

Marcus Island RM 708

	Marcus Island Avg	**RM705X1**	**RM706A1(X1)**	**RM707X1**	**RM708X1**	**RM710X1**
Antimony	2	1.8 J	3.8 UJ	0.72 UR	2.4 J	1.4 UR
Arsenic	8	26.2	4.5	8.8	9.4	7.2
Cadmium	5	1.6	3.8	0.54	1.8	4.5
Chromium	18	68.5	21.3	18	21.5	25.2
Copper	41	52.8	78.8	20	48.8	39.9
Iron	17900	30100	18800	18900	20900 J	19000 J
Lead	184	59.9	197	35.9	84.4	171
Manganese	210	534	317	205	347	261
Mercury	0.45	0.14	0.66	0.068 J	0.2	0.46
Nickel	15	52.8	15.5	18.4	18.7	20
Uranium	7	10 J	9.6 J	7.5 J	30.1 UJ	26.3 UJ
Zinc	574	260 J	764	157	351	392

Kettle Falls Swim RM 700

	Kettle Falls Avg	**RM698A1(X1)**	**RM701X1**
Antimony	--	3.5 J	6.5 UR
Arsenic	2	7.9	1.8
Cadmium	0	5.3	0.29 J
Chromium	14	34.9	9.8
Copper	12	164	13.4
Iron	12203	29800	9350
Lead	7	309	9.6
Manganese	236	417	171
Mercury	0.01	0.87	0.005 J
Nickel	11	25.3	8.1
Uranium	--	11.5 J	21.6 UJ
Zinc	42	954	45.4

Haag Cove RM 697

	Haag Cove Avg	RM695X3	RM698X3
Antimony	2	5.8 UJ	6.8 UR
Arsenic	2	1.7	1.2
Cadmium	4	0.26 J	0.13 J
Chromium	15	9.7	5.5
Copper	18	7.5	4.5
Iron	11693	8020	5550
Lead	125	13.7	2.6
Manganese	179	123	137
Mercury	0.55	0.0099 J	0.12 U
Nickel	12	7.3	4.1 J
Uranium	--	19.3 U	22.6 UJ
Zinc	382	56.1 J	16

French Rocks RM 690

	French Rocks Avg	**RM689A1(X3)**
Antimony		7.4 UJ
Arsenic	2	2.1
Cadmium	0.43	0.13 J
Chromium	13	16.9
Copper	13	14.7
Iron	10987	15000
Lead	20	12.3
Manganese	213	319
Mercury	0.02	0.034 J
Nickel	12	15.1
Uranium	8	24.8 U
Zinc	85	62.6

TABLE 5-8
Comparison of Average Concentrations of Metals at Beaches to Metals Concentrations in Nearby Transect Samples
Upper Columbia River RI/FS

Cloverleaf Branch RM 675

	Cloverleaf Branch Avg	RM676X1	RM677X1
Antimony	1.2	0.49 UR	1.2 UR
Arsenic	4	2.6 U	7.4
Cadmium	2	0.14 J	0.12 J
Chromium	22	8.4	20.3
Copper	20	7.6	19.8
Iron	17033	7690	16800
Lead	56	3	7.9
Manganese	288	126	245
Mercury	0.10	0.1 U	0.11 U
Nickel	18	7.7	22.2
Uranium	--	20.5 U	6.4 U
Zinc	202	25.9	41.6

AA Campground RM 673

	AA Campground Avg	RM670X3	RM673X3
Antimony	1.3	1.2 UJ	6.4 UR
Arsenic	4	2.4	4.2
Cadmium	0.6	0.26 J	0.12 J
Chromium	19	16.6	22.9
Copper	16	11.1	18.4
Iron	17300	14600	17900
Lead	20	9.6	6
Manganese	266	183	333
Mercury	0.03	0.007 J	0.017 J
Nickel	16	12.3	20.1
Uranium	--	11.6 J	21.5 U
Zinc	108	58.5	40.3

Rogers Bar RM 658

	Rogers Bar Avg	RM655X3	RM658A1(X3)	RM661X3
Antimony	--	6 UR	7.7 UR	0.91 UJ
Arsenic	2	11.2	5	7.7
Cadmium	0.13	0.5 U	0.41 J	0.48 U
Chromium	10	19.1	30.5	38.9
Copper	7	15.8	23.1	28.2
Iron	8150	19600	23400	22600
Lead	5	10	19.4 J	8.9
Manganese	129	320	563	391
Mercury	--	0.006 J	0.015 J	0.012 J
Nickel	8	18.5	27.4	35.5
Uranium	--	9.6 J	25.6 UJ	8.6 J
Zinc	34	44.6	88.6	62.3

Columbia RM 642

	Columbia Campground Avg	RM641A1(X1)	RM642A1(X1)	RM643X1	RM644X1
Antimony	0.93	11.3 UR	7.3 UR	5.1 UR	5.6 UJ
Arsenic	5	3.4	4.1	0.76 U	7.6
Cadmium	0.80	2.4	2.1	0.2 J	0.52
Chromium	14	24.1	17.9	8.4	8.6
Copper	13	28	19.9	9.5	9.4
Iron	15678	20500	16900	26600	27500
Lead	29	67.7 J	82.4 J	9.6	12
Manganese	214	379	314	516	610 J
Mercury	0.06	0.34	0.23	0.012 J	0.1 UR
Nickel	12	20.5	14.8	6.6	6.1
Uranium	10	37.7 UJ	24.3 UJ	17 U	18.7 U
Zinc	165	355	292	83.1	83.2

TABLE 5-8
Comparison of Average Concentrations of Metals at Beaches to Metals Concentrations in Nearby Transect Samples
Upper Columbia River RI/FS

Lincoln Mill RM 633

	Lincoln Mill Avg	RM631X1
Antimony	--	5.8 UR
Arsenic	6	6.3
Cadmium	--	0.48 U
Chromium	8	8.2
Copper	10	7.3
Iron	12333	13800
Lead	5	5.2
Manganese	258	254
Mercury	--	0.096 U
Nickel	7	7.1
Uranium	7	19.2 U
Zinc	31	38.8

Keller Ferry RM 615

	Kellers Ferry Avg	RM613X1	RM616X1
Antimony	--	6.3 UR	7.8 UR
Arsenic	5	14.6	3.9
Cadmium	--	0.53 U	0.64 J
Chromium	11	17.2	16.9
Copper	8	16.4	20.1
Iron	14733	21700	20000
Lead	6	12.1	13.9
Manganese	231	444	324
Mercury	--	0.005 J	0.026 U
Nickel	9	15.8	15.1
Uranium	5	21.1 U	26.1 UJ
Zinc	40	60.5	101 J

Spring Canyon RM 600

	Spring Canyon Avg	RM600X1	RM603A1(X1)
Antimony	--	5.3 UR	5.6 UR
Arsenic	9	5.2	6
Cadmium	--	0.038 J	0.23 J
Chromium	9	9.9	14
Copper	6	9.6	11.8
Iron	14867	14200	24900
Lead	7	5.3	11.1
Manganese	220	277	457
Mercury	--	0.009 U	0.017 J
Nickel	8	8.8	12.7
Uranium	5	17.6 UJ	18.6 U
Zinc	47	38.8 J	94.2

-- = metal was not detected
mg/kg = milligrams per kilogram
U = analyte was not detected
J = estimated value
D = dilution
UJ = analyte was not detected, reporting limit estimated
UR = analyte was not detected, reporting limit rejected

TABLE 5-9
Concentrations of 2,3,7,8-TCDF in Composite Beach Samples by Position on Beach
Upper Columbia River RI/FS

Beach	River Mile	2,3,7,8-Tetrachlorodibenzofuran (pg/g)		
		Lower	Middle	Upper
Spring Canyon Campground	600	0.204 U	0.0952 U	0.101 U
Keller Ferry No. 2	615	0.0961 U	0.161 U	0.0917 U
Lincoln Mill Boat Launch	633	0.0725 U	0.0569 U	0.106 U
Columbia Campground	642	3.99	0.677	0.311 J
Rogers Bar Campground	658	0.12 U	0.0665 U	0.104 U
AA Campground	673	1.2	0.778	0.0843 U
Cloverleaf Beach	675	1.93	0.718	1.42
French Rocks Boat Launch	690	1.45	1.19	0.649
Haag Cove	697	16.1	8.7	0.295 J
Kettle Falls Swim Beach	700	0.0817 U	0.0777 U	0.0723 J
Marcus Island Campground	708	23.7	18.4	1.15
North Gorge Campground	718	14.2	15.4	3.85
Dalles Orchard	729	0.564	0.575	0.67
Northport City Boat Launch	735	0.774	0.571	0.751
Black Sand Beach	742	0.235 J	0.428	0.36

U = not detected
J = estimated value
pg/g - picograms per gram (parts per trillion)

TABLE 5-10
Vertical Distribution of 2,3,7,8-TCDF in Core Samples
Upper Columbia River RI/FS

	2,3,7,8-TCDF Concentration (pg/g)				
Depth (ft)	**RM 605 Core**	**RM 637 Core**	**RM 661 Core**	**RM 692 Core**	**RM 704 Core**
0 - 0.5	NS	52.5	17.4	28	0.44
0 - 1	27	19.5	18.5	14.4	0.451
1 - 3	0.143	0.204	1.45	52.3	0.419
3 - 5	ND	0.0759	0.15	4.04	0.45
5 - 7	NS	NS	ND	3.66	0.446
7 - 9	NS	NS	NS	NS	0.402

ft = feet
pg/g = picograms per gram

TABLE 5-11
Distribution of 2,3,7,8-TCDF in Size-Fractionated Beach Samples
Upper Columbia River RI/FS

Beach	Sample	Fraction	Result	Qual	Unit
Columbia Campground	RM642BSF	<75 um	3.97		PG/G
	RM642BSF	>75 um	1.24		PG/G
	RM642BSF	whole	1.43		PG/G
Kettle Falls Swim Beach	RM700BSF	<75 um	0.263	J	PG/G
	RM700BSF	>75 um	0.12	J	PG/G
	RM700BSF	whole	0.0839	U	PG/G
Northport City Boat Launch	RM735BSF	<75 um	1.61		PG/G
	RM735BSF	>75 um	0.745	J	PG/G
	RM735BSF	whole	0.77		PG/G

um = micrometer
pg/g = picograms per gram

FIGURE 5-1
Lake Roosevelt Water Elevations
Upper Columbia River RI/FS

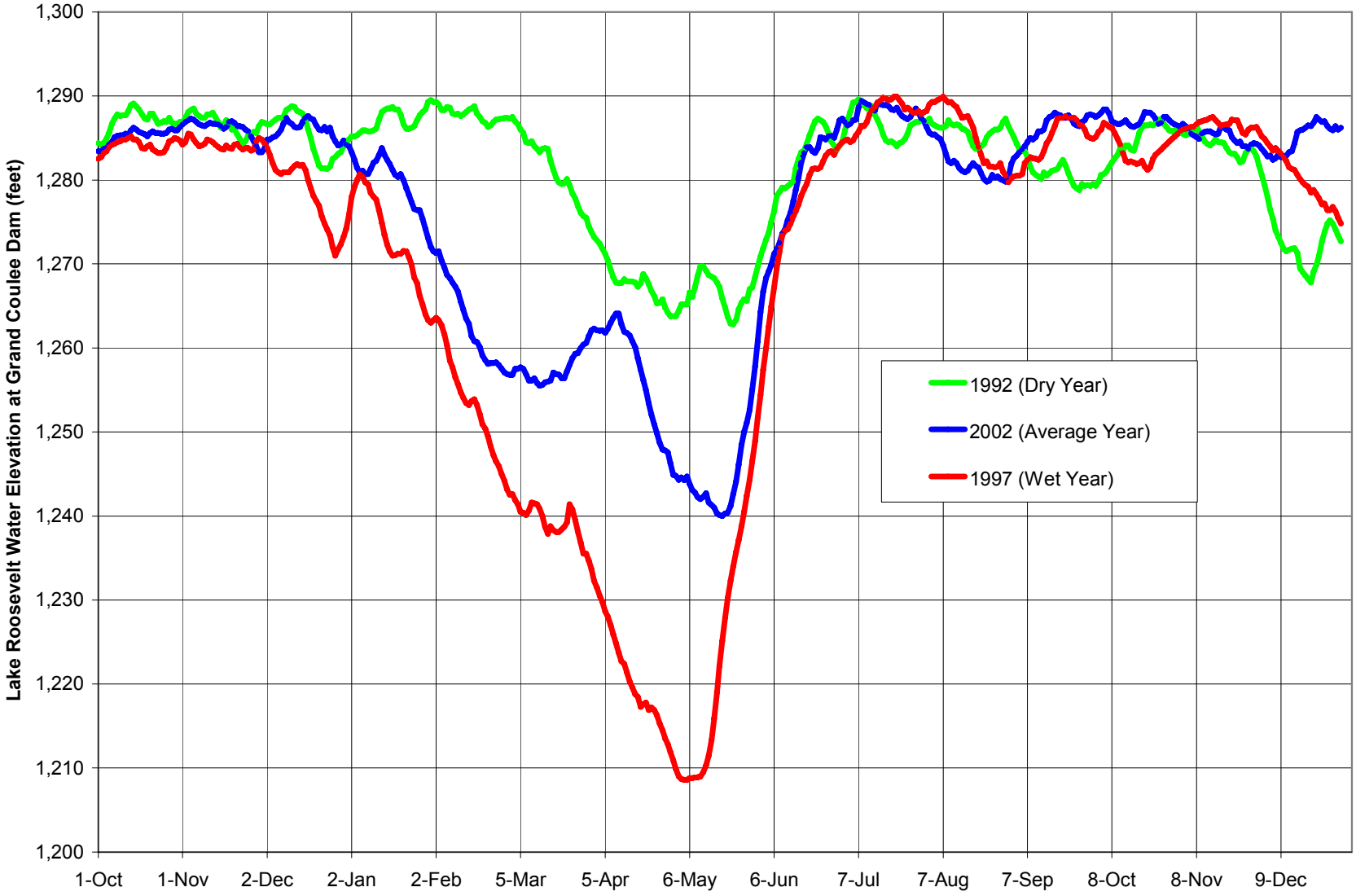


FIGURE 5-2
Percent Time When Lake Roosevelt Water Elevations are at or Below Indicated Levels (7/1/1940 – 8/4/2004)
Upper Columbia River RI/FS

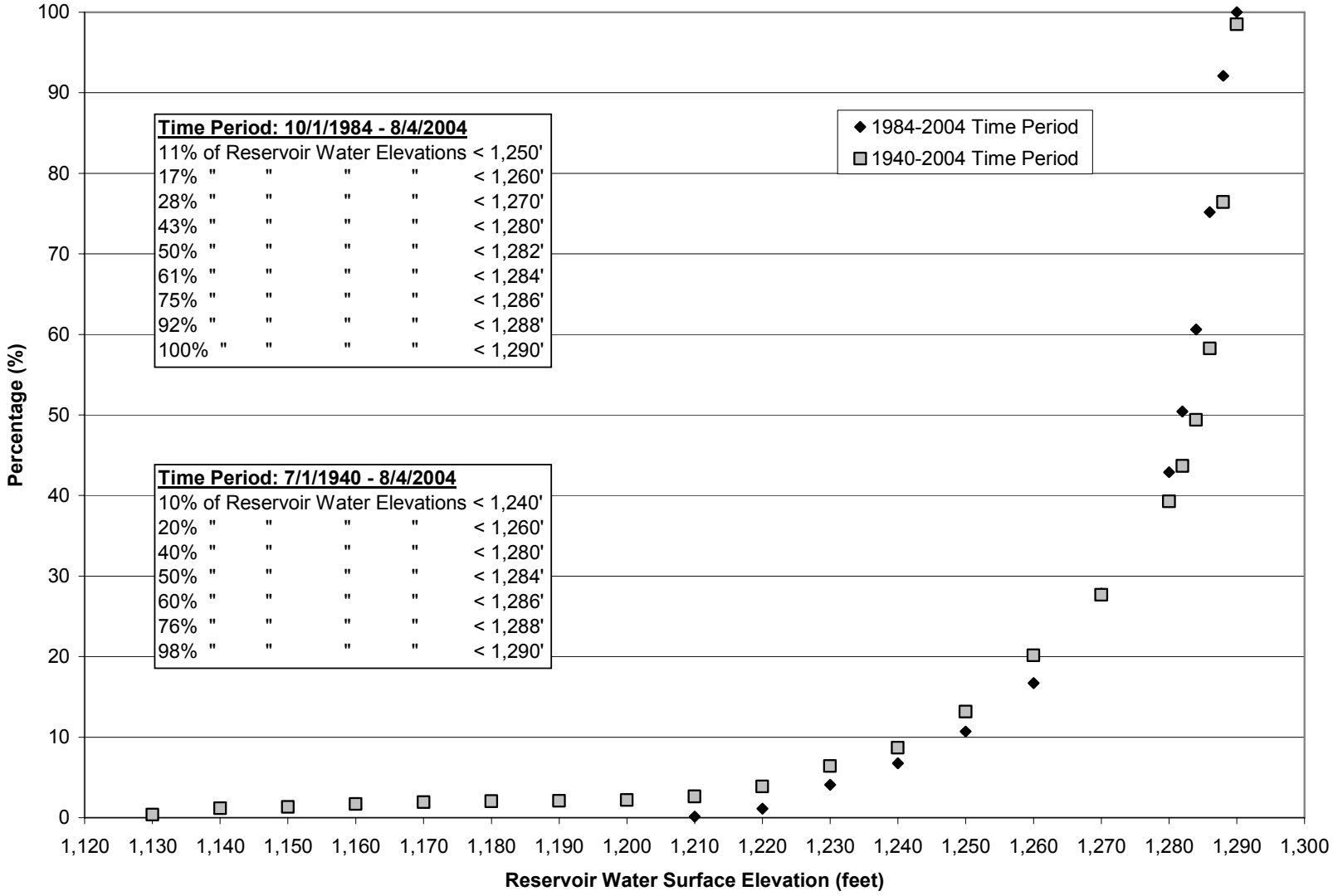


FIGURE 5-3
Columbia River Daily Mean Streamflow and Lake Roosevelt Water Surface Elevation for Water Year 1997 (October 1, 1996 – September 30, 1997)
Upper Columbia River RI/FS

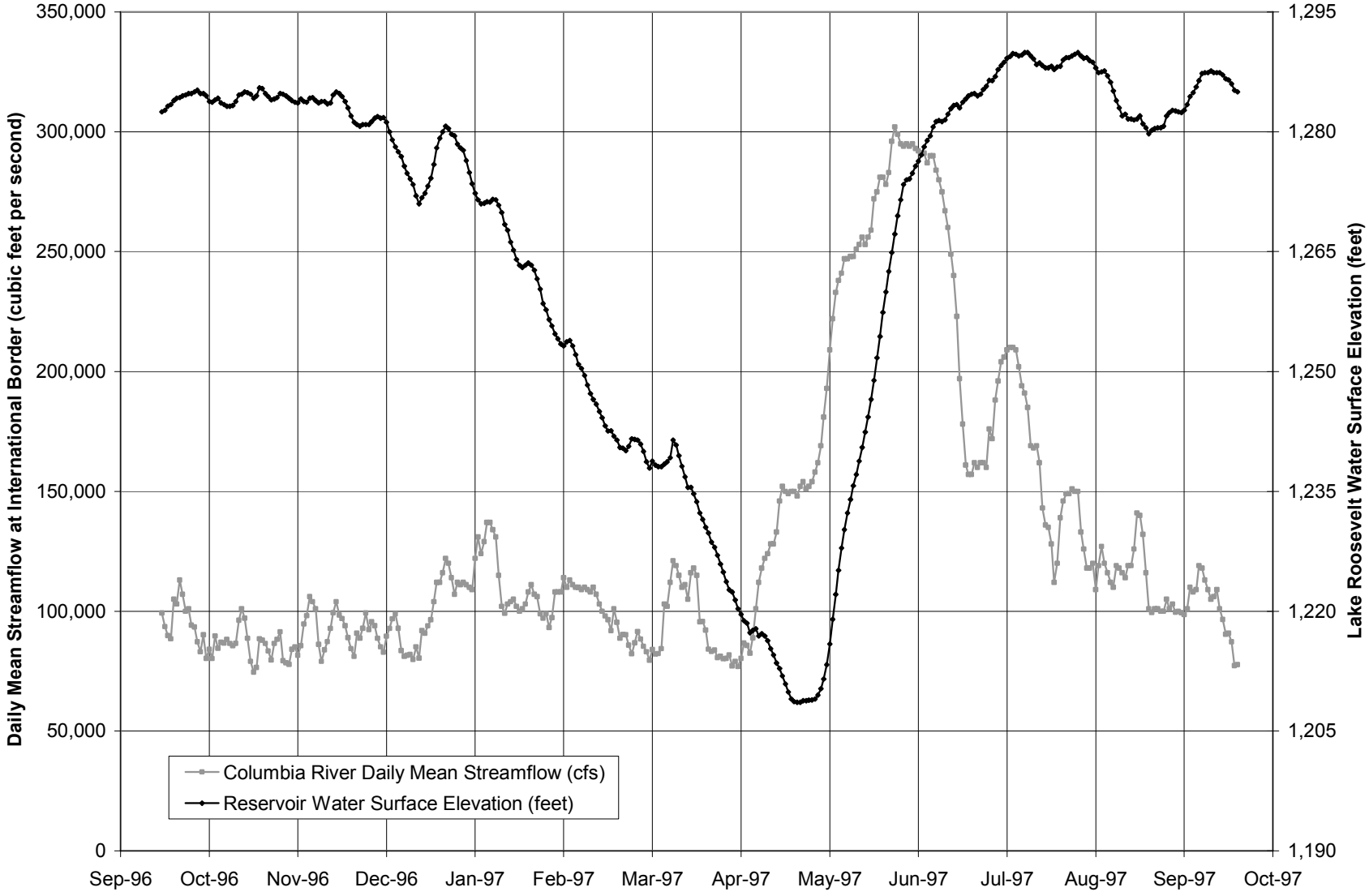


FIGURE 5-4

Highest Columbia River Flow at the International Border at Various 10-Foot Range Reservoir Water Levels

Upper Columbia River RI/FS

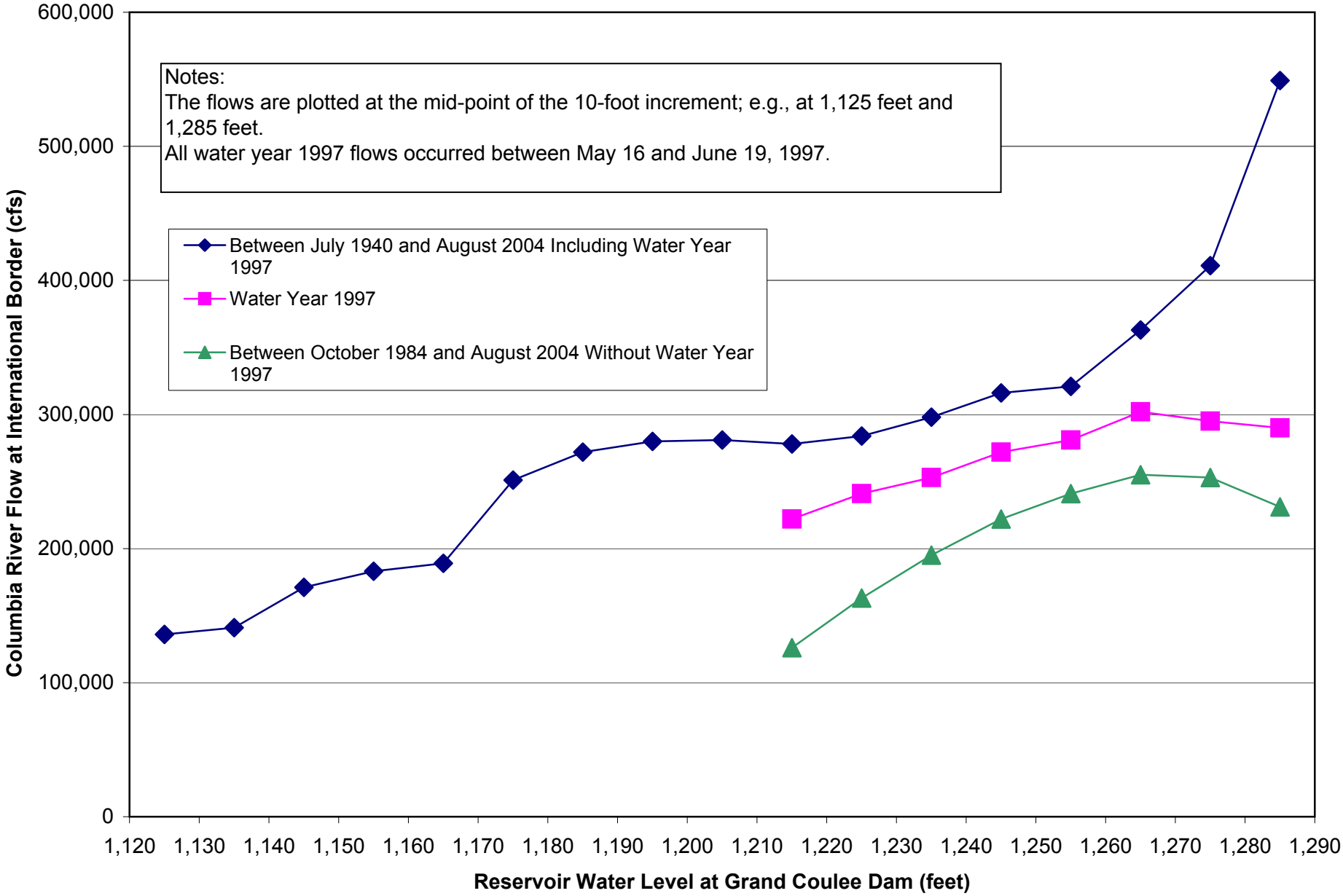


FIGURE 5-5

Cross-Sectional Flow Velocity Estimates at Each River Mile (pool elevation at 1,290 feet)

Upper Columbia River RI/FS

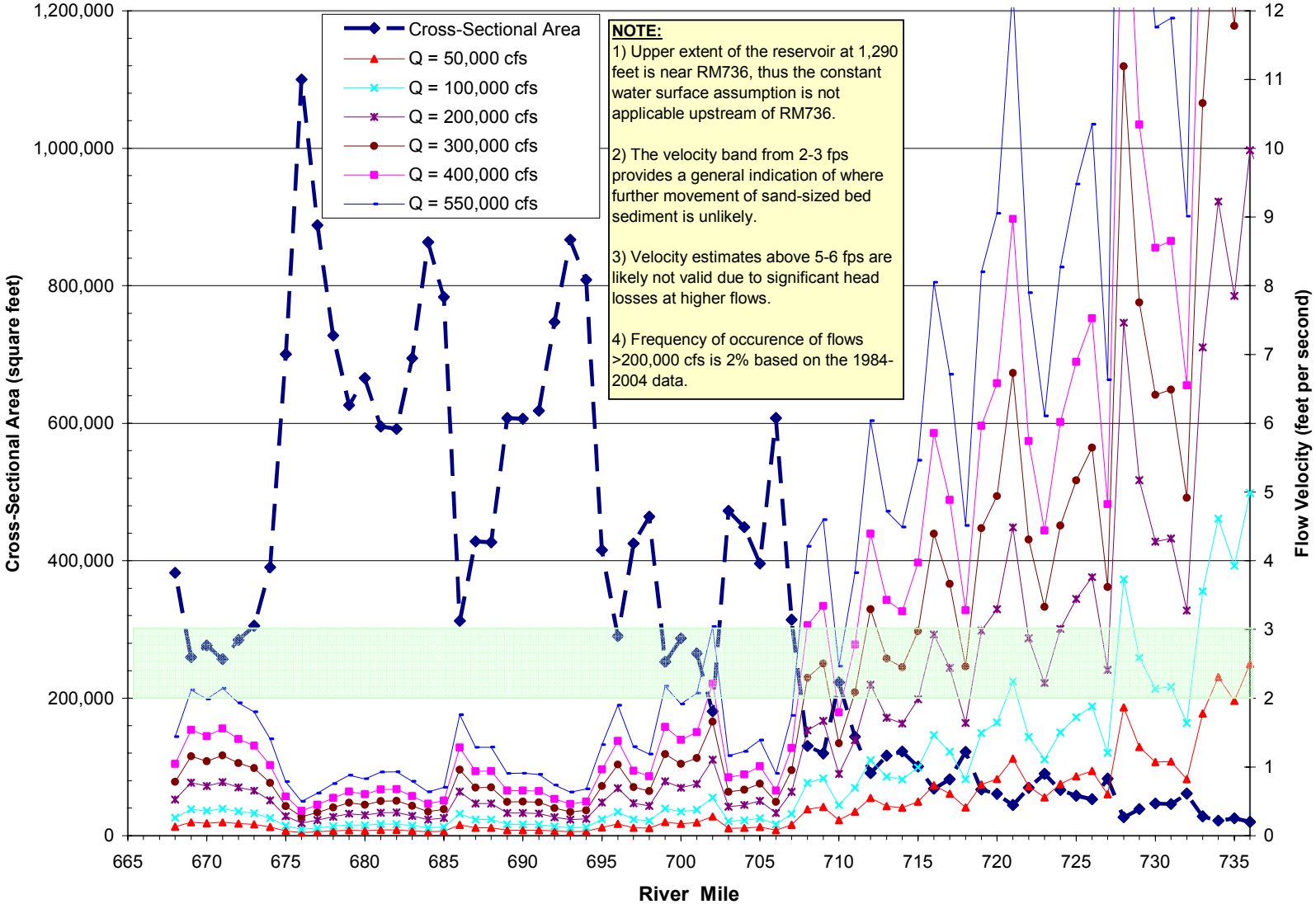


FIGURE 5-6

Cross-Sectional Flow Velocity Estimates at Each River Mile (pool elevation at 1,255 feet)

Upper Columbia River RI/FS

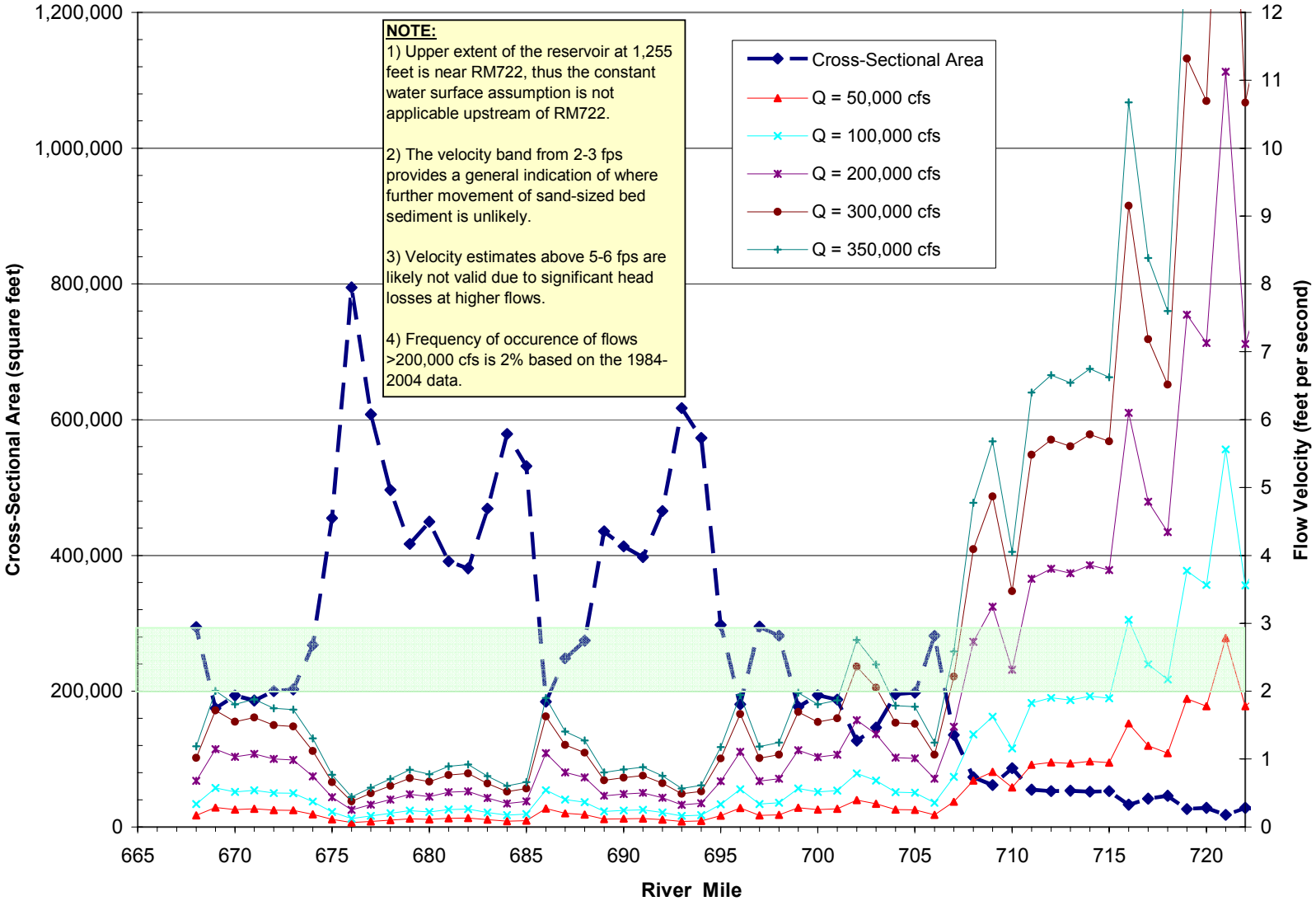


FIGURE 5-7

Cross-Sectional Flow Velocity Estimates at Each River Mile (pool elevation at 1,208 feet)

Upper Columbia River RI/FS

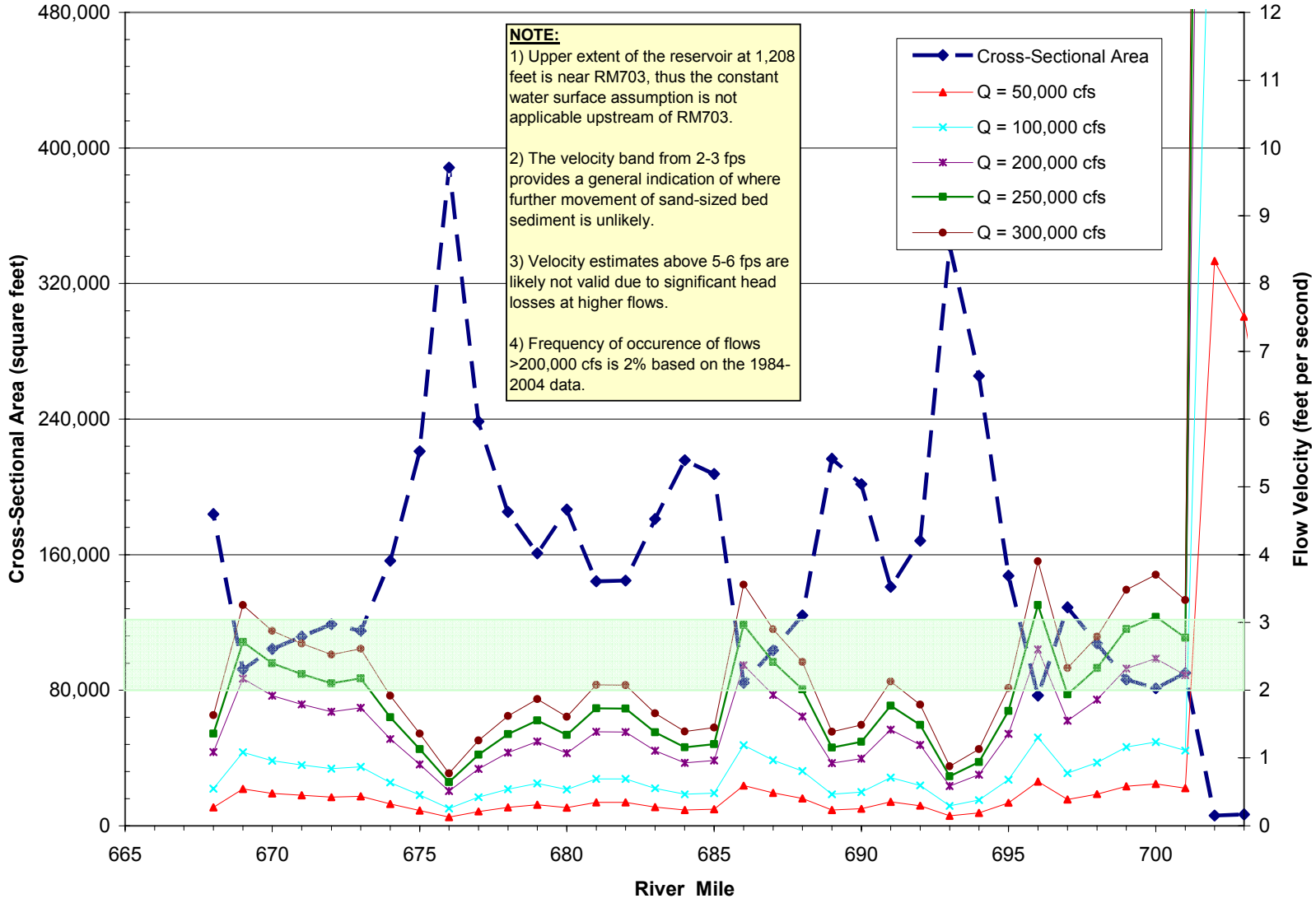
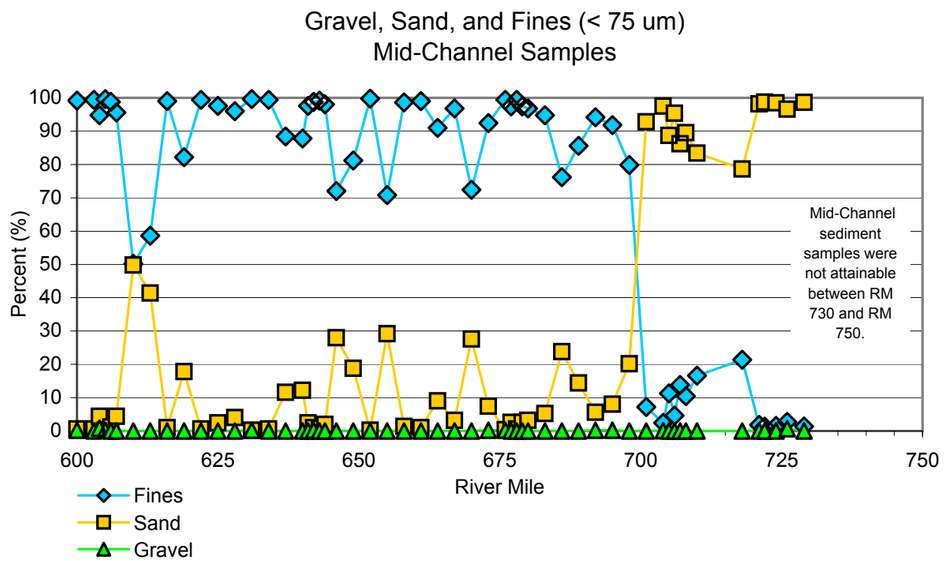
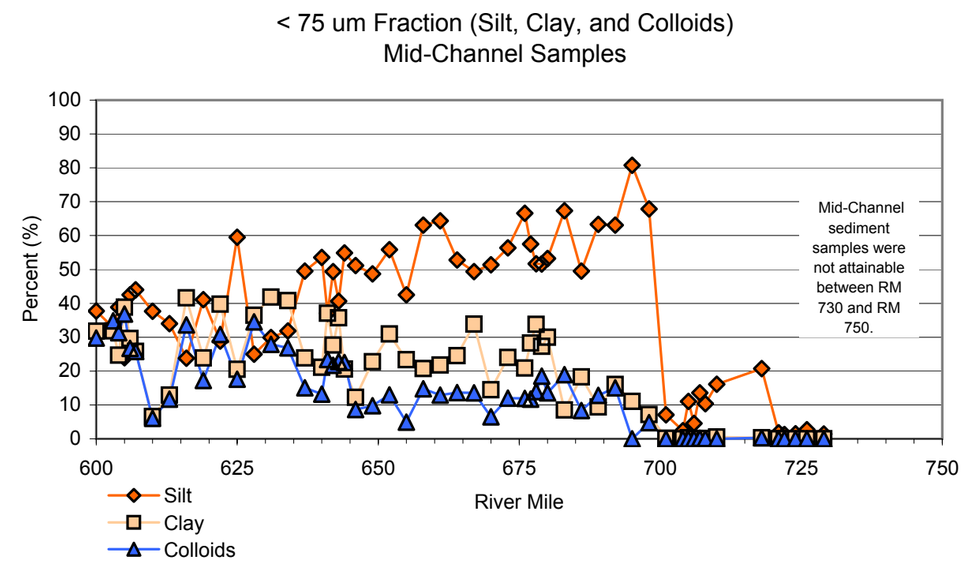
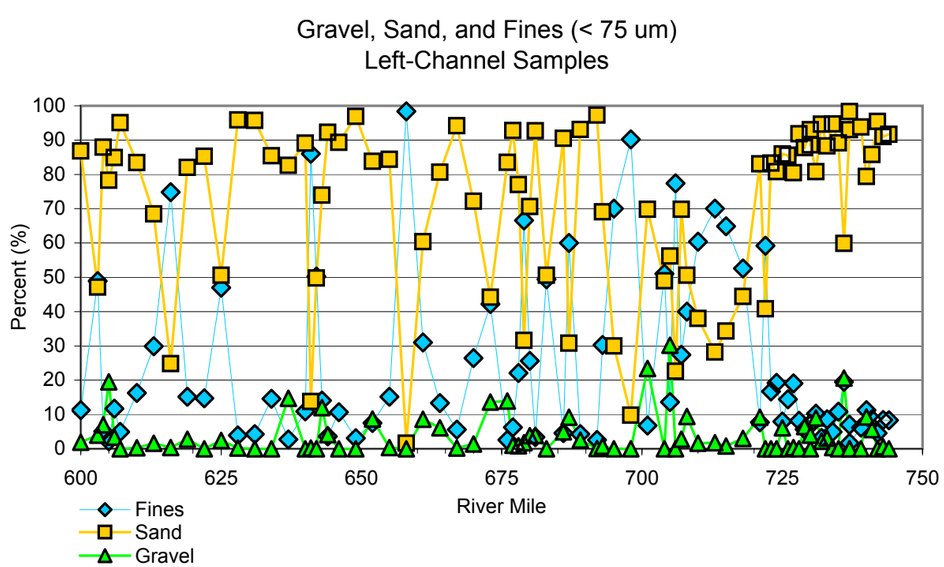
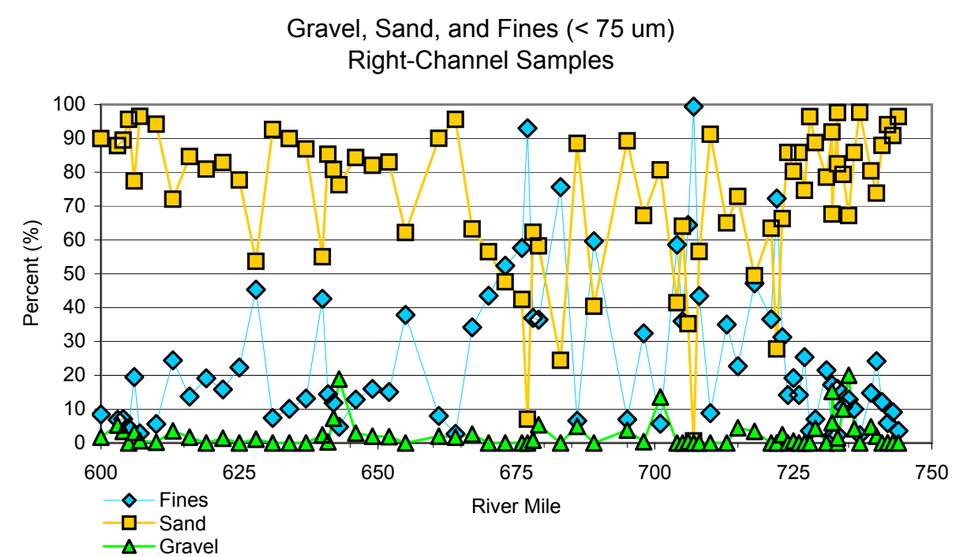


Figure 5-8
Distributions of Gravel, Sand, and Finer Grained Sediment in Mid-Channel, Left-Bank, and Right-Bank Sediment Samples - 2005 Phase I Sediment Samples
Upper Columbia River RI/FS









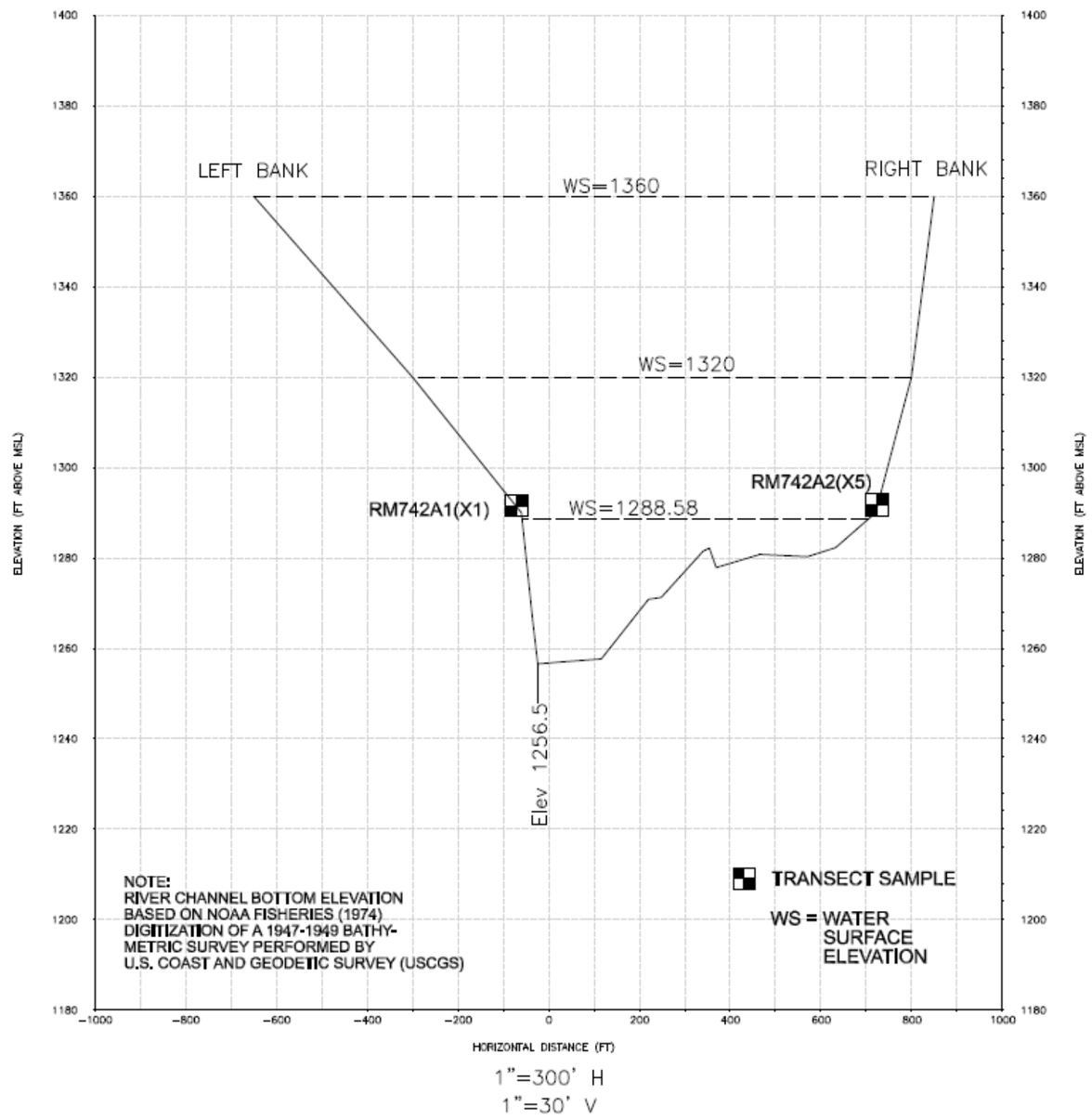


Figure 5-9
Channel Cross-Section and Sampling Locations at RM 742
Upper Columbia River RI/FS

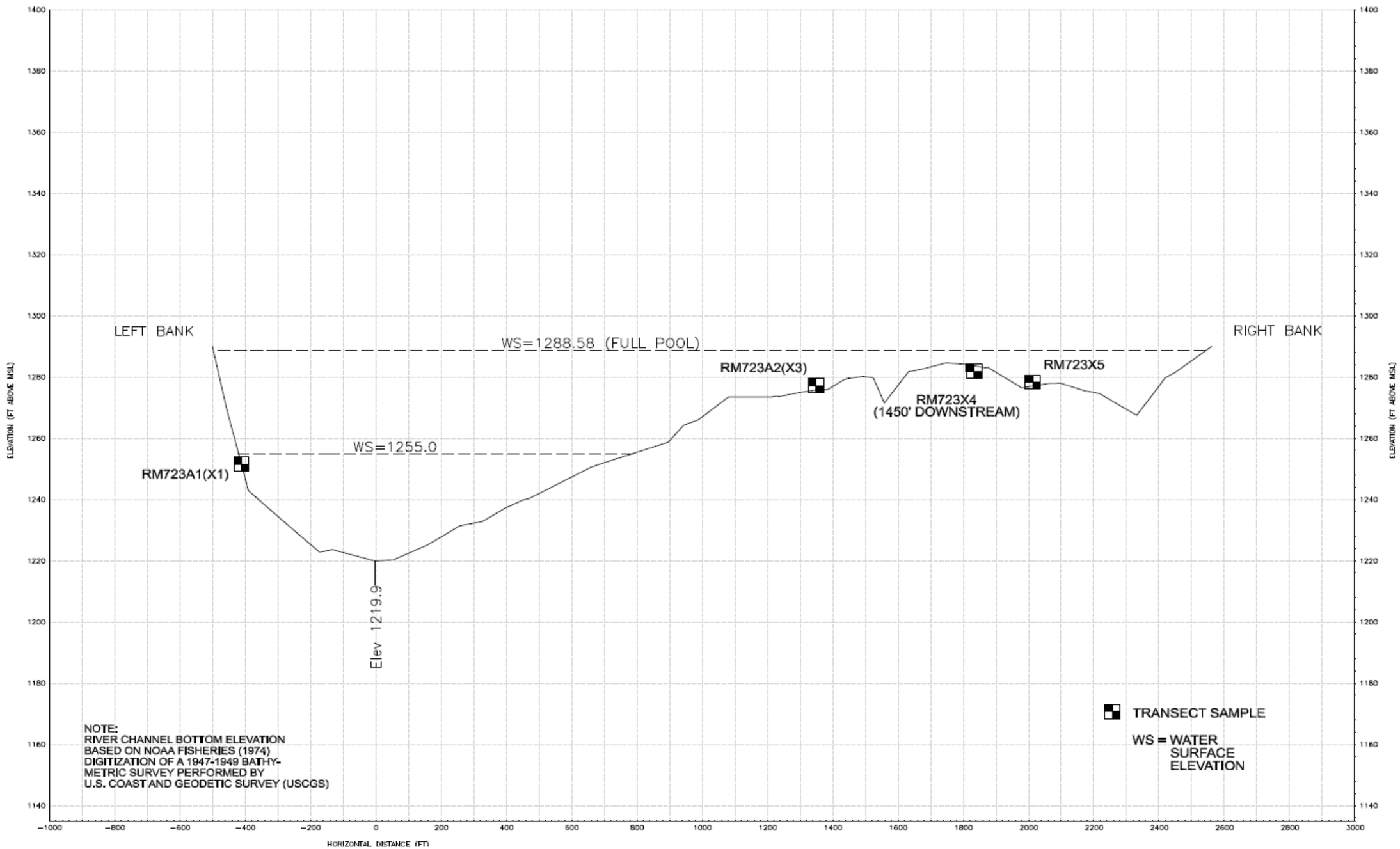


Figure 5-10
Channel Cross-Section and Sampling Locations at RM 723
Upper Columbia River RI/FS

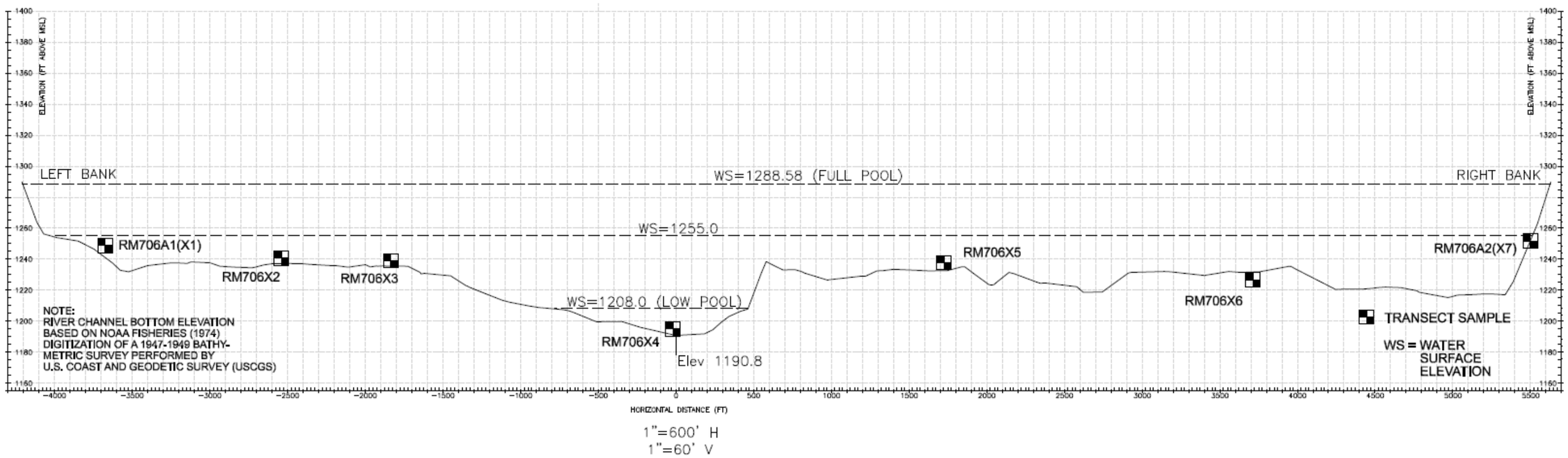


Figure 5-11
Channel Cross-Section and Sampling Locations at RM 706
Upper Columbia River RI/FS

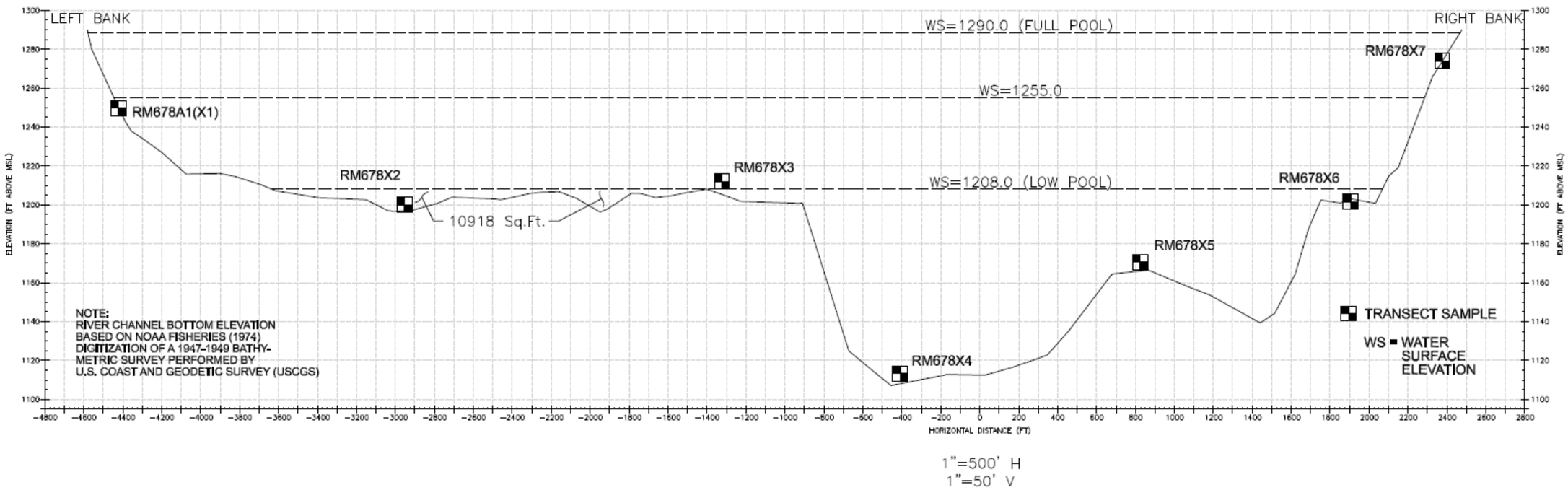


Figure 5-12
Channel Cross-Section and Sampling Locations at RM 678
Upper Columbia River RI/FS

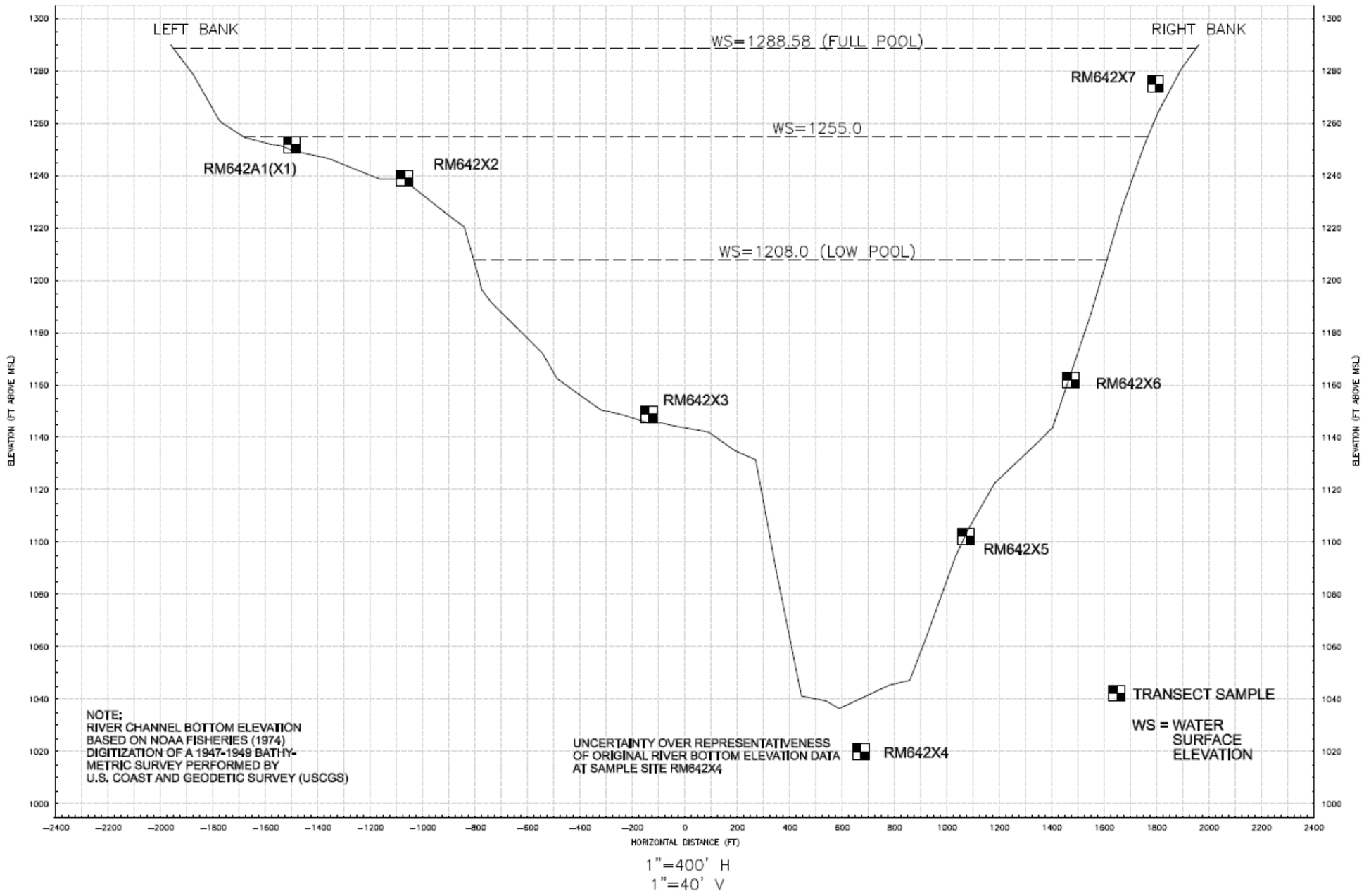


Figure 5-13
Channel Cross-Section and Sampling Locations at RM 642
Upper Columbia River RI/FS

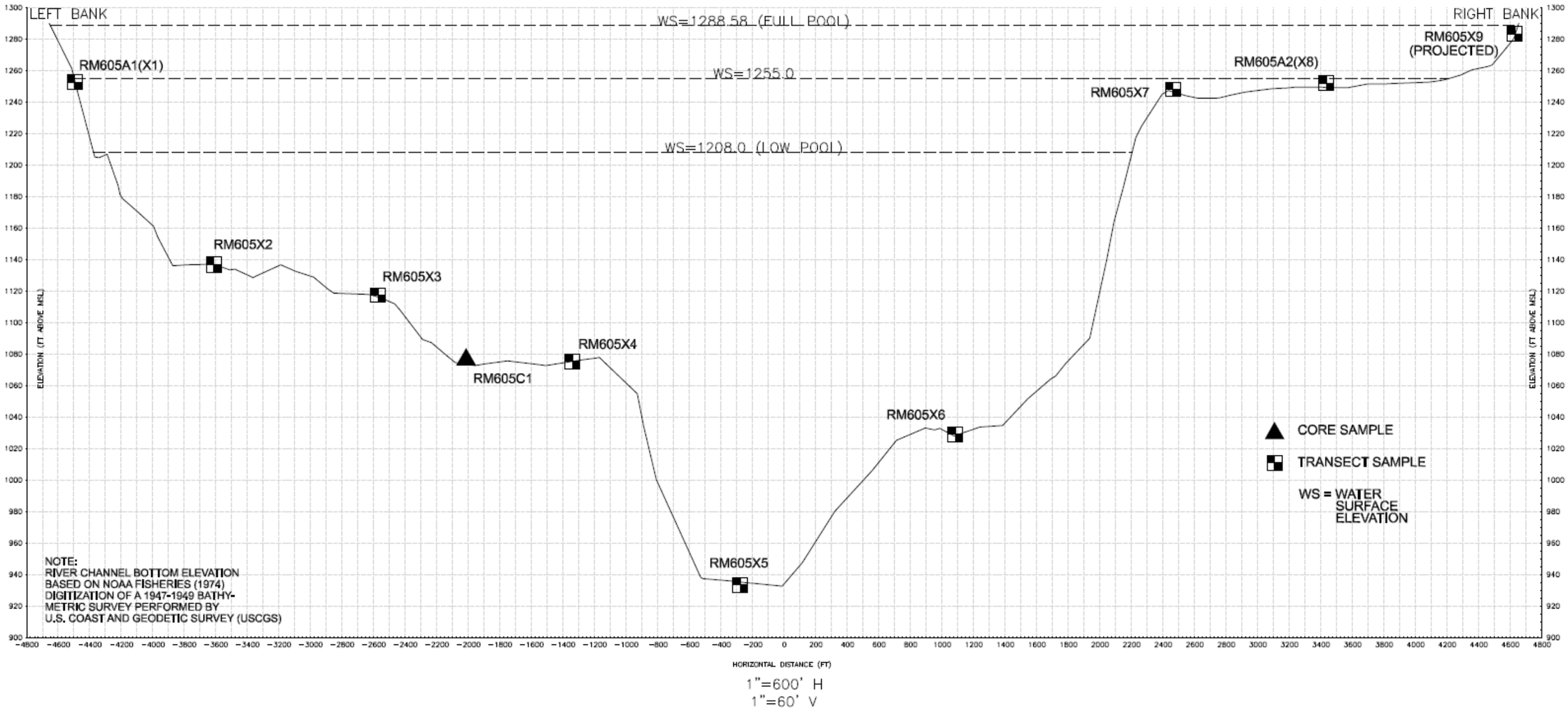


Figure 5-14
Channel Cross-Section and Sampling Locations at RM 605
Upper Columbia River RI/FS

FIGURE 5-15
Transverse Distributions of Grain Size and Elevation, River Miles 706, 678, and 605 - Phase I Surface Sediment Samples
Upper Columbia River RI/FS

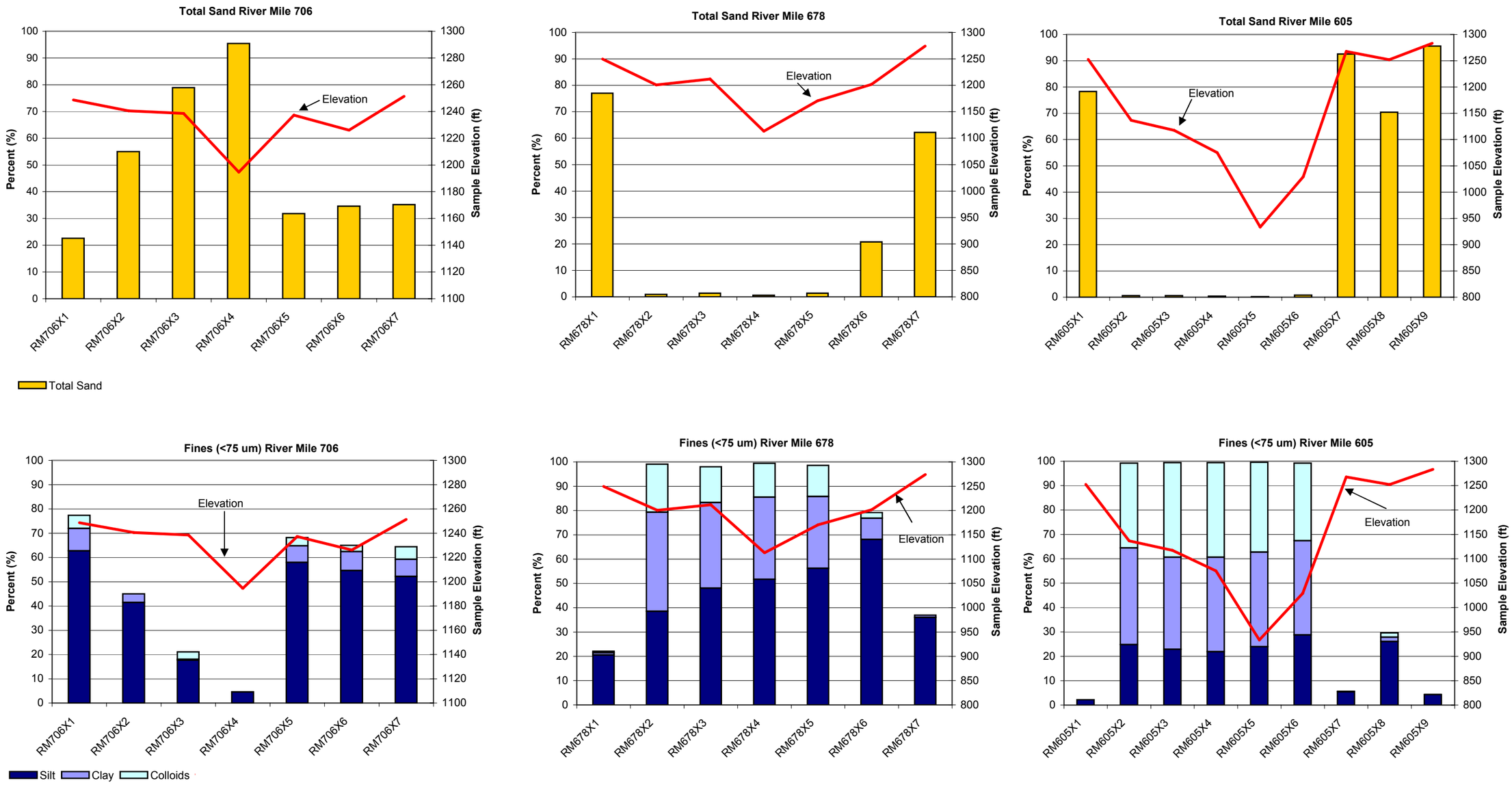
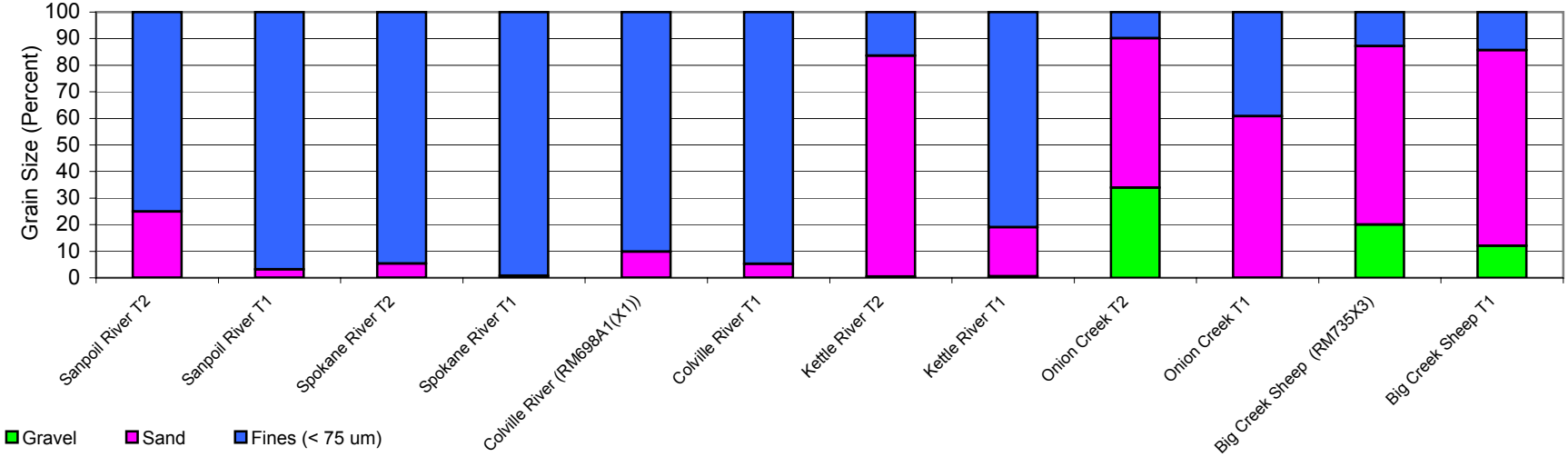


FIGURE 5-16
Comparison of Tributary Sample Particle Size Distributions - Phase I Surface Sediment Samples
Upper Columbia River RI/FS

Gravel, Sands, and Fines



Silt, Clay, and Colloids

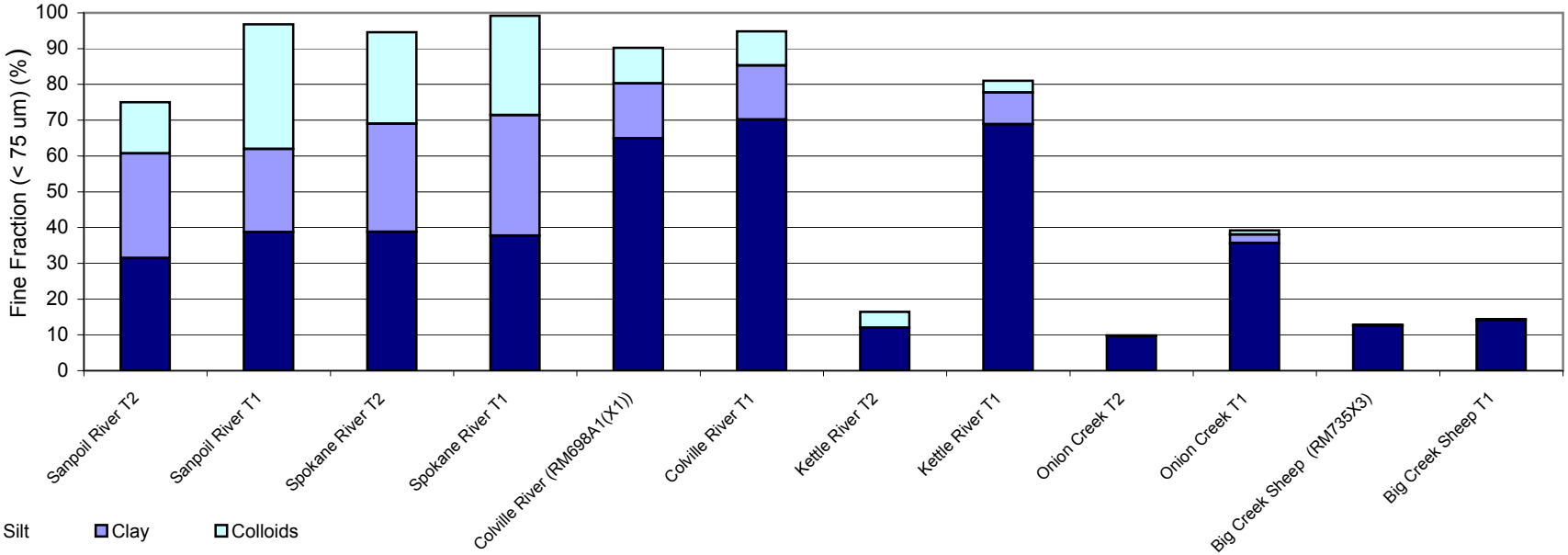
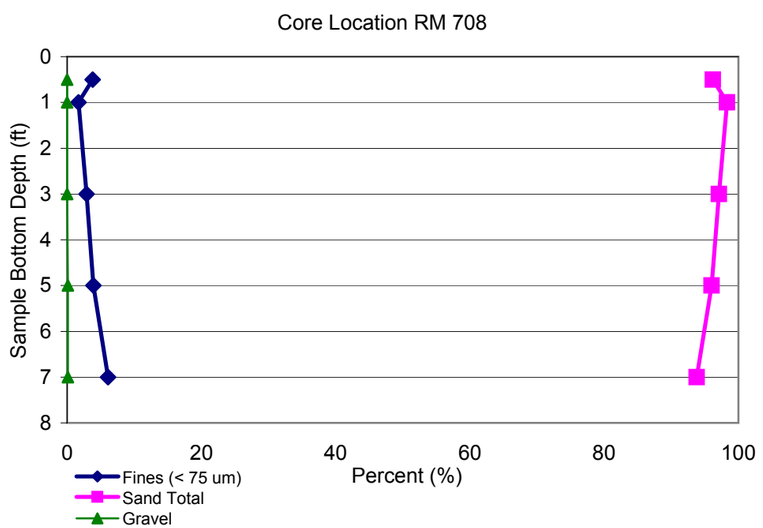
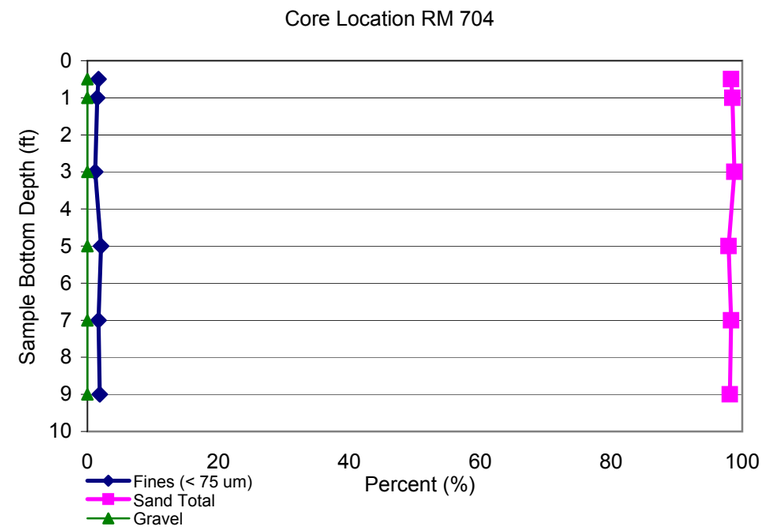
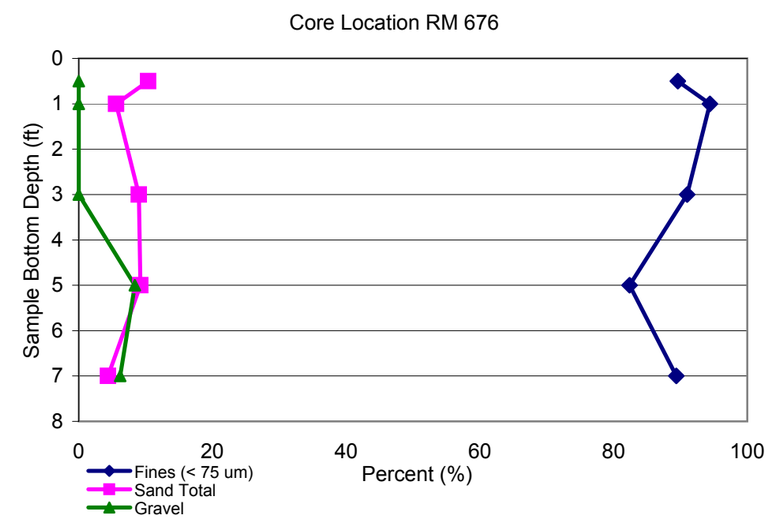
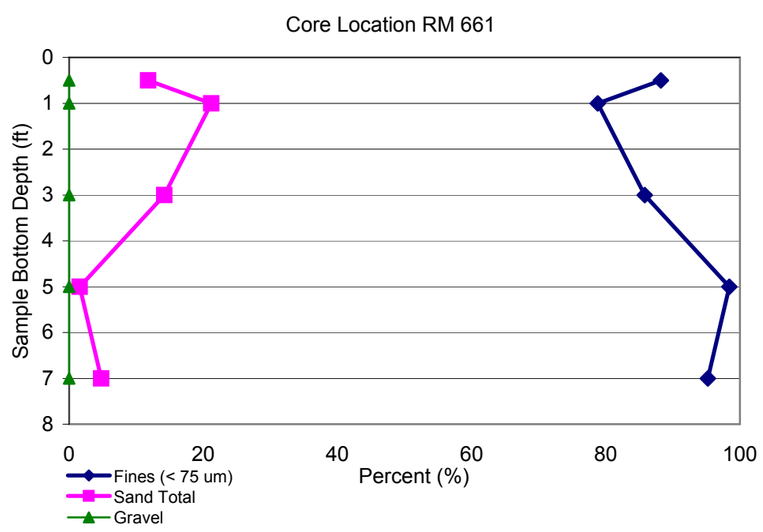


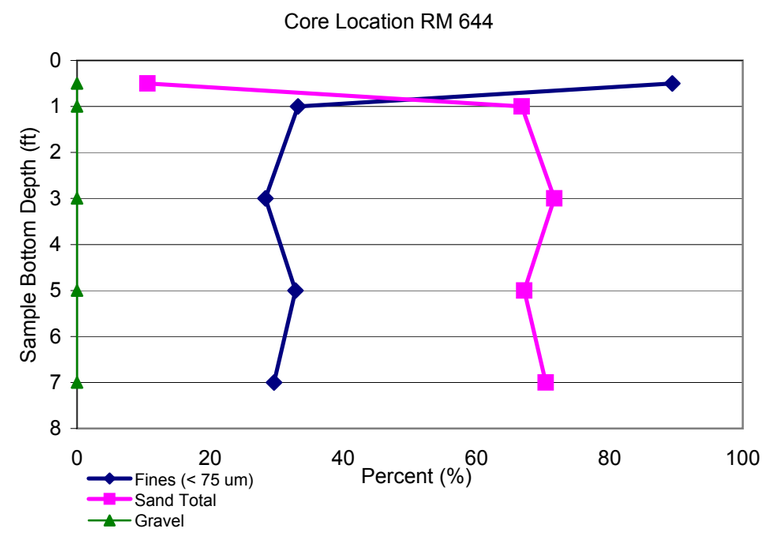
FIGURE 5-17
Grain Size Distributions in Core Samples Collected at RM 708, 704, 676, 661, 644, and 637 - 2005 Phase I Sediment Core Samples
Upper Columbia River RI/FS











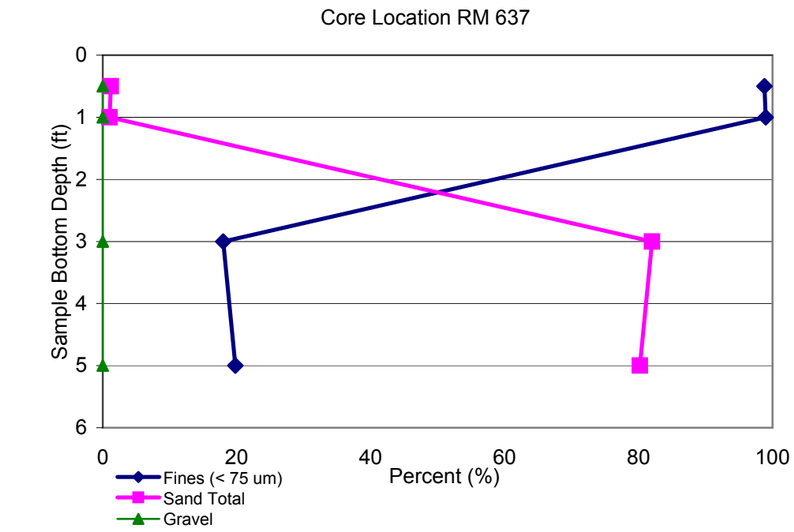
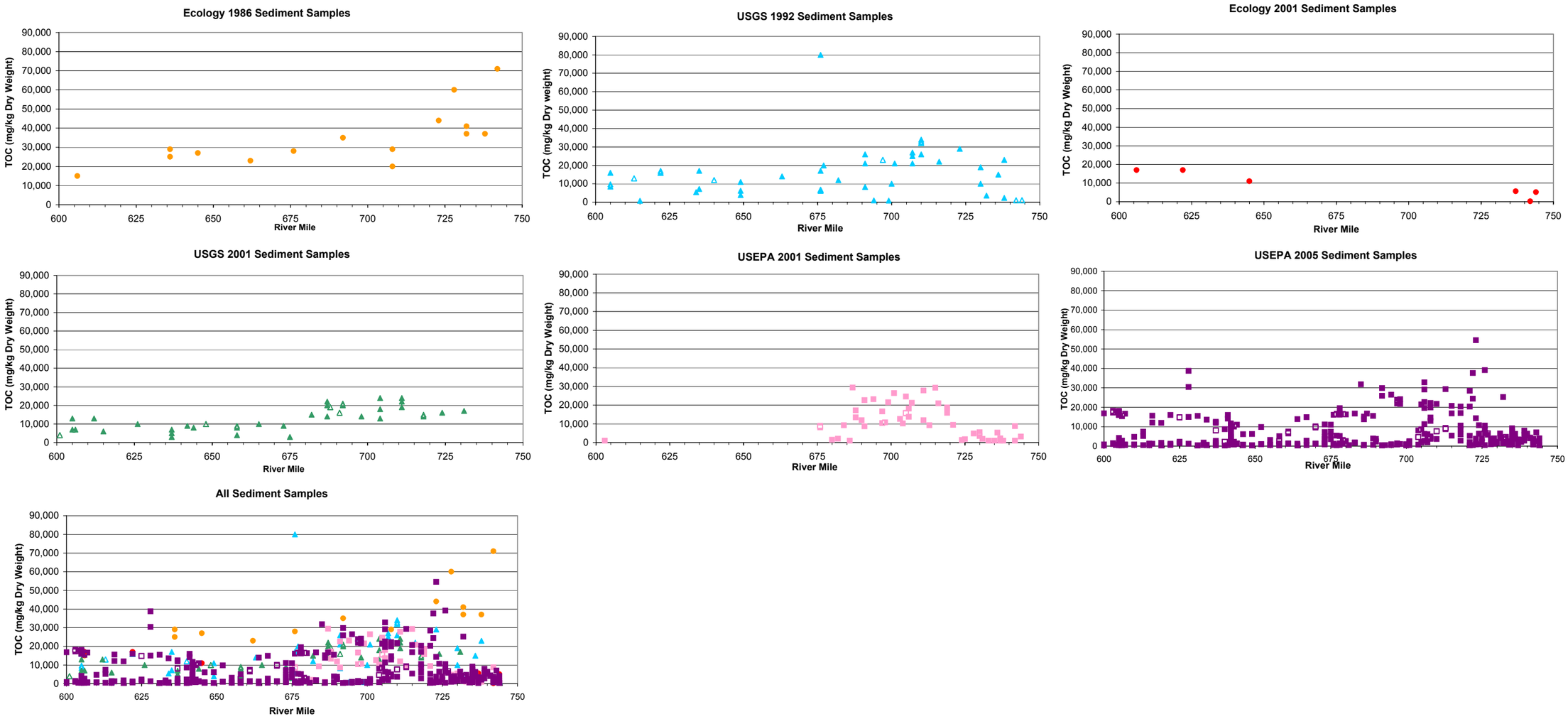


FIGURE 5-18
Distributions of TOC by Investigation
Upper Columbia River RI/FS

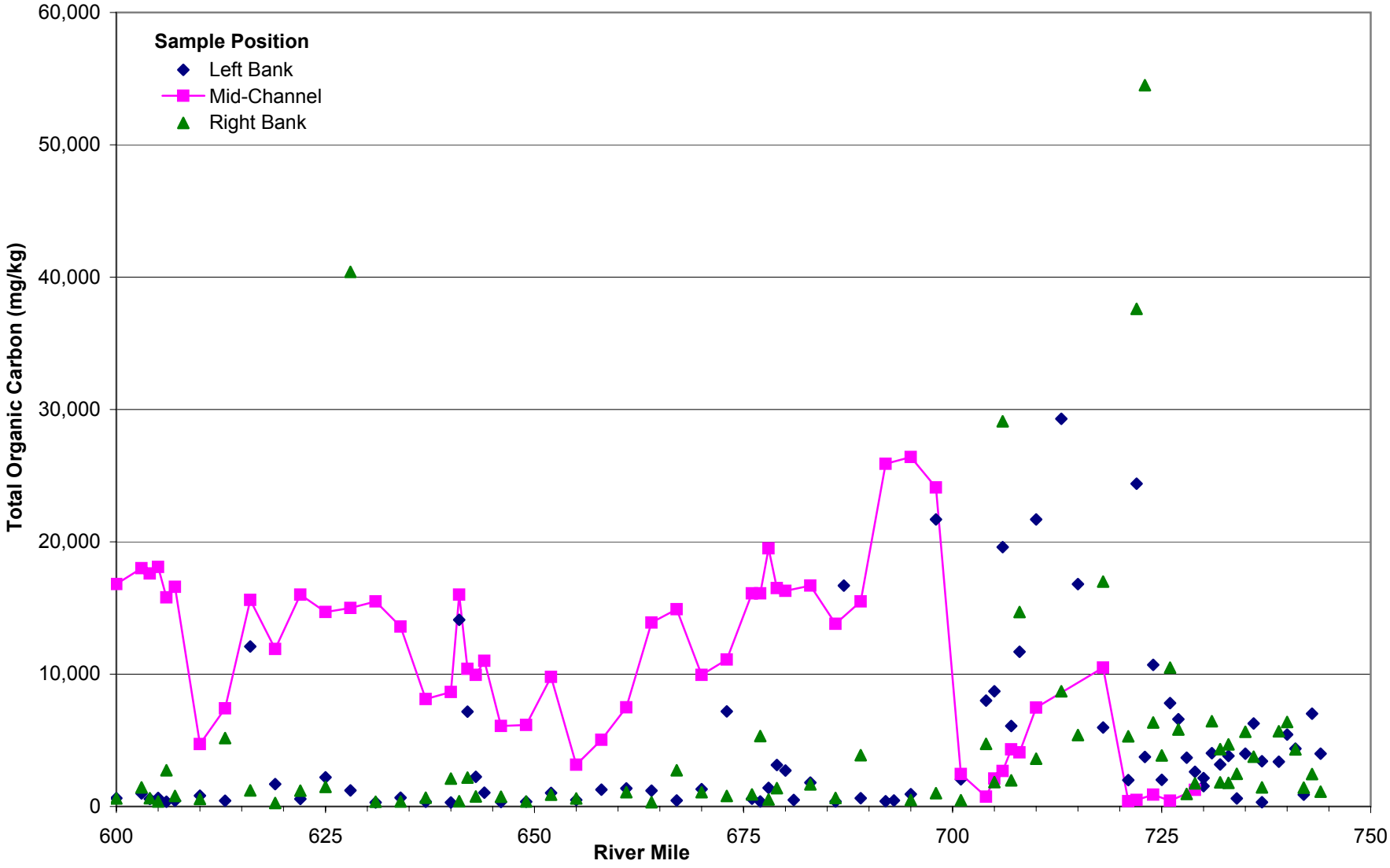


Notes:
The river mile is the measurement upstream from the Mouth of the Columbia River.
Ecology 1986 = An Assessment of Metals contamination in Lake Roosevelt
USGS 1992 = Sediment Quality Assessment of Franklin Roosevelt Lake and the Upstream Reach of the Columbia Rver (UCR 243)
USGS 2001 = Concentration and Distribution of Slag-Related Trace elements and Mercury in Fine-Grained Beach and Bed Sediments in Lake Roosevelt (UCR 002)
USEPA 2001 = Upper Columbia Preliminary Assessment and Site Investigations and Expanded Site Inspection (UCR 247)
Ecology 2001 = Reassessment of Toxicity of Lake Roosevelt Sediments
USEPA 2005 = Phase I Sediment Sampling
USEPA 2001 and USEPA 2005 reported TOC concentrations as mg/kg dry weight. All other studies reported TOC in % dry weight. These values were converted to mg/kg dry weight.

FIGURE 5-19

Longitudinal Distribution of Total Organic Carbon by River Mile - Phase I Mid-Channel, Right Bank, and Left Bank Surface Sediment Samples

Upper Columbia River RI/FS



UCR_Sediment_DE_Figure_5-19_REV.xls

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FIGURE 5-20
Transverse Distributions of TOC and Elevations at RM 706, 678, and 605 - 2005 Phase I Surface Sediment Samples
Upper Columbia River RI/FS

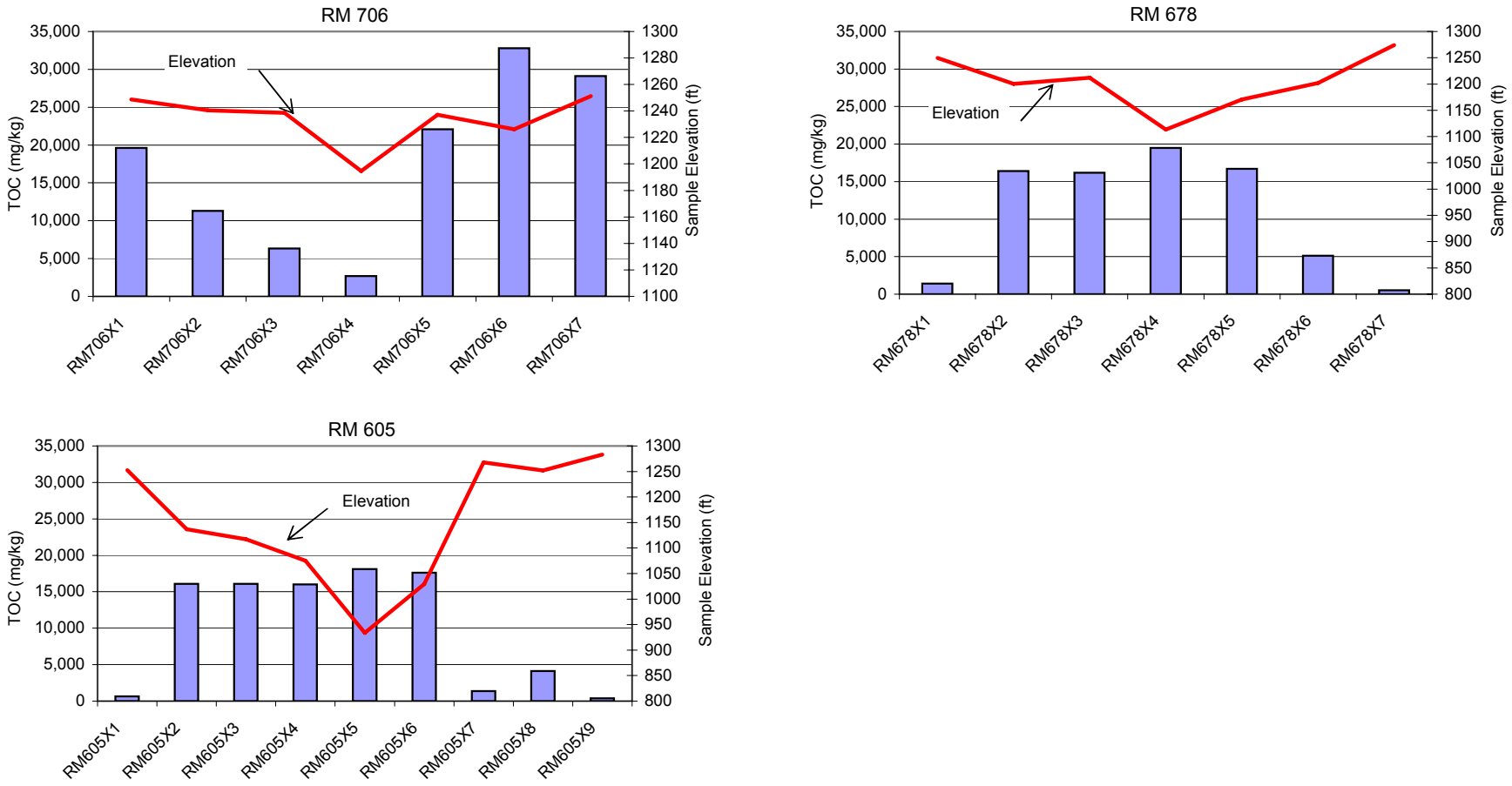


FIGURE 5-21
Longitudinal Distribution of Metals by River Mile - Phase I Surface Sediment
Upper Columbia River RI/FS

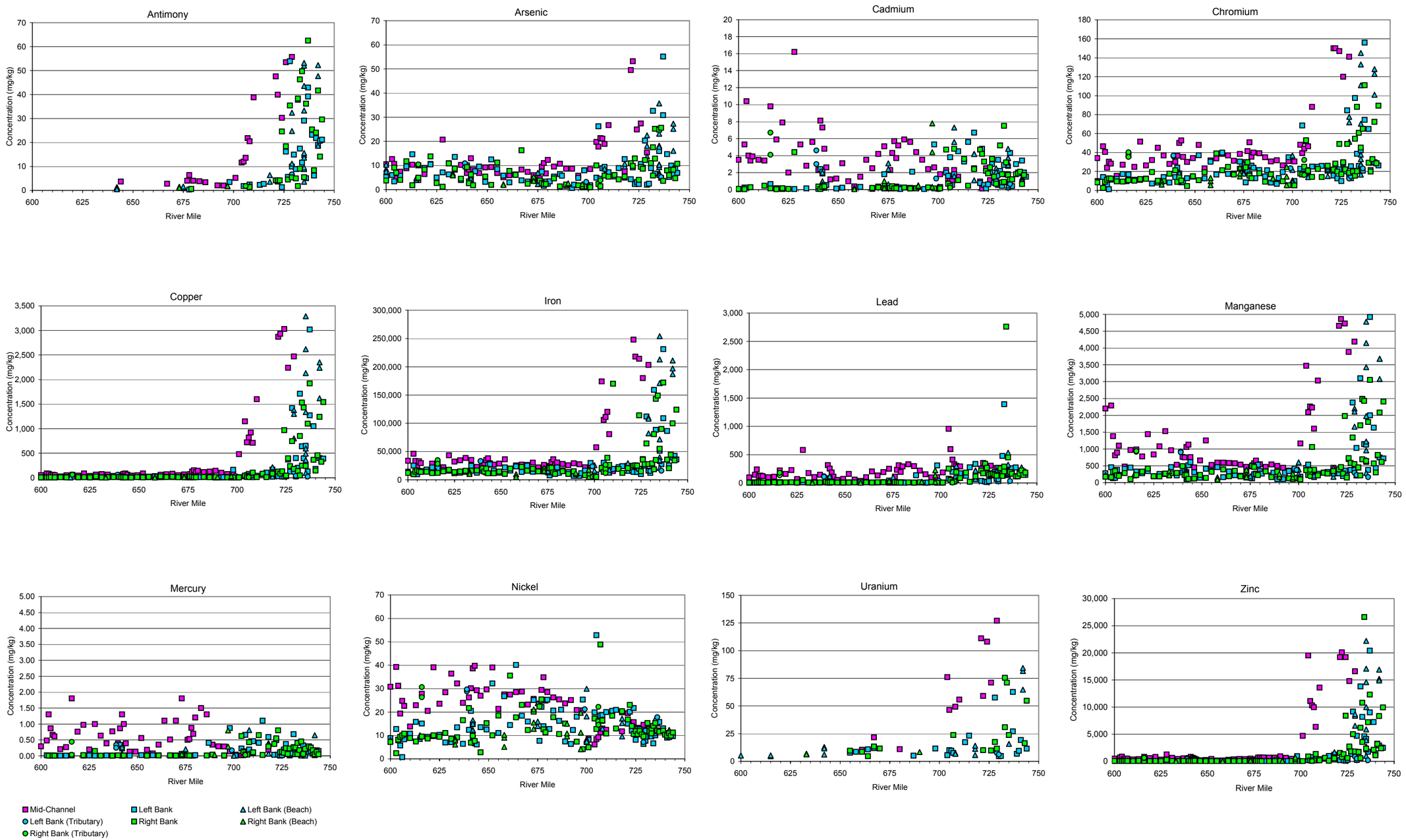
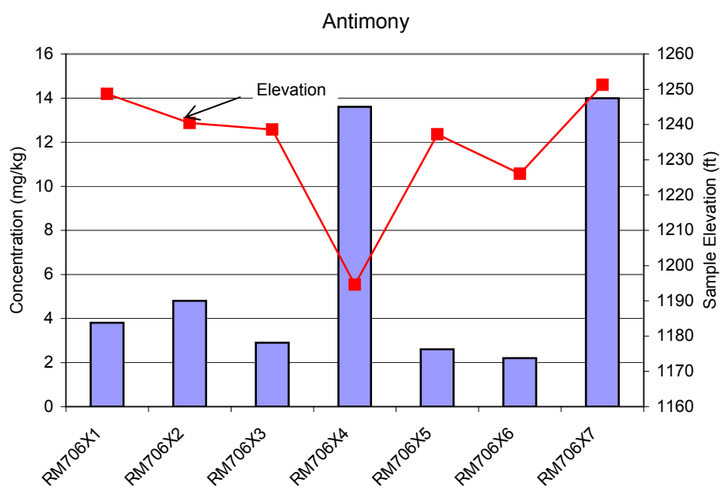
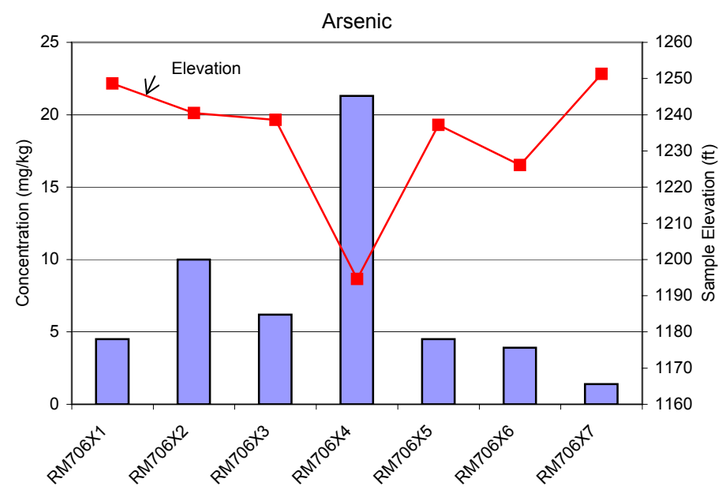
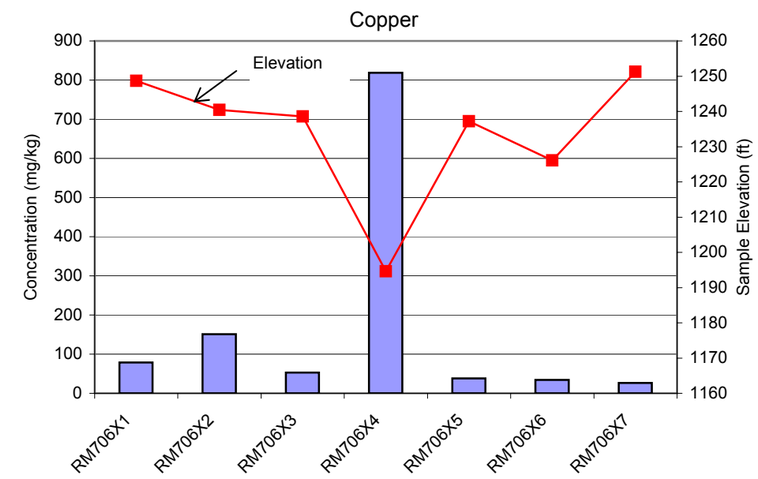
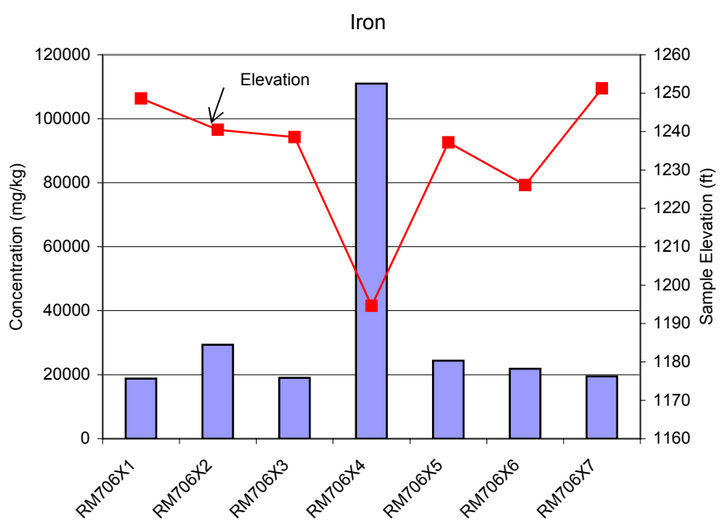


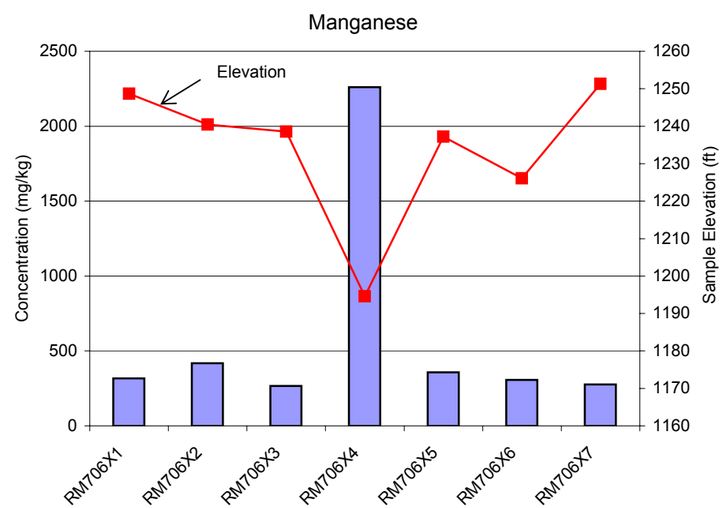
FIGURE 5-22a
Transverse Distribution of Metals and Sample Elevation - Focus Area 3 (RM 706) - 2005 Phase I Surface Sediment Samples
Upper Columbia River RI/FS











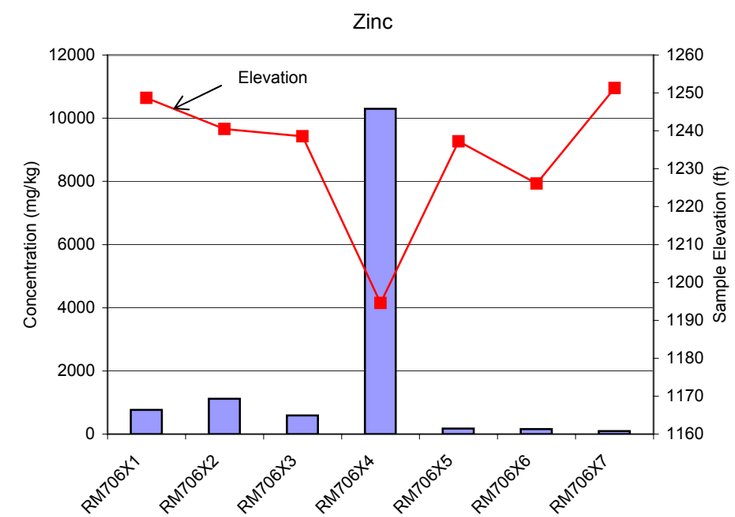
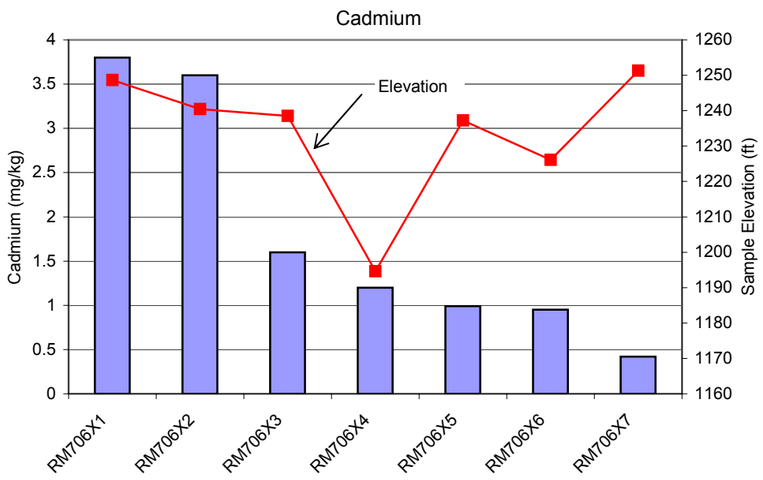
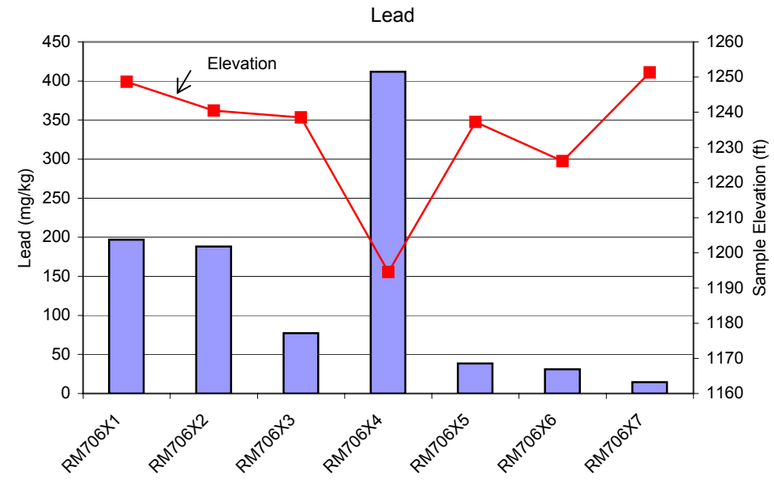
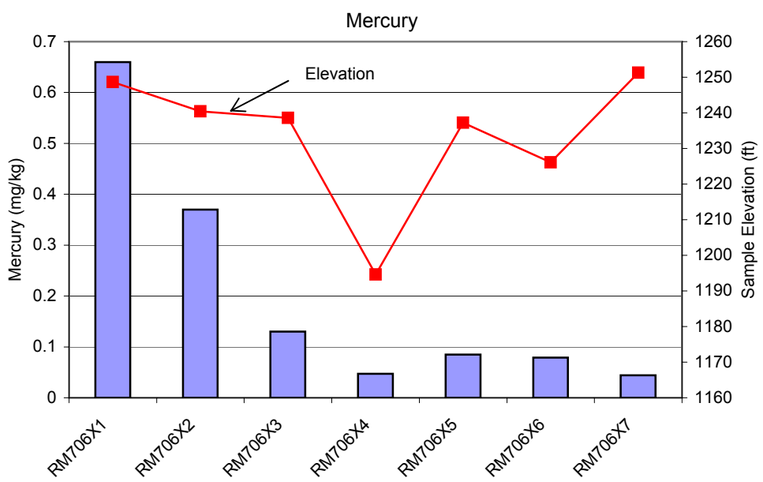


FIGURE 5-22b
Transverse Distribution of Metals and Sample Elevation - Focus Area 3 (RM 706) - 2005 Phase I Surface Sediment Samples
Upper Columbia River RI/FS







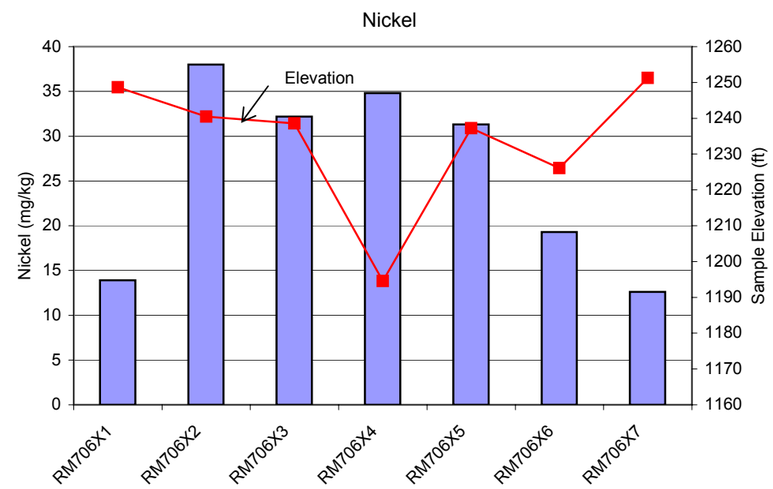


FIGURE 5-23
Transverse Distribution of Metals and Sample Elevation - Focus Area 4 (RM 678) - 2005 Phase I Surface Sediment Samples
Upper Columbia River RI/FS

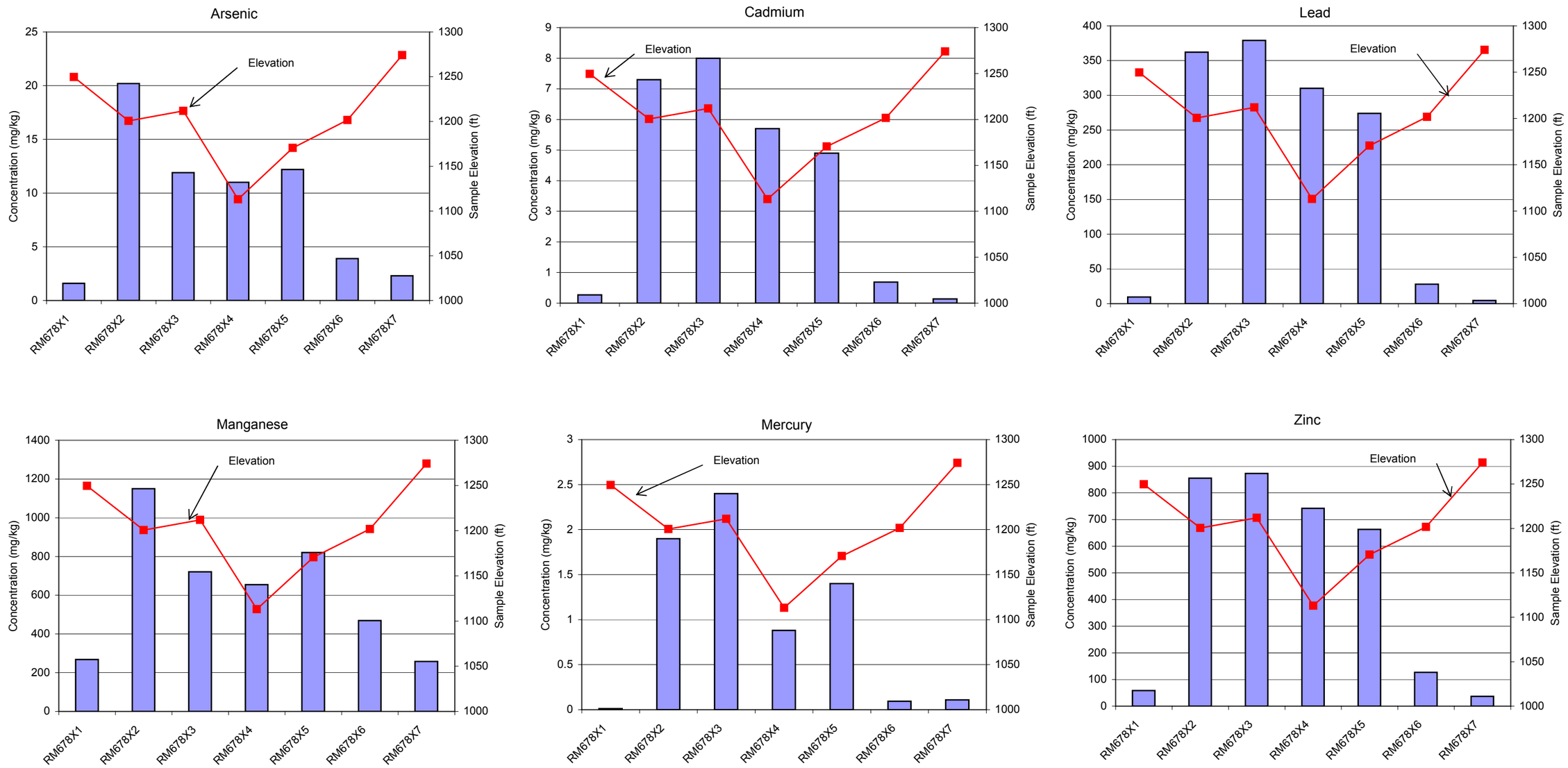


FIGURE 5-24
Transverse Distribution of Metals and Sample Elevation - Focus Area 5 (RM 642) - 2005 Phase I Surface Sediment Samples
Upper Columbia River RI/FS

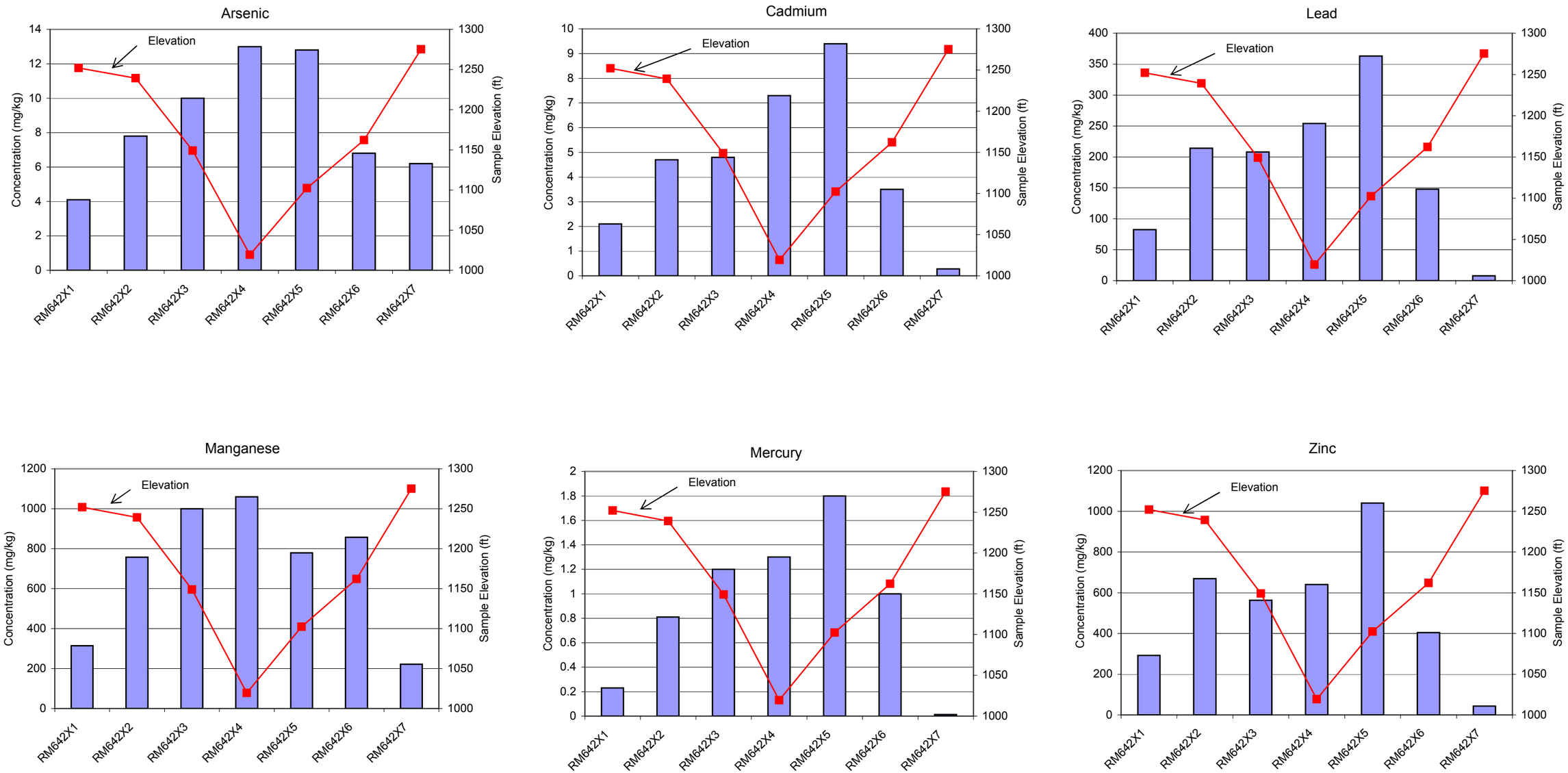
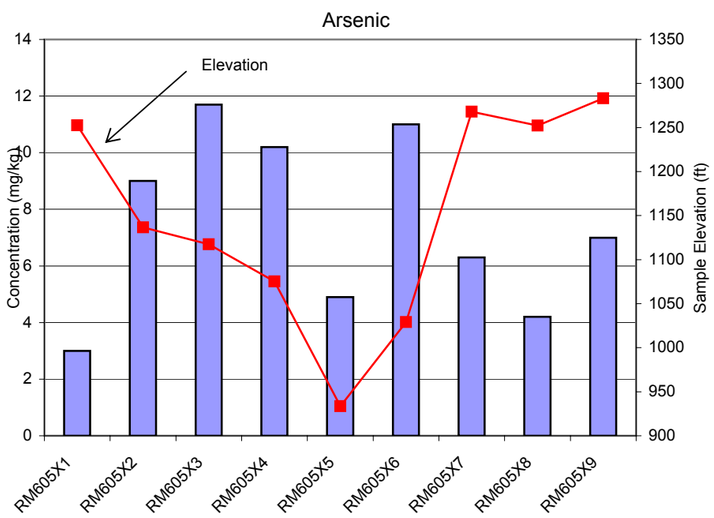
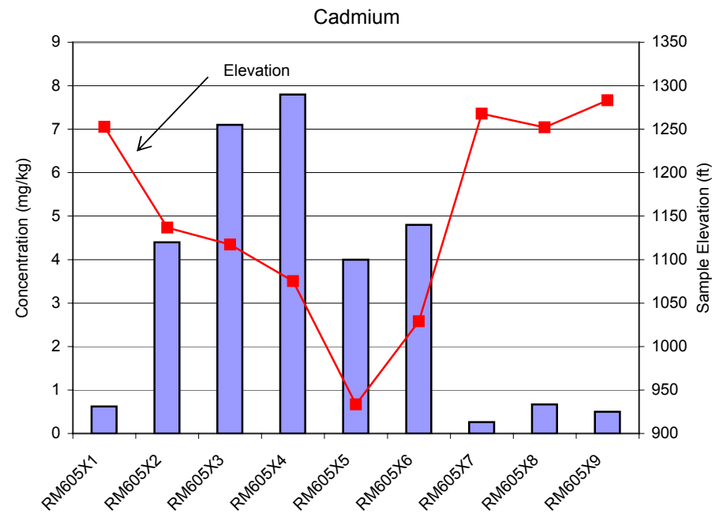
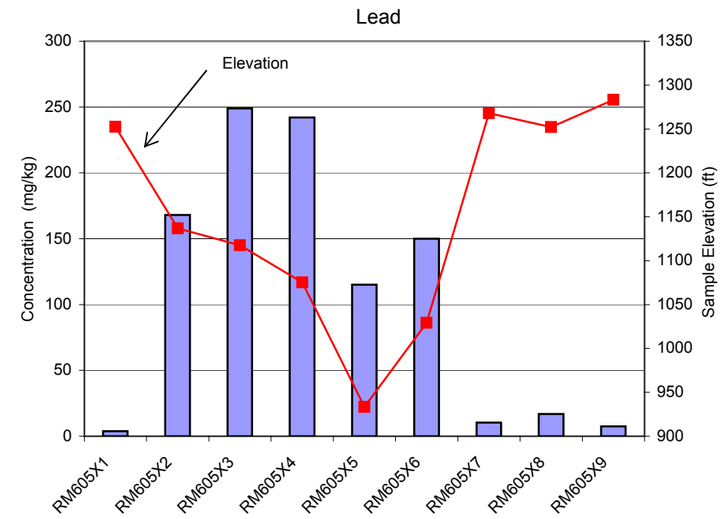
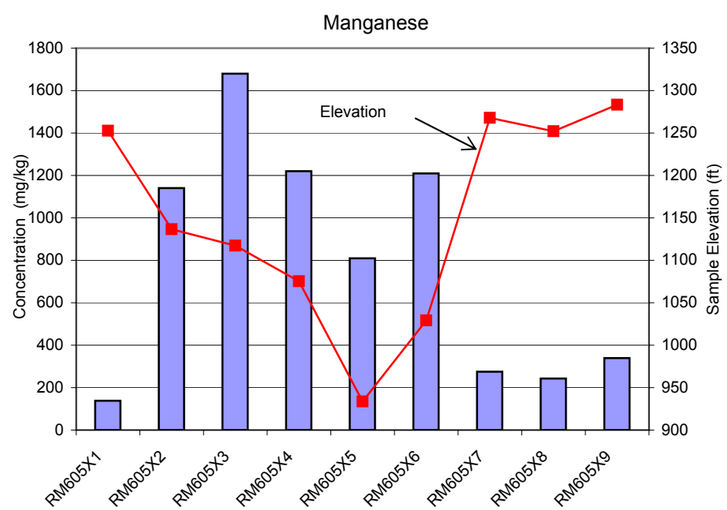


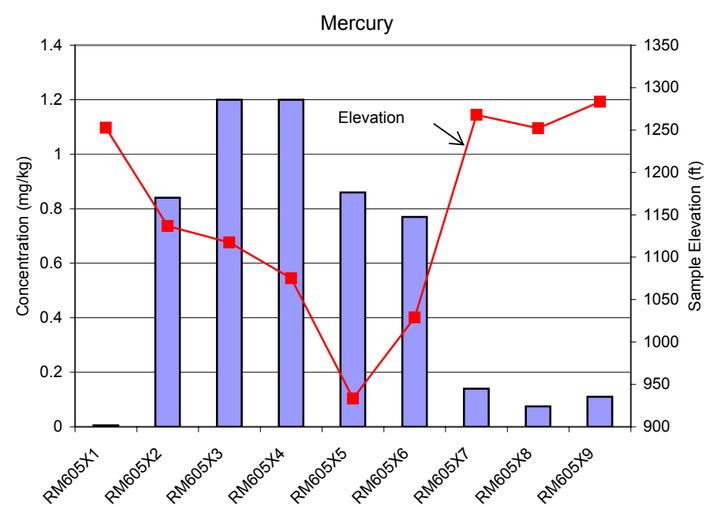
FIGURE 5-25
Transverse Distribution of Metals and Sample Elevation - Focus Area 5 (RM 605) - 2005 Phase I Surface Sediment Samples
Upper Columbia River RI/FS











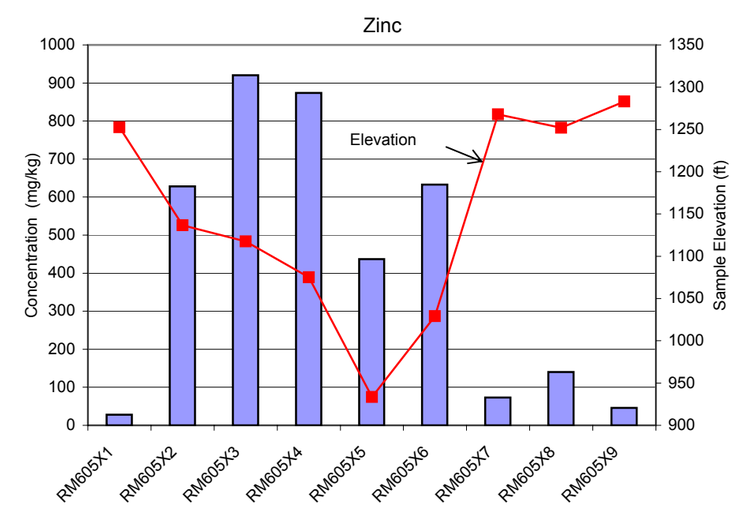


FIGURE 5-26

Cadmium Correlation with TOC in Mid-channel Samples Collected Below Marcus Flats - Phase I Surface Sediment Samples

Upper Columbia River RI/FS

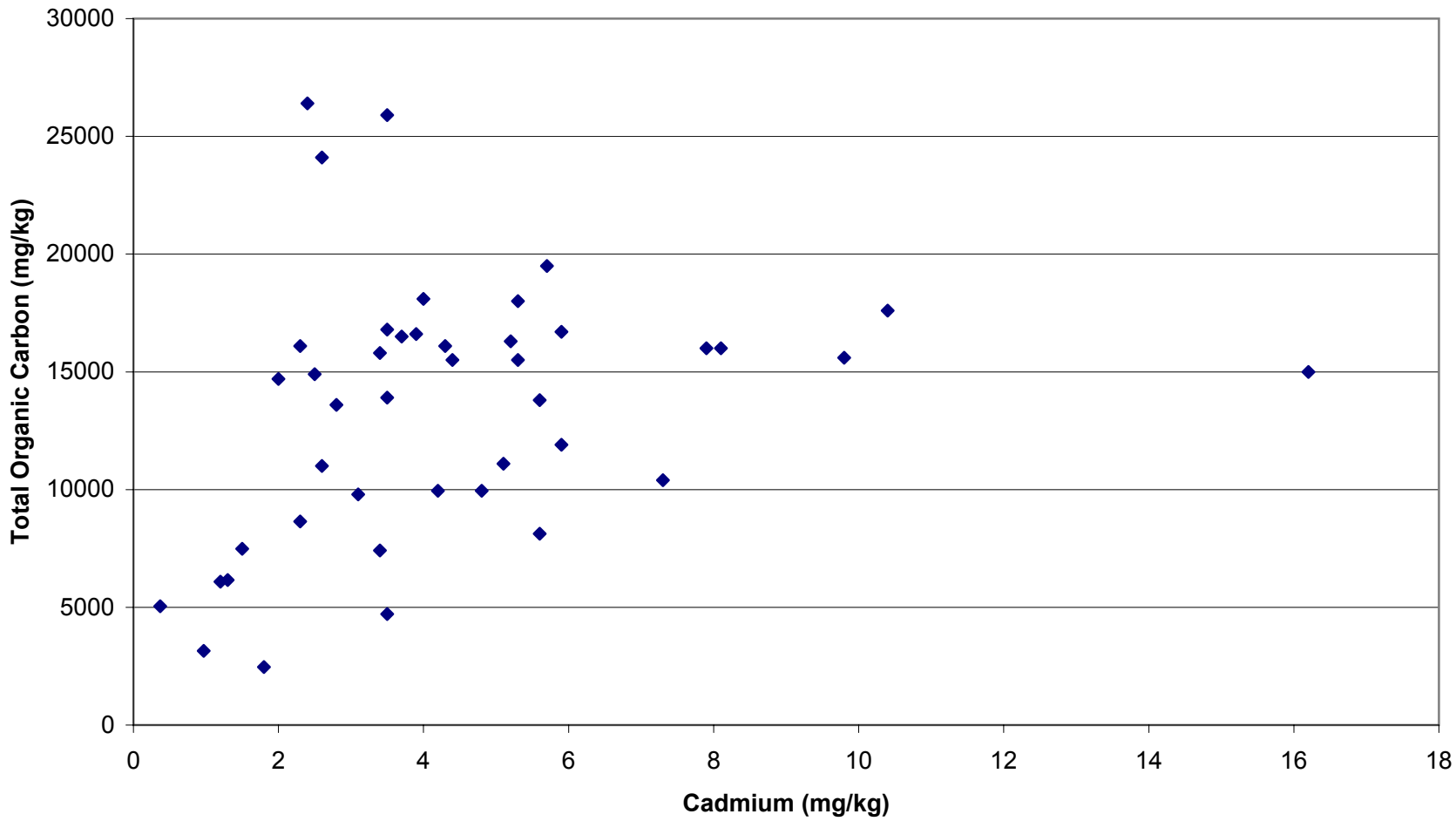


FIGURE 5-27

Cadmium Correlation with TOC in Mid-channel Samples Collected Below Marcus Flats - Phase I Surface Sediment Samples

Upper Columbia River RI/FS

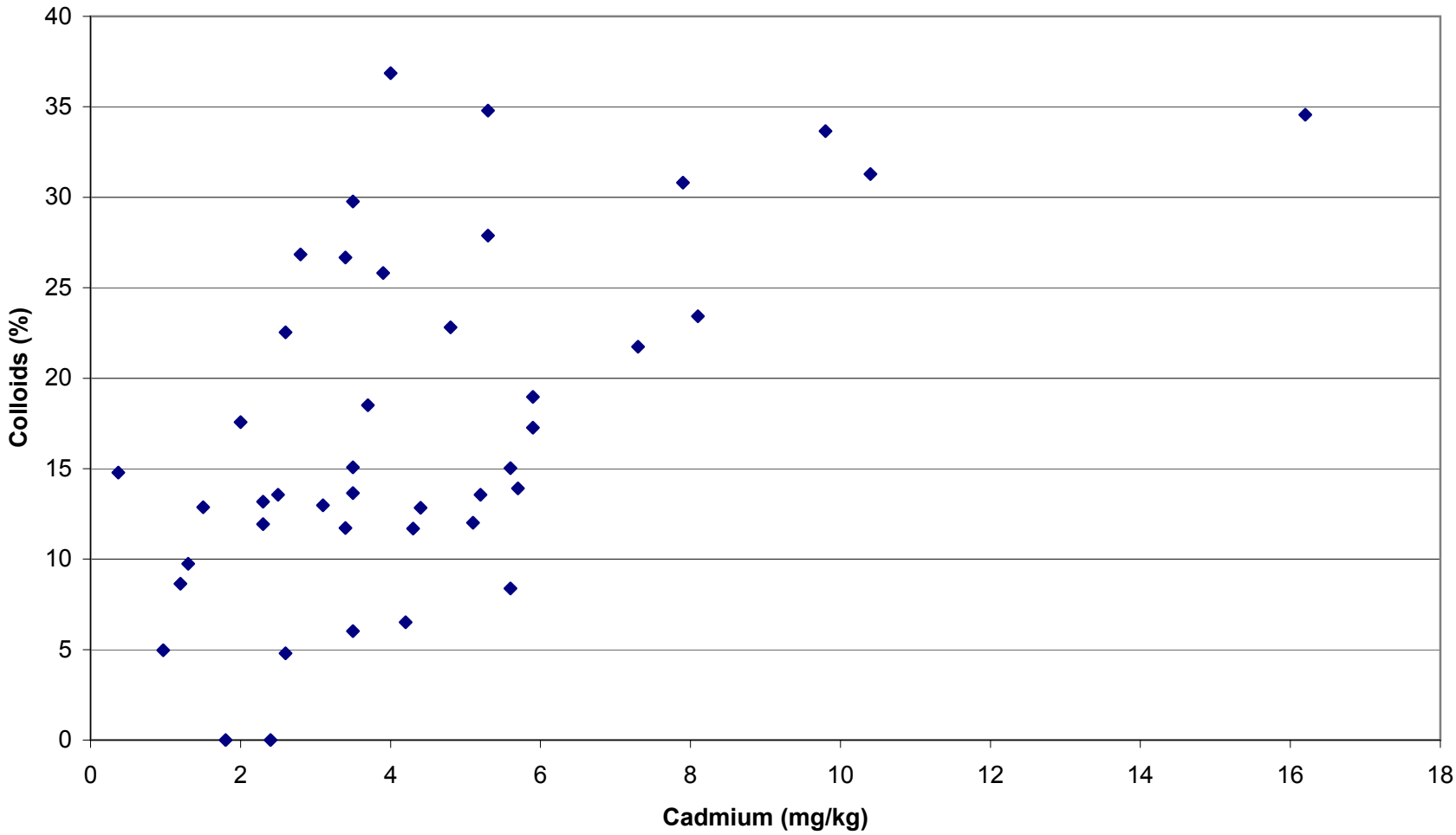
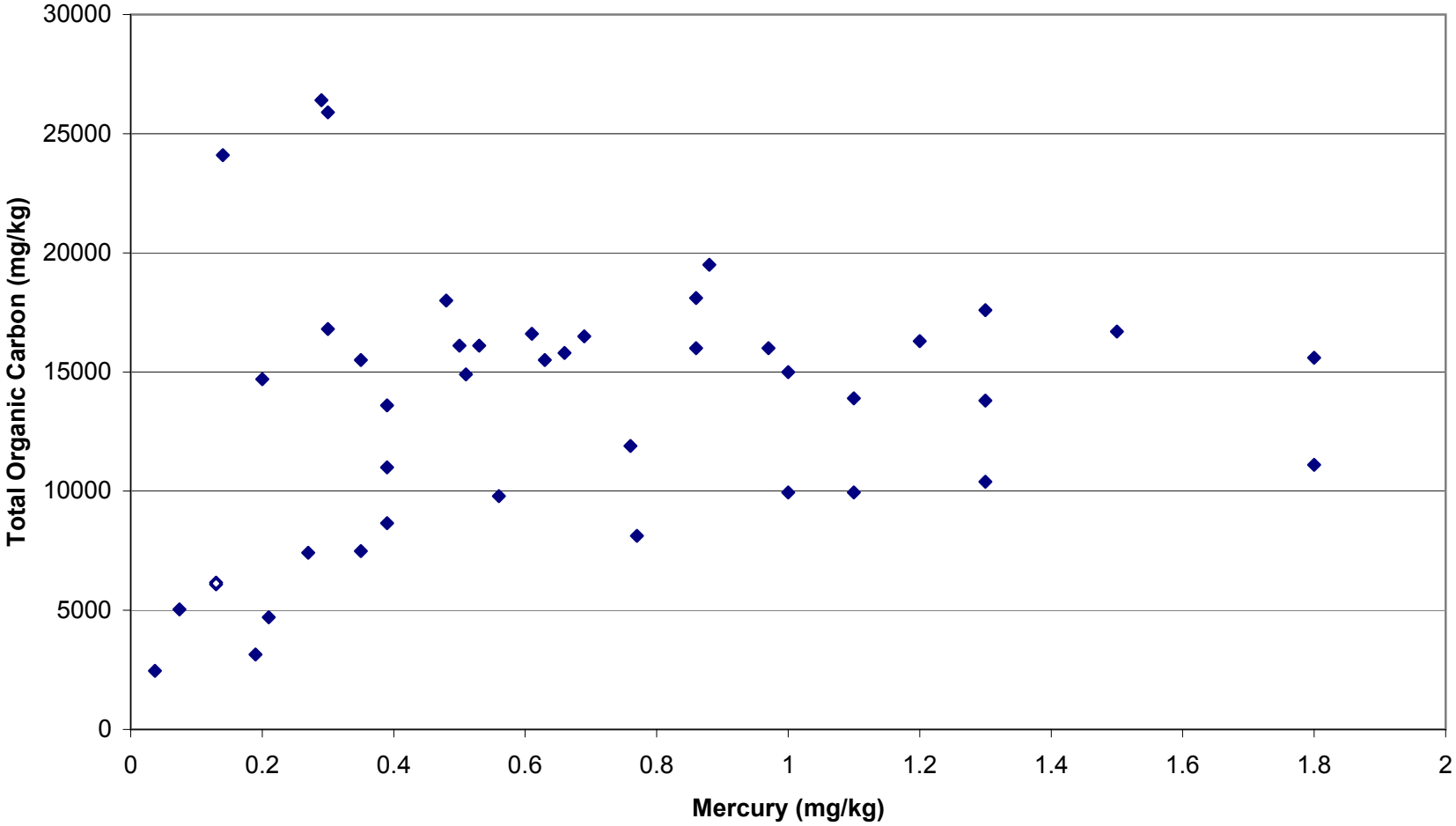


FIGURE 5-28

Mercury Correlation with TOC in Mid-channel Samples Collected Below Marcus Flats - Phase I Surface Sediment Samples

Upper Columbia River RI/FS



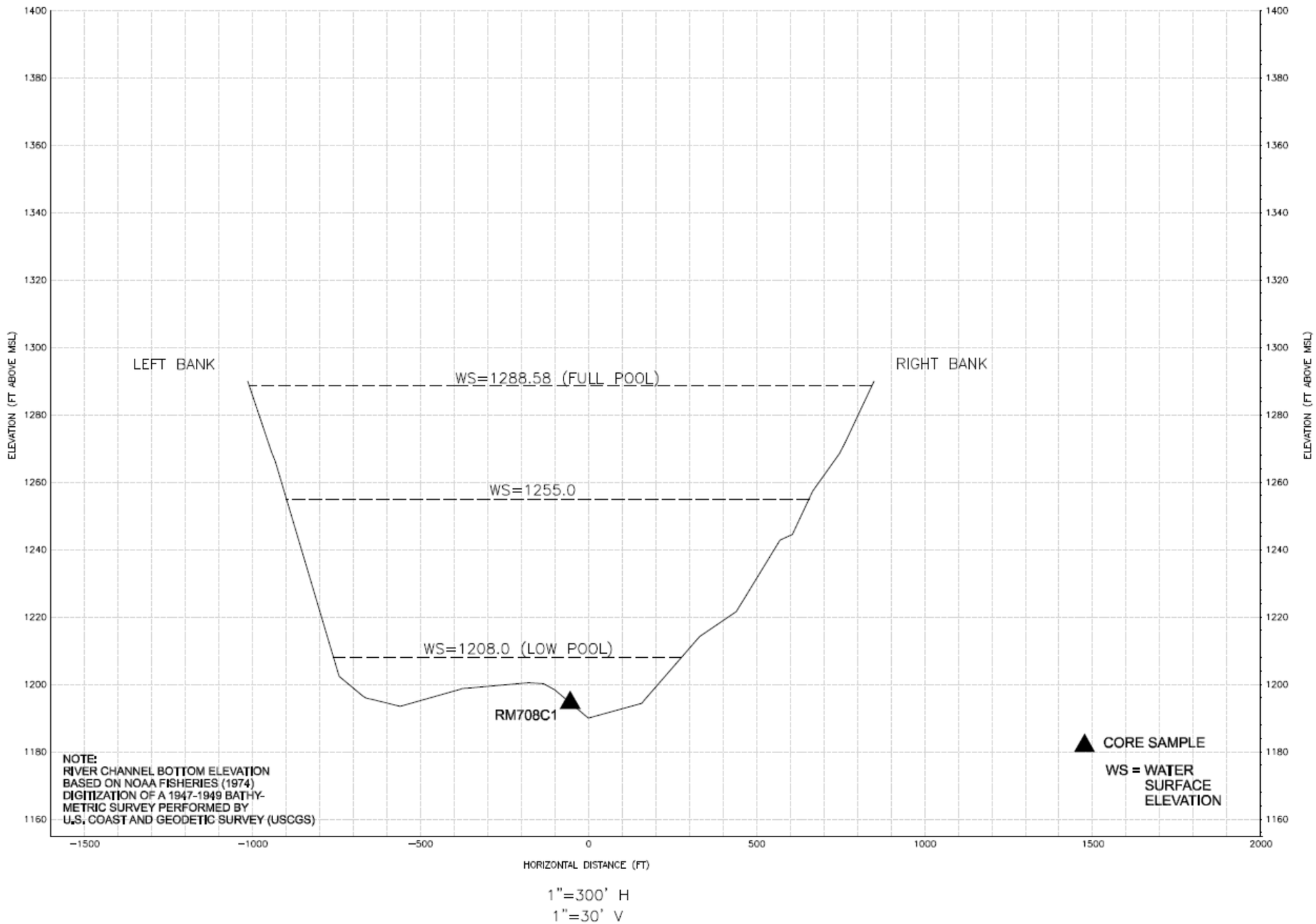


Figure 5-29
Channel Cross-Section and Sampling Locations at RM 708
Upper Columbia River RI/FS

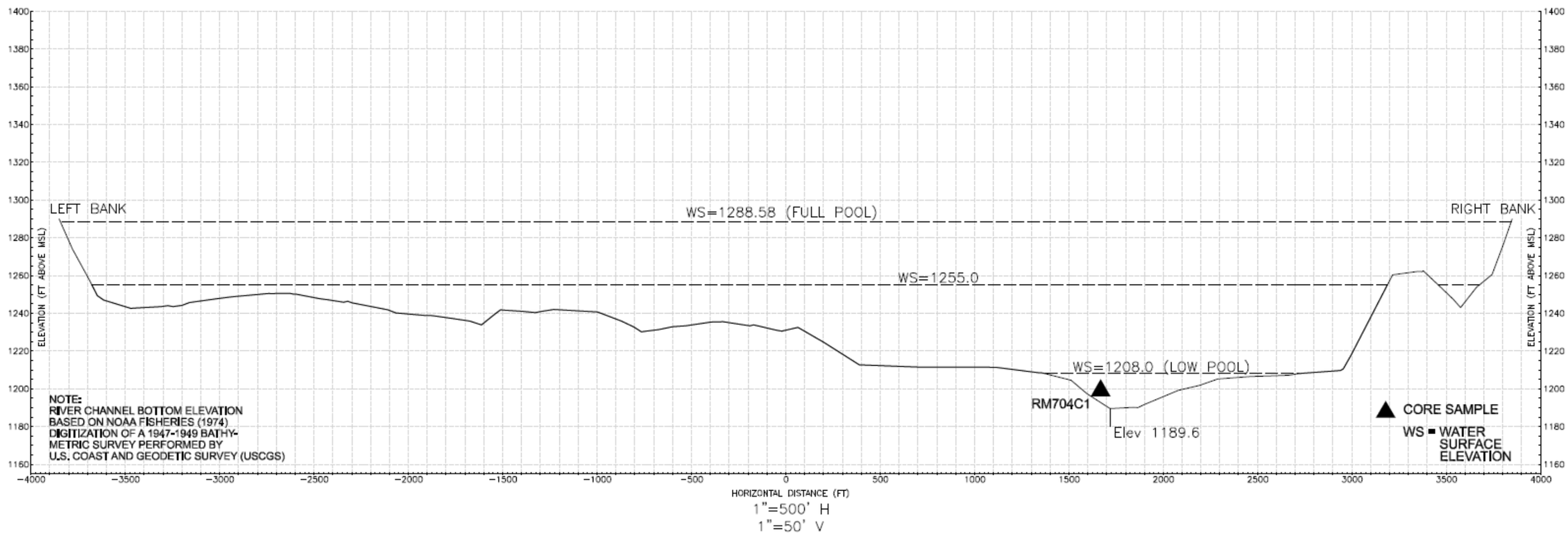


Figure 5-30
Channel Cross-Section and Sampling Locations at RM 704
Upper Columbia River RI/FS

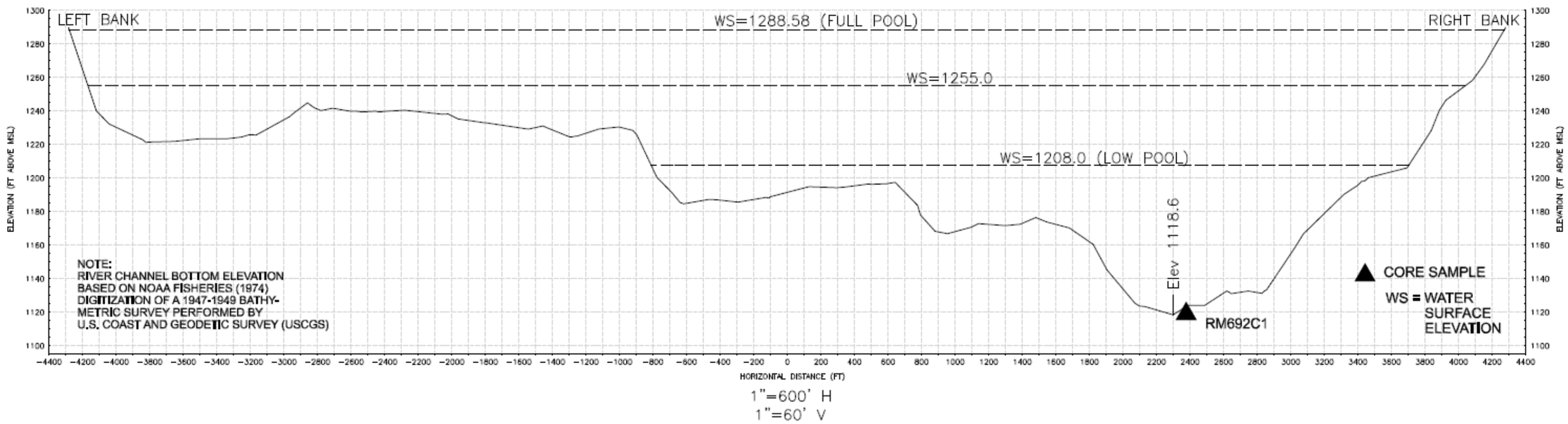


Figure 5-31
Channel Cross-Section and Sampling Locations at RM 692
Upper Columbia River RI/FS

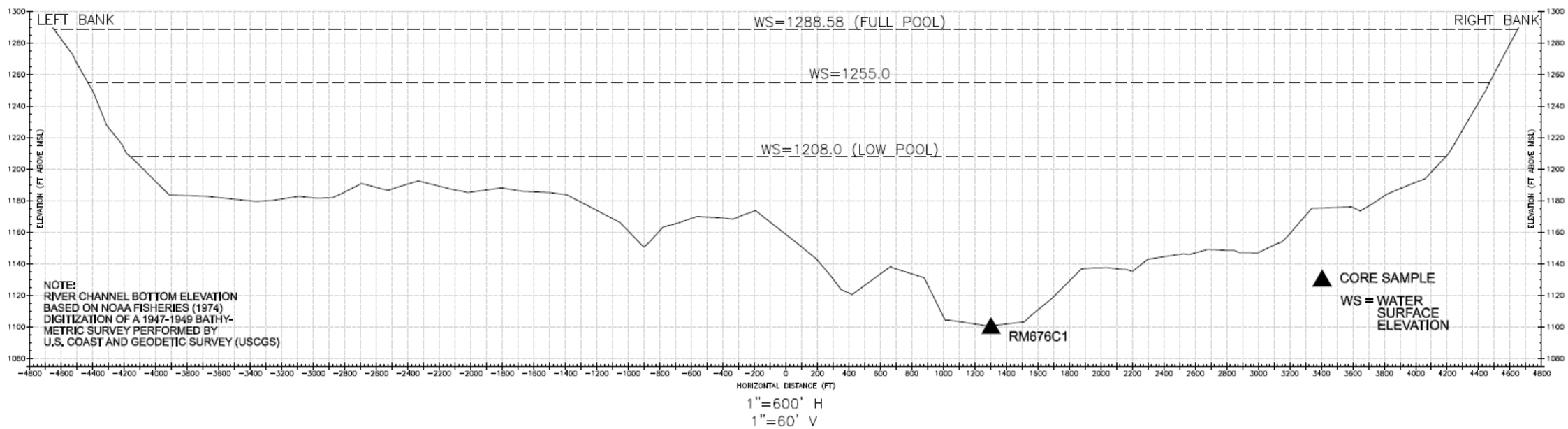


Figure 5-32
Channel Cross-Section and Sampling Locations at RM 676
Upper Columbia River RI/FS

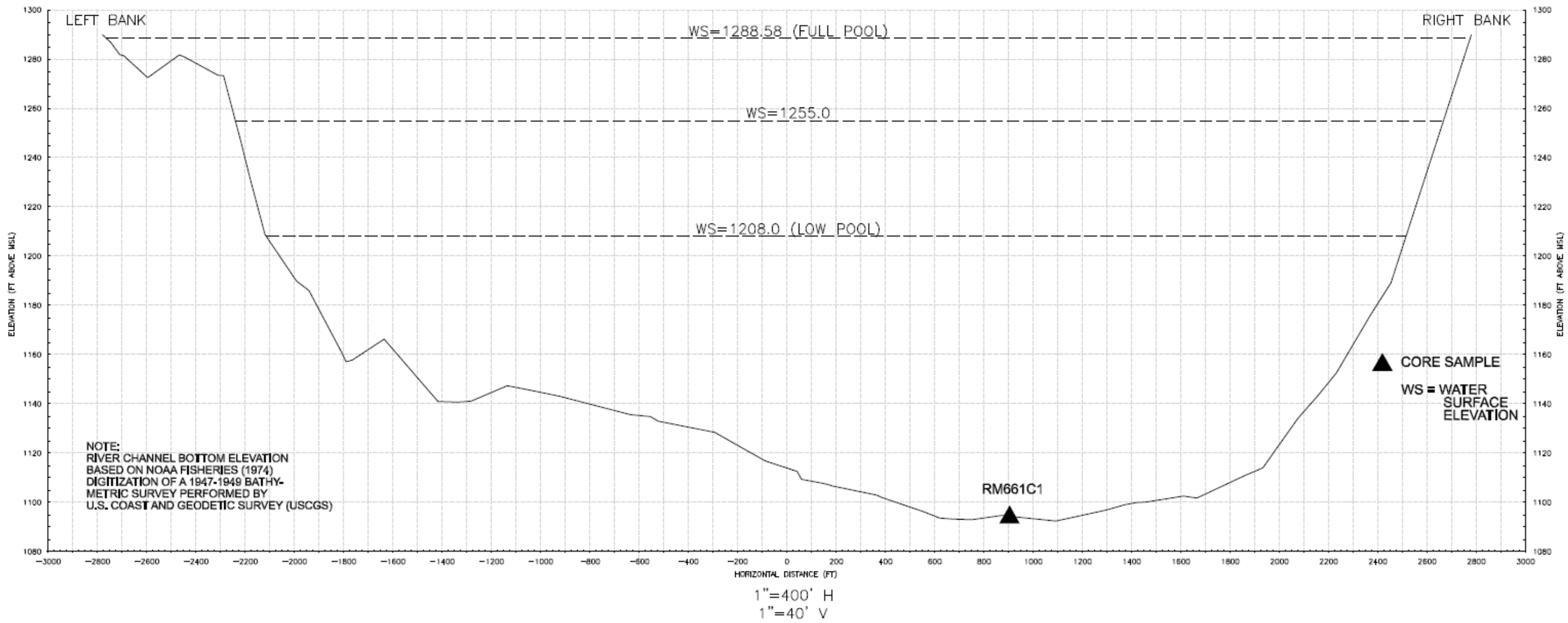


Figure 5-33
Channel Cross-Section and Sampling Locations at RM 661
Upper Columbia River RI/FS

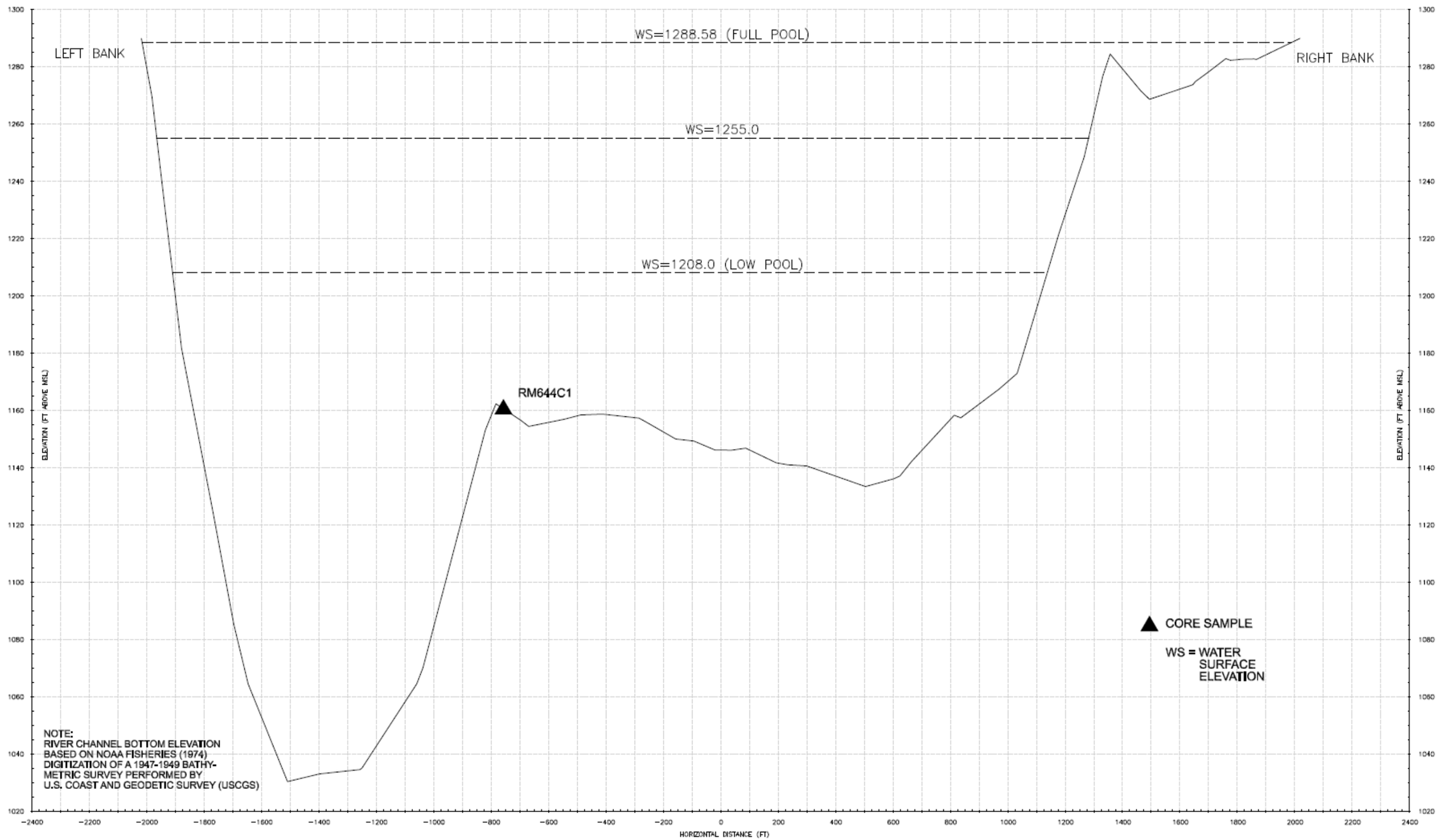


Figure 5-34
Channel Cross-Section and Sampling Locations at RM 644
Upper Columbia River RI/FS

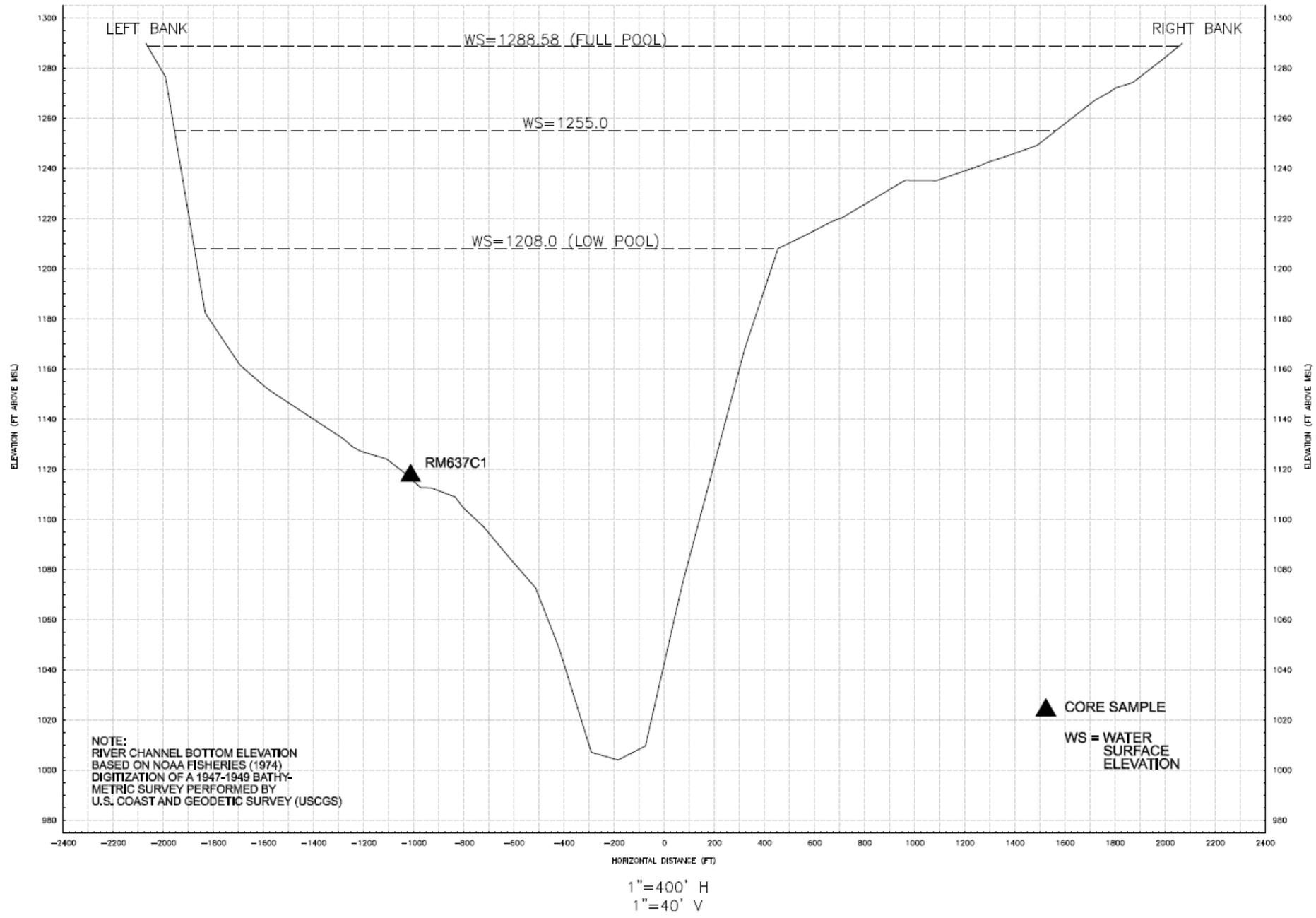


Figure 5-35
Channel Cross-Section and Sampling Locations at RM 637
Upper Columbia River RI/FS

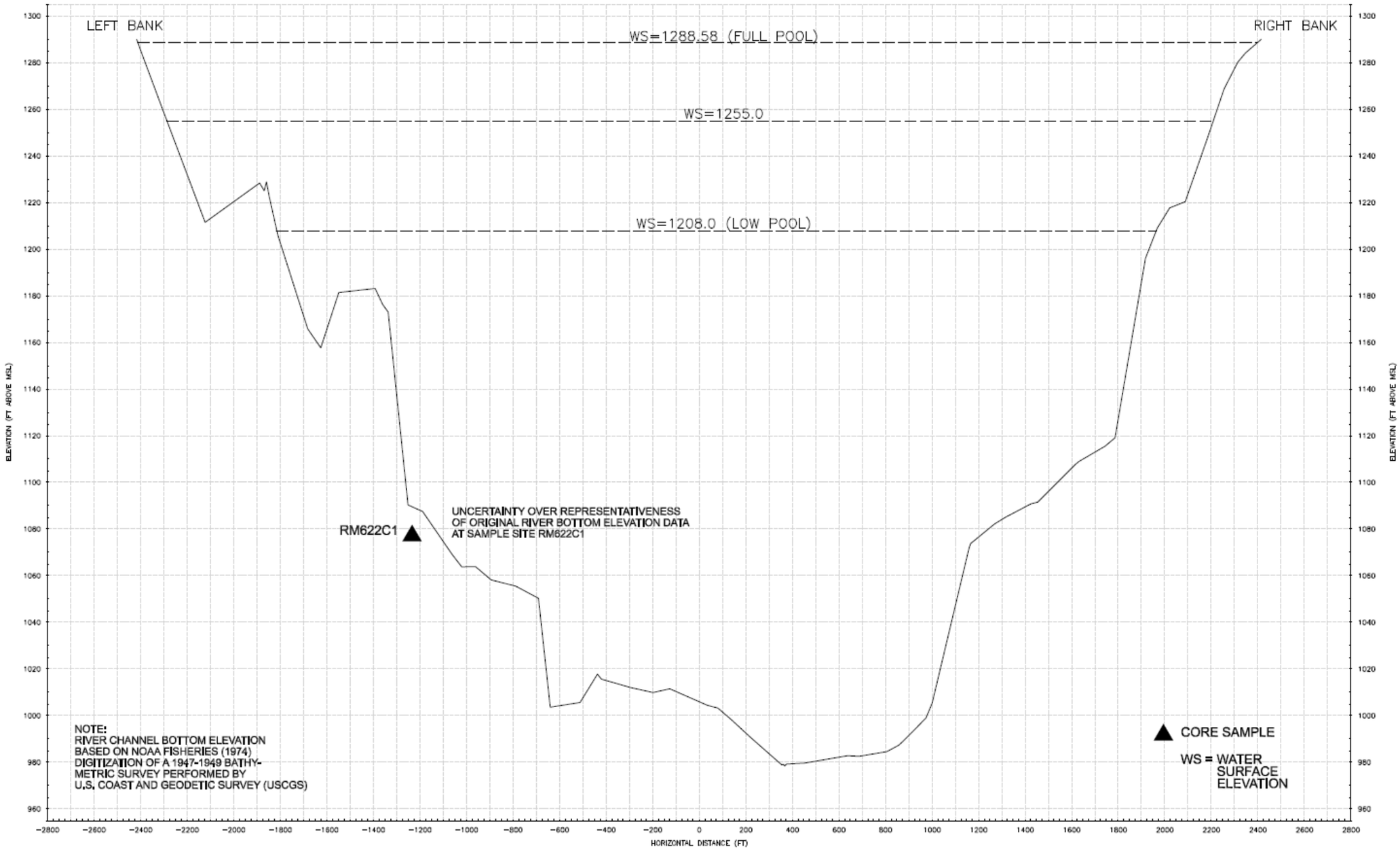


Figure 5-36
Channel Cross-Section and Sampling Locations at RM 622
Upper Columbia River RI/FS

FIGURE 5-37
Vertical Distribution of Metals in 2005 Phase I Sediment Core Samples RM 704
Upper Columbia River RI/FS

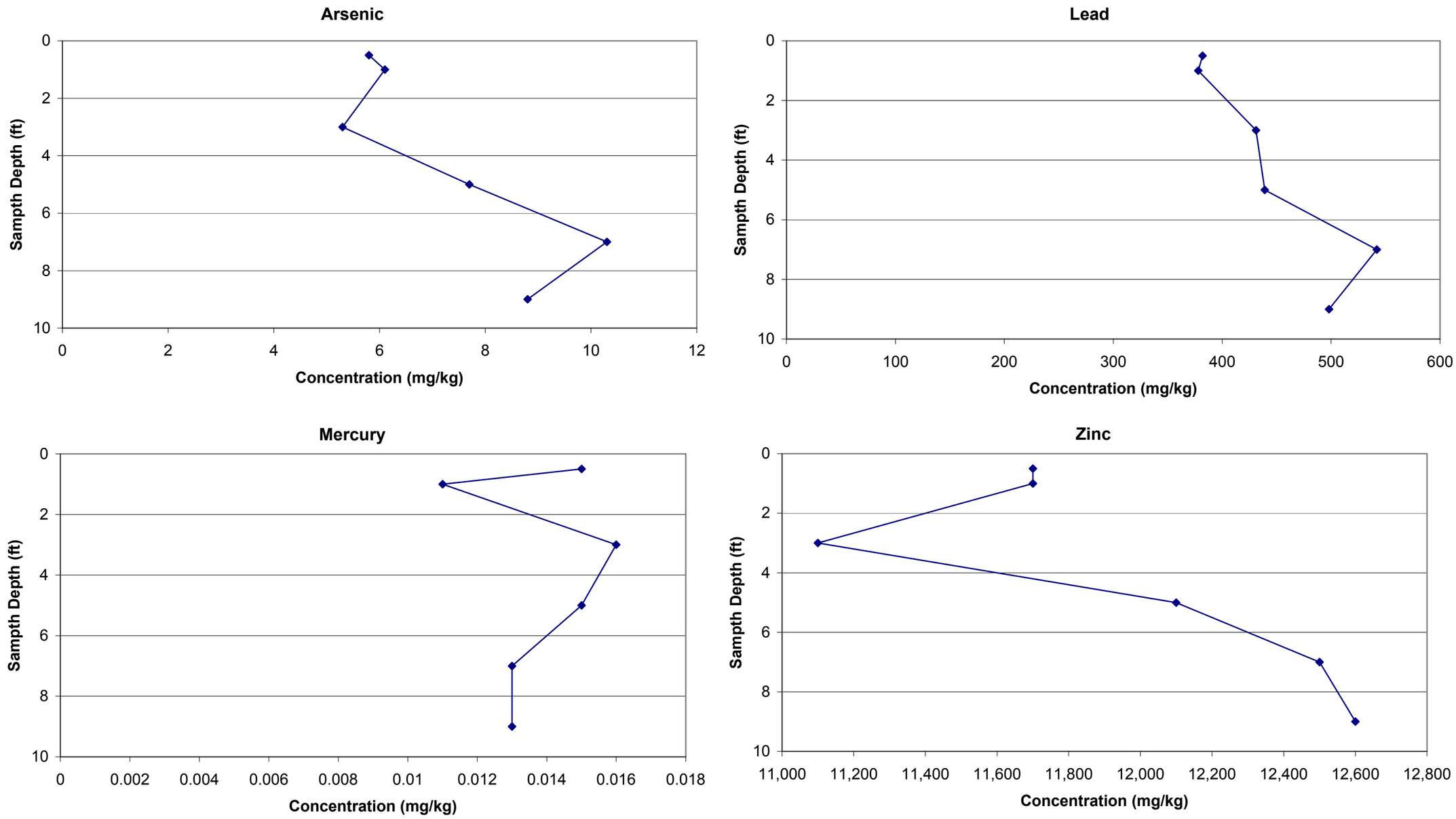


FIGURE 5-38
Vertical Distribution of Metals in 2005 Phase I Sediment Core Samples RM 676
Upper Columbia River RI/FS

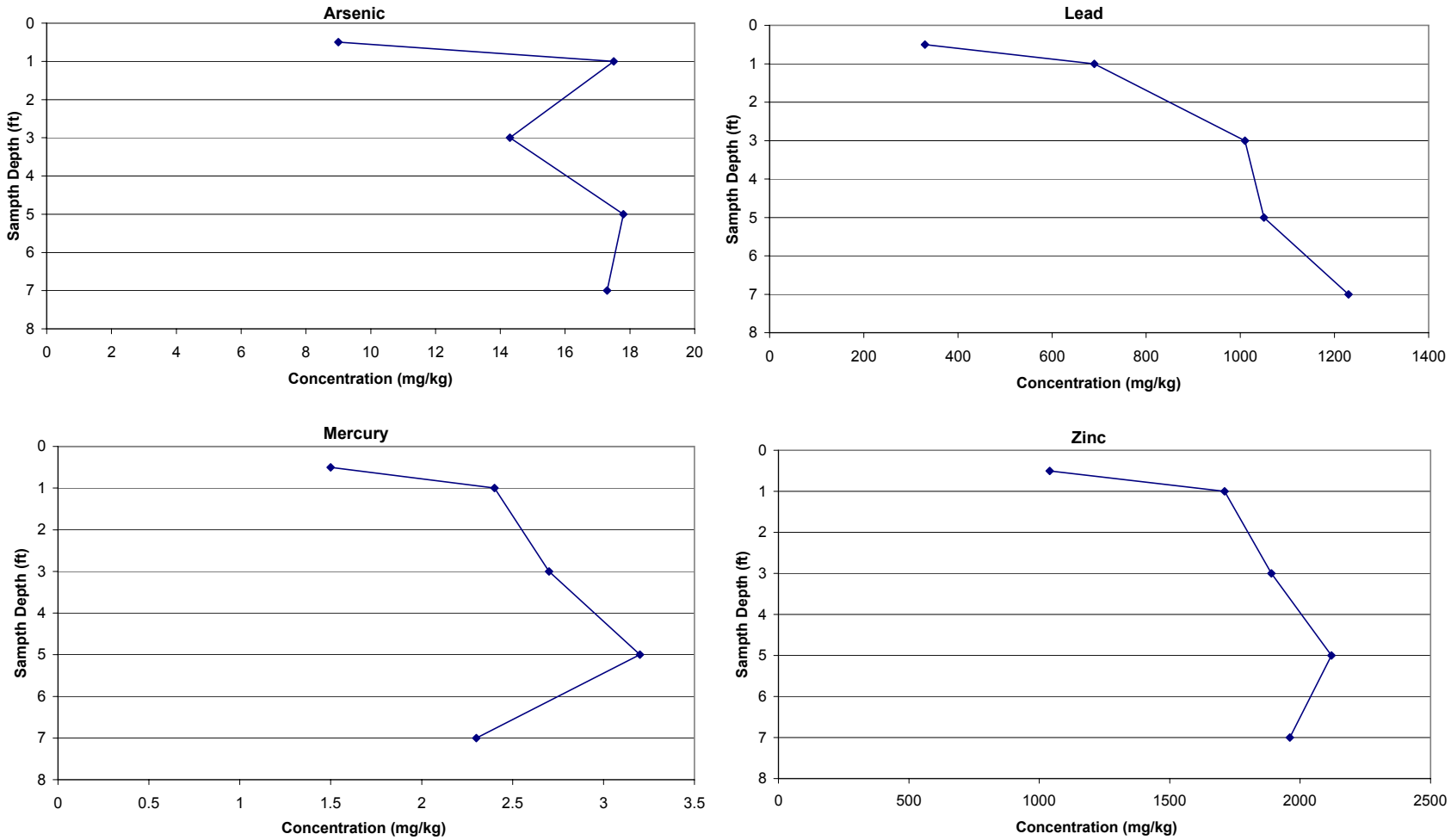


FIGURE 5-39
Vertical Distribution of Metals in 2005 Phase I Sediment Core Samples RM 605
Upper Columbia River RI/FS

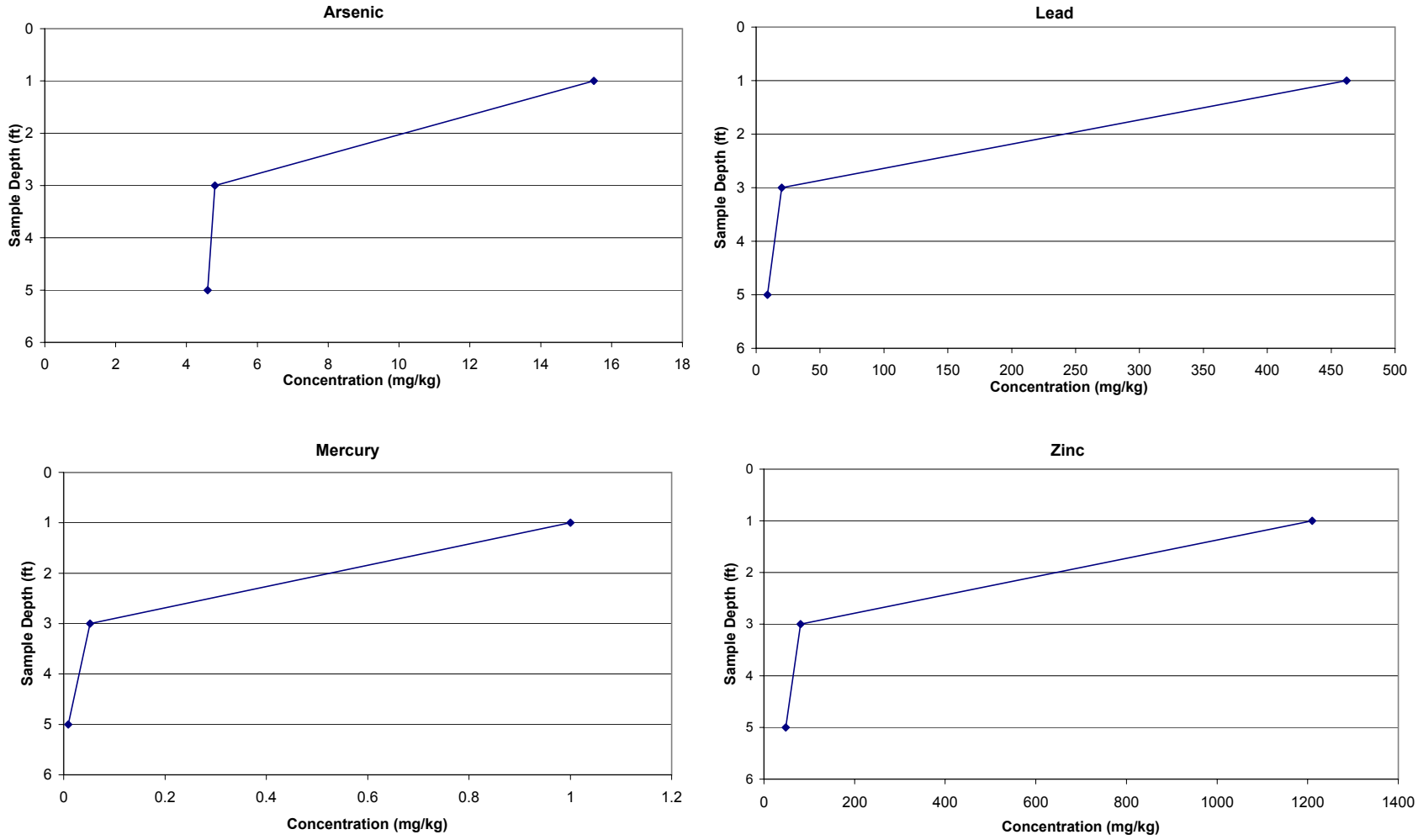


FIGURE 5-40a
Longitudinal Distribution of Metals in 2005 Phase I Beach Samples
Upper Columbia River RI/FS

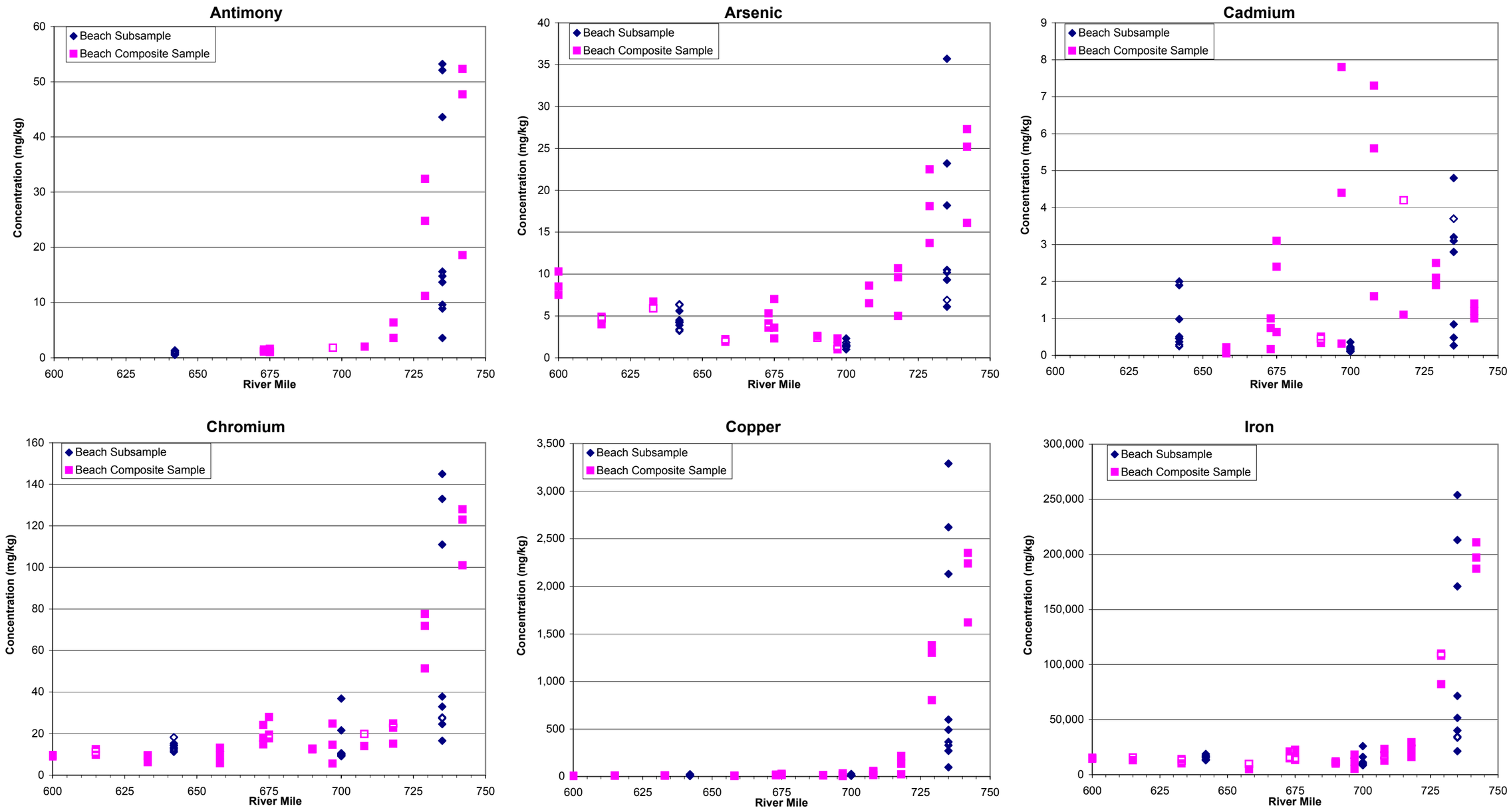


FIGURE 5-40b
Longitudinal Distribution of Metals in Phase I Beach Samples
Upper Columbia River RI/FS

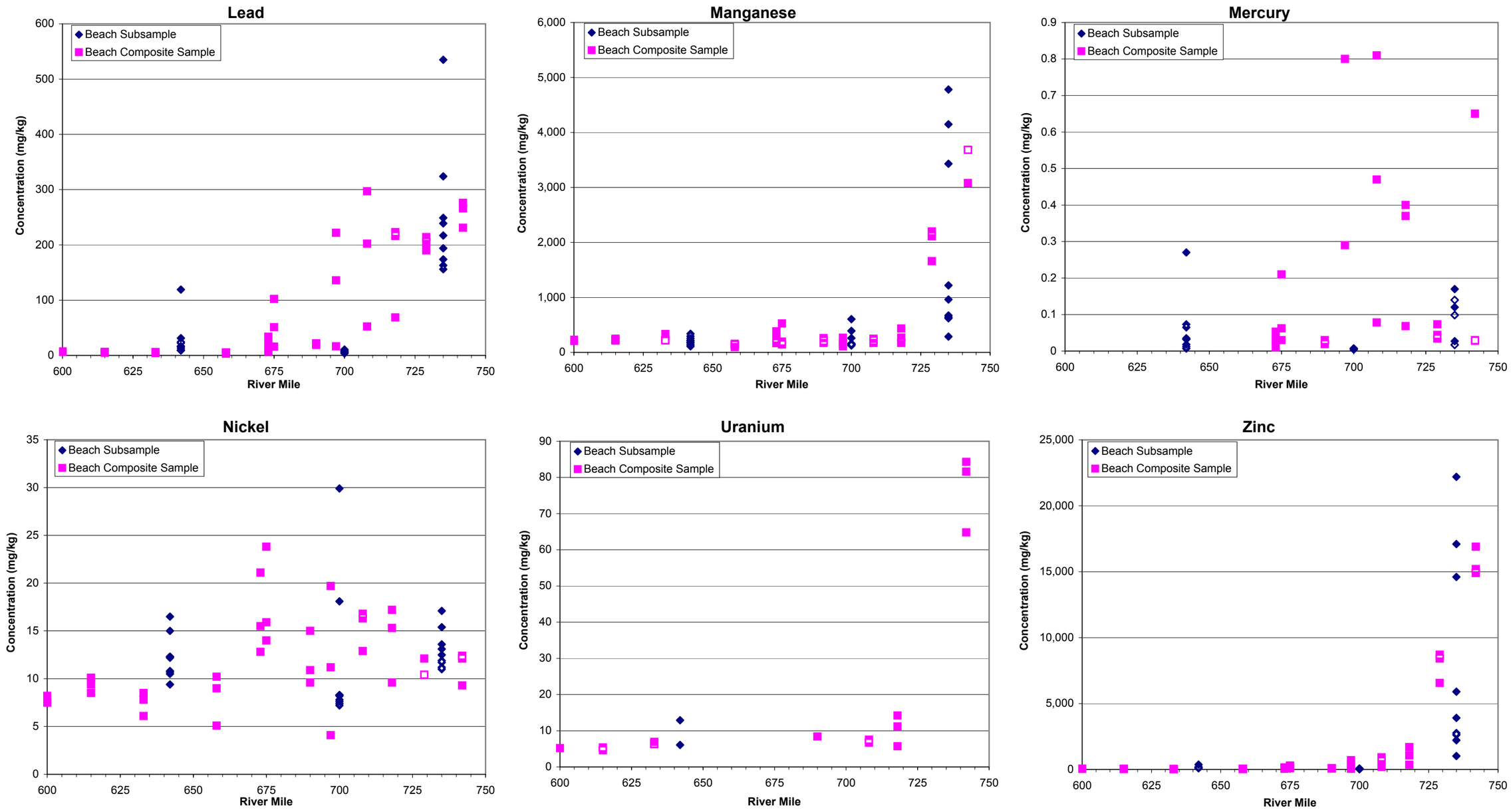


FIGURE 5-40a
Longitudinal Distribution of Metals in 2005 Phase I Beach Samples
Upper Columbia River RI/FS

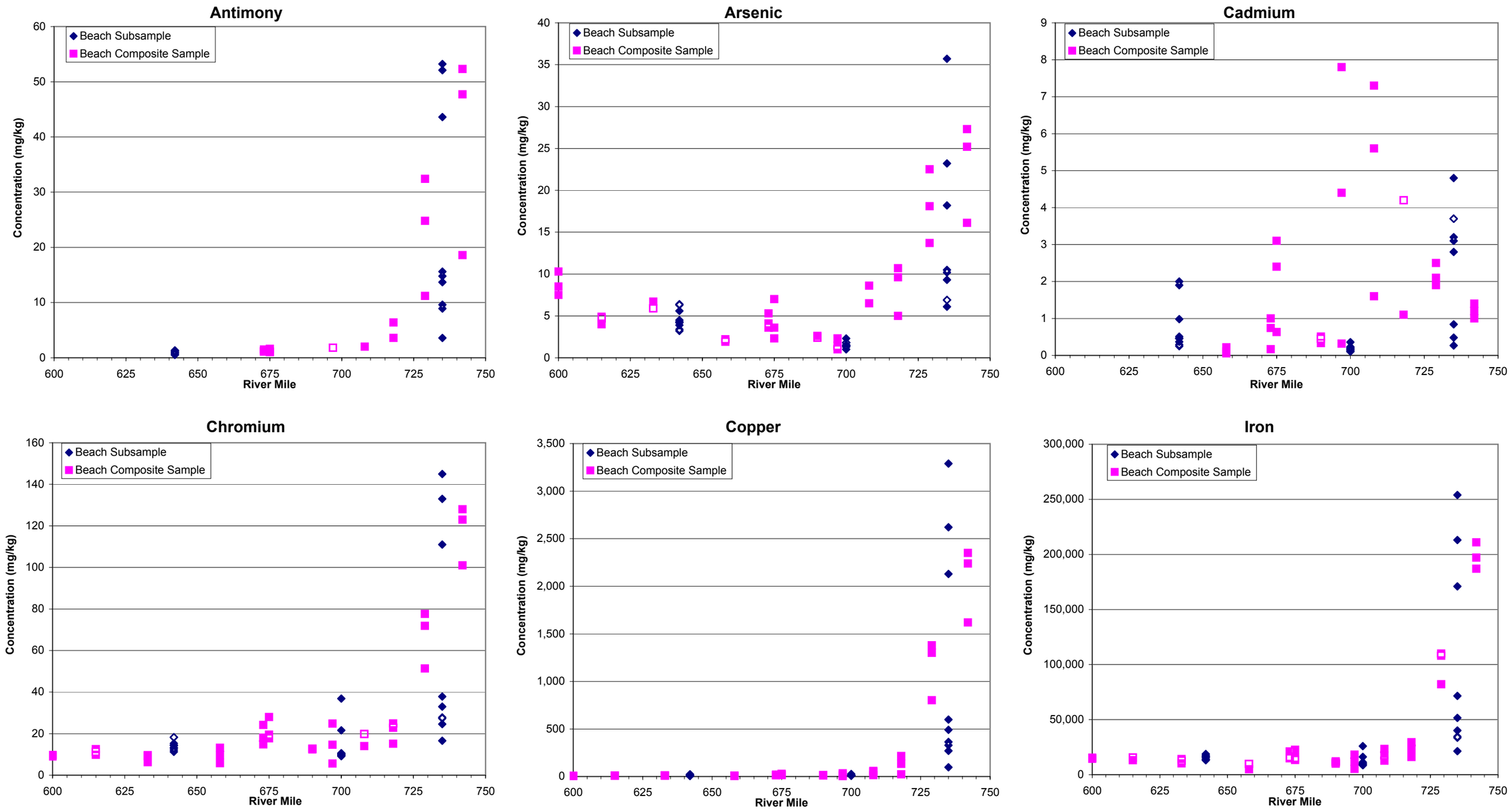


FIGURE 5-40b
Longitudinal Distribution of Metals in Phase I Beach Samples
Upper Columbia River RI/FS

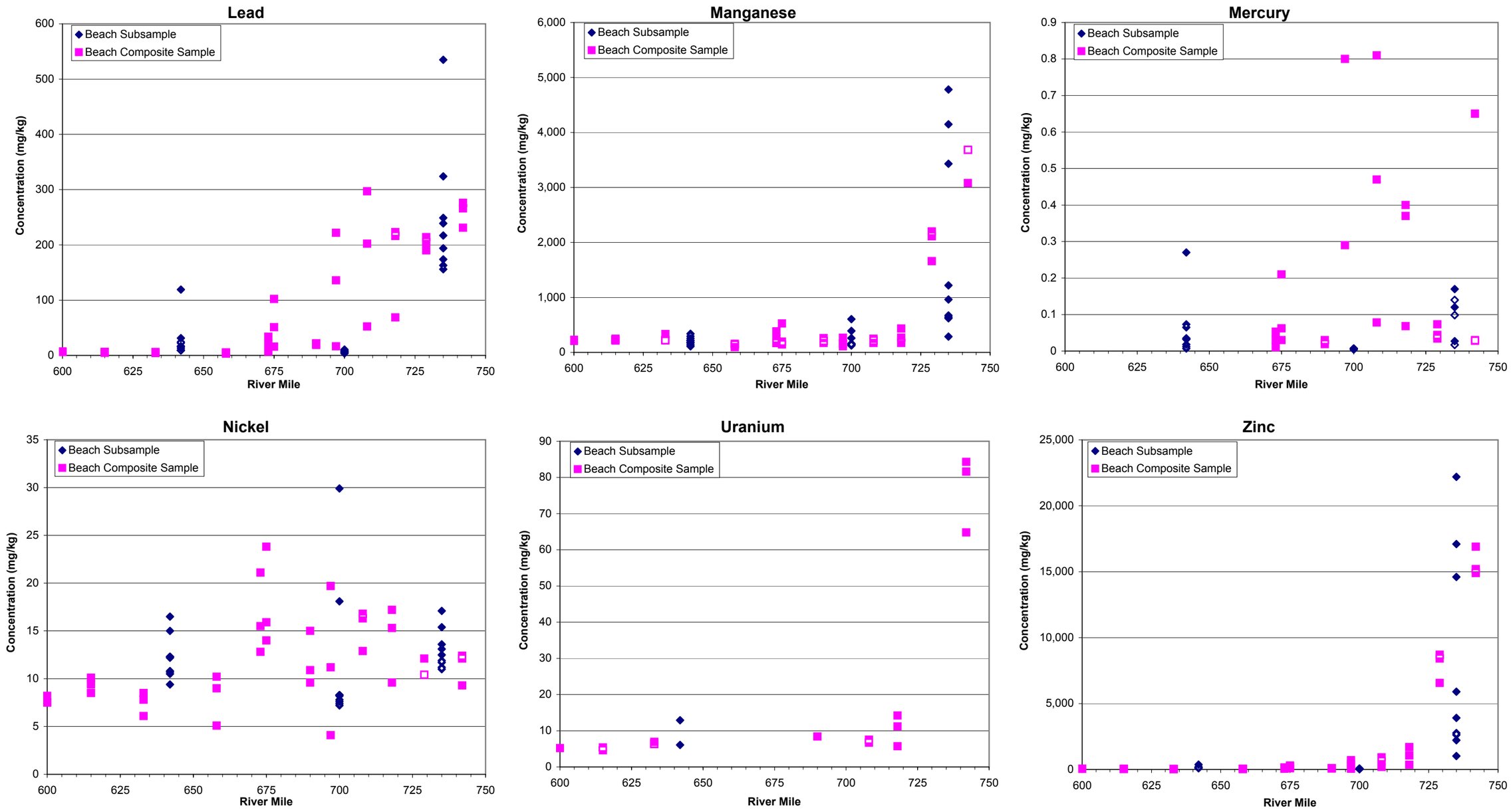


FIGURE 5-41
Distribution of Metals in Size Fractionated Sediment Samples - 2005 Phase I Composite Beach Samples
Upper Columbia River RI/FS

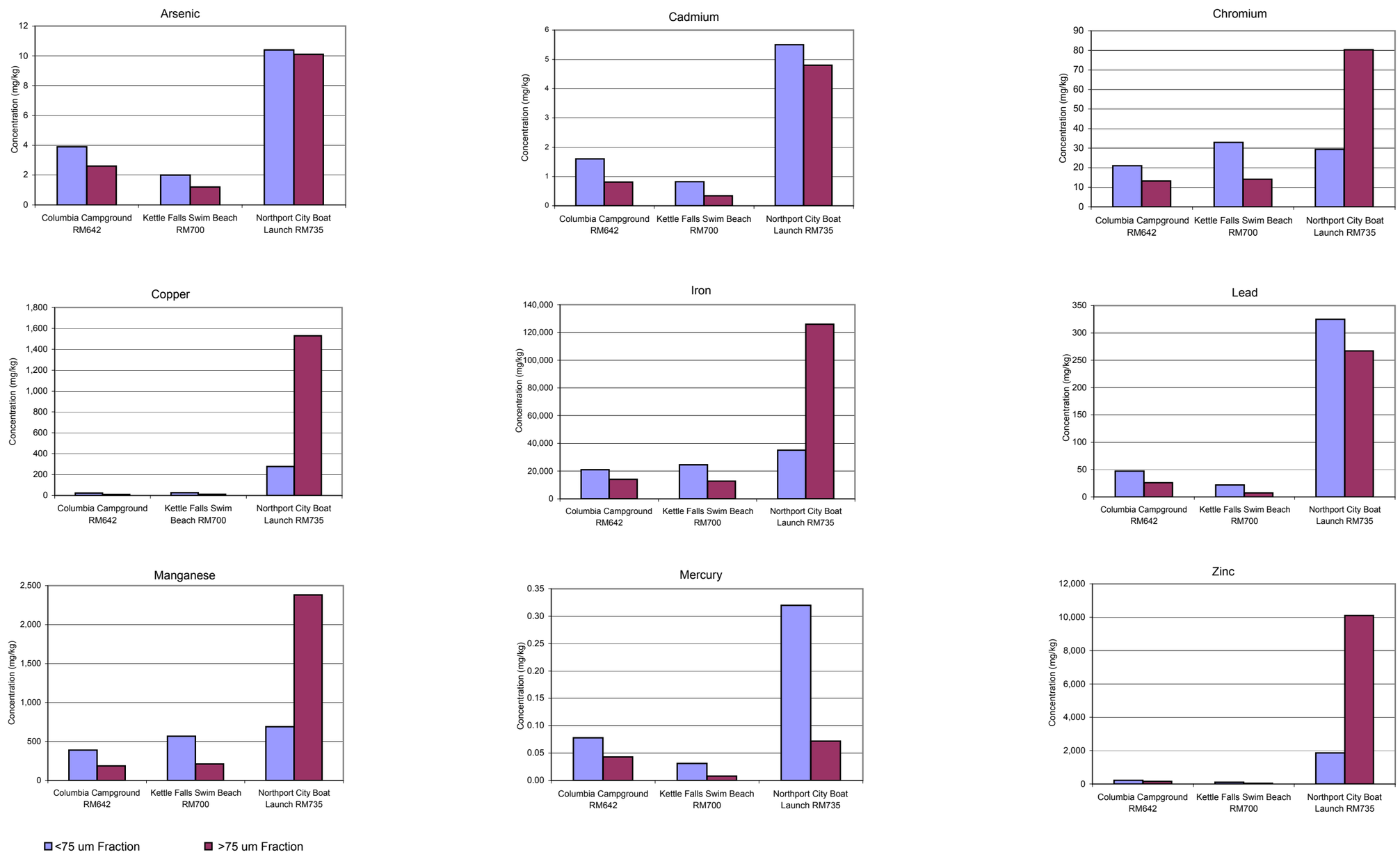


FIGURE 5-42
2,3,7,8-TCDF Correlation with TOC - Phase I Beach Composite and Sediment Core Samples
Upper Columbia River RI/FS

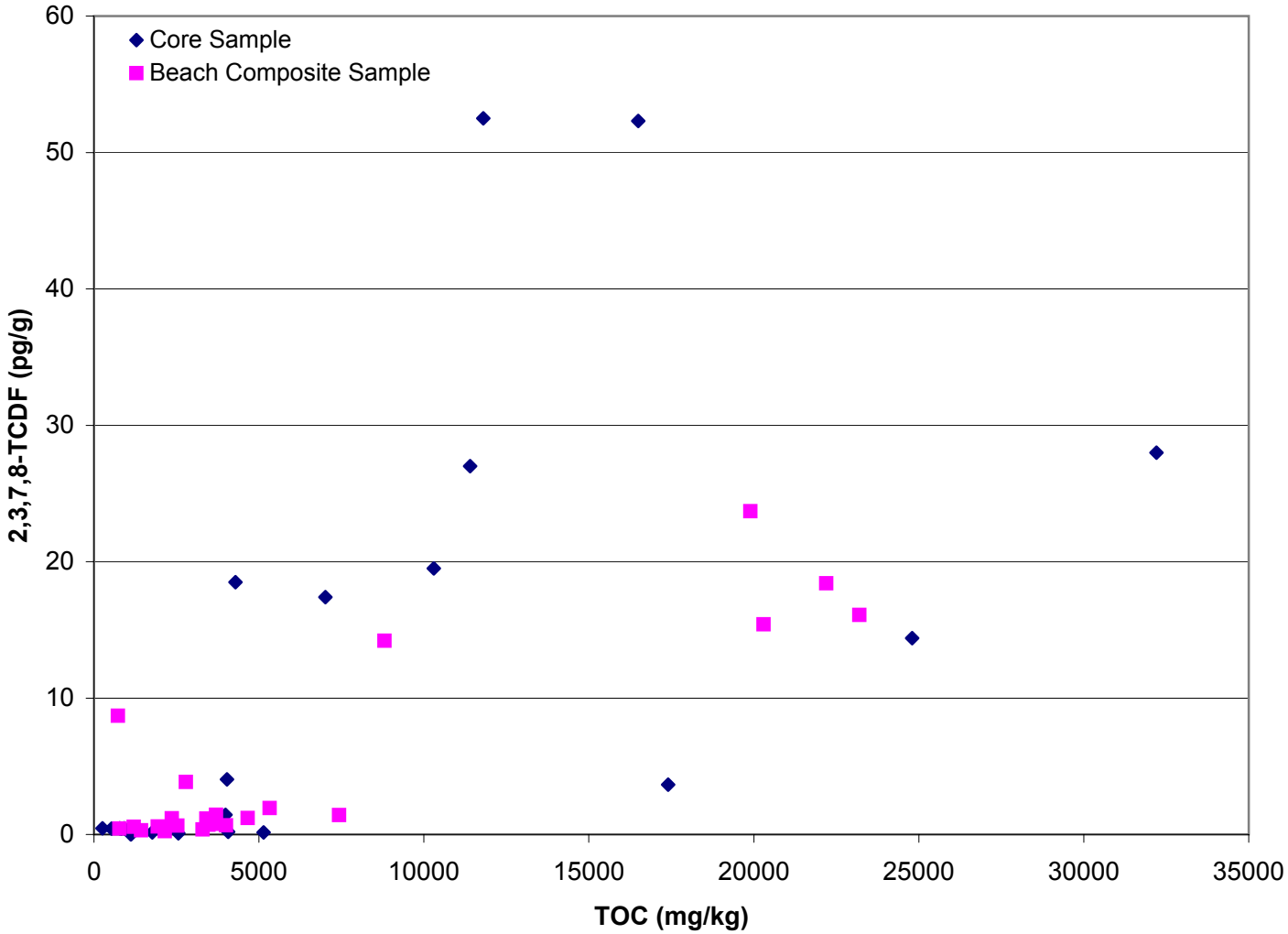
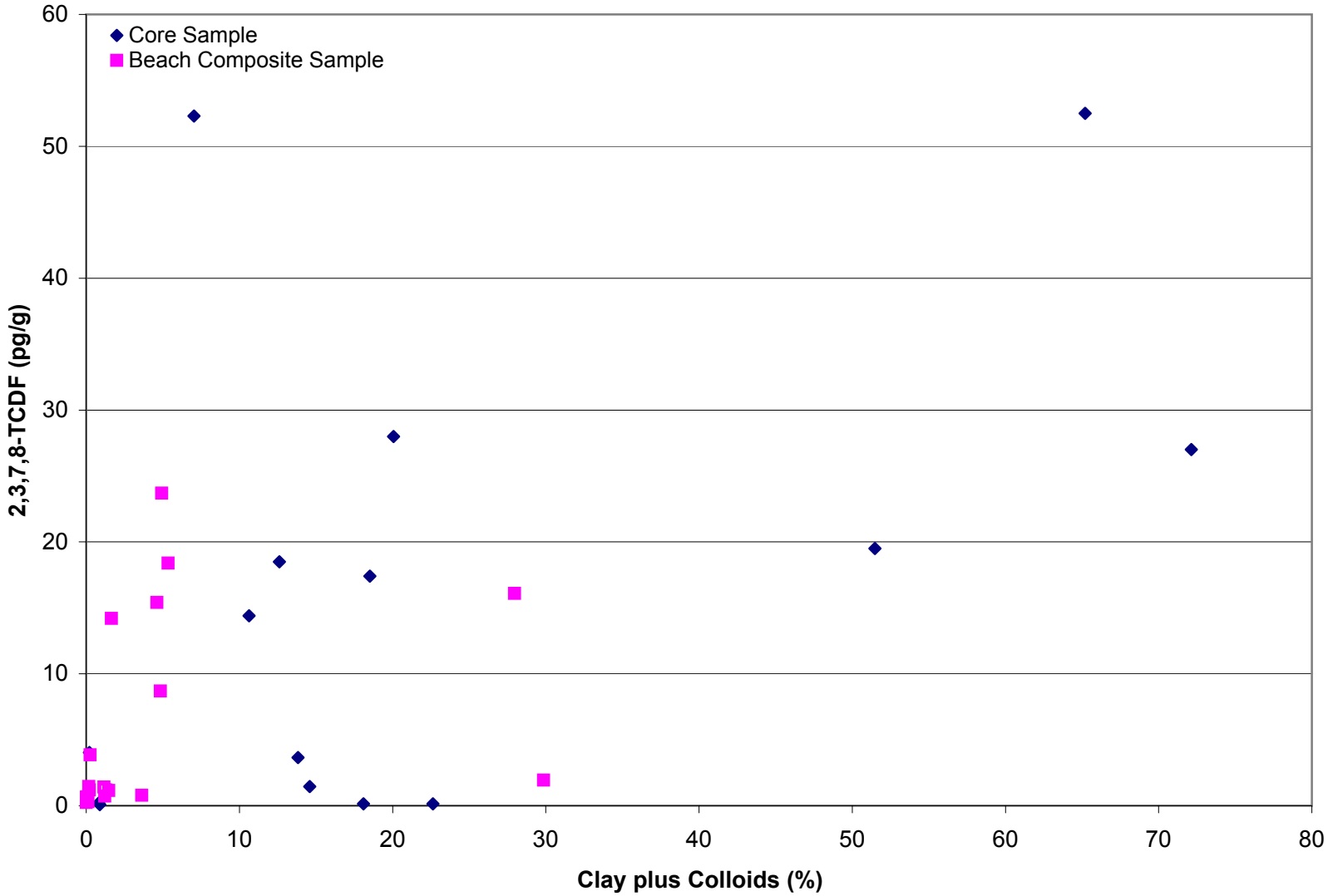


FIGURE 5-43

2,3,7,8-TCDF Correlation with Percent Colloid and Clay Fractions- Phase I Beach Composite and Sediment Core Samples

Upper Columbia River RI/FS



UCR_Sediment_DE_Figure_5-43_REV.xls

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FIGURE 5-44
Longitudinal Distribution of Pesticides by River Mile - 2005 Phase I Surface Sediment Samples
Upper Columbia River RI/FS

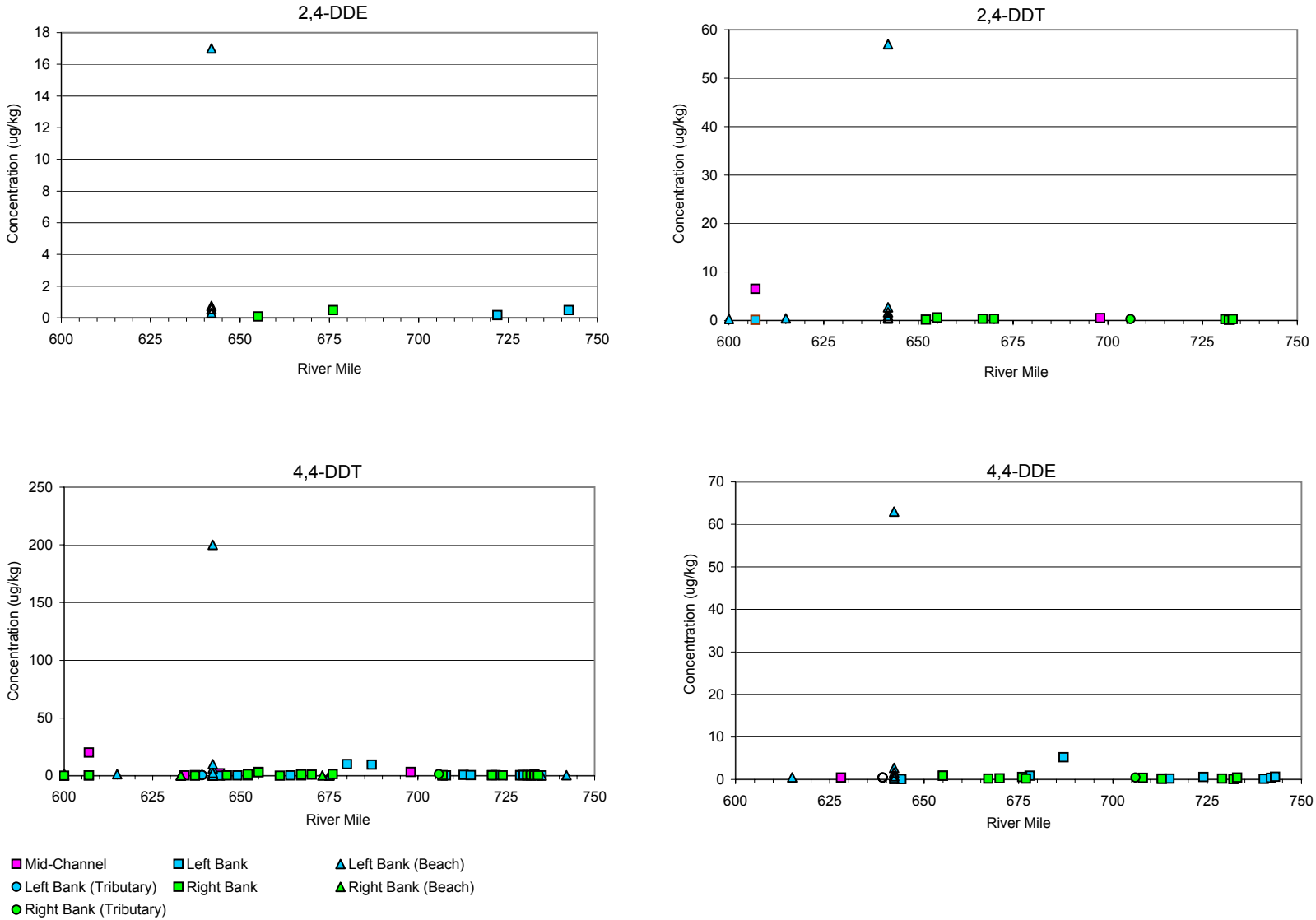
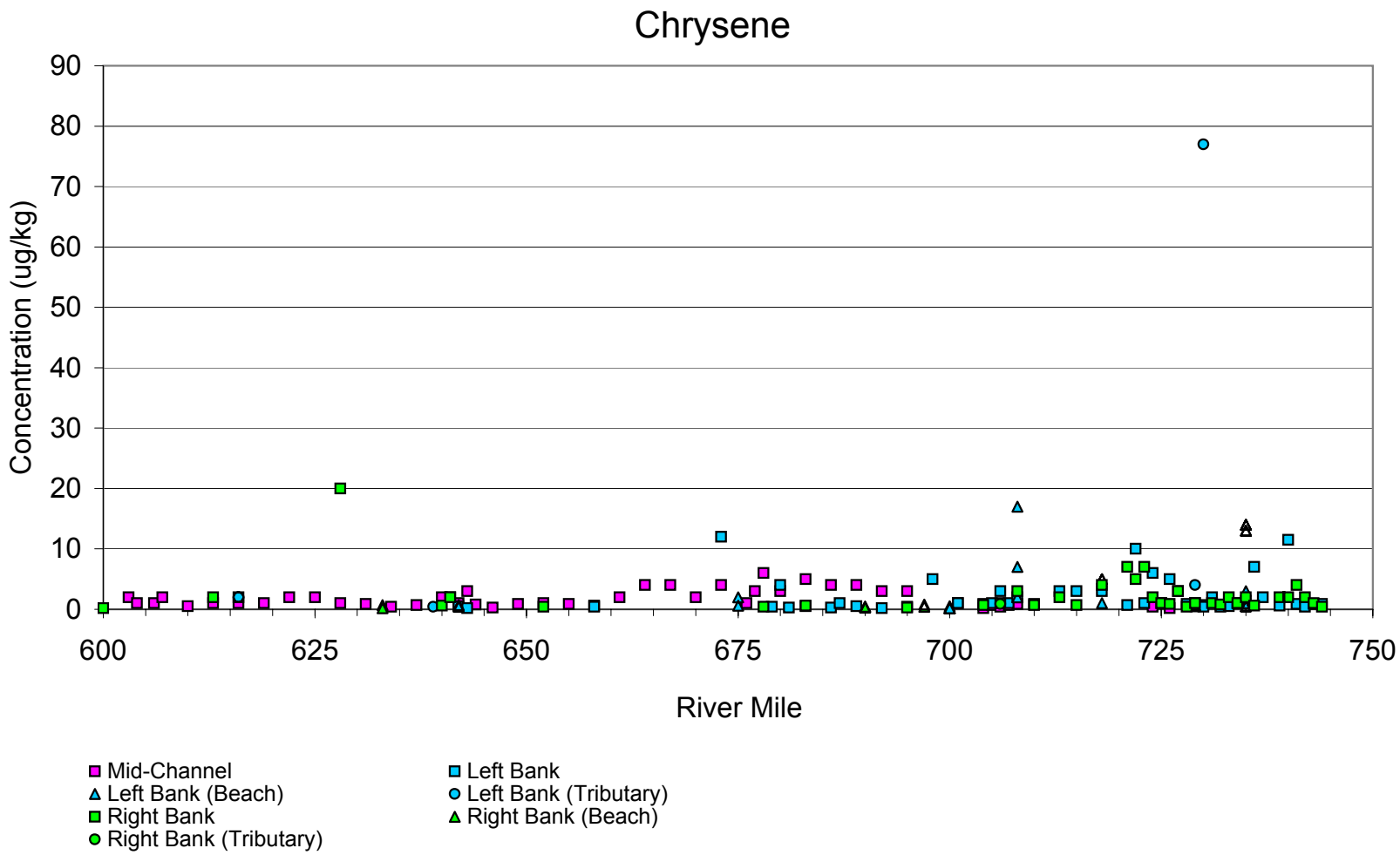


FIGURE 5-45
Longitudinal Distribution of Chrysene by River Mile - 2005 Phase I Surface Sediment Samples
Upper Columbia River RI/FS



SECTION 6

Summary of Findings and Sediment Data Gaps

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Summary of Findings and Sediment Data Gaps

The 2005 Phase I sediment sampling program has produced a large body of representative data on sediment contamination in the UCR river/reservoir system. This information has been used to refine the preliminary sediment CSM. Although this Phase I study encompassed a broad-scale evaluation of sediment within the UCR, additional phases of sediment investigation will be needed to further refine the CSM and to further provide information to assess potential risks to human and ecological receptors in the UCR.

The RI/FS process is both iterative and sequential. The need for additional information will be determined as the RI/FS process progresses. This section presents a summary of the findings from the Phase I sediment sampling program. It also presents a summary of sediment data gaps identified through evaluation of the Phase I data.

6.1 Summary of Findings

6.1.1 Data Quality

The 2005 Phase I sediment sampling program data are of known quality and provide a basis for refinement of the preliminary sediment CSM. Program DQOs for targeted analytes were met with two exceptions, antimony and uranium, as described below:

- For antimony, the laboratory analytical results for 109 of the 236 transect samples were rejected during validation due to low matrix spike recoveries. Given the percentage of rejected results, the Phase I data for antimony do not provide adequate coverage for the transect sample group to allow a full assessment of its nature and extent (see Section 2.5.2.3).
- Uranium was detected in 83 of 368 sediment samples, with concentrations ranging between 4.6 and 127 mg/kg (Figure 2-28). More than 75 percent of the samples were reported as nondetects due to reporting requirements established through the CLP. However, if the laboratory-specific MDLs are considered, a significantly higher percentage of the data could be used for assessing the nature and extent of uranium (see Section 2.5.2.3). This assessment has not yet been performed.

6.1.2 Constituents of Interest Identification

The selection of COIs described in Section 4 is based on comparison of Phase I RI/FS sediment analytical results for target analytes to sets of published risk-based sediment screening levels. It should be noted that the COI selection process did not involve an assessment of risk, site-specific or otherwise, other than that done by the publisher of the screening levels. Nor did the COI selection process entail consideration of the selected published sediment screening values as ARARs. Rather, the process constituted an initial screening of the large body of sediment analytical data generated during the Phase I

sediment sampling program in order to identify chemicals or locations of possible interest. The following COIs were identified based on these comparisons:

- Metals: antimony, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, uranium, and zinc
- Organics
  - Pesticides: 2,4-DDE, 2,4-DDT 4,4-DDD, 4,4-DDE, 4,4-DDT, and aldrin
  - PCBs: Aroclor 1016 and Aroclor 1260
  - Dioxins and furans: 2,3,7,8 TCDD toxicity equivalent (TEQ) and 14 congeners, as listed in Table 4-1
  - PAHs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene

6.1.3 Contaminant Sources

Known and potential sources of contaminants in UCR sediment include mining and milling operations, smelting operations, pulp and paper production, sewage treatment plants, and other industrial activities (see Section 5.1). The 2005 Phase I sediment sampling program did not identify any new COI sources. The sources of metal and organic contaminants in UCR sediments are as follows:

- Metals Sources
  - The historic discharge of water-granulated fumed slag, liquid effluent, and spills from the Cominco Smelter complex is the single largest known and documented source of metal COIs for UCR sediments. Other potential metal sources include mining and milling operations, smelting operations at the former Le Roi/Northport smelter, sewage treatment plants, and other industrial activities.
  - The source of uranium could not be determined, although the distribution is similar to other water-granulated fumed slag associated metals.
- Organics Sources
  - Pesticides: The source of pesticides could not be determined. Sediment pesticide concentrations are relatively low and have no definitive spatial pattern. Pesticides in sediment may be related to agricultural use within the large UCR watershed. The highest concentrations of pesticides were detected in beach samples collected at Columbia Beach (RM 642), possibly indicating a nearby local source or localized zone of accumulation.
  - PCBs: The source of PCBs could not be determined. Aroclor 1016 and Aroclor 1260 were each detected once at a concentration exceeding the CCT human health criteria. The detected exceedances occurred at the same sample location RM 687A1, located 13 miles downstream from Marcus Flats. This is in the general vicinity where PCBs were detected at low concentrations in bed sediment samples collected from nearby locations during previous investigations by Ecology in 1990 (Ecology, 1991) and

USEPA (E&E, 2003). The observation that detection of PCBs has been limited to the general area between RM 687 and 690 suggests the possibility of a local PCB source or a localized zone of accumulation in that area.

– PAHs: Sediment PAH concentrations are relatively low and have no definitive spatial pattern. No specific source of PAHs can be identified from the sediment data.

– Dioxins and furans: The congener 2,3,7,8-tetrachlorodibenzofuran (2,3,7,8-TCDF) is the congener with the greatest number of detects and the greatest number of exceedances of COI identification criteria. 2,3,7,8-TCDF is known to have been released from Celgar (Ecology, 1997). Celgar was identified as a source of dioxin and furan discharges to the Columbia River prior to modernization (Evergreen State College, 1993; USGS, 1994).

6.1.4 Nature and Extent of COIs in Sediment

The nature and extent of sediment contamination is generally consistent with sampling results from prior studies. Metal and organic COIs were detected throughout the UCR. Metal COIs are the primary contaminants above Marcus Flats. Metals and organics are both found below Marcus Flats and are generally associated with inorganic and organic silt-, clay- and colloid-sized material (see Section 5.4). The general distributions of water-granulated fumed slag associated metals, other metals, and organics in the UCR are illustrated in Figure 6-1. The three large graphs in Figure 6-1 depict general longitudinal distributions for the COI groups over the length of the UCR; smaller insets in the graphs depict the transverse distributions of the COI group and sample point elevations at transects located above Marcus Flats (RM 723), within Marcus Flats (RM 706), and below Marcus Flats (RM 678).

6.1.4.1 Metal Contaminants

Metal contamination within and upriver from Marcus Flats appears to be related primarily to coarse-grained water-granulated fumed slag; the metal COIs in sediment that show a strong association with the water-granulated fumed slag include antimony, arsenic, chromium, copper, iron, lead, manganese, and zinc. Elevated reporting limits for uranium in a number of samples limit the ability to make spatial distribution evaluations for this metal, although the highest detected concentrations are located above Marcus Flats.

From the evidence and observations gathered to date, the primary accumulation areas within the UCR for coarse-grained water-granulated fumed slag are the following:

- Side-bank beach and point bar areas in the upriver reaches (e.g., Black Sand Beach at RM 742; large point bar deposit at RM 738) deposited during high river flow events
- Dispersed accumulations to an unknown depth within the interstices of the coarse, cobbly sediments in the main river channel upstream of approximately RM 729 (Onion Creek)
- Localized accumulations within the original pre-reservoir river channel downstream from approximately RM 729 to approximately RM 710 (near the entrance to Marcus Flats)

- Within Marcus Flats, accumulations concentrated in the original pre-reservoir river channel

Appreciable accumulations of water-granulated fumed slag were not identified below Marcus Flats by the Phase I sediment samples. However, water-granulated fumed slag could be present, intermixed at depth with other sediment within the original pre-reservoir river channel downstream of Marcus Flats, because approximately 3 million tons were discharged from the Cominco Smelter complex prior to the construction of Grand Coulee Dam (see Section 5.1.1.2). Silt-sized or finer particles of slag could also be deposited in the lower velocity portions of the reservoir downstream from Marcus Flats along with other silt-sized and finer sediment, because approximately 1 percent or less of the slag discharged to the Columbia River is estimated to be within this size range (see Section 5.1.1.2). Silt-sized or finer particles of slag could also be present below Marcus Flats due to weathering and decrepitation processes affecting larger slag particles as described by USGS (USGS, 2005).

Metals contamination below Marcus Flats appears to be less related to coarse-grained water-granulated fumed slag and more related to either liquid effluent discharges (which may include particulate, colloidal, complexed, sorbed, or dissolved forms of metals), very fine-grained water-granulated fumed slag particles, and/or leaching and flaking of metal from the surfaces of weathered or abraded water-granulated fumed slag particles. The degree to which these three sources contribute to sediment contamination below Marcus Flats is unknown.

In general, sediment below Marcus Flats that lies at an elevation below approximately 1255 has higher metal concentrations than elevations above 1255 due to periodic washing of fines and their associated contaminants from the exposed banks and transport to lower elevations.

6.1.4.2 Organic Contaminants

Concentrations of organic contaminants within UCR sediment are generally low (see Section 5.4.2), but, where present, typically exceed the organic carbon normalized CCT human health sediment standards (see Section 4.2). No definitive spatial pattern has been identified for the organic COIs.

6.1.5 Fate and Transport of Contaminated Sediment

At the UCR-wide scale, the concentration of contaminants in UCR sediment appear to be relatively stable based on comparisons of Phase I sediment sampling results to historical sampling results. Small-scale variations in contaminant concentrations likely will occur due to seasonal changes in river flow and stage and could influence sediment transport and the redistribution and mobilization of COIs. For example, in the upriver portions of the system where river flow velocities are expected to be highest, movement of both fines (<75 um) and coarser grained sediment—including sand-sized water-granulated fumed slag—is expected to occur. Additional fate and transport findings are as follows:

- The apparent fate and transport of contaminated sediment is believed to be consistent, overall, with the mechanisms described in the A&R Document (CH2M HILL, 2004b, Section 4.4).

- Hydrodynamics and river/reservoir relationships are believed to be the dominant factors affecting distribution of sediment contaminants following construction of Grand Coulee Dam (see Section 5.2.1). However, other important factors affecting the distribution of contaminants include particle size, shape, and density; sorting of bed sediment; and riverbed morphology.
- Above approximately RM 711, sand-sized contaminants (principally water-granulated fumed slag) move longitudinally downstream, primarily via bedload transport. This sediment transport mechanism appears to become much less significant below about RM 701; below this, the major mechanisms for longitudinal transport for contaminants (as either dissolved phase, suspended particulates, or sorbed, complexed, or colloidal forms) appears to be primarily via solution transport and/or transport as suspended sediment.
- Although some water-granulated fumed slag is transported along the water surface as small, floating mats, the overall significance of this process is not understood.
- Transverse movement of contaminants (i.e., perpendicular to the flow direction of the river) is expected to occur throughout the UCR study area, predominantly due to natural erosional processes and the washing of the side banks due to seasonal changes in river flow and reservoir level fluctuations (see Section 5.5.2.1). Current reservoir and river management operations and the associated reduction in annual peak flow discharges (compared to historical conditions) are thought to reduce the potential for large-scale broadcasting of sand-sized or finer contaminated sediment into higher elevation side-bank areas.
- Downstream from Marcus Flats, transverse movement of side bank sediment to depths below about elevation 1255 appears to be limited because reservoir levels are lowered below elevation 1255 only infrequently and for short durations. Below elevation 1208 (the lowest reservoir drawdown elevation), there is likely little tendency for transverse movement of sediment-bound COIs into deeper portions of the reservoir unless there is an adjacent bank slump or some other direct physical disturbance.
- There is an insufficient quantity of comparable sediment contaminant data from prior studies to assess temporal changes.

6.2 Sediment Data Gaps

Data gaps within the sediment CSM were identified in Section 5 and are summarized below. Whether these data gaps constitute data needs for the RI/FS will be evaluated through the DQO process during future RI/FS phases. Because the RI/FS process is an iterative one, it is expected that data needs will continue to be identified as this project progresses.

6.2.1 Sources of Sediment Contamination

Data gaps pertaining to known and potential sources of contaminants in UCR sediments have been identified as follows:

- Metal COIs, including coarse-grained slag-associated metals and other metals, are documented to have been discharged into the UCR in liquid effluent from Cominco. The

chemical and physical characteristics of the metals in liquid effluent are not known based on review of available data. Additional information on the characteristics of the liquid effluent discharges may be required to better understand the nature and extent, as well as fate and transport and potential risk, of these COIs.

- Available data on liquid effluent discharges from Cominco are limited. Additional information on historic discharges from Cominco, including pre-1977 discharges, may be necessary to better understand the nature of contaminant loading to the UCR.
- Available information is limited on the chemical and physical characteristics of the water-granulated fumed slag over the period of time the material has been discharged by Cominco into the Columbia River. Additional information on these characteristics may be necessary to better understand the nature of contaminant loading to the UCR.
- The quantity and nature of water-granulated fumed slag remaining within the Columbia River above the U.S.-Canada border is not known. Additional information on this material may be necessary in order to better assess the potential for future impacts on the UCR.
- Information on current and anticipated future discharges from Cominco and associated operations and facilities, including Stoney Creek, may be necessary in order to better assess the potential for future impacts on the UCR.

6.2.2 River/Reservoir Hydraulic Relationship and Sediment Grain Size

Several data gaps are recognized to exist with respect to the overall understanding of the UCR river/reservoir hydraulics and sediment transport. These data gaps are as follows:

- Geomorphological features and environments that are present in the Columbia River floodplain (both the submerged pre-1940 floodplain and the current floodplain of the riverine portions) have not been mapped or evaluated in detail. Additional categorization and mapping of specific geomorphological features and landforms may be required to better understand the potential influence these features could have on river hydrodynamics and the distribution of COIs.
- An analysis of changes in the areal extent of exposed reservoir side-bank areas under various pool operating levels has not been conducted. Such an analysis may be important to better address possible concerns associated with wind-borne mobilization of COIs in fine grained sediment.
- Calculation of average cross-sectional flow velocity provides only a limited broad-scale understanding of sediment transport within the UCR. In order to better assess the characteristics of sediment transport in the UCR, to identify areas of active or potential sediment scour and/or deposition and the rate to which they could occur, and to provide a more detailed understanding of local-scale variations in river hydrodynamics, additional data collection and analysis may be required (e.g., high-resolution bathymetry, cross-sectional Doppler flow velocity profiling, sediment subbottom profiling, supplemental grain size analysis, hydraulic modeling, and sediment transport modeling).

- Little is known regarding the existing sediment load entering the UCR system. In particular, there is considerable uncertainty regarding the sediment flux (suspended and bedload transport) from UCR tributaries versus the Columbia River itself at the U.S.-Canada border. Sediment loading information is important for understanding sediment transport and accumulation. Additional sediment load information for the Columbia River and its major tributaries may need to be gathered to support sediment transport analysis or modeling.
- In general, a large proportion of sediment transport in riverine systems is believed to occur during episodic extreme events. The UCR reservoir is a component of a managed system in which reservoir level and river flow are largely controlled by operation of Grand Coulee Dam and dams located upstream on the Columbia River and tributaries, which greatly reduces the extremes of flow events that would otherwise strongly affect sediment transport within the UCR. Nonetheless, it is recognized that, even within the managed UCR system, extremes of flow and reservoir level may occur. The degree to which these extremes may affect sediment transport in the UCR has not been addressed by the first-pass analyses presented in this document.
- The potential role that wave action and seasonal reservoir fluctuations have on the mobilization of fine-grained sediment (possibly containing COIs) from side-bank portions of the reservoir is not well understood. Similarly, for the riverine portion of the UCR site near the U.S.-Canada border, uncertainty remains regarding the degree to which fine-grained sediment in river side-bank areas (containing variable concentrations of COIs) is scoured and eroded during high-flow and/or low-stage conditions.
- Sources or conditions that influence the spatial variations in TOC concentrations in UCR sediment are not well understood. Additional TOC sediment data may be required to better characterize TOC variations and sources and determine the role TOC plays within the fate and transport of sediment contaminants.

6.2.3 Nature and Extent of COIs in Sediment

Data gaps pertaining to the nature and extent of metal and organic COIs in UCR sediments have been identified. These data gaps are as follows:

- Insufficient comparable data are available from previous UCR sediment studies to assess temporal changes in COI concentrations. Evaluation of temporal changes in COI concentrations, although not specifically included as a DQO of the Phase I sediment sampling program, likely will be necessary as part of future RI/FS phases.
- Analytical uncertainties resulted in incomplete characterization of antimony and uranium as part of the Phase I sediment investigation. Additional antimony and uranium data may be required to more fully assess the nature, extent, and magnitude of these constituents in UCR sediment.
- The observed concentration pattern for nickel suggests a possible natural geologic source within the limits of the UCR watershed system. Additional evaluation of nickel in UCR sediments may be necessary to determine whether concentrations in UCR sediment are more attributable to natural or anthropogenic sources.

- Certain sediment samples were unattainable during the Phase I sediment investigation, especially mid-channel samples from the riverine and reservoir reaches above Marcus Flats. The absence of sediment samples from these areas limits the understanding of how sediment COIs are distributed in these portions of the UCR. Additional sediment samples may need to be collected (perhaps using different methods of sediment collection) to more fully characterize the distribution of COIs in this portion of the UCR.
- The evaluation and discussion of the findings from the Phase I sediment investigation was focused, by necessity, on a suite of COIs that served as a preliminary list of potential site contaminants. Additional analysis and evaluation of the Phase I data set (inorganics and organics) could be performed to better understand, or further refine, the nature and extent of various trace elements and COIs in UCR sediment that were not discussed in detail herein. A list of COCs will be developed during the human health and ecological risk assessments.
- Results from the Phase I sediment investigation suggest that transport of sand-sized sediment—including water-granulated fumed slag—is limited in areas downstream from Marcus Flats, whereas within Marcus Flats considerable quantities of water-granulated fumed slag are evident in the mid-channel core and surface sediment samples. Other large accumulations of slag have been documented upstream from Marcus Flats. Additional investigation of the lateral and vertical extent of water-granulated fumed slag-impacted sediment, both upstream and downstream from as well as within Marcus Flats, may be necessary to better refine the primary depositional zones for water-granulated fumed slag, and the extent over which the both the larger and smaller sized water-granulated fumed slag particles are distributed.
- The spacing of the Phase I sediment samples was established to gain a more refined and general understanding of longitudinal, transverse, and vertical distribution of COIs in sediment from throughout the UCR study area. Additional characterization samples may be needed to further refine specific areas or interest, locations of greatest sediment contamination by mass and concentration, and locations subject to scour and downstream transport.
- The various factors that influence the spatial concentration patterns for mercury and cadmium in the Marcus Flats area sediments are not well understood based on available source information, river/reservoir hydrodynamics, and the existing distribution of sediment samples. Refining the overall understanding of mercury and cadmium in UCR sediment is important to the sediment CSM and to future risk assessment efforts. Additional characterization samples from the Marcus Flats area may be necessary to better refine the nature and extent of these constituents and to identify what factors may be controlling their distribution in this area.
- Metal COIs, including coarse-grained slag-associated metals and other metals, are documented to have been discharged into the UCR in liquid effluent from Cominco. The chemical and physical characteristics of the metals in liquid effluent are not known based on review of available data. Additional information on the characteristics of the liquid effluent discharges may be required to better understand the nature and extent, as well as fate and transport and potential risk, of these COIs.

- The Phase I sediment investigation did not include a DQO related to the determination of background levels of COIs. Establishing background concentrations for selected COIs may be important, especially for purposes of risk assessment and/or when considering any possible future remedial actions.
- The Spokane River potentially has an influence on the concentrations of certain COIs that are measured in UCR sediments. However, ascribing a definitive cause/effect relationship to certain COIs without having a corresponding set of comparable data for the Spokane Arm of Lake Roosevelt limits the ability to assess this possible relationship. Additional evaluation of the Spokane River as a potential source of COIs to the lower reaches of the UCR reservoir may be necessary.
- Dioxin and furan data are limited to cores and beaches and thus provide only limited spatial coverage. Additional sampling and analysis for dioxins and furans may be necessary to provide a more complete characterization of these organic constituents in sediment throughout the UCR.
- Organic COIs have been detected in UCR sediment but have not been attributed to particular sources. Additional evaluation of organic COIs in UCR sediments may be necessary to determine whether concentrations in UCR sediment appear to be related to a specific source, or possibly are due to other causes (e.g., atmospheric deposition).

6.2.4 Fate and Transport of COIs in Sediment

Data gaps pertaining to the fate and transport of metal and organic COIs in UCR sediments have been identified and are as follows:

- Uncertainties remain with respect to the chemical processes that affect the potential remobilization of COIs that occur in association with the fine-grained sediment fraction. It is recognized that, although processes such as chemical oxidation, desorption, weathering, abrasion, dissolution, and benthic flux may be influencing the fate and transport of COIs in UCR sediment, specific details regarding these mechanisms is lacking. Investigation of such mechanisms was not a DQO of the Phase I sediment investigation program. Additional information on COI remobilization may be necessary to better understand the importance of these mechanisms on the fate and transport of COIs in UCR sediment.
- Uncertainties remain with respect to the physical and chemical processes and kinetics that affect the weathering/degradation and leaching of water-granulated fumed slag in the UCR environment. Evaluation of these processes on water-granulated fumed slag was not a DQO of the Phase I sediment investigation program; initial investigations of this process have been conducted by the USGS. Additional information on water-granulated fumed slag weathering may be necessary to better understand the importance of this process on the fate and transport of metal COIs in UCR sediment.
- Metal COIs, including coarse-grained slag-associated metals and other metals, are documented to have been discharged in to the UCR in liquid effluent from Cominco. The chemical and physical characteristics of the metals in liquid effluent is not known based on review of available data. Additional information on the characteristics of the

liquid effluent discharges may be required to better understand the fate and transport of these COIs.

- Tributary mouth areas can be complex and dynamic due to a variety of hydraulic, chemical, and physical processes that occur in these localized environments. Information collected during the Phase I sediment investigation provided limited information on the apparent nature and extent of COIs in the immediate vicinity of major tributary mouths. Additional data collection may be required to address specific fate and transport considerations or risk assessment concerns associated with tributary mouth areas.
- Consistent with project DQOs, the spacing of the Phase I sediment samples was designed, at large, to provide a general understanding of longitudinal, transverse, and vertical distribution of COIs in sediment from throughout the UCR study area. Additional characterization samples may be needed to further refine locations of greatest sediment contamination by mass and concentration at a smaller scale of resolution. Similarly, if it appears that high chemical variability occurs over small lateral or vertical distances, additional investigation may be necessary to better assess local-scale variations in fate and transport processes.
- The preliminary sediment CSM discusses the potential role of liquid-phase sorption/desorption to fine-grained sediments and TOC. The Phase I investigation did not include specific DQOs that were intended to address the degree to which liquid-phase COIs are sorbed to clay minerals and/or plankton. The specific role that suspended clay minerals and/or organic debris may play in controlling the fate and transport of COIs in the UCR environment may need to be further evaluated.
- Findings from the Phase I sediment investigation suggest there may be an association between the concentration of certain COIs, TOC, and the quantity of sediment fines. Additional information on the role that TOC and fine-grained particulates have on contaminant mobility and bioavailability may be necessary.
- Little information is available on sediment deposition rates within the UCR system. Establishing sediment deposition rates at several different locations within the system may be useful for understanding variations in sediment transport and the fate and transport of COIs. Age dating of sediments may also be useful to better understand such variations in sedimentation rates and magnitudes.

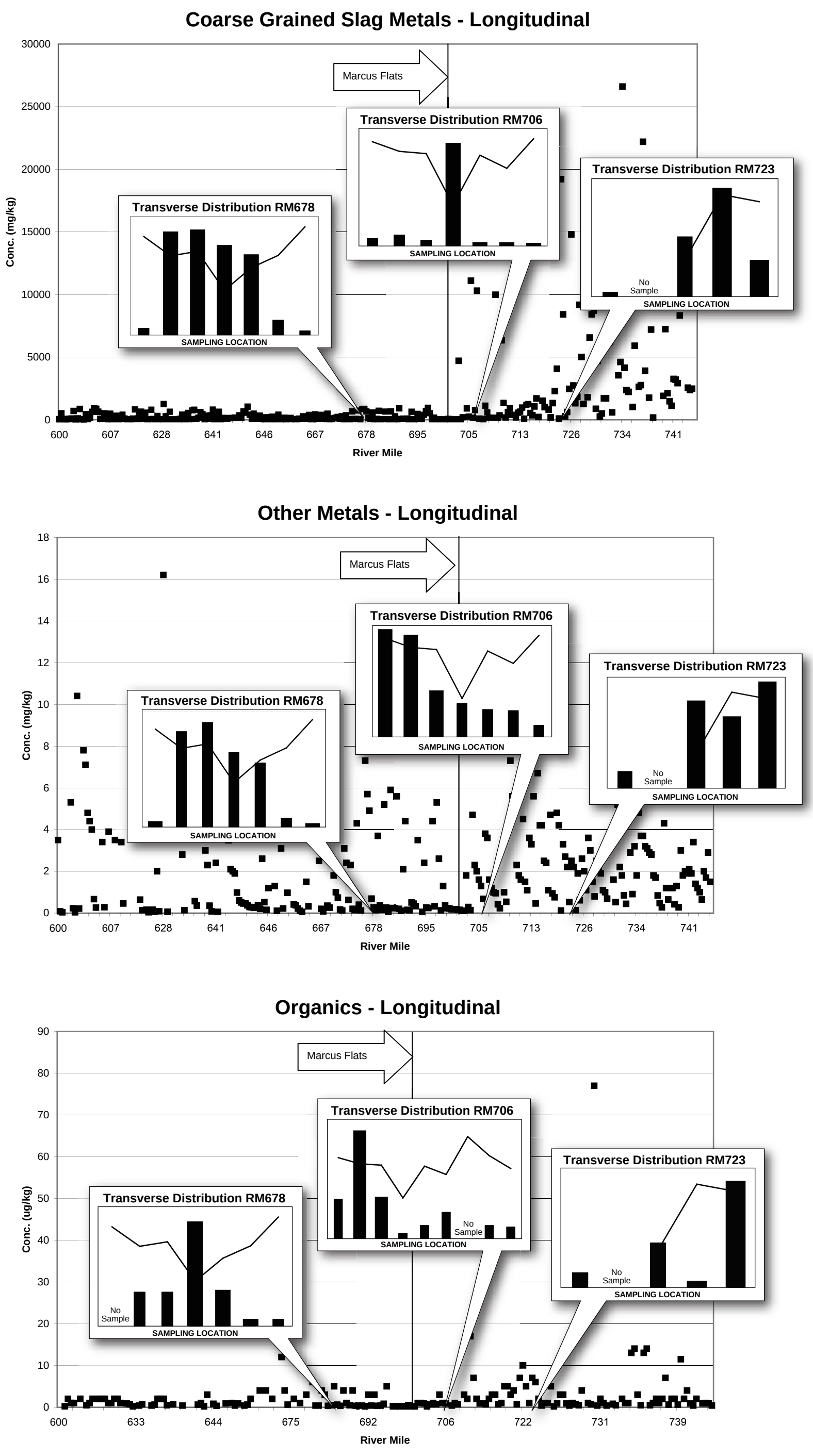

Figure 6-1
Summary of COI Distribution
Upper Columbia River RI/FS

SECTION 7

References

SECTION 7

References

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[1] Note: The style **{bold brackets}** indicates the year of the study itself, rather than the year the study results were published.

APPENDIX A

Phase I Sediment Sample Information

TABLE A-1
Summary of Sample Locations, Elevations, and Associated QA/QC Samples by Sample Type
Upper Columbia River RI/FS

Sample Name	Focus Area	Sample Type	Sample Elevation	Sample Latitude	Sample Longitude	Field Duplicate	MS/MSD	Lab Duplicate
TRANSECT SAMPLES								
RM744X2	Focus Area 1	Transect Sample	1281.7	2408428.14	744708.04	X		
RM741X1	Focus Area 1	Transect Sample	1291.3	2402015.62	732952.82			
RM740X3	Focus Area 1	Transect Sample	1291.6	2397427.48	730423.23			
RM739X1	Focus Area 1	Transect Sample	1290.9	2393417.70	727180.00	X	X	X
RM738X1	Focus Area 1	Transect Sample	1289.2	2390069.52	724420.30			
RM737X2		Transect Sample	1252.1	2385817.65	721632.56			
RM737X1		Transect Sample	1281.3	2385361.54	721704.17			
RM736X3		Transect Sample	1287.5	2380125.62	721415.53			
RM735X3		Transect Sample	1286.0	2377966.61	718906.49			
RM735X1		Transect Sample	1283.4	2378362.84	718390.04	X		
RM734X3		Transect Sample	1271.6	2375798.86	716693.76			
RM733X3		Transect Sample	1281.0	2370043.20	713659.00			
RM733X2		Transect Sample	1269.0	2370525.59	713798.69			
RM732X3		Transect Sample	1275.5	2366709.20	710019.20			
RM732X2		Transect Sample	1267.0	2367287.24	709688.12	X	X	X
RM732X1		Transect Sample	1266.4	2369115.06	708831.84			
RM731X3		Transect Sample	1280.0	2363851.50	705266.30			
RM731X1		Transect Sample	1275.8	2365081.46	705104.25			
RM730X1		Transect Sample	1271.0	2362096.43	701372.97			
RM729X3		Transect Sample	1267.8	2358042.61	698625.64			X
RM729X2		Transect Sample	1227.3	2358477.89	698271.79			
RM728X3		Transect Sample	1252.6	2354900.58	697305.21			
RM728X1		Transect Sample	1227.0	2354794.19	696708.90			
RM727X3		Transect Sample	1257.9	2349435.00	693114.86			
RM726X3		Transect Sample	1247.6	2345700.20	690453.07			
RM726X2		Transect Sample	1205.6	2345659.17	689974.29			
RM726X1		Transect Sample	1251.9	2346007.12	689771.03	X	X	X
RM725X3	Focus Area 2	Transect Sample	1273.4	2340756.08	685908.05			
RM725X1	Focus Area 2	Transect Sample	1273.7	2341571.01	685694.25			
RM724X2	Focus Area 2	Transect Sample	1201.8	2341264.12	681155.52			
RM723X5	Focus Area 2	Transect Sample	1278.3	2338349.75	677566.69			
RM723X4	Focus Area 2	Transect Sample	1281.9	2338940.83	677253.57	X	X	X
RM722X3	Focus Area 2	Transect Sample	1277.6	2335049.19	674748.94			
RM722X2	Focus Area 2	Transect Sample	1212.8	2335159.32	674378.00			
RM722X1	Focus Area 2	Transect Sample	1271.1	2335187.25	673401.62			
RM721X3	Focus Area 2	Transect Sample	1278.0	2329845.09	676097.98			
RM721X2	Focus Area 2	Transect Sample	1208.6	2329966.45	675500.99			
RM721X1	Focus Area 2	Transect Sample	1270.3	2329629.12	675267.21			
RM718X3		Transect Sample	1275.5	2320068.20	665866.09			
RM718X2		Transect Sample	1208.8	2321606.93	665958.42			
RM718X1		Transect Sample	1279.8	2322536.28	665993.75			
RM715X3		Transect Sample	1277.2	2311497.60	654678.26			
RM715X1		Transect Sample	1264.6	2312496.51	653577.02	X		X
RM713X1		Transect Sample	1270.2	2312111.30	644219.70			
RM710X3		Transect Sample	1284.6	2316570.05	629005.19	X		
RM710X2		Transect Sample	1202.4	2318368.65	629434.23			
RM710X1		Transect Sample	1276.2	2320851.94	629494.09			
RM708X2	Focus Area 3	Transect Sample	1199.3	2312645.60	622508.11			
RM708X1	Focus Area 3	Transect Sample	1259.0	2313009.56	621748.16		X	X
RM707X3	Focus Area 3	Transect Sample	1265.0	2306681.65	624415.85			
RM707X2	Focus Area 3	Transect Sample	1189.3	2307151.08	620539.57			
RM707X1	Focus Area 3	Transect Sample	1277.9	2307313.00	618875.70			
RM706X6	Focus Area 3	Transect Sample	1226.1	2298951.53	622020.34			
RM706X5	Focus Area 3	Transect Sample	1237.2	2300550.09	620838.75			X
RM706X4	Focus Area 3	Transect Sample	1194.6	2301937.74	619779.75			
RM706X3	Focus Area 3	Transect Sample	1238.6	2303352.90	618638.60			
RM706X2	Focus Area 3	Transect Sample	1240.5	2304011.10	618348.86			
RM705X3	Focus Area 3	Transect Sample	1256.5	2298624.12	617043.87			
RM705X2	Focus Area 3	Transect Sample	1150.5	2299184.61	616923.91			
RM705X1	Focus Area 3	Transect Sample	1256.4	2304282.01	616180.55			
RM704X3	Focus Area 3	Transect Sample	1255.4	2298719.39	611504.51	X	X	X
RM704X2	Focus Area 3	Transect Sample	1199.3	2300101.60	611671.05			
RM701X3		Transect Sample	1257.5	2294280.14	599234.23			
RM701X2		Transect Sample	1161.2	2295119.82	599105.32			
RM701X1		Transect Sample	1259.2	2296268.61	598105.38			
RM698X3		Transect Sample	1258.9	2292780.98	585948.53			
RM698X2		Transect Sample	1187.5	2293888.96	585549.33			
RM695X3		Transect Sample	1275.8	2289739.28	572438.90			
RM695X2		Transect Sample	1141.6	2292166.65	572000.55			
RM695X1		Transect Sample	1268.5	2293041.65	571817.99		X	X
RM693X1		Transect Sample	1276.4	2282906.56	566245.76			
RM692X2		Transect Sample	1122.2	2284066.21	564965.80	X		
RM689X2		Transect Sample	1106.9	2281239.57	550656.29			
RM689X1		Transect Sample	1258.5	2281630.33	550231.68			
RM686X2		Transect Sample	1109.2	2278453.93	536178.83			
RM686X1		Transect Sample	1262.0	2279217.26	536229.39			
RM683X3		Transect Sample	1269.5	2279089.70	521252.96			
RM683X2		Transect Sample	1108.2	2280585.67	521930.90			
RM683X1		Transect Sample	1261.2	2284985.97	523780.64			
RM681X1		Transect Sample	1282.4	2282128.56	511793.58			
RM680X2	Focus Area 4	Transect Sample	1125.8	2283778.29	510736.97			
RM679X3	Focus Area 4	Transect Sample	1274.6	2283103.05	505615.91	X	X	X
RM679X2	Focus Area 4	Transect Sample	1120.8	2285332.90	505856.94			
RM679X1	Focus Area 4	Transect Sample	1268.2	2289123.48	506219.11			
RM678X7	Focus Area 4	Transect Sample	1274.1	2283238.01	500273.06			
RM678X6	Focus Area 4	Transect Sample	1201.7	2283575.59	500363.51			
RM678X5	Focus Area 4	Transect Sample	1170.6	2284634.63	500582.46			
RM678X4	Focus Area 4	Transect Sample	1113.2	2285833.71	500861.06			
RM678X3	Focus Area 4	Transect Sample	1211.9	2286731.63	501044.28			
RM678X2	Focus Area 4	Transect Sample	1200.6	2288321.34	501403.34			
RM677X2	Focus Area 4	Transect Sample	1109.2	2286444.14	495747.80			X
RM677X1	Focus Area 4	Transect Sample	1275.9	2291499.06	497145.84			
RM676X2	Focus Area 4	Transect Sample	1102.7	2287298.92	490644.47			X
RM676X1	Focus Area 4	Transect Sample	1277.1	2292852.53	492295.51			
RM673X3		Transect Sample	1275.3	2293646.50	476511.70			
RM673X2		Transect Sample	1081.1	2294750.91	476982.43			
RM673X1		Transect Sample	1274.6	2296093.50	477844.48			
RM670X3		Transect Sample	1280.0	2291074.88	461919.12			
RM670X2		Transect Sample	1103.1	2291972.04	461013.30	X	X	X
RM670X1		Transect Sample	1277.5	2292619.05	460409.44			
RM667X3		Transect Sample	1280.3	2281691.68	448346.11			
RM667X2		Transect Sample	1121.4	2285799.91	447738.76			
RM667X1		Transect Sample	1280.2	2286501.27	447568.36			
RM664X3		Transect Sample	1282.2	2282394.34	431895.62	X		
RM664X2		Transect Sample	1118.6	2285462.55	431534.54			
RM664X1		Transect Sample	1278.0	2286388.76	431048.38			
RM661X3		Transect Sample	1267.1	2272144.27	425927.99			
RM661X2		Transect Sample	1097.6	2273182.53	424478.52	X	X	X
RM658X2		Transect Sample	1077.9	2275931.62	406881.30			
RM658X1		Transect Sample	1261.8	2277420.85	406956.16			

TABLE A-1
Summary of Sample Locations, Elevations, and Associated QA/QC Samples by Sample Type
Upper Columbia River RI/FS

Sample Name	Focus Area	Sample Type	Sample Elevation	Sample Latitude	Sample Longitude	Field Duplicate	MS/MSD	Lab Duplicate
RM655X3		Transect Sample	1279.9	2266116.80	394259.20			
RM655X2		Transect Sample	1064.5	2268110.43	392480.53			
RM655X1		Transect Sample	1281.4	2269910.20	390603.60			
RM652X3		Transect Sample	1275.9	2252440.15	393342.18		X	X
RM652X2		Transect Sample	1047.5	2252717.69	391503.53			
RM652X1		Transect Sample	1278.1	2252402.28	390102.72			
RM649X3		Transect Sample	1279.8	2236701.04	386782.17			
RM649X2		Transect Sample	1060.6	2237786.24	386524.62			
RM649X1		Transect Sample	1278.0	2241231.44	385448.16			
RM646X3		Transect Sample	1276.4	2240389.57	371400.91			
RM646X2		Transect Sample	1049.6	2242598.76	373180.54			
RM646X1		Transect Sample	1271.6	2243214.29	373595.48			
RM644X2	Focus Area 5	Transect Sample	1018.4	2249011.06	364128.57			
RM644X1	Focus Area 5	Transect Sample	1275.9	2249593.94	364171.86			
RM643X3	Focus Area 5	Transect Sample	1279.6	2246637.76	357908.63			
RM643X2	Focus Area 5	Transect Sample	1040.7	2248215.66	358014.20			
RM643X1	Focus Area 5	Transect Sample	1268.7	2249464.29	358066.55			
RM642X7	Focus Area 5	Transect Sample	1275.2	2246315.75	352289.90			
RM642X6	Focus Area 5	Transect Sample	1162.1	2246637.81	352318.50			
RM642X5	Focus Area 5	Transect Sample	1102.4	2247038.64	352307.31			
RM642X4	Focus Area 5	Transect Sample	1019.4	2247438.35	352338.42			
RM642X3	Focus Area 5	Transect Sample	1149.0	2248246.99	352358.27			
RM642X2	Focus Area 5	Transect Sample	1239.2	2249176.74	352424.76			
RM641X3	Focus Area 5	Transect Sample	1280.5	2246659.51	346814.48			X
RM641X2	Focus Area 5	Transect Sample	1017.1	2248103.95	346903.67			
RM640X2	Focus Area 5	Transect Sample	1030.2	2250437.05	341632.28			
RM640X1	Focus Area 5	Transect Sample	1276.5	2251528.82	341636.96			
RM637X7		Transect Sample	1277.8	2247558.71	326734.07			
RM637X6		Transect Sample	1245.0	2247785.22	326692.81			
RM637X5		Transect Sample	1222.1	2248422.04	326515.50			
RM637X4		Transect Sample	1008.1	2249263.77	326278.03	X	X	X
RM637X3		Transect Sample	1123.4	2250027.29	326083.70			
RM637X2		Transect Sample	1155.6	2250547.77	325936.28			
RM634X3		Transect Sample	1280.2	2240733.99	317531.73			
RM634X2		Transect Sample	1014.4	2243521.81	313219.90			
RM631X3		Transect Sample	1282.5	2228496.00	318115.02			
RM631X2		Transect Sample	989.2	2227747.88	316833.68			
RM631X1		Transect Sample	1280.2	2226953.09	315243.73			
RM628X3		Transect Sample	1271.0	2221083.44	331540.71	X	X	X
RM628X2		Transect Sample	984.6	2220218.24	330126.18			
RM625X3		Transect Sample	1281.2	2205625.95	330911.47			
RM625X2		Transect Sample	983.7	2203684.85	328572.13	X	X	X
RM625X1		Transect Sample	1269.0	2203674.03	327106.79			
RM622X2		Transect Sample	1003.0	2201924.88	344210.26			
RM622X1		Transect Sample	1271.8	2199801.91	342518.76			
RM619X3		Transect Sample	1284.0	2187630.81	348614.14			
RM619X2		Transect Sample	934.1	2185487.30	347457.97			
RM619X1		Transect Sample	1272.5	2185671.47	344242.54			
RM616X2		Transect Sample	954.1	2169083.54	350123.05			
RM616X1		Transect Sample	1270.1	2169240.58	347616.46			
RM613X3		Transect Sample	1276.3	2159198.36	340850.19			
RM613X2		Transect Sample	924.6	2160725.07	340860.30			
RM613X1		Transect Sample	1281.2	2162253.97	340989.01			
RM610X3		Transect Sample	1277.0	2149728.86	339776.37			
RM610X2		Transect Sample	955.2	2148994.78	338062.41			
RM610X1		Transect Sample	1278.0	2147886.94	336569.13			
RM607X3		Transect Sample	1277.0	2136318.27	345208.47			
RM607X2		Transect Sample	915.0	2134595.65	343128.86			
RM607X1		Transect Sample	1259.0	2132964.74	341022.62			
RM606X2	Focus Area 6	Transect Sample	912.2	2131485.94	346953.30			X
RM606X1	Focus Area 6	Transect Sample	1274.8	2130530.88	346329.92			
RM605X9	Focus Area 6	Transect Sample	1283.2	2134592.95	353451.63			
RM605X7	Focus Area 6	Transect Sample	1267.9	2132774.22	353495.58			
RM605X6	Focus Area 6	Transect Sample	1029.1	2131626.07	352728.91			X
RM605X5	Focus Area 6	Transect Sample	933.5	2130579.27	351838.33	X		
RM605X4	Focus Area 6	Transect Sample	1075.2	2129582.49	351425.29			
RM605X3	Focus Area 6	Transect Sample	1117.4	2128505.81	350820.76			
RM605X2	Focus Area 6	Transect Sample	1136.7	2127689.17	350168.19			
RM604X3	Focus Area 6	Transect Sample	1284.6	2128642.73	357937.10			X
RM604X2	Focus Area 6	Transect Sample	930.3	2127347.32	355592.99			
RM604X1	Focus Area 6	Transect Sample	1276.5	2124999.66	351522.60			
RM603X3	Focus Area 6	Transect Sample	1285.0	2122929.58	357701.72			
RM603X2	Focus Area 6	Transect Sample	926.0	2122227.06	354318.49	X		X
RM600X3		Transect Sample	1268.3	2107345.11	352215.17			
RM600X2		Transect Sample	920.5	2107707.59	350617.84			
RM600X1		Transect Sample	1269.0	2109124.42	348078.49			
BIOASSAY/TRANSECT/REFERENCE SAMPLES								
RM744A2(X3)	Focus Area 1	Transect/Bioassay/Pore Water	1295.9	2408305.33	745619.17			
RM744A1(X1)	Focus Area 1	Transect/Bioassay/Pore Water	1295.4	2409210.41	745575.17			
RM743A2(X3)	Focus Area 1	Transect/Bioassay/Pore Water	1295.7	2406578.17	741654.75			
RM743A1(X1)	Focus Area 1	Transect/Bioassay/Pore Water	1294.5	2407235.22	740946.86			
RM742A2(X5)	Focus Area 1	Transect/Bioassay/Pore Water	1291.5	2405463.25	735711.03			
RM742A1(X1)	Focus Area 1	Transect/Bioassay/Pore Water	1292.0	2406790.17	735741.31			
RM741A1(X3)	Focus Area 1	Transect/Bioassay/Pore Water	1291.1	2400203.73	732721.31			X
RM740A1(X1)	Focus Area 1	Transect/Bioassay/Pore Water	1288.4	2397508.23	729409.70			
RM739A1(X3)	Focus Area 1	Transect/Bioassay/Pore Water	1287.8	2392760.20	727649.59			
RM738A1(X3)		Transect/Bioassay/Pore Water	1285.4	2388467.87	723572.83			
RM737A1(X3)		Transect/Bioassay/Pore Water	1279.2	2385483.36	722620.13			
RM736A1(X1)		Transect/Bioassay/Pore Water	1273.3	2382071.99	720975.05			
RM734A1		Bioassay/Pore Water Sample	1271.6	2375798.86	716693.76			
RM733A1(X1)		Transect/Bioassay/Pore Water	1269.7	2371218.22	713297.88			
RM732R1		Reference/Bioassay/Pore Water	1410.0	2370022.87	707080.50			X
RM730A1		Bioassay/Pore Water Sample	1258.7	2361860.42	701004.21			
RM729A1(X1)		Transect/Bioassay/Pore Water	1268.7	2358959.14	698031.25		X	X
RM727A1(X1)		Transect/Bioassay/Pore Water	1252.7	2350564.27	692273.96	X		X
RM726R1		Reference/Bioassay/Pore Water	1716.0	2335679.06	692058.47			
RM724A2(X3)	Focus Area 2	Transect/Bioassay/Pore Water	1250.4	2340428.44	682889.58			
RM724A1(X1)	Focus Area 2	Transect/Bioassay/Pore Water	1249.2	2341548.08	682256.35			
RM723A2(X3)	Focus Area 2	Transect/Bioassay/Pore Water	1248.7	2337701.91	676348.54			X
RM723A1(X1)	Focus Area 2	Transect/Bioassay/Pore Water	1251.5	2340464.47	676289.32			
RM721R1		Reference/Bioassay/Pore Water	1301.0	2328148.26	677786.16	X		
RM713A1(X3)		Transect/Bioassay/Pore Water	1250.7	2310601.84	643646.79	X		
RM708A1(X3)	Focus Area 3	Transect/Bioassay/Pore Water	1249.3	2312364.24	623074.00			
RM706A2(X7)	Focus Area 3	Transect/Bioassay/Pore Water	1251.3	2298137.23	622921.37			
RM706A1(X1)	Focus Area 3	Transect/Bioassay/Pore Water	1248.7	2304940.47	617699.39			
RM705R1	Focus Area 3	Reference/Bioassay/Pore Water	1360.0	2297580.13	615475.86			
RM704A1(X1)	Focus Area 3	Transect/Bioassay/Pore Water	1251.1	2305630.70	611945.19			
RM698A1(X1)		Transect/Bioassay/Pore Water	1251.1	2296930.75	584475.88			
RM692A1(X1)		Transect/Bioassay/Pore Water	1249.6	2289612.46	561690.15	X		
RM689A1(X3)		Transect/Bioassay/Pore Water	1249.6	2277322.32	552840.18			

TABLE A-1
Summary of Sample Locations, Elevations, and Associated QA/QC Samples by Sample Type
Upper Columbia River RI/FS

Sample Name	Focus Area	Sample Type	Sample Elevation	Sample Latitude	Sample Longitude	Field Duplicate	MS/MSD	Lab Duplicate
RM687A1		Bioassay/Pore Water Sample	1252.6	2279453.47	540915.87			
RM686A1(X3)		Transect/Bioassay/Pore Water	1250.1	2276670.84	536118.10			X
RM686R1		Reference/Bioassay/Pore Water	1302.0	2274191.84	533714.32			
RM685R1		Reference/Bioassay/Pore Water	1297.0	2284498.75	528493.09			
RM680A1(X1)	Focus Area 4	Transect/Bioassay/Pore Water	1249.6	2288402.07	511590.34		X	X
RM678A1(X1)	Focus Area 4	Transect/Bioassay/Pore Water	1249.6	2289791.50	501691.70			
RM677A1(X3)	Focus Area 4	Transect/Bioassay/Pore Water	1250.1	2283732.02	494985.03			
RM676A1(X3)	Focus Area 4	Transect/Bioassay/Pore Water	1248.6	2284257.10	489746.90	X		
RM661A1(X1)		Transect/Bioassay/Pore Water	1252.4	2275060.95	422272.87		X	X
RM658A1(X3)		Transect/Bioassay/Pore Water	1250.9	2271972.89	406668.93	X		
RM644A1(X3)	Focus Area 5	Transect/Bioassay/Pore Water	1251.0	2246356.96	363581.40			
RM642A1(X1)	Focus Area 5	Transect/Bioassay/Pore Water	1252.0	2249610.81	352398.38			
RM641A1(X1)	Focus Area 5	Transect/Bioassay/Pore Water	1250.7	2249303.48	346956.11			
RM640A1(X3)	Focus Area 5	Transect/Bioassay/Pore Water	1251.0	2248039.99	341470.33	X		X
RM637A1(X1)		Transect/Bioassay/Pore Water	1251.6	2250933.42	325541.58			
RM634A1(X1)		Transect/Bioassay/Pore Water	1247.2	2245749.91	310993.91			
RM628A1(X1)		Transect/Bioassay/Pore Water	1249.1	2220310.30	328838.35			
RM622A1(X3)		Transect/Bioassay/Pore Water	1248.5	2203529.39	345974.88			
RM616A1(X3)		Transect/Bioassay/Pore Water	1250.3	2168919.70	354389.31			
RM606A1(X3)	Focus Area 6	Transect/Bioassay/Pore Water	1250.6	2134187.47	346459.76			
RM605A2(X8)	Focus Area 6	Transect/Bioassay/Pore Water	1252.1	2133650.53	353925.58			
RM605A1(X1)	Focus Area 6	Transect/Bioassay/Pore Water	1252.6	2126885.82	349712.18			
RM603A1(X1)	Focus Area 6	Transect/Bioassay/Pore Water	1252.0	2122514.67	353017.11			
TRIBUTARY MOUTH SAMPLES								
RM736T1		Tributary Sample	1287.5	2377974.68	721503.53			
RM730T1		Tributary Sample	1265.4	2359007.78	697930.16			
RM729T2		Tributary Sample	1254.5	2358687.75	698006.58			
RM706T2	Focus Area 3	Tributary Sample	1276.8	2297836.47	621403.12			
RM706T1	Focus Area 3	Tributary Sample	1234.0	2296491.80	623326.80			
RM699T1		Tributary Sample	1219.9	2299479.90	585607.40			
RM639T2		Tributary Sample	1123.0	2252418.80	334500.47			
RM639T1		Tributary Sample	1055.1	2253030.63	335943.68	X	X	X
RM616T2		Tributary Sample	1030.6	2166664.26	352343.50			
RM616T1		Tributary Sample	1004.6	2167338.72	354064.08			
BEACH SAMPLES								
RM742B3	Focus Area 1	Beach Subsample Composite	1293.1	2405417.76	734896.62			
RM742B2	Focus Area 1	Beach Subsample Composite	1297.3	2405424.65	734866.00	X	X	X
RM742B1	Focus Area 1	Beach Subsample Composite	1303.0	2405414.15	734803.91			
RM735B3R		Beach Subsample	1274.6	2376467.95	715770.50	X		
RM735B3L		Beach Subsample	1274.6	2376294.47	715976.98			
RM735B3c		Beach Subsample	1274.6	2376386.27	715829.06			
RM735B2R		Beach Subsample	1278.0	2376451.75	715746.19			X
RM735B2L		Beach Subsample	1278.3	2376283.04	715984.76			
RM735B2c		Beach Subsample	1277.0	2376306.11	715793.85			
RM735B1R		Beach Subsample	1288.8	2376410.32	715719.74			
RM735B1L		Beach Subsample	1282.1	2376274.84	715995.31			
RM735B1c		Beach Subsample	1282.2	2376235.88	715761.76			
RM735BSF		Size Fractioned Sample	1277.0	2376306.11	715793.85	X		
RM729B3		Beach Subsample Composite	1261.2	2355990.08	697028.38			
RM729B2		Beach Subsample Composite	1271.8	2355996.52	697007.01			
RM729B1		Beach Subsample Composite	1281.6	2356008.73	696981.37			
RM718B3		Beach Subsample Composite	1258.8	2321658.41	664177.05			
RM718B2		Beach Subsample Composite	1271.3	2322262.42	664081.83			
RM718B1		Beach Subsample Composite	1288.6	2322438.60	663970.49			
RM708B3	Focus Area 3	Beach Subsample Composite	1279.3	2308979.98	620005.89			
RM708B2	Focus Area 3	Beach Subsample Composite	1278.7	2309034.88	619894.54			
RM708B1	Focus Area 3	Beach Subsample Composite	1283.5	2309071.66	619771.62	X	X	X
RM700B3R		Beach Subsample	1254.7	2295878.28	592716.01			
RM700B3L		Beach Subsample	1254.7	2295938.65	592212.07	X		
RM700B3c		Beach Subsample	1259.2	2295901.25	592462.40			
RM700B2R		Beach Subsample	1269.1	2295902.89	592712.07			
RM700B2L		Beach Subsample	1280.6	2295985.57	592222.90			
RM700B2c		Beach Subsample	1274.0	2295943.57	592467.32			
RM700B1R		Beach Subsample	1282.2	2295927.82	592710.10			
RM700B1L		Beach Subsample	1287.5	2296083.99	592238.32			
RM700B1c		Beach Subsample	1284.8	2295997.70	592476.18			X
RM700BSF		Size Fractioned Sample	1274.0	2295943.57	592467.32			
RM697B3		Beach Subsample Composite	1276.7	2290280.20	580189.78	X	X	X
RM697B2		Beach Subsample Composite	1281.5	2290078.43	580331.84			
RM697B1		Beach Subsample Composite	1284.0	2289870.75	580472.26			
RM690B3		Beach Subsample Composite	1259.5	2281392.42	556387.99			
RM690B2		Beach Subsample Composite	1274.1	2281081.40	556266.28			X
RM690B1		Beach Subsample Composite	1284.5	2280939.01	556612.40			
RM675B3		Beach Subsample Composite	1253.4	2293686.77	484253.67			
RM675B2		Beach Subsample Composite	1272.3	2293989.61	484439.45			
RM675B1		Beach Subsample Composite	1282.7	2294284.47	484435.14	X		
RM673B3		Beach Subsample Composite	1278.2	2294090.72	476029.32			
RM673B2		Beach Subsample Composite	1276.9	2293866.56	476028.80			
RM673B1		Beach Subsample Composite	1281.8	2293642.28	476031.92	X	X	X
RM658B3		Beach Subsample Composite	1260.4	2271949.97	399683.17			
RM658B2		Beach Subsample Composite	1277.0	2271832.80	399675.59			
RM658B1		Beach Subsample Composite	1285.6	2271683.74	399670.58			
RM642B3R	Focus Area 5	Beach Subsample	1253.0	2249186.05	348869.95			
RM642B3L	Focus Area 5	Beach Subsample	1252.0	2249280.35	348380.30	X		X
RM642B3c	Focus Area 5	Beach Subsample	1252.0	2249242.82	348630.91			
RM642B2R	Focus Area 5	Beach Subsample	1264.1	2249540.51	348906.95			
RM642B2L	Focus Area 5	Beach Subsample	1263.6	2249603.09	348412.62			
RM642B2c	Focus Area 5	Beach Subsample	1263.7	2249555.87	348659.27			
RM642B1R	Focus Area 5	Beach Subsample	1280.7	2249946.79	348934.68			
RM642B1L	Focus Area 5	Beach Subsample	1278.7	2250085.30	348519.44			
RM642B1c	Focus Area 5	Beach Subsample	1281.2	2249898.09	348695.87			
RM642BSF	Focus Area 5	Size Fractioned Sample	1263.7	2249555.87	348659.27			
RM633B3		Beach Subsample Composite	1266.8	2236919.61	311818.36			
RM633B2		Beach Subsample Composite	1278.4	2236891.54	311773.68			
RM633B1		Beach Subsample Composite	1289.3	2236863.34	311732.64		X	X
RM615B3		Beach Subsample Composite	1274.9	2164329.07	346708.31			
RM615B2		Beach Subsample Composite	1275.4	2164545.90	346495.38			
RM615B1		Beach Subsample Composite	1279.4	2164765.28	346278.88			
RM600B3		Beach Subsample Composite	1265.8	2105034.70	347287.90			
RM600B2		Beach Subsample Composite	1276.2	2105037.10	347180.30			
RM600B1		Beach Subsample Composite	1289.0	2105040.20	347015.40			
CORE SAMPLES								
RM708C1	Focus Area 3	Core Sample	1193.2	2312644.92	622533.64			
RM708C2	Focus Area 3	Core Sample	1193.2	2312644.92	622533.64			
RM708C3	Focus Area 3	Core Sample	1193.2	2312644.92	622533.64			
RM708C4	Focus Area 3	Core Sample	1193.2	2312644.92	622533.64			
RM708C5	Focus Area 3	Core Sample	1193.2	2312644.92	622533.64			
RM704C1	Focus Area 3	Core Sample	1196.6	2300263.25	611928.68			
RM704C2	Focus Area 3	Core Sample	1196.6	2300263.25	611928.68			
RM704C3	Focus Area 3	Core Sample	1196.6	2300263.25	611928.68			
RM704C4	Focus Area 3	Core Sample	1196.6	2300263.25	611928.68			

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Sample Name	Focus Area	Sample Type	Sample Elevation	Sample Latitude	Sample Longitude	Field Duplicate	MS/MSD	Lab Duplicate
RM704C5	Focus Area 3	Core Sample	1196.6	2300263.25	611928.68			
RM704C6	Focus Area 3	Core Sample	1196.6	2300263.25	611928.68			
RM692C1		Core Sample	1116.1	2284081.23	564952.45			
RM692C2		Core Sample	1116.1	2284081.23	564952.45			
RM692C3		Core Sample	1116.1	2284081.23	564952.45		X	
RM692C4		Core Sample	1116.1	2284081.23	564952.45	X		
RM692C5		Core Sample	1116.1	2284081.23	564952.45			
RM676C1	Focus Area 4	Core Sample	1095.9	2287303.36	490677.84			
RM676C2	Focus Area 4	Core Sample	1095.9	2287303.36	490677.84			
RM676C3	Focus Area 4	Core Sample	1095.9	2287303.36	490677.84			
RM676C4	Focus Area 4	Core Sample	1095.9	2287303.36	490677.84			
RM676C5	Focus Area 4	Core Sample	1095.9	2287303.36	490677.84			
RM661C1		Core Sample	1092.0	2273201.17	424483.53			
RM661C2		Core Sample	1092.0	2273201.17	424483.53			
RM661C3		Core Sample	1092.0	2273201.17	424483.53	X		
RM661C4		Core Sample	1092.0	2273201.17	424483.53			
RM661C5		Core Sample	1092.0	2273201.17	424483.53			
RM644C1	Focus Area 5	Core Sample	1159.1	2248413.54	363992.13			
RM644C2	Focus Area 5	Core Sample	1159.1	2248413.54	363992.13			
RM644C3	Focus Area 5	Core Sample	1159.1	2248413.54	363992.13			
RM644C4	Focus Area 5	Core Sample	1159.1	2248413.54	363992.13			
RM644C5	Focus Area 5	Core Sample	1159.1	2248413.54	363992.13			
RM637C1		Core Sample	1115.6	2250033.37	326100.68			
RM637C2		Core Sample	1115.6	2250033.37	326100.68			
RM637C3		Core Sample	1115.6	2250033.37	326100.68	X		
RM637C4		Core Sample	1115.6	2250033.37	326100.68		X	
RM622C1		Core Sample	1075.2	2200696.15	343475.60			
RM622C2		Core Sample	1075.2	2200696.15	343475.60			
RM622C3		Core Sample	1075.2	2200696.15	343475.60			
RM622C4		Core Sample	1075.2	2200696.15	343475.60			
RM622C5		Core Sample	1075.2	2200696.15	343475.60			
RM622C6		Core Sample	1075.2	2200696.15	343475.60			
RM605C1	Focus Area 6	Core Sample	1075.6	2128806.86	351365.94			
RM605C3	Focus Area 6	Core Sample	1075.6	2128806.86	351365.94	X		
RM605C4	Focus Area 6	Core Sample	1075.6	2128806.86	351365.94			

MS/MSD = matrix spike/matrix spike duplicate

TABLE A-2

Analyses Conducted on Each Sample

Upper Columbia River RI/FS

Sample Name	Pesticides/ PCB Aroclors	Semivolatiles	Metals (Includes Hg and U)	Dioxins/ Furans	TOC	AVS/SEM (includes Hg)	Grain Size	Bioassay 10-day	Bioassay 7-day	Bioassay 28-day	Size-Fractionated Composite	Pore Water Dissolved TAL Metals (includes Hg and U)	TCLP Metals (includes Hg)	TCLP SVOAs	TCLP Pesticides/ PCBs
TRANSECT SAMPLES															
RM744X2	x	x	x		x		x								
RM741X1	x	x	x		x		x								
RM740X3	x	x	x		x		x								
RM739X1	x	x	x		x		x								
RM738X1	x	x	x		x		x								
RM737X2	x	x	x		x		x								
RM737X1	x	x	x		x		x								
RM736X3	x	x	x		x		x								
RM735X3	x	x	x		x		x								
RM735X1	x	x	x		x		x								
RM734X3	x	x	x		x		x								
RM733X3	x	x	x		x		x								
RM733X2	x	x	x		x		x								
RM732X3	x	x	x		x		x								
RM732X2	x	x	x		x		x								
RM732X1	x	x	x		x		x								
RM731X3	x	x	x		x		x								
RM731X1	x	x	x		x		x								
RM730X1	x	x	x		x		x								
RM729X3	x	x	x		x		x								
RM729X2	x	x	x		x		x								
RM728X3	x	x	x		x		x								
RM728X1	x	x	x		x		x								
RM727X3	x	x	x		x		x								
RM726X3	x	x	x		x		x								
RM726X2	x	x	x		x		x								
RM726X1	x	x	x		x		x								
RM725X3	x	x	x		x		x								
RM725X1	x	x	x		x		x								
RM724X2	x	x	x		x		x								
RM723X5	x	x	x		x		x								
RM723X4	x	x	x		x		x								
RM722X3	x	x	x		x		x								
RM722X2	x	x	x		x		x								
RM722X1	x	x	x		x		x								
RM721X3	x	x	x		x		x								
RM721X2	x	x	x		x		x								
RM721X1	x	x	x		x		x								
RM718X3	x	x	x		x		x								
RM718X2	x	x	x		x		x								
RM718X1	x	x	x		x		x								
RM715X3	x	x	x		x		x								
RM715X1	x	x	x		x		x								
RM713X1	x	x	x		x		x								
RM710X3	x	x	x		x		x								
RM710X2	x	x	x		x		x								
RM710X1	x	x	x		x		x								
RM708X2	x	x	x		x		x								
RM708X1	x	x	x		x		x								
RM707X3	x	x	x		x		x								
RM707X2	x	x	x		x		x								
RM707X1	x	x	x		x		x								
RM706X6	x	x	x		x		x								
RM706X5	x	x	x		x		x								
RM706X4	x	x	x		x		x								
RM706X3	x	x	x		x		x								
RM706X2	x	x	x		x		x								
RM705X3	x	x	x		x		x								
RM705X2	x	x	x		x		x								
RM705X1	x	x	x		x		x								
RM704X3	x	x	x		x		x								
RM704X2	x	x	x		x		x								
RM701X3	x	x	x		x		x								
RM701X2	x	x	x		x		x								
RM701X1	x	x	x		x		x								
RM698X3	x	x	x		x		x								
RM698X2	x	x	x		x		x								

TABLE A-2
Analyses Conducted on Each Sample
Upper Columbia River RI/FS

Sample Name	Pesticides/ PCB Aroclors	Semivolatiles	Metals (Includes Hg and U)	Dioxins/ Furans	TOC	AVS/SEM (includes Hg)	Grain Size	Bioassay 10-day	Bioassay 7-day	Bioassay 28-day	Size-Fractionated Composite	Pore Water Dissolved TAL Metals (includes Hg and U)	TCLP Metals (includes Hg)	TCLP SVOAs	TCLP Pesticides/ PCBs
RM695X3	x	x	x		x		x								
RM695X2	x	x	x		x		x								
RM695X1	x	x	x		x		x								
RM693X1	x	x	x		x		x								
RM692X2	x	x	x		x		x								
RM689X2	x	x	x		x		x								
RM689X1	x	x	x		x		x								
RM686X2	x	x	x		x		x								
RM686X1	x	x	x		x		x								
RM683X3	x	x	x		x		x								
RM683X2	x	x	x		x		x								
RM683X1	x	x	x		x		x								
RM681X1	x	x	x		x		x								
RM680X2	x	x	x		x		x								
RM679X3	x	x	x		x		x								
RM679X2	x	x	x		x		x								
RM679X1	x	x	x		x		x								
RM678X7	x	x	x		x		x								
RM678X6	x	x	x		x		x								
RM678X5	x	x	x		x		x								
RM678X4	x	x	x		x		x								
RM678X3	x	x	x		x		x								
RM678X2	x	x	x		x		x								
RM677X2	x	x	x		x		x								
RM677X1	x	x	x		x		x								
RM676X2	x	x	x		x		x								
RM676X1	x	x	x		x		x								
RM673X3	x	x	x		x		x								
RM673X2	x	x	x		x		x								
RM673X1	x	x	x		x		x								
RM670X3	x	x	x		x		x								
RM670X2	x	x	x		x		x								
RM670X1	x	x	x		x		x								
RM667X3	x	x	x		x		x								
RM667X2	x	x	x		x		x								
RM667X1	x	x	x		x		x								
RM664X3	x	x	x		x		x								
RM664X2	x	x	x		x		x								
RM664X1	x	x	x		x		x								
RM661X3	x	x	x		x		x								
RM661X2	x	x	x		x		x								
RM658X2	x	x	x		x		x								
RM658X1	x	x	x		x		x								
RM655X3	x	x	x		x		x								
RM655X2	x	x	x		x		x								
RM655X1	x	x	x		x		x								
RM652X3	x	x	x		x		x								
RM652X2	x	x	x		x		x								
RM652X1	x	x	x		x		x								
RM649X3	x	x	x		x		x								
RM649X2	x	x	x		x		x								
RM649X1	x	x	x		x		x								
RM646X3	x	x	x		x		x								
RM646X2	x	x	x		x		x								
RM646X1	x	x	x		x		x								
RM644X2	x	x	x		x		x								
RM644X1	x	x	x		x		x								
RM643X3	x	x	x		x		x								
RM643X2	x	x	x		x		x								
RM643X1	x	x	x		x		x								
RM642X7	x	x	x		x		x								
RM642X6	x	x	x		x		x								
RM642X5	x	x	x		x		x								
RM642X4	x	x	x		x		x								
RM642X3	x	x	x		x		x								
RM642X2	x	x	x		x		x								
RM641X3	x	x	x		x		x								
RM641X2	x	x	x		x		x								

TABLE A-2
Analyses Conducted on Each Sample
Upper Columbia River RI/FS

Sample Name	Pesticides/ PCB Aroclors	Semivolatiles	Metals (Includes Hg and U)	Dioxins/ Furans	TOC	AVS/SEM (includes Hg)	Grain Size	Bioassay 10-day	Bioassay 7-day	Bioassay 28-day	Size-Fractionated Composite	Pore Water Dissolved TAL Metals (includes Hg and U)	TCLP Metals (includes Hg)	TCLP SVOAs	TCLP Pesticides/ PCBs
RM640X2	x	x	x		x		x								
RM640X1	x	x	x		x		x								
RM637X7	x	x	x		x		x								
RM637X6	x	x	x		x		x								
RM637X5	x	x	x		x		x								
RM637X4	x	x	x		x		x								
RM637X3	x	x	x		x		x								
RM637X2	x	x	x		x		x								
RM634X3	x	x	x		x		x								
RM634X2	x	x	x		x		x								
RM631X3	x	x	x		x		x								
RM631X2	x	x	x		x		x								
RM631X1	x	x	x		x		x								
RM628X3	x	x	x		x		x								
RM628X2	x	x	x		x		x								
RM625X3	x	x	x		x		x								
RM625X2	x	x	x		x		x								
RM625X1	x	x	x		x		x								
RM622X2	x	x	x		x		x								
RM622X1	x	x	x		x		x								
RM619X3	x	x	x		x		x								
RM619X2	x	x	x		x		x								
RM619X1	x	x	x		x		x								
RM616X2	x	x	x		x		x								
RM616X1	x	x	x		x		x								
RM613X3	x	x	x		x		x								
RM613X2	x	x	x		x		x								
RM613X1	x	x	x		x		x								
RM610X3	x	x	x		x		x								
RM610X2	x	x	x		x		x								
RM610X1	x	x	x		x		x								
RM607X3	x	x	x		x		x								
RM607X2	x	x	x		x		x								
RM607X1	x	x	x		x		x								
RM606X2	x	x	x		x		x								
RM606X1	x	x	x		x		x								
RM605X9	x	x	x		x		x								
RM605X7	x	x	x		x		x								
RM605X6	x	x	x		x		x								
RM605X5	x	x	x		x		x								
RM605X4	x	x	x		x		x								
RM605X3	x	x	x		x		x								
RM605X2	x	x	x		x		x								
RM604X3	x	x	x		x		x								
RM604X2	x	x	x		x		x								
RM604X1	x	x	x		x		x								
RM603X3	x	x	x		x		x								
RM603X2	x	x	x		x		x								
RM600X3	x	x	x		x		x								
RM600X2	x	x	x		x		x								
RM600X1	x	x	x		x		x								
Total Number:	186	186	186		186		186								

TABLE A-2
Analyses Conducted on Each Sample
Upper Columbia River RI/FS

Sample Name	Pesticides/ PCB Aroclors	Semivolatiles	Metals (Includes Hg and U)	Dioxins/ Furans	TOC	AVS/SEM (includes Hg)	Grain Size	Bioassay 10-day	Bioassay 7-day	Bioassay 28-day	Size-Fractionated Composite	Pore Water Dissolved TAL Metals (includes Hg and U)	TCLP Metals (includes Hg)	TCLP SVOAs	TCLP Pesticides/ PCBs
BIOASSAY/TRANSECT/REFERENCE SAMPLES															
RM744A2(X3)	x	x	x		x	x	x	x	x	x		x			
RM744A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM743A2(X3)	x	x	x		x	x	x	x	x	x		x			
RM743A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM742A2(X5)	x	x	x		x	x	x	x	x	x		x			
RM742A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM741A1(X3)	x	x	x		x	x	x	x	x	x		x			
RM740A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM739A1(X3)	x	x	x		x	x	x	x	x	x		x			
RM738A1(X3)	x	x	x		x	x	x	x	x	x		x			
RM737A1(X3)	x	x	x		x	x	x	x	x	x		x			
RM736A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM734A1	x	x	x		x	x	x	x	x	x		x			
RM733A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM732R1	x	x	x		x	x	x	x	x	x		x			
RM730A1	x	x	x		x	x	x	x	x	x		x			
RM729A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM727A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM726R1	x	x	x		x	x	x	x	x	x		x			
RM724A2(X3)	x	x	x		x	x	x	x	x	x		x			
RM724A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM723A2(X3)	x	x	x		x	x	x	x	x	x		x			
RM723A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM721R1	x	x	x		x	x	x	x	x	x		x			
RM713A1(X3)	x	x	x		x	x	x	x	x	x		x			
RM708A1(X3)	x	x	x		x	x	x	x	x	x		x			
RM706A2(X7)	x	x	x		x	x	x	x	x	x		x			
RM706A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM705R1	x	x	x		x	x	x	x	x	x		x			
RM704A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM698A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM692A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM689A1(X3)	x	x	x		x	x	x	x	x	x		x			
RM687A1	x	x	x		x	x	x	x	x	x		x			
RM686A1(X3)	x	x	x		x	x	x	x	x	x		x			
RM686R1	x	x	x		x	x	x	x	x	x		x			
RM685R1	x	x	x		x	x	x	x	x	x		x			
RM680A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM678A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM677A1(X3)	x	x	x		x	x	x	x	x	x		x			
RM676A1(X3)	x	x	x		x	x	x	x	x	x		x			
RM661A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM658A1(X3)	x	x	x		x	x	x	x	x	x		x			
RM644A1(X3)	x	x	x		x	x	x	x	x	x		x			
RM642A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM641A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM640A1(X3)	x	x	x		x	x	x	x	x	x		x			
RM637A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM634A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM628A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM622A1(X3)	x	x	x		x	x	x	x	x	x		x			
RM616A1(X3)	x	x	x		x	x	x	x	x	x		x			
RM606A1(X3)	x	x	x		x	x	x	x	x	x		x			
RM605A2(X8)	x	x	x		x	x	x	x	x	x		x			
RM605A1(X1)	x	x	x		x	x	x	x	x	x		x			
RM603A1(X1)	x	x	x		x	x	x	x	x	x		x			
Total Number:	56	56	56		56	56	56	56	56	56		56			

TABLE A-2
Analyses Conducted on Each Sample
Upper Columbia River RI/FS

Sample Name	Pesticides/ PCB Aroclors	Semivolatiles	Metals (Includes Hg and U)	Dioxins/ Furans	TOC	AVS/SEM (includes Hg)	Grain Size	Bioassay 10-day	Bioassay 7-day	Bioassay 28-day	Size-Fractionated Composite	Pore Water Dissolved TAL Metals (includes Hg and U)	TCLP Metals (includes Hg)	TCLP SVOAs	TCLP Pesticides/ PCBs
TRIBUTARY MOUTH SAMPLES															
RM736T1	x	x	x		x		x								
RM730T1	x	x	x		x		x								
RM729T2	x	x	x		x		x								
RM706T2	x	x	x		x		x								
RM706T1	x	x	x		x		x								
RM699T1	x	x	x		x		x								
RM639T2	x	x	x		x		x								
RM639T1	x	x	x		x		x								
RM616T2	x	x	x		x		x								
RM616T1	x	x	x		x		x								
Total Number:	10	10	10		10		10								
BEACH SAMPLES															
RM742B3	x	x	x	x	x		x								
RM742B2	x	x	x	x	x		x								
RM742B1	x	x	x	x	x		x								
RM735B3R	x	x	x		x		x								
RM735B3L	x	x	x		x		x								
RM735B3c	x	x	x		x		x								
RM735B2R	x	x	x		x		x								
RM735B2L	x	x	x		x		x								
RM735B2c	x	x	x		x		x								
RM735B1R	x	x	x		x		x								
RM735B1L	x	x	x		x		x								
RM735B1c	x	x	x		x		x								
RM735BSF	x	x	x	x	x		x				x				
RM729B3	x	x	x	x	x		x								
RM729B2	x	x	x	x	x		x								
RM729B1	x	x	x	x	x		x								
RM718B3	x	x	x	x	x		x								
RM718B2	x	x	x	x	x		x								
RM718B1	x	x	x	x	x		x								
RM708B3	x	x	x	x	x		x								
RM708B2	x	x	x	x	x		x								
RM708B1	x	x	x	x	x		x								
RM700B3R	x	x	x		x		x								
RM700B3L	x	x	x		x		x								
RM700B3c	x	x	x		x		x								
RM700B2R	x	x	x		x		x								
RM700B2L	x	x	x		x		x								
RM700B2c	x	x	x		x		x								
RM700B1R	x	x	x		x		x								
RM700B1L	x	x	x		x		x								
RM700B1c	x	x	x		x		x								
RM700BSF	x	x	x	x	x		x				x				
RM697B3	x	x	x	x	x		x								
RM697B2	x	x	x	x	x		x								
RM697B1	x	x	x	x	x		x								
RM690B3	x	x	x	x	x		x								
RM690B2	x	x	x	x	x		x								
RM690B1	x	x	x	x	x		x								
RM675B3	x	x	x	x	x		x								
RM675B2	x	x	x	x	x		x								
RM675B1	x	x	x	x	x		x								
RM673B3	x	x	x	x	x		x								
RM673B2	x	x	x	x	x		x								
RM673B1	x	x	x	x	x		x								
RM658B3	x	x	x	x	x		x								
RM658B2	x	x	x	x	x		x								
RM658B1	x	x	x	x	x		x								
RM642B3R	x	x	x		x		x								
RM642B3L	x	x	x		x		x								
RM642B3c	x	x	x		x		x								
RM642B2R	x	x	x		x		x								
RM642B2L	x	x	x		x		x								
RM642B2c	x	x	x		x		x								
RM642B1R	x	x	x		x		x								

TABLE A-2
Analyses Conducted on Each Sample
Upper Columbia River RI/FS

Sample Name	Pesticides/ PCB Aroclors	Semivolatiles	Metals (Includes Hg and U)	Dioxins/ Furans	TOC	AVS/SEM (includes Hg)	Grain Size	Bioassay 10-day	Bioassay 7-day	Bioassay 28-day	Size-Fractionated Composite	Pore Water Dissolved TAL Metals (includes Hg and U)	TCLP Metals (includes Hg)	TCLP SVOAs	TCLP Pesticides/ PCBs
RM642B1L	x	x	x		x		x								
RM642B1c	x	x	x		x		x								
RM642BSF	x	x	x	x	x		x				x				
RM633B3	x	x	x	x	x		x								
RM633B2	x	x	x	x	x		x								
RM633B1	x	x	x	x	x		x								
RM615B3	x	x	x	x	x		x								
RM615B2	x	x	x	x	x		x								
RM615B1	x	x	x	x	x		x								
RM600B3	x	x	x	x	x		x								
RM600B2	x	x	x	x	x		x								
RM600B1	x	x	x	x	x		x								
Total Number:	66	66	66	39	66		66				3				
CORE SAMPLES															
RM708C1	x	x	x	x	x		x								
RM708C2	x	x	x	x	x		x								
RM708C3	x	x	x	x	x		x								
RM708C4	x	x	x	x	x		x								
RM708C5	x	x	x	x	x		x								
RM704C1	x	x	x	x	x		x								
RM704C2	x	x	x	x	x		x								
RM704C3	x	x	x	x	x		x								
RM704C4	x	x	x	x	x		x								
RM704C5	x	x	x	x	x		x								
RM704C6	x	x	x	x	x		x								
RM692C1	x	x	x	x	x		x								
RM692C2	x	x	x	x	x		x								
RM692C3	x	x	x	x	x		x								
RM692C4	x	x	x	x	x		x								
RM692C5	x	x	x	x	x		x								
RM676C1	x	x	x	x	x		x								
RM676C2	x	x	x	x	x		x								
RM676C3	x	x	x	x	x		x								
RM676C4	x	x	x	x	x		x								
RM676C5	x	x	x	x	x		x								
RM661C1	x	x	x	x	x		x								
RM661C2	x	x	x	x	x		x								
RM661C3	x	x	x	x	x		x								
RM661C4	x	x	x	x	x		x								
RM661C5	x	x	x	x	x		x								
RM644C1	x	x	x	x	x		x								
RM644C2	x	x	x	x	x		x								
RM644C3	x	x	x	x	x		x								
RM644C4	x	x	x	x	x		x								
RM644C5	x	x	x	x	x		x								
RM637C1	x	x	x	x	x		x								
RM637C2	x	x	x	x	x		x								
RM637C3	x	x	x	x	x		x								
RM637C4	x	x	x	x	x		x								
RM622C1	x	x	x	x	x		x								
RM622C2	x	x	x	x	x		x								
RM622C3	x	x	x	x	x		x								
RM622C4	x	x	x	x	x		x								
RM622C5	x	x	x	x	x		x								
RM622C6	x	x	x	x	x		x								
RM605C1	x	x	x	x	x		x								
RM605C3	x	x	x	x	x		x								
RM605C4	x	x	x	x	x		x								
Total Number:	44	44	44	44	44		44								
IDW SAMPLE															
IDW - Solid 1	x	x	x										x	x	x

AVS/SEM = acid volatile sulfides/simultaneously extracted metals
IDW = investigation-derived waste
PCB = polychlorinated biphenyl
SVOA = semivolatile organic aromatic
TAL = Target Analyte List
TCLP = Toxicity Characteristic Leaching Procedure
TOC = total organic carbon

APPENDIX B

QA/QC Sample Information

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM603X2	28-Apr-05	415.1	Total organic carbon	mg/Kg	18000	17200	4.5%
RM603X2	28-Apr-05	ASTMD422	<200 Total	Percent	99.4	99.4	0.0%
RM603X2	28-Apr-05	ASTMD422	Clay	Percent	31.808	29.82	6.5%
RM603X2	28-Apr-05	ASTMD422	Co. Sand	Percent	0	0	0.0%
RM603X2	28-Apr-05	ASTMD422	Colloids	Percent	34.79	37.772	8.2%
RM603X2	28-Apr-05	ASTMD422	Fine Sand	Percent	0.6	0.4	40.0%
RM603X2	28-Apr-05	ASTMD422	Gravel	Percent	0	0	0.0%
RM603X2	28-Apr-05	ASTMD422	Med. Sand	Percent	0	0.2	200.0%
RM603X2	28-Apr-05	ASTMD422	Sand Total	Percent	0.6	0.6	0.0%
RM603X2	28-Apr-05	ASTMD422	Silt	Percent	32.802	31.808	3.1%
RM603X2	28-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	34000	28700	16.9%
RM603X2	28-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	16.3 UR	16.7 UR	NC
RM603X2	28-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	12.6	12.7	0.8%
RM603X2	28-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	393	349	11.9%
RM603X2	28-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	2.7	2.3	16.0%
RM603X2	28-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	5.3	4.8	9.9%
RM603X2	28-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	6470	6010	7.4%
RM603X2	28-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	46.5	40.3	14.3%
RM603X2	28-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	19.4	17.5	10.3%
RM603X2	28-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	89.5	80.7	10.3%
RM603X2	28-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	45800	42700	7.0%
RM603X2	28-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	144	137	5.0%
RM603X2	28-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	11100	10200	8.5%
RM603X2	28-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	2290	2140	6.8%
RM603X2	28-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.48	0.37	25.9%
RM603X2	28-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	39.2	35.2	10.8%
RM603X2	28-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	4860	3870	22.7%
RM603X2	28-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	5 J	5 J	0.0%
RM603X2	28-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	2.7 UJ	2.8 UJ	NC
RM603X2	28-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	581 J	485 J	18.0%
RM603X2	28-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	6.8 U	7 U	NC
RM603X2	28-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	54.4 U	55.7 U	NC
RM603X2	28-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	64.7	54.8	16.6%
RM603X2	28-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	701	640	9.1%
RM603X2	28-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	2 J	2 J	0.0%
RM603X2	28-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	18 U	18 U	NC
RM603X2	28-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	18 U	18 U	NC
RM603X2	28-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	18 U	18 U	NC
RM603X2	28-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	0.7 J	18 U	NC
RM603X2	28-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	18 U	18 U	NC
RM603X2	28-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	18 U	18 U	NC
RM603X2	28-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	18 U	18 U	NC
RM603X2	28-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	18 U	18 U	NC
RM603X2	28-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	2 J	1 J	66.7%
RM603X2	28-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	18 U	18 U	NC
RM603X2	28-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	18 U	18 U	NC
RM603X2	28-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	2 J	1 J	66.7%
RM603X2	28-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	18 U	18 U	NC
RM603X2	28-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	1 J	18 U	NC
RM603X2	28-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	4 J	4 J	0.0%
RM603X2	28-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	2 J	1 J	66.7%
RM603X2	28-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	1 J	1 J	0.0%
RM603X2	28-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	3.5 UR	3.5 UR	NC
RM603X2	28-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	14 UR	14 UR	NC
RM603X2	28-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	14 UR	14 UR	NC
RM603X2	28-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	3.5 UR	3.5 UR	NC
RM603X2	28-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	3.5 UR	3.5 UR	NC
RM603X2	28-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	3.5 UR	3.5 UR	NC
RM603X2	28-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	3.5 UR	3.5 UR	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	2.8 U	2.8 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	2.8 U	2.8 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	2.8 U	2.8 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	2.8 U	2.8 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	2.8 U	2.8 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	2.8 U	2.8 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	1.4 U	1.4 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	1.4 U	1.4 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	1.4 U	1.4 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	1.4 U	1.4 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM603X2	28-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	1.4 U	1.4 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	1.4 U	1.4 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	2.8 U	2.8 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	1.4 U	1.4 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	2.8 U	2.8 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	2.8 U	2.8 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	2.8 U	2.8 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	2.8 U	2.8 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	2.8 U	2.8 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	1.4 U	1.4 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	1.4 U	1.4 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	1.4 U	1.4 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	1.4 U	1.4 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	1.4 U	1.4 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	1.4 U	1.4 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	14 U	14 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	1.4 U	1.4 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	140 U	140 U	NC
RM603X2	28-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	1.4 U	1.4 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	880 U	870 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	880 UJ	870 UJ	NC
RM603X2	28-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	880 U	870 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	880 U	870 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	880 U	870 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	880 U	870 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	880 U	870 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	350 UJ	340 UJ	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	350 UR	340 UR	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	350 U	340 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	880 U	870 U	NC
RM603X2	28-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	350 U	340 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM603X2	28-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	350 U	340 U	NC
RM605C1	3-May-05	415.1	Total organic carbon	mg/Kg	5140	5400	4.9%
RM605C1	3-May-05	ASTMD422	<200 Total	Percent	75.4	74.6	1.1%
RM605C1	3-May-05	ASTMD422	Clay	Percent	9.048	8.952	1.1%
RM605C1	3-May-05	ASTMD422	Co. Sand	Percent	0.2	0	200.0%
RM605C1	3-May-05	ASTMD422	Colloids	Percent	9.048	8.952	1.1%
RM605C1	3-May-05	ASTMD422	Fine Sand	Percent	22.6	23.8	5.2%
RM605C1	3-May-05	ASTMD422	Gravel	Percent	0	0	0.0%
RM605C1	3-May-05	ASTMD422	Med. Sand	Percent	1.8	1.6	11.8%
RM605C1	3-May-05	ASTMD422	Sand Total	Percent	24.6	25.4	3.2%
RM605C1	3-May-05	ASTMD422	Silt	Percent	57.304	56.696	1.1%
RM605C1	3-May-05	CLP TAL TotMetals	Aluminum	mg/Kg	15800	15600	1.3%
RM605C1	3-May-05	CLP TAL TotMetals	Antimony	mg/Kg	8.4 UJ	8 UJ	NC
RM605C1	3-May-05	CLP TAL TotMetals	Arsenic	mg/Kg	4.8	3.5	31.3%
RM605C1	3-May-05	CLP TAL TotMetals	Barium	mg/Kg	179	148	19.0%
RM605C1	3-May-05	CLP TAL TotMetals	Beryllium	mg/Kg	1.3	1.1	16.7%
RM605C1	3-May-05	CLP TAL TotMetals	Cadmium	mg/Kg	0.43 J	0.36 J	17.7%
RM605C1	3-May-05	CLP TAL TotMetals	Calcium	mg/Kg	4060	3250	22.2%
RM605C1	3-May-05	CLP TAL TotMetals	Chromium	mg/Kg	16.2	14	14.6%
RM605C1	3-May-05	CLP TAL TotMetals	Cobalt	mg/Kg	9.3	6.9	29.6%
RM605C1	3-May-05	CLP TAL TotMetals	Copper	mg/Kg	20.9	18	14.9%
RM605C1	3-May-05	CLP TAL TotMetals	Iron	mg/Kg	18700	15400	19.4%
RM605C1	3-May-05	CLP TAL TotMetals	Lead	mg/Kg	20	15.3	26.6%
RM605C1	3-May-05	CLP TAL TotMetals	Magnesium	mg/Kg	5360	4220	23.8%
RM605C1	3-May-05	CLP TAL TotMetals	Manganese	mg/Kg	486	395	20.7%
RM605C1	3-May-05	CLP TAL TotMetals	Mercury	mg/Kg	0.052 J	0.029 J	56.8%
RM605C1	3-May-05	CLP TAL TotMetals	Nickel	mg/Kg	14.7	11.4	25.3%
RM605C1	3-May-05	CLP TAL TotMetals	Potassium	mg/Kg	3450	3280	5.1%
RM605C1	3-May-05	CLP TAL TotMetals	Selenium	mg/Kg	2.5 J	1.4 J	56.4%
RM605C1	3-May-05	CLP TAL TotMetals	Silver	mg/Kg	1.4 UJ	1.3 UR	NC
RM605C1	3-May-05	CLP TAL TotMetals	Sodium	mg/Kg	491 J	558 J	12.8%
RM605C1	3-May-05	CLP TAL TotMetals	Thallium	mg/Kg	3.5 U	3.3 UJ	NC
RM605C1	3-May-05	CLP TAL TotMetals	Uranium	mg/Kg	28.2 U	5.7 U	NC
RM605C1	3-May-05	CLP TAL TotMetals	Vanadium	mg/Kg	28.5	24.7	14.3%
RM605C1	3-May-05	CLP TAL TotMetals	Zinc	mg/Kg	80.5	60.8	27.9%
RM605C1	3-May-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.5 J	0.4 J	22.2%
RM605C1	3-May-05	CLP TCL PAH	Acenaphthene	µg/Kg	6 U	5 U	NC
RM605C1	3-May-05	CLP TCL PAH	Acenaphthylene	µg/Kg	6 U	5 U	NC
RM605C1	3-May-05	CLP TCL PAH	Anthracene	µg/Kg	6 U	5 U	NC
RM605C1	3-May-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	6 U	5 U	NC
RM605C1	3-May-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	6 U	5 U	NC
RM605C1	3-May-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	6 U	5 U	NC
RM605C1	3-May-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	6 U	5 U	NC
RM605C1	3-May-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	6 U	5 U	NC
RM605C1	3-May-05	CLP TCL PAH	Chrysene	µg/Kg	6 U	5 U	NC
RM605C1	3-May-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	6 U	5 U	NC
RM605C1	3-May-05	CLP TCL PAH	Dibenzofuran	µg/Kg	6 U	5 U	NC
RM605C1	3-May-05	CLP TCL PAH	Fluoranthene	µg/Kg	6 U	5 U	NC
RM605C1	3-May-05	CLP TCL PAH	Fluorene	µg/Kg	6 U	5 U	NC
RM605C1	3-May-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	6 U	5 U	NC
RM605C1	3-May-05	CLP TCL PAH	Naphthalene	µg/Kg	4.7 U	4.3 U	NC
RM605C1	3-May-05	CLP TCL PAH	Phenanthrene	µg/Kg	6 U	0.2 J	NC
RM605C1	3-May-05	CLP TCL PAH	Pyrene	µg/Kg	6 U	5 U	NC
RM605C1	3-May-05	CLP TCL PCBs	PCB-1016	µg/Kg	2.3 U	2.1 U	NC
RM605C1	3-May-05	CLP TCL PCBs	PCB-1221	µg/Kg	9.3 U	8.6 U	NC
RM605C1	3-May-05	CLP TCL PCBs	PCB-1232	µg/Kg	9.3 U	8.6 U	NC
RM605C1	3-May-05	CLP TCL PCBs	PCB-1242	µg/Kg	2.3 U	2.1 U	NC
RM605C1	3-May-05	CLP TCL PCBs	PCB-1248	µg/Kg	2.3 U	2.1 U	NC
RM605C1	3-May-05	CLP TCL PCBs	PCB-1254	µg/Kg	2.3 U	2.1 U	NC
RM605C1	3-May-05	CLP TCL PCBs	PCB-1260	µg/Kg	2.3 U	2.1 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.93 U	0.86 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.93 U	0.86 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.93 U	0.86 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.93 U	0.86 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.93 U	0.86 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.93 U	0.86 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.46 U	0.42 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.46 U	0.42 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.46 U	0.42 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM605C1	3-May-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.46 U	0.42 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.46 U	0.42 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.46 U	0.42 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.93 U	0.86 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.46 U	0.42 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.93 U	0.86 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.93 U	0.86 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	Endrin	µg/Kg	0.93 U	0.86 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.93 U	0.86 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.93 U	0.86 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.46 U	0.42 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.46 U	0.42 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.46 U	0.42 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.46 U	0.42 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.46 U	0.42 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.46 U	0.42 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	4.6 U	4.2 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.46 U	0.42 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	Toxaphene	µg/Kg	46 U	42 U	NC
RM605C1	3-May-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.46 U	0.42 U	NC
RM605C1	3-May-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	290 U	270 U	NC
RM605C1	3-May-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	290 U	270 U	NC
RM605C1	3-May-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	290 U	270 U	NC
RM605C1	3-May-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	290 U	270 U	NC
RM605C1	3-May-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	290 U	270 U	NC
RM605C1	3-May-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	290 U	270 U	NC
RM605C1	3-May-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	290 U	270 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Acetophenone	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Atrazine	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Benzoic acid	µg/Kg	110 UR	110 UR	NC
RM605C1	3-May-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Caprolactam	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Carbazole	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Isophorone	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	290 U	270 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM605C1	3-May-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	CLP TCL SVOC	Phenol	µg/Kg	110 U	110 U	NC
RM605C1	3-May-05	Dioxins and Furans	% Moisture	%	22.1	23.3	5.3%
RM605C1	3-May-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	1.02 J	0.898 J	12.7%
RM605C1	3-May-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	0.234 J	0.202 J	14.7%
RM605C1	3-May-05	Dioxins and Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	0.0979 U	0.066 U	NC
RM605C1	3-May-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	0.0767 U	0.0427 J	NC
RM605C1	3-May-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	0.0431 U	0.0398 U	NC
RM605C1	3-May-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	0.0759 U	0.0523 U	NC
RM605C1	3-May-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	0.0611 U	0.0335 U	NC
RM605C1	3-May-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	0.0942 U	0.0728 J	NC
RM605C1	3-May-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	PG/G	0.0693 U	0.0559 U	NC
RM605C1	3-May-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	0.0529 U	0.0604 U	NC
RM605C1	3-May-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	0.052 U	0.0385 J	NC
RM605C1	3-May-05	Dioxins and Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	0.0372 J	0.0385 J	3.4%
RM605C1	3-May-05	Dioxins and Furans	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	0.0743 U	0.0402 U	NC
RM605C1	3-May-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	0.0393 U	0.0389 U	NC
RM605C1	3-May-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzofuran	PG/G	0.143 J	0.138 J	3.6%
RM605C1	3-May-05	Dioxins and Furans	Heptachlorodibenzodioxin (Total)	PG/G	1.91	1.67	13.4%
RM605C1	3-May-05	Dioxins and Furans	Heptachlorodibenzofuran (Total)	PG/G	0.408	0.371	9.5%
RM605C1	3-May-05	Dioxins and Furans	Hexachlorodibenzodioxin (Total)	PG/G	0.0765 U	0.115	NC
RM605C1	3-May-05	Dioxins and Furans	Hexachlorodibenzofuran (Total)	PG/G	0.178 J	0.23 J	25.5%
RM605C1	3-May-05	Dioxins and Furans	Octachlorodibenzodioxin	PG/G	6.21	5.99	3.6%
RM605C1	3-May-05	Dioxins and Furans	Octachlorodibenzofuran	PG/G	0.386 J	0.3 J	25.1%
RM605C1	3-May-05	Dioxins and Furans	Pentachlorodibenzodioxin (Total)	PG/G	0.0628	0.0604 U	NC
RM605C1	3-May-05	Dioxins and Furans	Pentachlorodibenzofuran (Total)	PG/G	0.126 J	0.1 J	23.0%
RM605C1	3-May-05	Dioxins and Furans	TEQ WHO-98	PG/G	0.0312	0.0425	30.7%
RM605C1	3-May-05	Dioxins and Furans	Tetrachlorodibenzodioxin (Total)	PG/G	0.0393 U	0.0389 U	NC
RM605C1	3-May-05	Dioxins and Furans	Tetrachlorodibenzofuran (Total)	PG/G	0.381	0.275	32.3%
RM605X5	29-Apr-05	415.1	Total organic carbon	mg/Kg	18100	17300	4.5%
RM605X5	29-Apr-05	ASTMD422	<200 Total	Percent	99.6	99.4	0.2%
RM605X5	29-Apr-05	ASTMD422	Clay	Percent	38.844	39.76	2.3%
RM605X5	29-Apr-05	ASTMD422	Co. Sand	Percent	0	0	0.0%
RM605X5	29-Apr-05	ASTMD422	Colloids	Percent	36.852	36.778	0.2%
RM605X5	29-Apr-05	ASTMD422	Fine Sand	Percent	0.2	0.4	66.7%
RM605X5	29-Apr-05	ASTMD422	Gravel	Percent	0.2	0.2	0.0%
RM605X5	29-Apr-05	ASTMD422	Med. Sand	Percent	0	0	0.0%
RM605X5	29-Apr-05	ASTMD422	Sand Total	Percent	0.2	0.4	66.7%
RM605X5	29-Apr-05	ASTMD422	Silt	Percent	23.904	22.862	4.5%
RM605X5	29-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	13900	28100	67.6%
RM605X5	29-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	22 UR	23.7 UR	NC
RM605X5	29-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	4.9	10.3	71.1%
RM605X5	29-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	183	345	61.4%
RM605X5	29-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	1.2 J	2.2	58.8%
RM605X5	29-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	4	6.9	53.2%
RM605X5	29-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	3170	5780	58.3%
RM605X5	29-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	23.9	44.4	60.0%
RM605X5	29-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	9.3 J	17.2 J	59.6%
RM605X5	29-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	49.3	87	55.3%
RM605X5	29-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	22000	38000	53.3%
RM605X5	29-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	115	194	51.1%
RM605X5	29-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	5220	9400	57.2%
RM605X5	29-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	809	1540	62.2%
RM605X5	29-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.86	0.74	15.0%
RM605X5	29-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	19.3	35.2	58.3%
RM605X5	29-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	2140	4480	70.7%
RM605X5	29-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	6.4 J	6.5 J	1.6%
RM605X5	29-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	3.7 UJ	4 UJ	NC
RM605X5	29-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	216 J	446 J	69.5%
RM605X5	29-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	9.2 U	9.9 U	NC
RM605X5	29-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	73.4 UJ	79.1 UJ	NC
RM605X5	29-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	28.9	55.5	63.0%
RM605X5	29-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	437 J	778 J	56.1%
RM605X5	29-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	1 J	1 J	0.0%
RM605X5	29-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	15 U	16 U	NC
RM605X5	29-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	15 U	16 U	NC
RM605X5	29-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	15 U	16 U	NC
RM605X5	29-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	15 U	16 U	NC
RM605X5	29-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	15 U	16 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM605X5	29-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	15 U	16 U	NC
RM605X5	29-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	15 U	16 U	NC
RM605X5	29-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	15 U	16 U	NC
RM605X5	29-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	15 U	16 U	NC
RM605X5	29-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	15 U	16 U	NC
RM605X5	29-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	15 U	16 U	NC
RM605X5	29-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	1 J	0.6 J	50.0%
RM605X5	29-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	15 U	16 U	NC
RM605X5	29-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	15 U	16 U	NC
RM605X5	29-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	4 J	4 J	0.0%
RM605X5	29-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	1 J	0.6 J	50.0%
RM605X5	29-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	15 U	16 U	NC
RM605X5	29-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	2.9 UJ	3.1 UJ	NC
RM605X5	29-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	12 UJ	12 UJ	NC
RM605X5	29-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	12 UJ	12 UJ	NC
RM605X5	29-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	2.9 UJ	3.1 UJ	NC
RM605X5	29-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	2.9 UJ	3.1 UJ	NC
RM605X5	29-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	2.9 UJ	3.1 UJ	NC
RM605X5	29-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	2.9 UJ	3.1 UJ	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	2.4 U	2.5 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	2.4 U	2.5 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	2.4 U	2.5 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	2.4 U	2.5 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	2.4 U	2.5 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	2.4 U	2.5 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	1.2 U	1.2 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	1.2 U	1.2 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	1.2 U	1.2 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	1.2 U	1.2 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	1.2 U	1.2 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	1.2 U	1.2 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	2.4 U	2.5 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	1.2 U	1.2 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	2.4 U	2.5 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	2.4 U	2.5 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	2.4 U	2.5 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	2.4 U	2.5 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	2.4 U	2.5 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	1.2 U	1.2 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	1.2 U	1.2 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	1.2 U	1.2 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	1.2 U	1.2 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	1.2 U	1.2 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	1.2 U	1.2 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	12 U	12 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	1.2 U	1.2 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	120 U	120 U	NC
RM605X5	29-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	1.2 U	1.2 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	750 U	780 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	750 UJ	780 UJ	NC
RM605X5	29-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	750 U	780 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	750 U	780 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	750 U	780 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM605X5	29-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	750 U	780 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	750 U	780 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	290 UJ	310 UJ	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	290 UR	310 UR	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	750 U	780 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	290 U	310 U	NC
RM605X5	29-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	290 U	310 U	NC
RM625X2	28-Apr-05	415.1	Total organic carbon	mg/Kg	14700	14900	1.4%
RM625X2	28-Apr-05	ASTMD422	<200 Total	Percent	97.6	97.4	0.2%
RM625X2	28-Apr-05	ASTMD422	Clay	Percent	20.496	19.48	5.1%
RM625X2	28-Apr-05	ASTMD422	Co. Sand	Percent	0.2	0	200.0%
RM625X2	28-Apr-05	ASTMD422	Colloids	Percent	17.568	20.454	15.2%
RM625X2	28-Apr-05	ASTMD422	Fine Sand	Percent	2.2	2.2	0.0%
RM625X2	28-Apr-05	ASTMD422	Gravel	Percent	0	0.2	200.0%
RM625X2	28-Apr-05	ASTMD422	Med. Sand	Percent	0	0.2	200.0%
RM625X2	28-Apr-05	ASTMD422	Sand Total	Percent	2.4	2.4	0.0%
RM625X2	28-Apr-05	ASTMD422	Silt	Percent	59.536	57.466	3.5%
RM625X2	28-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	19600	18800	4.2%
RM625X2	28-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	13.3 UR	13 UR	NC
RM625X2	28-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	5	5.8	14.8%
RM625X2	28-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	208	206	1.0%
RM625X2	28-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	1.9	1.9	0.0%
RM625X2	28-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	2	2.1	4.9%
RM625X2	28-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	4910	4790	2.5%
RM625X2	28-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	26.4	26.2	0.8%
RM625X2	28-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	15.5	14.9	3.9%
RM625X2	28-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	38.9	39.6	1.8%
RM625X2	28-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	32100	31300	2.5%
RM625X2	28-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	68.3	69.1	1.2%
RM625X2	28-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	7010	6920	1.3%
RM625X2	28-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	836	856	2.4%
RM625X2	28-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.2 J	0.2 J	0.0%
RM625X2	28-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	23.5	23.5	0.0%
RM625X2	28-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	2840	2780	2.1%
RM625X2	28-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	3.2 J	3.2 J	0.0%
RM625X2	28-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	2.2 UR	2.2 UR	NC
RM625X2	28-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	328 J	309 J	6.0%
RM625X2	28-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	5.5 U	5.4 U	NC
RM625X2	28-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	44.2 UJ	43.2 UJ	NC
RM625X2	28-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	49.3	48.6	1.4%
RM625X2	28-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	299	303	1.3%
RM625X2	28-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.8 J	1 J	22.2%
RM625X2	28-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	10 U	10 U	NC
RM625X2	28-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	10 U	10 U	NC
RM625X2	28-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	10 U	10 U	NC
RM625X2	28-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	0.8 J	0.8 J	0.0%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM625X2	28-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	10 U	10 U	NC
RM625X2	28-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	10 U	10 U	NC
RM625X2	28-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	10 U	10 U	NC
RM625X2	28-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	10 U	10 U	NC
RM625X2	28-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	2 J	1 J	66.7%
RM625X2	28-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	10 U	0.4 J	NC
RM625X2	28-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	10 UJ	10 UJ	NC
RM625X2	28-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	2 J	2 J	0.0%
RM625X2	28-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	10 U	10 U	NC
RM625X2	28-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	10 U	10 U	NC
RM625X2	28-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	2 J	3 J	40.0%
RM625X2	28-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	1 J	1 J	0.0%
RM625X2	28-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	1 J	2 J	66.7%
RM625X2	28-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	2 UJ	1.9 U	NC
RM625X2	28-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	8 UJ	7.7 U	NC
RM625X2	28-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	8 UJ	7.7 U	NC
RM625X2	28-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	2 UJ	1.9 U	NC
RM625X2	28-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	2 UJ	1.9 U	NC
RM625X2	28-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	2 UJ	1.9 U	NC
RM625X2	28-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	2 UJ	1.9 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	1.6 U	1.6 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	1.6 U	1.6 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	1.6 U	1.6 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	1.6 U	1.6 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	1.6 U	1.6 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	1.6 U	1.6 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.79 U	0.76 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.79 U	0.76 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.79 U	0.76 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.79 U	0.76 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.79 U	0.76 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.79 U	0.76 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	1.6 U	1.6 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.79 U	0.76 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	1.6 U	1.6 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	1.6 U	1.6 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	1.6 U	1.6 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	1.6 U	1.6 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	1.6 U	1.6 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.79 U	0.76 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.79 U	0.76 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.79 U	0.76 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.79 U	0.76 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.79 U	0.76 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.79 U	0.76 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	7.9 U	7.6 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.79 U	0.76 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	79 U	76 U	NC
RM625X2	28-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.79 U	0.76 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	500 U	490 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	500 UJ	490 UJ	NC
RM625X2	28-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	500 U	490 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	500 U	490 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM625X2	28-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	500 U	490 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	500 U	490 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	500 U	490 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	200 UJ	190 UJ	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	200 UJ	190 UJ	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	500 U	490 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	200 U	190 U	NC
RM625X2	28-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	200 U	190 U	NC
RM628X3	2-May-05	415.1	Total organic carbon	mg/Kg	40400	28800	33.5%
RM628X3	2-May-05	ASTMD422	<200 Total	Percent	45.2991	41.4	9.0%
RM628X3	2-May-05	ASTMD422	Clay	Percent	3.38776	3.726	9.5%
RM628X3	2-May-05	ASTMD422	Co. Sand	Percent	5.34188	7.2	29.6%
RM628X3	2-May-05	ASTMD422	Colloids	Percent	4.35569	3.312	27.2%
RM628X3	2-May-05	ASTMD422	Fine Sand	Percent	28.4188	29.6	4.1%
RM628X3	2-May-05	ASTMD422	Gravel	Percent	1.1	2.6	81.1%
RM628X3	2-May-05	ASTMD422	Med. Sand	Percent	19.8718	19.2	3.4%
RM628X3	2-May-05	ASTMD422	Sand Total	Percent	53.6325	56	4.3%
RM628X3	2-May-05	ASTMD422	Silt	Percent	37.5557	34.362	8.9%
RM628X3	2-May-05	CLP TAL TotMetals	Aluminum	mg/Kg	10900	11200	2.7%
RM628X3	2-May-05	CLP TAL TotMetals	Antimony	mg/Kg	7.7 UJ	7.4 UJ	NC
RM628X3	2-May-05	CLP TAL TotMetals	Arsenic	mg/Kg	1.2 J	0.96 J	22.2%
RM628X3	2-May-05	CLP TAL TotMetals	Barium	mg/Kg	152	147	3.3%
RM628X3	2-May-05	CLP TAL TotMetals	Beryllium	mg/Kg	1.1	1	9.5%
RM628X3	2-May-05	CLP TAL TotMetals	Cadmium	mg/Kg	4.4	4.5	2.2%
RM628X3	2-May-05	CLP TAL TotMetals	Calcium	mg/Kg	5710	6150	7.4%
RM628X3	2-May-05	CLP TAL TotMetals	Chromium	mg/Kg	19.3	18.6	3.7%
RM628X3	2-May-05	CLP TAL TotMetals	Cobalt	mg/Kg	6.6	6 J	9.5%
RM628X3	2-May-05	CLP TAL TotMetals	Copper	mg/Kg	28.2	27.4	2.9%
RM628X3	2-May-05	CLP TAL TotMetals	Iron	mg/Kg	14800	13300	10.7%
RM628X3	2-May-05	CLP TAL TotMetals	Lead	mg/Kg	48.9	41.3	16.9%
RM628X3	2-May-05	CLP TAL TotMetals	Magnesium	mg/Kg	4460	4320	3.2%
RM628X3	2-May-05	CLP TAL TotMetals	Manganese	mg/Kg	181	178	1.7%
RM628X3	2-May-05	CLP TAL TotMetals	Mercury	mg/Kg	0.15	0.1 J	40.0%
RM628X3	2-May-05	CLP TAL TotMetals	Nickel	mg/Kg	11	11.2	1.8%
RM628X3	2-May-05	CLP TAL TotMetals	Potassium	mg/Kg	1880	1970	4.7%
RM628X3	2-May-05	CLP TAL TotMetals	Selenium	mg/Kg	2.5 J	1.7 J	38.1%
RM628X3	2-May-05	CLP TAL TotMetals	Silver	mg/Kg	1.3 UJ	1.2 UR	NC
RM628X3	2-May-05	CLP TAL TotMetals	Sodium	mg/Kg	198 J	212 UJ	NC
RM628X3	2-May-05	CLP TAL TotMetals	Thallium	mg/Kg	3.2 U	3.1 UJ	NC
RM628X3	2-May-05	CLP TAL TotMetals	Uranium	mg/Kg	25.6 U	9.4 U	NC
RM628X3	2-May-05	CLP TAL TotMetals	Vanadium	mg/Kg	28.6	26	9.5%
RM628X3	2-May-05	CLP TAL TotMetals	Zinc	mg/Kg	291	282	3.1%
RM628X3	2-May-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.7 J	0.9 J	25.0%
RM628X3	2-May-05	CLP TCL PAH	Acenaphthene	µg/Kg	5 U	5 U	NC
RM628X3	2-May-05	CLP TCL PAH	Acenaphthylene	µg/Kg	5 U	5 U	NC
RM628X3	2-May-05	CLP TCL PAH	Anthracene	µg/Kg	2 J	1 J	66.7%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM628X3	2-May-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	9	7	25.0%
RM628X3	2-May-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	9	8	11.8%
RM628X3	2-May-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	14	17	19.4%
RM628X3	2-May-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	6	8	28.6%
RM628X3	2-May-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	10	10	0.0%
RM628X3	2-May-05	CLP TCL PAH	Chrysene	µg/Kg	20	16	22.2%
RM628X3	2-May-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	2 J	3 J	40.0%
RM628X3	2-May-05	CLP TCL PAH	Dibenzofuran	µg/Kg	5 U	5 U	NC
RM628X3	2-May-05	CLP TCL PAH	Fluoranthene	µg/Kg	9	15	50.0%
RM628X3	2-May-05	CLP TCL PAH	Fluorene	µg/Kg	5 U	5 U	NC
RM628X3	2-May-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	10	13	26.1%
RM628X3	2-May-05	CLP TCL PAH	Naphthalene	µg/Kg	2 J	2 J	0.0%
RM628X3	2-May-05	CLP TCL PAH	Phenanthrene	µg/Kg	2 J	4 J	66.7%
RM628X3	2-May-05	CLP TCL PAH	Pyrene	µg/Kg	7	10	35.3%
RM628X3	2-May-05	CLP TCL PCBs	PCB-1016	µg/Kg	2.2 U	2.1 U	NC
RM628X3	2-May-05	CLP TCL PCBs	PCB-1221	µg/Kg	8.8 U	8.6 U	NC
RM628X3	2-May-05	CLP TCL PCBs	PCB-1232	µg/Kg	8.8 U	8.6 U	NC
RM628X3	2-May-05	CLP TCL PCBs	PCB-1242	µg/Kg	2.2 U	2.1 U	NC
RM628X3	2-May-05	CLP TCL PCBs	PCB-1248	µg/Kg	2.2 U	2.1 U	NC
RM628X3	2-May-05	CLP TCL PCBs	PCB-1254	µg/Kg	2.2 U	2.1 U	NC
RM628X3	2-May-05	CLP TCL PCBs	PCB-1260	µg/Kg	2.2 U	2.1 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.88 U	0.86 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.88 U	0.86 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.88 U	0.86 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.88 U	0.86 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.88 U	0.86 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.88 U	0.86 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.43 U	0.43 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.43 U	0.43 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.43 U	0.43 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.43 U	0.43 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.43 U	0.43 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.43 U	0.43 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.88 U	0.86 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.43 U	0.43 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.88 U	0.86 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.88 U	0.86 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	Endrin	µg/Kg	0.88 U	0.86 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.88 U	0.86 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.88 U	0.86 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.43 U	0.43 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.43 U	0.43 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.43 U	0.43 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.43 U	0.43 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.43 U	0.43 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.43 U	0.43 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	4.3 U	4.3 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.43 U	0.43 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	Toxaphene	µg/Kg	43 U	43 U	NC
RM628X3	2-May-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.43 U	0.43 U	NC
RM628X3	2-May-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	280 U	270 U	NC
RM628X3	2-May-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	280 U	270 U	NC
RM628X3	2-May-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	280 U	270 U	NC
RM628X3	2-May-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	110 U	110 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM628X3	2-May-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	280 U	270 U	NC
RM628X3	2-May-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	280 U	270 U	NC
RM628X3	2-May-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	280 U	270 U	NC
RM628X3	2-May-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	280 U	270 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Acetophenone	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Atrazine	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Benzoic acid	µg/Kg	110 UR	110 UR	NC
RM628X3	2-May-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Caprolactam	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Carbazole	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Isophorone	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	280 U	270 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	110 U	110 U	NC
RM628X3	2-May-05	CLP TCL SVOC	Phenol	µg/Kg	110 U	110 U	NC
RM637C1	29-Apr-05	415.1	Total organic carbon	mg/Kg	4070	3320	20.3%
RM637C1	29-Apr-05	ASTMD422	<200 Total	Percent	18	18.7	3.8%
RM637C1	29-Apr-05	ASTMD422	Clay	Percent	0.36	0.187	63.3%
RM637C1	29-Apr-05	ASTMD422	Co. Sand	Percent	0	0	0.0%
RM637C1	29-Apr-05	ASTMD422	Colloids	Percent	0.45	0.6545	37.0%
RM637C1	29-Apr-05	ASTMD422	Fine Sand	Percent	81.6	81	0.7%
RM637C1	29-Apr-05	ASTMD422	Gravel	Percent	0	0	0.0%
RM637C1	29-Apr-05	ASTMD422	Med. Sand	Percent	0.4	0.3	28.6%
RM637C1	29-Apr-05	ASTMD422	Sand Total	Percent	82	81.3	0.9%
RM637C1	29-Apr-05	ASTMD422	Silt	Percent	17.19	17.8585	3.8%
RM637C1	29-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	8350	7690	8.2%
RM637C1	29-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	6.9 UJ	6.6 UJ	NC
RM637C1	29-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	2.4	2.5	4.1%
RM637C1	29-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	80.2	79.6	0.8%
RM637C1	29-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.81	0.72	11.8%
RM637C1	29-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	0.09 J	0.12 J	28.6%
RM637C1	29-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	2350	2200	6.6%
RM637C1	29-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	12.7	11.3	11.7%
RM637C1	29-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	5.6 J	5.2 J	7.4%
RM637C1	29-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	9.5	8.9	6.5%
RM637C1	29-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	14700	13400	9.3%
RM637C1	29-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	7.9	7.3	7.9%
RM637C1	29-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	3580	3430	4.3%
RM637C1	29-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	205	197	4.0%
RM637C1	29-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.014 U	0.016 U	NC
RM637C1	29-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	9.6	9	6.5%
RM637C1	29-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1460	1340	8.6%
RM637C1	29-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	0.93 J	1.6 J	53.0%
RM637C1	29-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.2 UJ	1.1 UJ	NC
RM637C1	29-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	114 J	102 J	11.1%
RM637C1	29-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	2.9 U	2.7 U	NC
RM637C1	29-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	23.1 U	22 U	NC
RM637C1	29-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	22.1	19.5	12.5%
RM637C1	29-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	46.1	44.3	4.0%
RM637C1	29-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.4 J	0.4 J	0.0%
RM637C1	29-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	5 U	5 U	NC
RM637C1	29-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	5 U	5 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM637C1	29-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	5 U	5 U	NC
RM637C1	29-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	5 U	5 U	NC
RM637C1	29-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	2 J	5 U	NC
RM637C1	29-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	5 U	5 U	NC
RM637C1	29-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	5 U	5 U	NC
RM637C1	29-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	5 U	5 U	NC
RM637C1	29-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	5 U	5 U	NC
RM637C1	29-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	5 U	5 U	NC
RM637C1	29-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	5 U	5 U	NC
RM637C1	29-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	5 U	5 U	NC
RM637C1	29-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	5 U	5 U	NC
RM637C1	29-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	5 U	5 U	NC
RM637C1	29-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	4.2 U	4.3 U	NC
RM637C1	29-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	5 U	0.2 J	NC
RM637C1	29-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	5 U	5 U	NC
RM637C1	29-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1 U	1.1 U	NC
RM637C1	29-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	4.2 U	4.3 U	NC
RM637C1	29-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	4.2 U	4.3 U	NC
RM637C1	29-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1 U	1.1 U	NC
RM637C1	29-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1 U	1.1 U	NC
RM637C1	29-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1 U	1.1 U	NC
RM637C1	29-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1 U	1.1 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.84 U	0.85 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.84 U	0.85 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.84 U	0.85 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.84 U	0.85 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.84 U	0.85 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.84 U	0.85 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.42 U	0.42 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.42 U	0.42 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.42 U	0.42 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.42 U	0.42 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.42 U	0.42 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.42 U	0.42 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.84 U	0.85 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.42 U	0.42 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.84 U	0.85 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.84 U	0.85 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.84 U	0.85 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.84 U	0.85 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.84 U	0.85 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.42 U	0.42 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.42 U	0.42 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.42 U	0.42 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.42 U	0.42 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.42 U	0.42 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.42 U	0.42 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	4.2 U	4.2 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.42 U	0.42 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	42 U	42 U	NC
RM637C1	29-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.42 U	0.42 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	260 U	270 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	260 UJ	270 UJ	NC
RM637C1	29-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	260 U	270 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	100 U	110 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM637C1	29-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	260 U	270 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	260 U	270 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	260 U	270 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	260 U	270 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	100 UJ	110 UJ	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	100 UR	110 UR	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	260 U	270 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	100 U	110 U	NC
RM637C1	29-Apr-05	Dioxins and Furans	% Moisture	%	21.7	20.3	6.7%
RM637C1	29-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	0.709 J	0.623 J	12.9%
RM637C1	29-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	3.67	2.8	26.9%
RM637C1	29-Apr-05	Dioxins and Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	0.0562 J	0.04 U	NC
RM637C1	29-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	0.0497 J	0.0457 U	NC
RM637C1	29-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	0.103 U	0.0688 U	NC
RM637C1	29-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	0.115 J	0.111 J	3.5%
RM637C1	29-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	0.126 U	0.0989 U	NC
RM637C1	29-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	0.0641 U	0.0695 J	NC
RM637C1	29-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	PG/G	0.0582 U	0.0501 U	NC
RM637C1	29-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	0.0497 U	0.0442 U	NC
RM637C1	29-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	0.0353 U	0.0236 U	NC
RM637C1	29-Apr-05	Dioxins and Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	0.0907 J	0.0668 J	30.3%
RM637C1	29-Apr-05	Dioxins and Furans	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	0.0612 U	0.0472 U	NC
RM637C1	29-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	0.0357 U	0.0382 U	NC
RM637C1	29-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzofuran	PG/G	0.204 J	0.13 J	44.3%
RM637C1	29-Apr-05	Dioxins and Furans	Heptachlorodibenzodioxin (Total)	PG/G	1.28	1.11	14.2%
RM637C1	29-Apr-05	Dioxins and Furans	Heptachlorodibenzofuran (Total)	PG/G	5.8	4.4	27.5%
RM637C1	29-Apr-05	Dioxins and Furans	Hexachlorodibenzodioxin (Total)	PG/G	0.743	0.467	45.6%
RM637C1	29-Apr-05	Dioxins and Furans	Hexachlorodibenzofuran (Total)	PG/G	2.12 J	1.7 J	22.0%
RM637C1	29-Apr-05	Dioxins and Furans	Octachlorodibenzodioxin	PG/G	4.21	3.24 J	26.0%
RM637C1	29-Apr-05	Dioxins and Furans	Octachlorodibenzofuran	PG/G	1.14 J	0.918 J	21.6%
RM637C1	29-Apr-05	Dioxins and Furans	Pentachlorodibenzodioxin (Total)	PG/G	0.307	0.0767	120.0%
RM637C1	29-Apr-05	Dioxins and Furans	Pentachlorodibenzofuran (Total)	PG/G	0.461 J	0.36 J	24.6%
RM637C1	29-Apr-05	Dioxins and Furans	TEQ WHO-98	PG/G	0.0908	0.0631	36.0%
RM637C1	29-Apr-05	Dioxins and Furans	Tetrachlorodibenzodioxin (Total)	PG/G	0.0357 U	0.0382 U	NC
RM637C1	29-Apr-05	Dioxins and Furans	Tetrachlorodibenzofuran (Total)	PG/G	0.545	0.358	41.4%
RM637X4	30-Apr-05	415.1	Total organic carbon	mg/Kg	8120	8170	0.6%
RM637X4	30-Apr-05	ASTMD422	<200 Total	Percent	88.4	86	2.8%
RM637X4	30-Apr-05	ASTMD422	Clay	Percent	23.868	21.5	10.4%
RM637X4	30-Apr-05	ASTMD422	Co. Sand	Percent	0	0	0.0%
RM637X4	30-Apr-05	ASTMD422	Colloids	Percent	15.028	12.04	22.1%
RM637X4	30-Apr-05	ASTMD422	Fine Sand	Percent	11.6	13.8	17.3%
RM637X4	30-Apr-05	ASTMD422	Gravel	Percent	0	0	0.0%
RM637X4	30-Apr-05	ASTMD422	Med. Sand	Percent	0	0.2	200.0%
RM637X4	30-Apr-05	ASTMD422	Sand Total	Percent	11.6	14	18.8%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM637X4	30-Apr-05	ASTMD422	Silt	Percent	49.504	52.46	5.8%
RM637X4	30-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	14100	16800	17.5%
RM637X4	30-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	12.5 UR	9.5 UR	NC
RM637X4	30-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	10.2	10.1	1.0%
RM637X4	30-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	188	202	7.2%
RM637X4	30-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	1.3	1.5	14.3%
RM637X4	30-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	5.6	6.2	10.2%
RM637X4	30-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	7770	8310	6.7%
RM637X4	30-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	28	32.3	14.3%
RM637X4	30-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	11.4	12.4	8.4%
RM637X4	30-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	38.5	41.1	6.5%
RM637X4	30-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	22800	25600	11.6%
RM637X4	30-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	144	148	2.7%
RM637X4	30-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	7510	8220	9.0%
RM637X4	30-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	529	601	12.7%
RM637X4	30-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.77	0.67	13.9%
RM637X4	30-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	23.9	25.9	8.0%
RM637X4	30-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	2390	2830	16.9%
RM637X4	30-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	2.7 J	3.3 J	20.0%
RM637X4	30-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	2.1 UJ	1.6 UJ	NC
RM637X4	30-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	258 J	295 J	13.4%
RM637X4	30-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	5.2 U	4 U	NC
RM637X4	30-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	41.8 U	31.6 U	NC
RM637X4	30-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	32.8	39	17.3%
RM637X4	30-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	543	577	6.1%
RM637X4	30-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.7 J	1 J	35.3%
RM637X4	30-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	9 U	8 U	NC
RM637X4	30-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	9 U	8 U	NC
RM637X4	30-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	9 U	8 U	NC
RM637X4	30-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	9 U	0.3 J	NC
RM637X4	30-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	9 U	8 U	NC
RM637X4	30-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	9 U	8 U	NC
RM637X4	30-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	9 U	8 U	NC
RM637X4	30-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	9 U	8 U	NC
RM637X4	30-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	0.7 J	1 J	35.3%
RM637X4	30-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	9 U	8 U	NC
RM637X4	30-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	9 U	8 U	NC
RM637X4	30-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	0.7 J	0.6 J	15.4%
RM637X4	30-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	9 U	8 U	NC
RM637X4	30-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	0.4 J	0.3 J	28.6%
RM637X4	30-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	2 J	2 J	0.0%
RM637X4	30-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	0.7 J	1 J	35.3%
RM637X4	30-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	0.7 J	0.6 J	15.4%
RM637X4	30-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1.8 U	1.6 U	NC
RM637X4	30-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	7.3 U	6.4 U	NC
RM637X4	30-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	7.3 U	6.4 U	NC
RM637X4	30-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1.8 U	1.6 U	NC
RM637X4	30-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1.8 U	1.6 U	NC
RM637X4	30-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1.8 U	1.6 U	NC
RM637X4	30-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1.8 U	1.6 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	1.5 U	1.3 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	1.5 U	1.3 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	1.5 U	1.3 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	1.5 U	1.3 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	1.5 U	1.3 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.4 J	1.3 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.72 U	0.63 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.72 U	0.63 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.72 U	0.63 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.72 U	0.63 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.72 U	0.63 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.72 U	0.63 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	1.5 U	1.3 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.72 U	0.63 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	1.5 U	1.3 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	1.5 U	1.3 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	1.5 U	1.3 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	1.5 U	1.3 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	1.5 U	1.3 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM637X4	30-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.72 U	0.63 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.72 U	0.63 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.72 U	0.63 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.72 U	0.63 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.72 U	0.63 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.72 U	0.63 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	7.2 U	6.3 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.72 U	0.63 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	72 U	63 U	NC
RM637X4	30-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.72 U	0.63 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	460 U	400 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	460 UJ	400 UJ	NC
RM637X4	30-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	460 U	400 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	460 U	400 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	460 U	400 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	460 U	400 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	460 U	400 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	180 UJ	160 UJ	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	180 UR	160 UR	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	460 UJ	400 UJ	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	180 U	160 U	NC
RM637X4	30-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	180 U	160 U	NC
RM639T1	29-Apr-05	415.1	Total organic carbon	mg/Kg	13400	13800	2.9%
RM639T1	29-Apr-05	ASTMD422	<200 Total	Percent	99.2	99.2	0.0%
RM639T1	29-Apr-05	ASTMD422	Clay	Percent	33.728	32.736	3.0%
RM639T1	29-Apr-05	ASTMD422	Co. Sand	Percent	0	0	0.0%
RM639T1	29-Apr-05	ASTMD422	Colloids	Percent	27.776	27.776	0.0%
RM639T1	29-Apr-05	ASTMD422	Fine Sand	Percent	0.6	0.6	0.0%
RM639T1	29-Apr-05	ASTMD422	Gravel	Percent	0	0	0.0%
RM639T1	29-Apr-05	ASTMD422	Med. Sand	Percent	0.2	0.2	0.0%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM639T1	29-Apr-05	ASTMD422	Sand Total	Percent	0.8	0.8	0.0%
RM639T1	29-Apr-05	ASTMD422	Silt	Percent	37.696	38.688	2.6%
RM639T1	29-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	23000	17200	28.9%
RM639T1	29-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	13.6 UR	16.5 UR	NC
RM639T1	29-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	9.3	10.7	14.0%
RM639T1	29-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	232	206	11.9%
RM639T1	29-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	1.8	1.6	11.8%
RM639T1	29-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	4.6	4.4	4.4%
RM639T1	29-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	5700	5190	9.4%
RM639T1	29-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	36	31.3	14.0%
RM639T1	29-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	14.8 J	13.6 J	8.5%
RM639T1	29-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	57.1	57.2	0.2%
RM639T1	29-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	32900	29000	12.6%
RM639T1	29-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	118	114	3.4%
RM639T1	29-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	8600	7940	8.0%
RM639T1	29-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	925	844	9.2%
RM639T1	29-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.34	0.35	2.9%
RM639T1	29-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	28.8	26.2	9.5%
RM639T1	29-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	3590	2670	29.4%
RM639T1	29-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	6.2 J	4.2 J	38.5%
RM639T1	29-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	2.3 UJ	2.7 UJ	NC
RM639T1	29-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	276 J	182 J	41.0%
RM639T1	29-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	5.7 U	6.9 U	NC
RM639T1	29-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	45.5 UJ	54.9 UJ	NC
RM639T1	29-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	47.2	38.1	21.3%
RM639T1	29-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	617 J	578 J	6.5%
RM639T1	29-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.4 J	0.8 J	66.7%
RM639T1	29-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	10 U	11 U	NC
RM639T1	29-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	10 U	11 U	NC
RM639T1	29-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	10 U	11 U	NC
RM639T1	29-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	10 U	11 U	NC
RM639T1	29-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	10 U	11 U	NC
RM639T1	29-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	10 U	11 U	NC
RM639T1	29-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	10 U	11 U	NC
RM639T1	29-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	10 U	11 U	NC
RM639T1	29-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	10 U	0.4 J	NC
RM639T1	29-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	10 U	11 U	NC
RM639T1	29-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	10 U	11 U	NC
RM639T1	29-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	0.4 J	0.8 J	66.7%
RM639T1	29-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	10 U	11 U	NC
RM639T1	29-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	10 U	11 U	NC
RM639T1	29-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	1 J	1 J	0.0%
RM639T1	29-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	10 U	0.4 J	NC
RM639T1	29-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	10 U	0.4 J	NC
RM639T1	29-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	2 U	2.1 U	NC
RM639T1	29-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	8 U	8.3 U	NC
RM639T1	29-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	8 U	8.3 U	NC
RM639T1	29-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	2 U	2.1 U	NC
RM639T1	29-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	2 U	2.1 U	NC
RM639T1	29-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	2 U	2.1 U	NC
RM639T1	29-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	2 U	2.1 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	1.6 U	1.7 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	1.6 U	1.7 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	1.6 U	1.7 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	1.6 U	1.7 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.49	0.42 J	15.4%
RM639T1	29-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	1.6 U	1.1 J	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.79 U	0.82 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.79 U	0.82 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.79 U	0.82 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.79 U	0.82 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.79 U	0.82 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.79 U	0.82 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	1.6 U	1.7 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.79 U	0.82 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	1.6 U	1.7 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	1.6 U	1.7 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	1.6 U	1.7 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.79 U	1.7 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM639T1	29-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	1.6 U	1.7 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.79 U	0.82 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.79 U	0.82 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.79 U	0.82 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.79 U	0.82 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.79 U	0.82 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.79 U	0.82 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	7.9 U	8.2 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.79 U	0.82 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	79 U	82 U	NC
RM639T1	29-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.79 U	0.82 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	500 U	520 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	500 UJ	520 UJ	NC
RM639T1	29-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	500 U	520 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	500 U	520 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	500 U	520 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	500 U	520 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	500 U	520 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	200 UJ	210 UJ	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	200 UR	210 UR	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	500 U	520 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	200 U	210 U	NC
RM639T1	29-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	200 U	210 U	NC
RM640A1(X	26-Apr-05	415.1	Total organic carbon	mg/Kg	2110	2250	6.4%
RM640A1(X	26-Apr-05	ASTMD422	<200 Total	Percent	42.6	36.6	15.2%
RM640A1(X	26-Apr-05	ASTMD422	Clay	Percent	3.834	1.83	70.8%
RM640A1(X	26-Apr-05	ASTMD422	Co. Sand	Percent	1.2	0.4	100.0%
RM640A1(X	26-Apr-05	ASTMD422	Colloids	Percent	4.686	4.392	6.5%
RM640A1(X	26-Apr-05	ASTMD422	Fine Sand	Percent	51.4	60.6	16.4%
RM640A1(X	26-Apr-05	ASTMD422	Gravel	Percent	2.4	0	200.0%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM640A1(X	26-Apr-05	ASTMD422	Med. Sand	Percent	2.4	2.4	0.0%
RM640A1(X	26-Apr-05	ASTMD422	Sand Total	Percent	55	63.4	14.2%
RM640A1(X	26-Apr-05	ASTMD422	Silt	Percent	34.08	30.378	11.5%
RM640A1(X	26-Apr-05	AVS/SEM	Antimony-SEM	umol/g	0.0014 U	0.00131 U	NC
RM640A1(X	26-Apr-05	AVS/SEM	Cadmium-SEM	umol/g	0.0016 U	0.00178	NC
RM640A1(X	26-Apr-05	AVS/SEM	Chromium-SEM	umol/g	0.03462	0.02116	48.3%
RM640A1(X	26-Apr-05	AVS/SEM	Copper-SEM	umol/g	0.06767	0.08183	18.9%
RM640A1(X	26-Apr-05	AVS/SEM	Lead-SEM	umol/g	0.06419 J	0.06178 J	3.8%
RM640A1(X	26-Apr-05	AVS/SEM	Mercury-SEM	umol/g	2.4E-06 U	1.6E-06 U	NC
RM640A1(X	26-Apr-05	AVS/SEM	Nickel-SEM	umol/g	0.12093	0.11071	8.8%
RM640A1(X	26-Apr-05	AVS/SEM	Sulfide-AVS	umol/g	0.02268 UJ	0.01391 J	NC
RM640A1(X	26-Apr-05	AVS/SEM	Zinc-SEM	umol/g	0.24	0.45128	61.1%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	11200	11500	2.6%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	7 UR	7.7 UR	NC
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	9.3	8.6	7.8%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	120	120	0.0%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	1	1	0.0%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	0.35 J	0.3 J	15.4%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	4000	4240	5.8%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	21.3	22.1	3.7%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	13.4	14.5	7.9%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	17.8	17.4	2.3%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	19900	22000	10.0%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	17.9 J	18.8 J	4.9%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	5180	5460	5.3%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	489	508	3.8%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.018 J	0.022 J	20.0%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	21.7	23.7	8.8%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	2290	2190	4.5%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	3.1 U	4.1 U	NC
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.2 UR	1.3 UR	NC
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	170 J	166 J	2.4%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	2.9 U	3.2 U	NC
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	23.3 UJ	25.7 UJ	NC
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	29.8	30.1	1.0%
RM640A1(X	26-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	86.5	93.8	8.1%
RM640A1(X	26-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.4 J	0.4 J	0.0%
RM640A1(X	26-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	5 U	5 U	NC
RM640A1(X	26-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	5 U	5 U	NC
RM640A1(X	26-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	5 U	5 U	NC
RM640A1(X	26-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	0.2 J	5 U	NC
RM640A1(X	26-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	5 U	5 U	NC
RM640A1(X	26-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	5 U	5 U	NC
RM640A1(X	26-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	5 U	5 U	NC
RM640A1(X	26-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	5 U	5 U	NC
RM640A1(X	26-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	0.6 J	5 U	NC
RM640A1(X	26-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	5 U	5 U	NC
RM640A1(X	26-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	5 U	5 UJ	NC
RM640A1(X	26-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	0.8 J	5 U	NC
RM640A1(X	26-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	5 U	5 U	NC
RM640A1(X	26-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	5 U	5 U	NC
RM640A1(X	26-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	1 J	1 J	0.0%
RM640A1(X	26-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	0.6 J	0.2 J	100.0%
RM640A1(X	26-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	0.4 J	5 U	NC
RM640A1(X	26-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1.1 U	1.1 U	NC
RM640A1(X	26-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	4.3 U	4.4 U	NC
RM640A1(X	26-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	4.3 U	4.4 U	NC
RM640A1(X	26-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1.1 U	1.1 U	NC
RM640A1(X	26-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1.1 U	1.1 U	NC
RM640A1(X	26-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1.1 U	1.1 U	NC
RM640A1(X	26-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1.1 U	1.1 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.86 U	0.87 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.86 U	0.87 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.86 U	0.87 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.86 U	0.87 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.86 U	0.87 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.86 U	0.87 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.42 U	0.43 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.42 U	0.43 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM640A1(X	26-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.42 U	0.43 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.42 U	0.43 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.42 U	0.43 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.42 U	0.43 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.86 U	0.87 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.42 U	0.43 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.86 U	0.87 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.86 U	0.87 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.86 U	0.87 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.86 U	0.87 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.86 U	0.87 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.42 U	0.43 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.42 U	0.43 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.42 U	0.43 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.42 U	0.43 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.42 U	0.43 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.42 U	0.43 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	4.2 U	4.3 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.42 U	0.43 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	42 U	43 U	NC
RM640A1(X	26-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.42 U	0.43 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	270 U	270 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	270 UJ	270 UJ	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	270 U	270 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	270 U	270 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	270 U	270 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	270 U	270 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	270 U	270 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	110 UJ	110 UJ	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	110 UR	110 UR	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	110 U	110 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM640A1(X	26-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	270 U	270 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	110 U	110 U	NC
RM640A1(X	26-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	110 U	110 U	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Aluminum	µg/L	121 U	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Antimony	µg/L	60 U	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Arsenic	µg/L	10 U	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Barium	µg/L	345	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Beryllium	µg/L	5 U	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Cadmium	µg/L	0.27 J	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Calcium	µg/L	91400	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Chromium	µg/L	5.8 J	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Cobalt	µg/L	3.8 U	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Copper	µg/L	25 U	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Iron	µg/L	119 U	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Lead	µg/L	10 U	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Magnesium	µg/L	21100	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Manganese	µg/L	4740	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Mercury	µg/L	0.2 UJ	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Nickel	µg/L	4.7 J	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Potassium	µg/L	936 J	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Selenium	µg/L	35 U	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Silver	µg/L	10 U	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Sodium	µg/L	5350	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Thallium	µg/L	25 U	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Uranium	µg/L	200 U	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Vanadium	µg/L	12.8 J	--	NC
RM640A1(X	11-May-05	CLP TAL TotMetals-PW	Zinc	µg/L	73.3	--	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Aluminum	µg/L	--	67.4 U	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Antimony	µg/L	--	60 U	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Arsenic	µg/L	--	10 U	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Barium	µg/L	--	269	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Beryllium	µg/L	--	5 U	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Cadmium	µg/L	--	0.3 J	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Calcium	µg/L	--	96200	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Chromium	µg/L	--	6.7 J	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Cobalt	µg/L	--	4.2 J	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Copper	µg/L	--	25 U	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Iron	µg/L	--	68.9 U	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Lead	µg/L	--	10 U	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Magnesium	µg/L	--	22800	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Manganese	µg/L	--	5680	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Mercury	µg/L	--	0.2 UJ	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Nickel	µg/L	--	5.6 J	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Potassium	µg/L	--	1270 J	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Selenium	µg/L	--	35 U	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Silver	µg/L	--	10 U	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Sodium	µg/L	--	4650 J	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Thallium	µg/L	--	25 U	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Uranium	µg/L	--	200 U	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Vanadium	µg/L	--	13.7 J	NC
RM640A1(X	12-May-05	CLP TAL TotMetals-PW	Zinc	µg/L	--	39.1 J	NC
RM642B3L	15-Apr-05	415.1	Total organic carbon	mg/Kg	4680	4120	12.7%
RM642B3L	15-Apr-05	ASTMD422	<200 Total	Percent	36.8	35	5.0%
RM642B3L	15-Apr-05	ASTMD422	Clay	Percent	2.944	2.8	5.0%
RM642B3L	15-Apr-05	ASTMD422	Co. Sand	Percent	2.2	5.8	90.0%
RM642B3L	15-Apr-05	ASTMD422	Colloids	Percent	4.048	3.5	14.5%
RM642B3L	15-Apr-05	ASTMD422	Fine Sand	Percent	42.6	37.4	13.0%
RM642B3L	15-Apr-05	ASTMD422	Gravel	Percent	0	1.6	200.0%
RM642B3L	15-Apr-05	ASTMD422	Med. Sand	Percent	18.4	20.2	9.3%
RM642B3L	15-Apr-05	ASTMD422	Sand Total	Percent	63.2	63.4	0.3%
RM642B3L	15-Apr-05	ASTMD422	Silt	Percent	29.808	28.7	3.8%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	13600	14700	7.8%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	0.58 J	1.3 J	76.6%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	6.4	6.2	3.2%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	158	140	12.1%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	1	1.1	9.5%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	1.9	0.85	76.4%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	3210	3130	2.5%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	18.3	18.4	0.5%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM642B3L	15-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	9.2	9	2.2%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	23.2	19	19.9%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	18700	19500	4.2%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	24.4	25.4	4.0%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	4370	4270	2.3%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	340	306	10.5%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.065 J	0.026 J	85.7%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	16.5	15.5	6.3%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	3060	2890	5.7%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	3.9 UR	4.3 UR	NC
RM642B3L	15-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.1 UJ	1.2 UJ	NC
RM642B3L	15-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	122 J	171 J	33.4%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	2.8 U	3.1 U	NC
RM642B3L	15-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	6.1 J	24.7 U	NC
RM642B3L	15-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	26.5	28.8	8.3%
RM642B3L	15-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	149	147	1.4%
RM642B3L	15-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	5 U	5 U	NC
RM642B3L	15-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	5 U	5 U	NC
RM642B3L	15-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	5 U	5 U	NC
RM642B3L	15-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	5 U	5 U	NC
RM642B3L	15-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	5 U	5 U	NC
RM642B3L	15-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	5 U	5 U	NC
RM642B3L	15-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	5 U	5 U	NC
RM642B3L	15-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	5 U	5 U	NC
RM642B3L	15-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	5 U	5 U	NC
RM642B3L	15-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	5 U	5 U	NC
RM642B3L	15-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	5 U	5 U	NC
RM642B3L	15-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	5 U	5 U	NC
RM642B3L	15-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	5 U	5 U	NC
RM642B3L	15-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	5 U	5 U	NC
RM642B3L	15-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	5 U	5 U	NC
RM642B3L	15-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	4.2 U	4.2 U	NC
RM642B3L	15-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	5 U	5 U	NC
RM642B3L	15-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	5 U	5 U	NC
RM642B3L	15-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1 U	1 U	NC
RM642B3L	15-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	4.1 U	4.1 U	NC
RM642B3L	15-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	4.1 U	4.1 U	NC
RM642B3L	15-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1 U	1 U	NC
RM642B3L	15-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1 U	1 U	NC
RM642B3L	15-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1 U	1 U	NC
RM642B3L	15-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1 U	1 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.81 U	0.82 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.74 J	0.82 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	2.7	0.19 J	173.7%
RM642B3L	15-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.81 U	0.82 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	2.7	0.11 J	184.3%
RM642B3L	15-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	10	0.64 J	175.9%
RM642B3L	15-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.4 U	0.41 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.4 U	0.41 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.4 U	0.41 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.4 U	0.41 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.4 U	0.41 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.4 U	0.41 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.81 U	0.82 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.4 U	0.41 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.81 U	0.82 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.81 U	0.82 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.81 U	0.82 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.81 U	0.82 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.81 U	0.82 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.4 U	0.41 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.4 U	0.41 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.4 U	0.41 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.4 U	0.41 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.4 U	0.41 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.4 U	0.41 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	4 U	4.1 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.4 U	0.41 U	NC
RM642B3L	15-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	40 U	41 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM642B3L	15-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.4 U	0.41 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	260 U	260 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	260 U	260 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	260 U	260 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	260 U	260 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	260 U	260 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	260 U	260 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	260 U	260 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	55 J	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	260 U	260 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	100 U	100 U	NC
RM642B3L	15-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	100 U	100 U	NC
RM658A1(X	22-Apr-05	415.1	Total organic carbon	mg/Kg	2360	2630	10.8%
RM658A1(X	22-Apr-05	ASTMD422	<200 Total	Percent	51.4	50.6	1.6%
RM658A1(X	22-Apr-05	ASTMD422	Clay	Percent	9.766	9.614	1.6%
RM658A1(X	22-Apr-05	ASTMD422	Co. Sand	Percent	1.8	0.6	100.0%
RM658A1(X	22-Apr-05	ASTMD422	Colloids	Percent	4.112	4.048	1.6%
RM658A1(X	22-Apr-05	ASTMD422	Fine Sand	Percent	39.8	41.6	4.4%
RM658A1(X	22-Apr-05	ASTMD422	Gravel	Percent	0.6	0	200.0%
RM658A1(X	22-Apr-05	ASTMD422	Med. Sand	Percent	6.4	7.2	11.8%
RM658A1(X	22-Apr-05	ASTMD422	Sand Total	Percent	48	49.4	2.9%
RM658A1(X	22-Apr-05	ASTMD422	Silt	Percent	37.522	36.938	1.6%
RM658A1(X	22-Apr-05	AVS/SEM	Antimony-SEM	umol/g	0.0014 U	0.00181 U	NC
RM658A1(X	22-Apr-05	AVS/SEM	Cadmium-SEM	umol/g	0.00756	0.0052	37.0%
RM658A1(X	22-Apr-05	AVS/SEM	Chromium-SEM	umol/g	0.08078	0.04231	62.5%
RM658A1(X	22-Apr-05	AVS/SEM	Copper-SEM	umol/g	0.62002	0.15737	119.0%
RM658A1(X	22-Apr-05	AVS/SEM	Lead-SEM	umol/g	0.077	0.08832	13.7%
RM658A1(X	22-Apr-05	AVS/SEM	Mercury-SEM	umol/g	3.9E-06 U	3.3E-06 U	NC
RM658A1(X	22-Apr-05	AVS/SEM	Nickel-SEM	umol/g	2.55493	0.19928	171.1%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM658A1(X	22-Apr-05	AVS/SEM	Sulfide-AVS	umol/g	0.02389 UR	0.0248 UR	NC
RM658A1(X	22-Apr-05	AVS/SEM	Zinc-SEM	umol/g	0.67921	0.63944	6.0%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	13300	13700	3.0%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	7.7 UR	7.1 UR	NC
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	5	5.2	3.9%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	149	147	1.4%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	1.2	1.2	0.0%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	0.41 J	0.4 J	2.5%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	4990	5180	3.7%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	30.5	30.6	0.3%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	12.5	12.1	3.3%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	23.1	23.1	0.0%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	23400	23600	0.9%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	19.4 J	18.8 J	3.1%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	7030	7150	1.7%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	563	573	1.8%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.015 J	0.021 J	33.3%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	27.4	27.3	0.4%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	2550	2580	1.2%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	4 U	3.4 U	NC
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.3 UR	1.2 UR	NC
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	291 J	302 J	3.7%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	3.2 U	3 U	NC
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	25.6 UJ	23.8 UJ	NC
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	38.7	38.3	1.0%
RM658A1(X	22-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	88.6	88.9	0.3%
RM658A1(X	22-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.7 J	0.7 J	0.0%
RM658A1(X	22-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	6 U	6 U	NC
RM658A1(X	22-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	6 U	6 U	NC
RM658A1(X	22-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	6 U	6 U	NC
RM658A1(X	22-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	6 U	6 U	NC
RM658A1(X	22-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	6 U	6 U	NC
RM658A1(X	22-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	0.2 J	0.2 J	0.0%
RM658A1(X	22-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	6 U	6 U	NC
RM658A1(X	22-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	0.5 J	0.4 J	22.2%
RM658A1(X	22-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	0.2 J	0.2 J	0.0%
RM658A1(X	22-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	6 U	6 U	NC
RM658A1(X	22-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	6 U	6 U	NC
RM658A1(X	22-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	0.2 J	6 U	NC
RM658A1(X	22-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	6 U	6 U	NC
RM658A1(X	22-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	0.2 J	6 U	NC
RM658A1(X	22-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	1 J	1 J	0.0%
RM658A1(X	22-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	0.2 J	0.2 J	0.0%
RM658A1(X	22-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	0.2 J	6 U	NC
RM658A1(X	22-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1.1 U	1.1 U	NC
RM658A1(X	22-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	4.5 U	4.5 U	NC
RM658A1(X	22-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	4.5 U	4.5 U	NC
RM658A1(X	22-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1.1 U	1.1 U	NC
RM658A1(X	22-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1.1 U	1.1 U	NC
RM658A1(X	22-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1.1 U	1.1 U	NC
RM658A1(X	22-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1.1 U	1.1 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.9 U	0.9 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.9 U	0.9 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.9 U	0.9 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.9 U	0.9 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.9 U	0.9 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.9 U	0.9 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.44 U	0.44 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.44 U	0.44 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.44 U	0.44 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.44 U	0.44 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.44 U	0.44 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.44 U	0.44 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.9 U	0.9 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.44 U	0.44 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.9 U	0.9 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.9 U	0.9 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.9 U	0.9 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.9 U	0.9 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM658A1(X	22-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.9 U	0.9 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.44 U	0.44 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.44 U	0.44 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.44 U	0.44 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.44 U	0.44 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.44 U	0.44 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.44 U	0.44 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	4.4 U	4.4 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.44 U	0.44 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	44 U	44 U	NC
RM658A1(X	22-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.44 U	0.44 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	280 U	280 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	280 UJ	280 UJ	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	280 U	280 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	280 U	280 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	280 U	280 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	280 U	280 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	280 U	280 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	110 UJ	110 UJ	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	280 U	280 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	110 U	110 U	NC
RM658A1(X	22-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	110 U	110 U	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Aluminum	µg/L	--	282	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Antimony	µg/L	--	60 U	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Arsenic	µg/L	--	10 U	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Barium	µg/L	--	216	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Beryllium	µg/L	--	5 U	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Cadmium	µg/L	--	0.3 J	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Calcium	µg/L	--	54000	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Chromium	µg/L	--	1.4 J	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Cobalt	µg/L	--	0.72 U	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Copper	µg/L	--	5.5 J	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Iron	µg/L	--	198	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Lead	µg/L	--	10 U	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Magnesium	µg/L	--	11400	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Manganese	µg/L	--	651	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Mercury	µg/L	--	0.2 UJ	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Nickel	µg/L	--	40 U	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Potassium	µg/L	--	1890 J	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Selenium	µg/L	--	35 U	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Silver	µg/L	--	10 U	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Sodium	µg/L	--	3730 J	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Thallium	µg/L	--	25 U	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Uranium	µg/L	--	200 U	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Vanadium	µg/L	--	50 U	NC
RM658A1(X	5-May-05	CLP TAL TotMetals-PW	Zinc	µg/L	--	45.9 J	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Aluminum	µg/L	473	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Antimony	µg/L	60 U	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Arsenic	µg/L	10 U	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Barium	µg/L	189 J	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Beryllium	µg/L	5 U	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Cadmium	µg/L	0.27 J	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Calcium	µg/L	47400	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Chromium	µg/L	1.6 J	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Cobalt	µg/L	1 U	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Copper	µg/L	5.6 J	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Iron	µg/L	424	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Lead	µg/L	10 U	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Magnesium	µg/L	10400	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Manganese	µg/L	702	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Mercury	µg/L	0.014 J	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Nickel	µg/L	40 U	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Potassium	µg/L	1700 J	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Selenium	µg/L	35 U	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Silver	µg/L	10 U	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Sodium	µg/L	3220 J	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Thallium	µg/L	25 U	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Uranium	µg/L	200 U	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Vanadium	µg/L	50 U	--	NC
RM658A1(X	8-May-05	CLP TAL TotMetals-PW	Zinc	µg/L	39.6 J	--	NC
RM661C1	29-Apr-05	415.1	Total organic carbon	mg/Kg	3990	3950	1.0%
RM661C1	29-Apr-05	ASTMD422	<200 Total	Percent	85.8	80.8	6.0%
RM661C1	29-Apr-05	ASTMD422	Clay	Percent	9.438	9.696	2.7%
RM661C1	29-Apr-05	ASTMD422	Co. Sand	Percent	0	0	0.0%
RM661C1	29-Apr-05	ASTMD422	Colloids	Percent	5.148	5.656	9.4%
RM661C1	29-Apr-05	ASTMD422	Fine Sand	Percent	14	19	30.3%
RM661C1	29-Apr-05	ASTMD422	Gravel	Percent	0	0	0.0%
RM661C1	29-Apr-05	ASTMD422	Med. Sand	Percent	0.2	0.2	0.0%
RM661C1	29-Apr-05	ASTMD422	Sand Total	Percent	14.2	19.2	29.9%
RM661C1	29-Apr-05	ASTMD422	Silt	Percent	71.214	65.448	8.4%
RM661C1	29-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	10200	10000	2.0%
RM661C1	29-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	5.9 UR	7.3 UR	NC
RM661C1	29-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	8.9	9.3	4.4%
RM661C1	29-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	315	317	0.6%
RM661C1	29-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.98	0.93	5.2%
RM661C1	29-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	4.9	5	2.0%
RM661C1	29-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	20100	20900	3.9%
RM661C1	29-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	27.2	25.9	4.9%
RM661C1	29-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	9.2	8.9	3.3%
RM661C1	29-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	34.7	35.4	2.0%
RM661C1	29-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	22000	22300	1.4%
RM661C1	29-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	234	242	3.4%
RM661C1	29-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	10800	11000	1.8%
RM661C1	29-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	403	407	1.0%
RM661C1	29-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.6	0.7	15.4%
RM661C1	29-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	24	23.1	3.8%
RM661C1	29-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1720	1590	7.9%
RM661C1	29-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	3.4 J	4.1 J	18.7%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM661C1	29-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	0.99 UR	1.2 UR	NC
RM661C1	29-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	237 J	238 J	0.4%
RM661C1	29-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	2.5 U	3 U	NC
RM661C1	29-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	19.8 UJ	24.3 UJ	NC
RM661C1	29-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	33.6	31.7	5.8%
RM661C1	29-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	545	557	2.2%
RM661C1	29-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.9 J	2 J	75.9%
RM661C1	29-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	6 U	6 U	NC
RM661C1	29-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	6 U	6 U	NC
RM661C1	29-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	6 U	6 U	NC
RM661C1	29-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	0.5 J	0.5 J	0.0%
RM661C1	29-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	6 U	6 U	NC
RM661C1	29-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	6 U	6 U	NC
RM661C1	29-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	0.2 J	0.5 J	85.7%
RM661C1	29-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	6 UJ	6 UJ	NC
RM661C1	29-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	0.7 J	1 J	35.3%
RM661C1	29-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	6 U	6 U	NC
RM661C1	29-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	6 U	6 U	NC
RM661C1	29-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	0.7 J	1 J	35.3%
RM661C1	29-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	6 U	6 U	NC
RM661C1	29-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	6 U	0.5 J	NC
RM661C1	29-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	2 J	3 J	40.0%
RM661C1	29-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	1 J	2 J	66.7%
RM661C1	29-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	0.7 J	1 J	35.3%
RM661C1	29-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1.2 U	1.2 U	NC
RM661C1	29-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	4.7 U	4.8 U	NC
RM661C1	29-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	4.7 U	4.8 U	NC
RM661C1	29-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1.2 U	1.2 U	NC
RM661C1	29-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1.2 U	1.2 U	NC
RM661C1	29-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1.2 U	1.2 U	NC
RM661C1	29-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1.2 U	1.2 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.95 U	0.96 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.95 U	0.96 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.95 U	0.96 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.95 U	0.96 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.95 U	0.96 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.95 U	0.96 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.47 U	0.47 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.47 U	0.47 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.47 U	0.47 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.47 U	0.47 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.47 U	0.47 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.47 U	0.47 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.95 U	0.96 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.47 U	0.47 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.95 U	0.96 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.95 U	0.96 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.95 U	0.96 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.95 U	0.96 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.95 U	0.96 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.47 U	0.47 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.47 U	0.47 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.47 U	0.47 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.47 U	0.47 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.47 U	0.47 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.47 U	0.47 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	4.7 U	4.7 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.47 U	0.47 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	47 U	47 U	NC
RM661C1	29-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.47 U	0.47 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	300 U	300 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	120 U	120 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM661C1	29-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	300 U	300 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	300 U	300 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	300 U	300 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	300 U	300 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	300 U	300 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	300 U	300 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	120 UR	120 UR	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	300 U	300 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	120 U	120 U	NC
RM661C1	29-Apr-05	Dioxins and Furans	% Moisture	%	30.4	32.8	7.6%
RM661C1	29-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	8.23	10.7	26.1%
RM661C1	29-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	1.85 J	2.49	29.5%
RM661C1	29-Apr-05	Dioxins and Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	0.167 U	0.208 J	NC
RM661C1	29-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	0.185 J	0.261 J	34.1%
RM661C1	29-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	0.272 J	0.336 J	21.1%
RM661C1	29-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	0.461 J	0.65 J	34.0%
RM661C1	29-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	0.145 U	0.179 U	NC
RM661C1	29-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	0.349 J	0.508 J	37.1%
RM661C1	29-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	PG/G	0.114 U	0.109 U	NC
RM661C1	29-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	0.117 U	0.172 U	NC
RM661C1	29-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	0.135 U	0.167 U	NC
RM661C1	29-Apr-05	Dioxins and Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	0.164 U	0.201 J	NC
RM661C1	29-Apr-05	Dioxins and Furans	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	0.265 U	0.32 J	NC
RM661C1	29-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	0.112 J	0.15 J	29.0%
RM661C1	29-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzofuran	PG/G	1.45	2.64	58.2%
RM661C1	29-Apr-05	Dioxins and Furans	Heptachlorodibenzodioxin (Total)	PG/G	17.2	22.3	25.8%
RM661C1	29-Apr-05	Dioxins and Furans	Heptachlorodibenzofuran (Total)	PG/G	4.45	6.41	36.1%
RM661C1	29-Apr-05	Dioxins and Furans	Hexachlorodibenzodioxin (Total)	PG/G	4.51	5.67	22.8%
RM661C1	29-Apr-05	Dioxins and Furans	Hexachlorodibenzofuran (Total)	PG/G	3.07 J	3.78 J	20.7%
RM661C1	29-Apr-05	Dioxins and Furans	Octachlorodibenzodioxin	PG/G	57	75.4	27.8%
RM661C1	29-Apr-05	Dioxins and Furans	Octachlorodibenzofuran	PG/G	4.44	6.01	30.0%
RM661C1	29-Apr-05	Dioxins and Furans	Pentachlorodibenzodioxin (Total)	PG/G	1.13	0.809	33.1%
RM661C1	29-Apr-05	Dioxins and Furans	Pentachlorodibenzofuran (Total)	PG/G	2.56 J	2.87 J	11.4%
RM661C1	29-Apr-05	Dioxins and Furans	TEQ WHO-98	PG/G	0.5017	0.911	57.9%
RM661C1	29-Apr-05	Dioxins and Furans	Tetrachlorodibenzodioxin (Total)	PG/G	0.238	0.499	70.8%
RM661C1	29-Apr-05	Dioxins and Furans	Tetrachlorodibenzofuran (Total)	PG/G	6.77	9.3	31.5%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM661X2	19-Apr-05	415.1	Total organic carbon	mg/Kg	7490	6460	14.8%
RM661X2	19-Apr-05	ASTMD422	<200 Total	Percent	99	98.6	0.4%
RM661X2	19-Apr-05	ASTMD422	Clay	Percent	21.78	26.622	20.0%
RM661X2	19-Apr-05	ASTMD422	Co. Sand	Percent	0.2	0	200.0%
RM661X2	19-Apr-05	ASTMD422	Colloids	Percent	12.87	14.79	13.9%
RM661X2	19-Apr-05	ASTMD422	Fine Sand	Percent	0.8	1.4	54.5%
RM661X2	19-Apr-05	ASTMD422	Gravel	Percent	0	0	0.0%
RM661X2	19-Apr-05	ASTMD422	Med. Sand	Percent	0	0	0.0%
RM661X2	19-Apr-05	ASTMD422	Sand Total	Percent	1	1.4	33.3%
RM661X2	19-Apr-05	ASTMD422	Silt	Percent	64.35	57.188	11.8%
RM661X2	19-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	13400	14700	9.3%
RM661X2	19-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	0.92 UR	1.5 UJ	NC
RM661X2	19-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	5.9	5.3	10.7%
RM661X2	19-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	171	180	5.1%
RM661X2	19-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	1.3	1.4	7.4%
RM661X2	19-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	1.5	1.5	0.0%
RM661X2	19-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	8020	9010	11.6%
RM661X2	19-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	33.8	35.6	5.2%
RM661X2	19-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	11.4	11.9	4.3%
RM661X2	19-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	61.4	66.8	8.4%
RM661X2	19-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	26900	27500	2.2%
RM661X2	19-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	98.8	99.3	0.5%
RM661X2	19-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	8120	8440	3.9%
RM661X2	19-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	591	534	10.1%
RM661X2	19-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.35	0.32	9.0%
RM661X2	19-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	27.4	29.3	6.7%
RM661X2	19-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	2110	2210	4.6%
RM661X2	19-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	6.5 UR	5.6 UJ	NC
RM661X2	19-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.9 UJ	1.6 UJ	NC
RM661X2	19-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	225 J	276 J	20.4%
RM661X2	19-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	4.7 U	4 U	NC
RM661X2	19-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	10.3 J	9.6 J	7.0%
RM661X2	19-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	38.9	40.8	4.8%
RM661X2	19-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	275	282	2.5%
RM661X2	19-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	2 J	3 J	40.0%
RM661X2	19-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	8 U	8 U	NC
RM661X2	19-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	8 U	8 U	NC
RM661X2	19-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	8 U	8 U	NC
RM661X2	19-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	1 J	1 J	0.0%
RM661X2	19-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	8 U	1 J	NC
RM661X2	19-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	2 J	2 J	0.0%
RM661X2	19-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	1 J	1 J	0.0%
RM661X2	19-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	2 J	1 J	66.7%
RM661X2	19-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	2 J	3 J	40.0%
RM661X2	19-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	8 U	8 U	NC
RM661X2	19-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	1 J	1 J	0.0%
RM661X2	19-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	2 J	3 J	40.0%
RM661X2	19-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	0.6 J	1 J	50.0%
RM661X2	19-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	1 J	8 U	NC
RM661X2	19-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	3 J	3 J	0.0%
RM661X2	19-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	3 J	4 J	28.6%
RM661X2	19-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	2 J	2 J	0.0%
RM661X2	19-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1.6 U	1.7 U	NC
RM661X2	19-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	6.4 U	6.7 U	NC
RM661X2	19-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	6.4 U	6.7 U	NC
RM661X2	19-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1.6 U	1.7 U	NC
RM661X2	19-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1.6 U	1.7 U	NC
RM661X2	19-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1.6 U	1.7 U	NC
RM661X2	19-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1.6 U	1.7 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	1.3 U	1.3 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	1.3 U	1.3 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	1.3 U	1.3 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	1.3 U	1.3 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	1.3 U	1.3 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	1.3 U	1.3 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.63 U	0.66 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.63 U	0.66 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.63 U	0.66 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.63 U	0.66 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM661X2	19-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.63 U	0.66 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.63 U	0.66 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	1.3 U	1.3 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.63 U	0.66 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	1.3 U	1.3 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	1.3 U	1.3 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	1.3 U	1.3 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	1.3 U	1.3 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	1.3 U	1.3 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.63 U	0.66 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.63 U	0.66 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.63 U	0.66 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.63 U	0.66 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.63 U	0.66 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.63 U	0.66 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	6.3 U	6.6 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.63 U	0.66 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	63 U	66 U	NC
RM661X2	19-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.63 U	0.66 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	400 U	420 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	400 UR	420 UR	NC
RM661X2	19-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	400 U	420 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	400 U	420 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	400 UJ	420 UJ	NC
RM661X2	19-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	400 U	420 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	400 U	420 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	160 UR	170 UR	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	160 U	170 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	400 U	420 U	NC
RM661X2	19-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	160 U	170 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM661X2	19-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	160 U	170 U	NC
RM664X3	19-Apr-05	415.1	Total organic carbon	mg/Kg	321	418	26.3%
RM664X3	19-Apr-05	ASTMD422	<200 Total	Percent	2.7	2.8	3.6%
RM664X3	19-Apr-05	ASTMD422	Clay	Percent	0.0405	0.028	36.5%
RM664X3	19-Apr-05	ASTMD422	Co. Sand	Percent	2.5	2.6	3.9%
RM664X3	19-Apr-05	ASTMD422	Colloids	Percent	0.0405	0.042	3.6%
RM664X3	19-Apr-05	ASTMD422	Fine Sand	Percent	54.9	54.7	0.4%
RM664X3	19-Apr-05	ASTMD422	Gravel	Percent	1.7	1.9	11.1%
RM664X3	19-Apr-05	ASTMD422	Med. Sand	Percent	38.2	38	0.5%
RM664X3	19-Apr-05	ASTMD422	Sand Total	Percent	95.6	95.3	0.3%
RM664X3	19-Apr-05	ASTMD422	Silt	Percent	2.619	2.73	4.2%
RM664X3	19-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	6290	6180	1.8%
RM664X3	19-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	0.77 UJ	0.66 UJ	NC
RM664X3	19-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	6.1	6.8	10.9%
RM664X3	19-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	35.4	41.4	15.6%
RM664X3	19-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.48	0.45 J	6.5%
RM664X3	19-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	0.47 U	0.5 U	NC
RM664X3	19-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	2640	2440	7.9%
RM664X3	19-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	21.3	16.2	27.2%
RM664X3	19-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	6.4	5.9	8.1%
RM664X3	19-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	12.2	11.3	7.7%
RM664X3	19-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	16000	15800	1.3%
RM664X3	19-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	6.1	7.3	17.9%
RM664X3	19-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	3910	3860	1.3%
RM664X3	19-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	186	207	10.7%
RM664X3	19-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.096 U	0.1 U	NC
RM664X3	19-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	17.7	16.3	8.2%
RM664X3	19-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	664	708	6.4%
RM664X3	19-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	3.3 UJ	3.5 UJ	NC
RM664X3	19-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	0.93 UJ	1 UJ	NC
RM664X3	19-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	70.9 J	69.7 J	1.7%
RM664X3	19-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	2.3 U	2.5 U	NC
RM664X3	19-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	4.7 J	4.8 J	2.1%
RM664X3	19-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	23.2	20.5	12.4%
RM664X3	19-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	36.3	37.5	3.3%
RM664X3	19-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	4 U	4 U	NC
RM664X3	19-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	4 U	4 U	NC
RM664X3	19-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	4 U	4 U	NC
RM664X3	19-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	4 U	4 U	NC
RM664X3	19-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	4 U	4 U	NC
RM664X3	19-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	4 U	4 UJ	NC
RM664X3	19-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	4 U	4 UJ	NC
RM664X3	19-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	4 U	4 UJ	NC
RM664X3	19-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	4 U	4 UJ	NC
RM664X3	19-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	4 U	4 U	NC
RM664X3	19-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	4 U	4 UJ	NC
RM664X3	19-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	4 U	4 U	NC
RM664X3	19-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	4 U	4 U	NC
RM664X3	19-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	4 U	4 U	NC
RM664X3	19-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	4 U	4 UJ	NC
RM664X3	19-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	3.4 U	3.4 U	NC
RM664X3	19-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	4 U	4 U	NC
RM664X3	19-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	4 U	4 U	NC
RM664X3	19-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	0.84 U	0.84 U	NC
RM664X3	19-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	3.4 U	3.4 U	NC
RM664X3	19-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	3.4 U	3.4 U	NC
RM664X3	19-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	0.84 U	0.84 U	NC
RM664X3	19-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	0.84 U	0.84 U	NC
RM664X3	19-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	0.84 U	0.84 U	NC
RM664X3	19-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	0.84 U	0.84 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.68 U	0.68 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.68 U	0.68 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.68 U	0.68 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.68 U	0.68 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.68 U	0.68 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.68 U	0.68 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.33 U	0.33 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.33 U	0.33 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.33 U	0.33 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM664X3	19-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.33 U	0.33 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.33 U	0.33 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.33 U	0.33 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.68 U	0.68 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.33 U	0.33 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.68 U	0.68 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.68 U	0.68 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.68 U	0.68 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.68 U	0.68 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.68 U	0.68 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.33 U	0.33 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.33 U	0.33 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.33 U	0.33 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.33 U	0.33 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.33 U	0.33 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.33 U	0.33 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	3.3 U	3.3 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.33 U	0.33 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	33 U	33 U	NC
RM664X3	19-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.33 U	0.33 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	210 U	210 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	210 UR	210 UR	NC
RM664X3	19-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	210 U	210 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	210 U	210 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	210 UJ	210 UJ	NC
RM664X3	19-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	210 U	210 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	210 U	210 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	83 UR	83 UR	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	210 U	210 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM664X3	19-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	83 U	83 U	NC
RM664X3	19-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	83 U	83 U	NC
RM670X2	14-Apr-05	415.1	Total organic carbon	mg/Kg	9950	9510	4.5%
RM670X2	14-Apr-05	ASTMD422	<200 Total	Percent	72.4	70.8	2.2%
RM670X2	14-Apr-05	ASTMD422	Clay	Percent	14.48	14.16	2.2%
RM670X2	14-Apr-05	ASTMD422	Co. Sand	Percent	0	0	0.0%
RM670X2	14-Apr-05	ASTMD422	Colloids	Percent	6.516	5.664	14.0%
RM670X2	14-Apr-05	ASTMD422	Fine Sand	Percent	25.6	26.8	4.6%
RM670X2	14-Apr-05	ASTMD422	Gravel	Percent	0	0	0.0%
RM670X2	14-Apr-05	ASTMD422	Med. Sand	Percent	2	2.4	18.2%
RM670X2	14-Apr-05	ASTMD422	Sand Total	Percent	27.6	29.2	5.6%
RM670X2	14-Apr-05	ASTMD422	Silt	Percent	51.404	50.976	0.8%
RM670X2	14-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	12000	14000	15.4%
RM670X2	14-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	12.8 UR	3.3 J	NC
RM670X2	14-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	7.3	13.1	56.9%
RM670X2	14-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	166	198	17.6%
RM670X2	14-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.98 J	1.2 J	20.2%
RM670X2	14-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	4.2	5.2	21.3%
RM670X2	14-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	5160	5670	9.4%
RM670X2	14-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	31.2	36.4	15.4%
RM670X2	14-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	9.7 J	10.9 J	11.7%
RM670X2	14-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	50.8	63.9	22.8%
RM670X2	14-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	21800	23800	8.8%
RM670X2	14-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	192	259	29.7%
RM670X2	14-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	6670	7280	8.7%
RM670X2	14-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	536	596	10.6%
RM670X2	14-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	1.1	1.7	42.9%
RM670X2	14-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	23.2	25.4	9.1%
RM670X2	14-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1840	2400	26.4%
RM670X2	14-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	7.5 UR	8.5 UR	NC
RM670X2	14-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	2.1 UJ	2.4 UJ	NC
RM670X2	14-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	260 J	302 J	14.9%
RM670X2	14-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	5.3 U	6.1 U	NC
RM670X2	14-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	42.7 U	48.9 U	NC
RM670X2	14-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	34.4	38.8	12.0%
RM670X2	14-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	397	507	24.3%
RM670X2	14-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	1 J	3 J	100.0%
RM670X2	14-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	9 U	9 U	NC
RM670X2	14-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	9 U	9 U	NC
RM670X2	14-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	9 U	9 U	NC
RM670X2	14-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	1 J	2 J	66.7%
RM670X2	14-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	1 J	1 J	0.0%
RM670X2	14-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	2 J	3 J	40.0%
RM670X2	14-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	9 U	1 J	NC
RM670X2	14-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	1 J	2 J	66.7%
RM670X2	14-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	2 J	3 J	40.0%
RM670X2	14-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	9 U	9 U	NC
RM670X2	14-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	9 U	9 U	NC
RM670X2	14-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	2 J	3 J	40.0%
RM670X2	14-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	9 U	9 U	NC
RM670X2	14-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	1 J	1 J	0.0%
RM670X2	14-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	7 U	7.4 U	NC
RM670X2	14-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	3 J	5 J	50.0%
RM670X2	14-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	1 J	2 J	66.7%
RM670X2	14-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1.7 U	1.8 U	NC
RM670X2	14-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	7 U	7.3 U	NC
RM670X2	14-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	7 U	7.3 U	NC
RM670X2	14-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1.7 U	1.8 U	NC
RM670X2	14-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1.7 U	1.8 U	NC
RM670X2	14-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1.7 U	1.8 U	NC
RM670X2	14-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1.7 U	1.8 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	1.4 U	1.5 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	1.4 U	1.5 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	1.4 U	1.5 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	1.4 U	1.5 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	1.4 U	1.5 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	1.4 U	1.5 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.69 U	0.72 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.69 U	0.72 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM670X2	14-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.69 U	0.72 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.69 U	0.72 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.69 U	0.72 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.69 U	0.72 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	1.4 U	1.5 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.69 U	0.72 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	1.4 U	1.5 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	1.4 U	1.5 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	1.4 U	1.5 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	1.4 U	1.5 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	1.4 U	1.5 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.69 U	0.72 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.69 U	0.72 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.69 U	0.72 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.69 U	0.72 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.69 U	0.72 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.69 U	0.72 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	6.9 U	7.2 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.69 U	0.72 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	69 U	72 U	NC
RM670X2	14-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.69 U	0.72 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	440 U	460 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	440 UJ	460 UJ	NC
RM670X2	14-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	170 UJ	180 UJ	NC
RM670X2	14-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	440 U	460 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	440 U	460 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	440 UJ	460 UJ	NC
RM670X2	14-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	440 U	460 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	440 U	460 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	440 UR	460 UR	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	170 UJ	180 UJ	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	170 U	180 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM670X2	14-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	440 U	460 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	170 U	180 U	NC
RM670X2	14-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	170 U	180 U	NC
RM673B1	16-Apr-05	415.1	Total organic carbon	mg/Kg	1500	1480	1.3%
RM673B1	16-Apr-05	ASTMD422	<200 Total	Percent	29.4	30	2.0%
RM673B1	16-Apr-05	ASTMD422	Clay	Percent	0.882	0	200.0%
RM673B1	16-Apr-05	ASTMD422	Co. Sand	Percent	3.4	4.3	23.4%
RM673B1	16-Apr-05	ASTMD422	Colloids	Percent	0	0.45	200.0%
RM673B1	16-Apr-05	ASTMD422	Fine Sand	Percent	36.8	35	5.0%
RM673B1	16-Apr-05	ASTMD422	Gravel	Percent	7.8	7.1	9.4%
RM673B1	16-Apr-05	ASTMD422	Med. Sand	Percent	22.6	23.6	4.3%
RM673B1	16-Apr-05	ASTMD422	Sand Total	Percent	62.8	62.9	0.2%
RM673B1	16-Apr-05	ASTMD422	Silt	Percent	28.518	29.55	3.6%
RM673B1	16-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	9080 J	7660 J	17.0%
RM673B1	16-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	1.2 J	1.7 J	34.5%
RM673B1	16-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	4.1	2.4	52.3%
RM673B1	16-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	77.9	73.5	5.8%
RM673B1	16-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.66	0.51 J	25.6%
RM673B1	16-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	0.17 J	0.18 J	5.7%
RM673B1	16-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	2990	2730	9.1%
RM673B1	16-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	14.8	13.1	12.2%
RM673B1	16-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	6.4	5.8	9.8%
RM673B1	16-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	12.1	12.3	1.6%
RM673B1	16-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	14800	13500	9.2%
RM673B1	16-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	6.7	6.3	6.2%
RM673B1	16-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	3550	3600	1.4%
RM673B1	16-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	248	246	0.8%
RM673B1	16-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.01 J	0.012 J	18.2%
RM673B1	16-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	12.8	12.1	5.6%
RM673B1	16-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1160	1130	2.6%
RM673B1	16-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	4 UR	3.7 UR	NC
RM673B1	16-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.1 UJ	1.1 UJ	NC
RM673B1	16-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	129 J	93.7 J	31.7%
RM673B1	16-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	2.9 U	2.7 U	NC
RM673B1	16-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	22.8 U	21.4 U	NC
RM673B1	16-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	26.3	21.4	20.5%
RM673B1	16-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	48.9	43.4	11.9%
RM673B1	16-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	5 U	5 U	NC
RM673B1	16-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	5 U	5 U	NC
RM673B1	16-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	5 U	5 U	NC
RM673B1	16-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	5 U	5 U	NC
RM673B1	16-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	5 U	5 U	NC
RM673B1	16-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	5 U	5 U	NC
RM673B1	16-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	5 U	5 U	NC
RM673B1	16-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	5 U	5 U	NC
RM673B1	16-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	5 U	5 U	NC
RM673B1	16-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	5 U	5 U	NC
RM673B1	16-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	5 U	5 U	NC
RM673B1	16-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	5 U	5 U	NC
RM673B1	16-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	5 U	5 U	NC
RM673B1	16-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	5 U	5 U	NC
RM673B1	16-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	5 U	5 U	NC
RM673B1	16-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	4 U	4 U	NC
RM673B1	16-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	5 U	5 U	NC
RM673B1	16-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	5 U	5 U	NC
RM673B1	16-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	0.97 UJ	0.98 U	NC
RM673B1	16-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	3.9 UJ	3.9 U	NC
RM673B1	16-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	3.9 UJ	3.9 U	NC
RM673B1	16-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	0.97 UJ	0.98 U	NC
RM673B1	16-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	0.97 UJ	0.98 U	NC
RM673B1	16-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	0.97 UJ	0.98 U	NC
RM673B1	16-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	0.97 UJ	0.98 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.79 U	0.79 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.79 U	0.79 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.79 U	0.79 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.79 U	0.79 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.79 U	0.062 J	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.79 U	0.29 J	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.39 U	0.39 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM673B1	16-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.39 U	0.39 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.39 U	0.39 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.39 U	0.39 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.39 U	0.39 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.39 U	0.39 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.79 U	0.79 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.39 U	0.39 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.79 U	0.79 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.79 U	0.79 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.79 U	0.79 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.79 U	0.79 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.79 U	0.79 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.39 U	0.39 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.39 U	0.39 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.39 U	0.39 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.39 U	0.39 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.39 U	0.39 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.39 U	0.39 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	3.9 U	3.9 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.39 U	0.39 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	39 U	39 U	NC
RM673B1	16-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.39 U	0.39 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	250 U	250 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	250 U	250 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	250 U	250 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	250 U	250 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	250 U	250 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	250 U	250 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	250 U	250 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	98 UR	97 UR	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	98 U	97 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM673B1	16-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	250 U	250 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	98 U	97 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	0.548 U	0.56 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	0.119 U	0.111 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	0.0713 U	0.0829 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	0.0793 U	0.0717 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	0.0474 J	0.0452 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	0.0879 U	0.0697 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	0.0456 U	0.0436 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	0.0841 U	0.0712 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	PG/G	0.0697 U	0.0676 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	0.0572 U	0.0682 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	0.0409 U	0.0429 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	0.0573 J	0.0448 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	0.0468 U	0.0699 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	0.0446 U	0.0542 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzofuran	PG/G	0.0843 U	0.0893 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	Heptachlorodibenzodioxin (Total)	PG/G	1.08 U	1.11 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	Heptachlorodibenzofuran (Total)	PG/G	0.219 U	0.188 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	Hexachlorodibenzodioxin (Total)	PG/G	0.0764	0.102	28.7%
RM673B1	16-Apr-05	Dioxins and Furans	Hexachlorodibenzofuran (Total)	PG/G	0.124	0.077 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	Octachlorodibenzodioxin	PG/G	3.3 U	3.64 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	Octachlorodibenzofuran	PG/G	0.21 U	0.22 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	Pentachlorodibenzodioxin (Total)	PG/G	0.165	0.0654	86.5%
RM673B1	16-Apr-05	Dioxins and Furans	Pentachlorodibenzofuran (Total)	PG/G	0.0876 U	0.042 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	TEQ WHO-98	PG/G	0.0105	0 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	Tetrachlorodibenzodioxin (Total)	PG/G	0.0446 U	0.0542 U	NC
RM673B1	16-Apr-05	Dioxins and Furans	Tetrachlorodibenzofuran (Total)	PG/G	0.0843 U	0.134 U	NC
RM675B1	16-Apr-05	415.1	Total organic carbon	mg/Kg	7430	11000	38.7%
RM675B1	16-Apr-05	ASTMD422	<200 Total	Percent	39	39.6	1.5%
RM675B1	16-Apr-05	ASTMD422	Clay	Percent	0	3.168	200.0%
RM675B1	16-Apr-05	ASTMD422	Co. Sand	Percent	1.6	2.2	31.6%
RM675B1	16-Apr-05	ASTMD422	Colloids	Percent	1.17	1.188	1.5%
RM675B1	16-Apr-05	ASTMD422	Fine Sand	Percent	30.8	33.2	7.5%
RM675B1	16-Apr-05	ASTMD422	Gravel	Percent	9.8	4.8	68.5%
RM675B1	16-Apr-05	ASTMD422	Med. Sand	Percent	18.8	20.2	7.2%
RM675B1	16-Apr-05	ASTMD422	Sand Total	Percent	51.2	55.6	8.2%
RM675B1	16-Apr-05	ASTMD422	Silt	Percent	37.83	35.244	7.1%
RM675B1	16-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	7780 J	7080 J	9.4%
RM675B1	16-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	1 J	0.95 J	5.1%
RM675B1	16-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	2.3	1.7	30.0%
RM675B1	16-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	65.6	65.9	0.5%
RM675B1	16-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.63	0.57	10.0%
RM675B1	16-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	3.1	2.2	34.0%
RM675B1	16-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	3100	2710	13.4%
RM675B1	16-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	19.5	15.7	21.6%
RM675B1	16-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	5.6 J	5.3	5.5%
RM675B1	16-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	14.8	14.5	2.0%
RM675B1	16-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	13300	11900	11.1%
RM675B1	16-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	51.1	51	0.2%
RM675B1	16-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	4040	3450	15.8%
RM675B1	16-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	145	137	5.7%
RM675B1	16-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.062 J	0.07 J	12.1%
RM675B1	16-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	14	12.9	8.2%
RM675B1	16-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1200	1260	4.9%
RM675B1	16-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	4.3 UR	3.5 UR	NC
RM675B1	16-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.2 UJ	1 UJ	NC
RM675B1	16-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	94 J	101 J	7.2%
RM675B1	16-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	3.1 U	2.5 U	NC
RM675B1	16-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	24.4 U	20.3 U	NC
RM675B1	16-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	21.9	20	9.1%
RM675B1	16-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	220	227	3.1%
RM675B1	16-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	5 U	5 U	NC
RM675B1	16-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	5 U	5 U	NC
RM675B1	16-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	5 U	5 U	NC
RM675B1	16-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	5 U	5 U	NC
RM675B1	16-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	0.4 J	0.4 J	0.0%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM675B1	16-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	0.4 J	0.4 J	0.0%
RM675B1	16-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	0.6 J	0.6 J	0.0%
RM675B1	16-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	0.4 J	0.4 J	0.0%
RM675B1	16-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	0.4 J	0.4 J	0.0%
RM675B1	16-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	0.6 J	0.6 J	0.0%
RM675B1	16-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	5 U	5 U	NC
RM675B1	16-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	5 U	5 U	NC
RM675B1	16-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	0.6 J	0.8 J	28.6%
RM675B1	16-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	5 U	5 U	NC
RM675B1	16-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	0.4 J	5 U	NC
RM675B1	16-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	3.8 U	4.2 U	NC
RM675B1	16-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	0.4 J	0.4 J	0.0%
RM675B1	16-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	0.6 J	0.6 J	0.0%
RM675B1	16-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	0.92 U	1 U	NC
RM675B1	16-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	3.7 U	4.1 U	NC
RM675B1	16-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	3.7 U	4.1 U	NC
RM675B1	16-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	0.92 U	1 U	NC
RM675B1	16-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	0.92 U	1 U	NC
RM675B1	16-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	0.92 U	1 U	NC
RM675B1	16-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	0.92 U	1 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.75 U	0.83 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.75 U	0.83 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.75 U	0.83 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.75 U	0.83 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.75 U	0.83 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.81 J	0.83 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.37 U	0.41 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.37 U	0.41 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.37 U	0.41 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.37 U	0.41 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.37 U	0.41 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.37 U	0.41 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.75 U	0.83 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.37 U	0.41 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.75 U	0.83 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.75 U	0.83 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.75 U	0.83 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.75 U	0.83 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.75 U	0.83 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.37 U	0.41 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.37 U	0.41 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.37 U	0.41 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.37 U	0.41 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.37 U	0.41 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.37 U	0.41 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	3.7 U	4.1 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.37 U	0.41 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	37 U	41 U	NC
RM675B1	16-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.37 U	0.41 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	230 U	260 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	230 U	260 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	230 U	260 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	230 U	260 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM675B1	16-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	230 U	260 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	230 U	260 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	230 U	260 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	93 UR	100 UR	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	230 U	260 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	93 U	100 U	NC
RM675B1	16-Apr-05	Dioxins and Furans	% Moisture	%	15.6	23	38.3%
RM675B1	16-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	6.38	11	53.2%
RM675B1	16-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	0.533 J	0.949 J	56.1%
RM675B1	16-Apr-05	Dioxins and Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	0.109 U	0.111 U	NC
RM675B1	16-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	0.234 J	0.218 U	NC
RM675B1	16-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	0.0634 U	0.103 U	NC
RM675B1	16-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	0.374 J	0.632 J	51.3%
RM675B1	16-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	0.0532 U	0.0755 U	NC
RM675B1	16-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	0.265 J	0.378 U	NC
RM675B1	16-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	PG/G	0.0856 U	0.11 U	NC
RM675B1	16-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	0.129 J	0.16 U	NC
RM675B1	16-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	0.0748 U	0.0716 U	NC
RM675B1	16-Apr-05	Dioxins and Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	0.1 U	0.141 U	NC
RM675B1	16-Apr-05	Dioxins and Furans	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	0.0925 U	0.163 U	NC
RM675B1	16-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	0.0944 J	0.0734 U	NC
RM675B1	16-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzofuran	PG/G	1.42	2.19	42.7%
RM675B1	16-Apr-05	Dioxins and Furans	Heptachlorodibenzodioxin (Total)	PG/G	13.1	21.9	50.3%
RM675B1	16-Apr-05	Dioxins and Furans	Heptachlorodibenzofuran (Total)	PG/G	1.18 U	2.37	NC
RM675B1	16-Apr-05	Dioxins and Furans	Hexachlorodibenzodioxin (Total)	PG/G	3.01	3.53	15.9%
RM675B1	16-Apr-05	Dioxins and Furans	Hexachlorodibenzofuran (Total)	PG/G	1.21	1.98	48.3%
RM675B1	16-Apr-05	Dioxins and Furans	Octachlorodibenzodioxin	PG/G	51.7	98.6	62.4%
RM675B1	16-Apr-05	Dioxins and Furans	Octachlorodibenzofuran	PG/G	0.741 J	1.36 J	58.9%
RM675B1	16-Apr-05	Dioxins and Furans	Pentachlorodibenzodioxin (Total)	PG/G	0.401	0.253	45.3%
RM675B1	16-Apr-05	Dioxins and Furans	Pentachlorodibenzofuran (Total)	PG/G	0.538	1.09 J	67.8%
RM675B1	16-Apr-05	Dioxins and Furans	TEQ WHO-98	PG/G	0.536	0.4117	26.2%
RM675B1	16-Apr-05	Dioxins and Furans	Tetrachlorodibenzodioxin (Total)	PG/G	0.0944	0.11	15.3%
RM675B1	16-Apr-05	Dioxins and Furans	Tetrachlorodibenzofuran (Total)	PG/G	1	4.36 J	125.4%
RM676A1(X	21-Apr-05	415.1	Total organic carbon	mg/Kg	918	1230	29.1%
RM676A1(X	21-Apr-05	ASTMD422	<200 Total	Percent	57.6	63	9.0%
RM676A1(X	21-Apr-05	ASTMD422	Clay	Percent	3.456	5.04	37.3%
RM676A1(X	21-Apr-05	ASTMD422	Co. Sand	Percent	0.2	0.4	66.7%
RM676A1(X	21-Apr-05	ASTMD422	Colloids	Percent	5.76	5.04	13.3%
RM676A1(X	21-Apr-05	ASTMD422	Fine Sand	Percent	39.8	34.6	14.0%
RM676A1(X	21-Apr-05	ASTMD422	Gravel	Percent	0	0	0.0%
RM676A1(X	21-Apr-05	ASTMD422	Med. Sand	Percent	2.4	2	18.2%
RM676A1(X	21-Apr-05	ASTMD422	Sand Total	Percent	42.4	37	13.6%
RM676A1(X	21-Apr-05	ASTMD422	Silt	Percent	48.384	52.92	9.0%
RM676A1(X	21-Apr-05	AVS/SEM	Antimony-SEM	umol/g	0.0014 U	0.00131 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM676A1(X	21-Apr-05	AVS/SEM	Cadmium-SEM	umol/g	0.00116	0.00142	20.7%
RM676A1(X	21-Apr-05	AVS/SEM	Chromium-SEM	umol/g	0.02885	0.02885	0.0%
RM676A1(X	21-Apr-05	AVS/SEM	Copper-SEM	umol/g	0.09127	0.10071	9.8%
RM676A1(X	21-Apr-05	AVS/SEM	Lead-SEM	umol/g	0.02799	0.03427	20.2%
RM676A1(X	21-Apr-05	AVS/SEM	Mercury-SEM	umol/g	3.4E-06 U	3.2E-06 U	NC
RM676A1(X	21-Apr-05	AVS/SEM	Nickel-SEM	umol/g	0.07324	0.06813	7.2%
RM676A1(X	21-Apr-05	AVS/SEM	Sulfide-AVS	umol/g	0.02328 UR	0.037 J	NC
RM676A1(X	21-Apr-05	AVS/SEM	Zinc-SEM	umol/g	0.1698	0.23252	31.2%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	10400	9380	10.3%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	7.6 UJ	1.3 J	NC
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	3.7	3.1	17.6%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	122	108	12.2%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	1 J	0.96 J	4.1%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	0.2 J	0.16 J	22.2%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	11300	11400	0.9%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	24.3	24.5	0.8%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	9.8	9.6	2.1%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	22.3	19.9	11.4%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	20700	21700	4.7%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	10.5 J	9.2 J	13.2%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	6760	6220	8.3%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	501	454	9.8%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.012 J	0.15 U	NC
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	22.3	21.3	4.6%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1990	1850	7.3%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	3.7 J	4.3 J	15.0%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.3 UJ	1.3 UJ	NC
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	244 J	298 J	19.9%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	3.2 U	3.3 U	NC
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	25.4 U	26.6 U	NC
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	32.9	35.3	7.0%
RM676A1(X	21-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	61.1	59	3.5%
RM676A1(X	21-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	5 U	6 U	NC
RM676A1(X	21-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	5 U	0.4 J	NC
RM676A1(X	21-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	5 U	6 U	NC
RM676A1(X	21-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	5 U	6 U	NC
RM676A1(X	21-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	5 U	6 U	NC
RM676A1(X	21-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	5 U	6 U	NC
RM676A1(X	21-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	5 U	6 U	NC
RM676A1(X	21-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	5 U	6 U	NC
RM676A1(X	21-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	5 U	6 U	NC
RM676A1(X	21-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	5 U	6 U	NC
RM676A1(X	21-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	5 U	6 U	NC
RM676A1(X	21-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	5 U	6 U	NC
RM676A1(X	21-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	5 U	6 U	NC
RM676A1(X	21-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	5 U	6 U	NC
RM676A1(X	21-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	5 U	6 U	NC
RM676A1(X	21-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	4.4 U	0.9 J	NC
RM676A1(X	21-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	5 U	6 U	NC
RM676A1(X	21-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	5 U	6 U	NC
RM676A1(X	21-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1.1 U	1.1 U	NC
RM676A1(X	21-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	4.3 U	4.4 U	NC
RM676A1(X	21-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	4.3 U	4.4 U	NC
RM676A1(X	21-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1.1 U	1.1 U	NC
RM676A1(X	21-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1.1 U	1.1 U	NC
RM676A1(X	21-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1.1 U	1.1 U	NC
RM676A1(X	21-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1.1 U	1.1 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.86 U	0.89 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.48 J	0.89 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.86 U	0.89 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.86 U	0.89 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.54 J	0.89 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	1.4	0.89 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.43 U	0.44 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.43 U	0.44 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.43 U	0.44 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.43 U	0.44 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.43 U	0.44 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.43 U	0.44 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM676A1(X	21-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.86 U	0.89 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.43 U	0.44 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.86 U	0.89 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.86 U	0.89 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.86 U	0.89 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.86 U	0.89 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.86 U	0.89 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.43 U	0.44 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.43 U	0.44 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.43 U	0.44 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.43 U	0.44 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.43 U	0.44 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.43 U	0.44 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	4.3 U	4.4 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.43 U	0.44 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	43 U	44 U	NC
RM676A1(X	21-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.43 U	0.44 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	270 U	280 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	270 UR	280 UR	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	270 U	280 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	270 U	280 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	270 UJ	280 UJ	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	270 U	280 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	270 U	280 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	110 UR	110 UR	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	270 U	280 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	110 U	110 U	NC
RM676A1(X	21-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	110 U	110 U	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Aluminum	µg/L	111 U	--	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Antimony	µg/L	60 U	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Arsenic	µg/L	5.7 J	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Barium	µg/L	255	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Beryllium	µg/L	5 U	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Cadmium	µg/L	5 U	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Calcium	µg/L	56900	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Chromium	µg/L	2.1 J	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Cobalt	µg/L	1.4 J	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Copper	µg/L	7.1 J	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Iron	µg/L	102	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Lead	µg/L	5 J	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Magnesium	µg/L	11800	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Manganese	µg/L	2710	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Mercury	µg/L	0.2 U	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Nickel	µg/L	3.6 J	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Potassium	µg/L	2110 J	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Selenium	µg/L	35 U	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Silver	µg/L	10 U	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Sodium	µg/L	7850	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Thallium	µg/L	25 U	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Uranium	µg/L	200 U	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Vanadium	µg/L	2.1 J	--	NC
RM676A1(X	29-Apr-05	CLP TAL TotMetals-PW	Zinc	µg/L	42 J	--	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Aluminum	µg/L	--	109 U	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Antimony	µg/L	--	60 U	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Arsenic	µg/L	--	10 U	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Barium	µg/L	--	243	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Beryllium	µg/L	--	5 U	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Cadmium	µg/L	--	5 U	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Calcium	µg/L	--	50100	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Chromium	µg/L	--	1.5 J	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Cobalt	µg/L	--	0.84 J	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Copper	µg/L	--	5.5 J	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Iron	µg/L	--	69.6 U	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Lead	µg/L	--	10 U	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Magnesium	µg/L	--	10800	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Manganese	µg/L	--	2110	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Mercury	µg/L	--	0.2 U	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Nickel	µg/L	--	3.4 J	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Potassium	µg/L	--	2190 J	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Selenium	µg/L	--	35 U	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Silver	µg/L	--	10 U	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Sodium	µg/L	--	11700	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Thallium	µg/L	--	25 U	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Uranium	µg/L	--	200 U	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Vanadium	µg/L	--	2.6 J	NC
RM676A1(X	1-May-05	CLP TAL TotMetals-PW	Zinc	µg/L	--	37.3 J	NC
RM679X3	12-Apr-05	415.1	Total organic carbon	mg/Kg	1390	1180	16.3%
RM679X3	12-Apr-05	ASTMD422	<200 Total	Percent	36.4	37.2	2.2%
RM679X3	12-Apr-05	ASTMD422	Clay	Percent	0.364	0	200.0%
RM679X3	12-Apr-05	ASTMD422	Co. Sand	Percent	4.4	6.2	34.0%
RM679X3	12-Apr-05	ASTMD422	Colloids	Percent	1.456	1.488	2.2%
RM679X3	12-Apr-05	ASTMD422	Fine Sand	Percent	25.4	23.2	9.1%
RM679X3	12-Apr-05	ASTMD422	Gravel	Percent	5.4	4.4	20.4%
RM679X3	12-Apr-05	ASTMD422	Med. Sand	Percent	28.4	29	2.1%
RM679X3	12-Apr-05	ASTMD422	Sand Total	Percent	58.2	58.4	0.3%
RM679X3	12-Apr-05	ASTMD422	Silt	Percent	34.58	35.712	3.2%
RM679X3	12-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	5800	6530	11.8%
RM679X3	12-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	0.65 J	0.64 UJ	NC
RM679X3	12-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	2.3	2.5	8.3%
RM679X3	12-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	61.1	68.7	11.7%
RM679X3	12-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.51	0.56 J	9.3%
RM679X3	12-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	0.16 J	0.079 J	67.8%
RM679X3	12-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	4550	5150	12.4%
RM679X3	12-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	12.8	12.2	4.8%
RM679X3	12-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	4.8	5.2 J	8.0%
RM679X3	12-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	11.2	12	6.9%
RM679X3	12-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	10400	11500	10.0%
RM679X3	12-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	4.5	5.2	14.4%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM679X3	12-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	3460	3930	12.7%
RM679X3	12-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	225	254	12.1%
RM679X3	12-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.11 U	0.12 U	NC
RM679X3	12-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	11.3	11.3	0.0%
RM679X3	12-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	945	1030	8.6%
RM679X3	12-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	3.1 UR	4 UR	NC
RM679X3	12-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	0.88 UJ	1.1 UJ	NC
RM679X3	12-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	164 J	153 J	6.9%
RM679X3	12-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	2.2 U	2.9 U	NC
RM679X3	12-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	7.8 U	22.9 U	NC
RM679X3	12-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	19.9	20.1	1.0%
RM679X3	12-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	31.9	36	12.1%
RM679X3	12-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	5 U	5 U	NC
RM679X3	12-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	5 U	5 U	NC
RM679X3	12-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	5 U	5 U	NC
RM679X3	12-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	5 U	5 U	NC
RM679X3	12-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	5 U	5 U	NC
RM679X3	12-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	5 U	5 U	NC
RM679X3	12-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	5 U	5 U	NC
RM679X3	12-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	5 U	5 U	NC
RM679X3	12-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	5 U	5 U	NC
RM679X3	12-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	5 U	5 U	NC
RM679X3	12-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	5 U	5 U	NC
RM679X3	12-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	5 U	5 U	NC
RM679X3	12-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	5 U	5 U	NC
RM679X3	12-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	5 U	5 U	NC
RM679X3	12-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	5 U	5 U	NC
RM679X3	12-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	3.9 U	3.9 U	NC
RM679X3	12-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	5 U	5 U	NC
RM679X3	12-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	5 U	5 U	NC
RM679X3	12-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	0.96 U	0.97 U	NC
RM679X3	12-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	3.9 U	3.9 U	NC
RM679X3	12-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	3.9 U	3.9 U	NC
RM679X3	12-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	0.96 U	0.97 U	NC
RM679X3	12-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	0.96 U	0.97 U	NC
RM679X3	12-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	0.96 U	0.97 U	NC
RM679X3	12-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	0.96 U	0.97 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.78 U	0.78 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.78 U	0.78 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.78 U	0.78 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.78 U	0.78 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.78 U	0.78 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.78 U	0.78 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.38 U	0.38 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.38 U	0.38 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.38 U	0.38 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.38 U	0.38 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.38 U	0.38 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.38 U	0.38 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.78 U	0.78 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.38 U	0.38 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.78 U	0.78 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.78 U	0.78 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.78 U	0.78 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.78 U	0.78 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.78 U	0.78 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.38 U	0.38 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.38 U	0.38 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.38 U	0.38 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.38 U	0.38 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.38 U	0.38 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.38 U	0.38 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	3.8 U	3.8 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.38 U	0.38 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	38 U	38 U	NC
RM679X3	12-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.38 U	0.38 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	97 U	97 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM679X3	12-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	240 U	250 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	240 U	250 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	240 U	250 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	240 U	250 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	240 U	250 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	240 U	250 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	240 U	250 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	97 UJ	97 UJ	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	240 U	250 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	97 U	97 U	NC
RM679X3	12-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	97 U	97 U	NC
RM692A1(X	20-Apr-05	415.1	Total organic carbon	mg/Kg	391	353	10.2%
RM692A1(X	20-Apr-05	ASTMD422	<200 Total	Percent	2.6	4.1	44.8%
RM692A1(X	20-Apr-05	ASTMD422	Clay	Percent	0.026	0.041	44.8%
RM692A1(X	20-Apr-05	ASTMD422	Co. Sand	Percent	1.1	1.5	30.8%
RM692A1(X	20-Apr-05	ASTMD422	Colloids	Percent	0.026	0.0615	81.1%
RM692A1(X	20-Apr-05	ASTMD422	Fine Sand	Percent	67.7	66.7	1.5%
RM692A1(X	20-Apr-05	ASTMD422	Gravel	Percent	0.1	3.8	189.7%
RM692A1(X	20-Apr-05	ASTMD422	Med. Sand	Percent	28.5	23.9	17.6%
RM692A1(X	20-Apr-05	ASTMD422	Sand Total	Percent	97.3	92.1	5.5%
RM692A1(X	20-Apr-05	ASTMD422	Silt	Percent	2.548	3.9975	44.3%
RM692A1(X	20-Apr-05	AVS/SEM	Antimony-SEM	umol/g	0.00115 U	0.00115 U	NC
RM692A1(X	20-Apr-05	AVS/SEM	Cadmium-SEM	umol/g	0.00088	0.00077	14.1%
RM692A1(X	20-Apr-05	AVS/SEM	Chromium-SEM	umol/g	0.00654	0.00462	34.5%
RM692A1(X	20-Apr-05	AVS/SEM	Copper-SEM	umol/g	0.02046 U	0.02046 U	NC
RM692A1(X	20-Apr-05	AVS/SEM	Lead-SEM	umol/g	0.01496	0.01255	17.5%
RM692A1(X	20-Apr-05	AVS/SEM	Mercury-SEM	umol/g	6.5E-06 U	4.8E-06 U	NC
RM692A1(X	20-Apr-05	AVS/SEM	Nickel-SEM	umol/g	0.00954	0.00784	19.6%
RM692A1(X	20-Apr-05	AVS/SEM	Sulfide-AVS	umol/g	0.01966 UR	0.01875 UR	NC
RM692A1(X	20-Apr-05	AVS/SEM	Zinc-SEM	umol/g	0.16368	0.11473 U	NC
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	3460	4100	16.9%
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	0.62 UJ	0.91 UJ	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	0.65 J	0.97 J	39.5%
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	30.5	36.6	18.2%
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.34 J	0.41 J	18.7%
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	0.55 U	0.61 U	NC
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	1960	1920	2.1%
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	6.8	9.3	31.1%
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	2.6 J	3.1 J	17.5%
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	5.3	6.8	24.8%
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	6640	8370	23.1%
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	3.9	4.4	12.0%
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	1980	2370	17.9%
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	103	122	16.9%
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.14 U	0.12 U	NC
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	6.3	6.8	7.6%
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	474 J	557 J	16.1%
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	3.9 UJ	4.3 UJ	NC
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.1 UJ	1.2 UJ	NC
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	74.6 J	85.8 J	14.0%
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	2.8 U	3.1 U	NC
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	22 U	24.6 U	NC
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	11.7	16.3	32.9%
RM692A1(X	20-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	28.7	35.3	20.6%
RM692A1(X	20-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	5 U	5 U	NC
RM692A1(X	20-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	5 U	5 U	NC
RM692A1(X	20-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	5 U	5 U	NC
RM692A1(X	20-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	5 U	5 U	NC
RM692A1(X	20-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	5 U	5 U	NC
RM692A1(X	20-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	5 U	5 U	NC
RM692A1(X	20-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	5 U	5 U	NC
RM692A1(X	20-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	5 U	5 U	NC
RM692A1(X	20-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	5 U	5 U	NC
RM692A1(X	20-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	0.2 J	5 U	NC
RM692A1(X	20-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	5 U	5 U	NC
RM692A1(X	20-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	5 U	5 U	NC
RM692A1(X	20-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	5 U	5 U	NC
RM692A1(X	20-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	5 U	5 U	NC
RM692A1(X	20-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	5 U	5 U	NC
RM692A1(X	20-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	4.1 U	4.2 U	NC
RM692A1(X	20-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	5 U	5 U	NC
RM692A1(X	20-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	5 U	5 U	NC
RM692A1(X	20-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1 U	--	NC
RM692A1(X	20-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	4 U	--	NC
RM692A1(X	20-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	4 U	--	NC
RM692A1(X	20-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1 U	--	NC
RM692A1(X	20-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1 U	--	NC
RM692A1(X	20-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1 U	--	NC
RM692A1(X	20-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1 U	--	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.81 U	0.81 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.81 U	0.81 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.81 U	0.81 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.81 U	0.81 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.81 U	0.81 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.81 U	0.81 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.4 U	0.4 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.4 U	0.4 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.4 U	0.4 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.4 U	0.4 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.4 U	0.4 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.4 U	0.4 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.81 U	0.81 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.4 U	0.4 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.81 U	0.81 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.81 U	0.81 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.81 U	0.81 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.81 U	0.81 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.81 U	0.81 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.4 U	0.4 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.4 U	0.4 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.4 U	0.4 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM692A1(X	20-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.4 U	0.4 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.4 U	0.4 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.4 U	0.4 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	4 U	4 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.4 U	0.4 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	40 U	40 U	NC
RM692A1(X	20-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.4 U	0.4 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	250 U	260 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	250 UR	260 UR	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	250 U	260 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	250 U	260 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	250 UJ	260 UJ	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	250 U	260 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	250 U	260 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	100 UR	100 UR	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	100 UJ	100 UJ	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	250 U	260 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	100 U	100 U	NC
RM692A1(X	20-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	415.1	Total organic carbon	mg/Kg	4030	4290	6.3%
RM692C1	23-Apr-05	ASTMD422	<200 Total	Percent	10.4	7	39.1%
RM692C1	23-Apr-05	ASTMD422	Clay	Percent	0.156	0.07	76.1%
RM692C1	23-Apr-05	ASTMD422	Co. Sand	Percent	1.5	1.2	22.2%
RM692C1	23-Apr-05	ASTMD422	Colloids	Percent	0.052	0.07	29.5%
RM692C1	23-Apr-05	ASTMD422	Fine Sand	Percent	63.2	69	8.8%
RM692C1	23-Apr-05	ASTMD422	Gravel	Percent	0.8	0	200.0%
RM692C1	23-Apr-05	ASTMD422	Med. Sand	Percent	24.1	22.8	5.5%
RM692C1	23-Apr-05	ASTMD422	Sand Total	Percent	88.8	93	4.6%
RM692C1	23-Apr-05	ASTMD422	Silt	Percent	10.192	6.86	39.1%
RM692C1	23-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	8520	9460	10.5%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM692C1	23-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	2.7 J	4.8 J	56.0%
RM692C1	23-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	7.5	7.7	2.6%
RM692C1	23-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	240	227	5.6%
RM692C1	23-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.67	0.75	11.3%
RM692C1	23-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	3.6	3.1	14.9%
RM692C1	23-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	26600	26900	1.1%
RM692C1	23-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	18.7	19.3	3.2%
RM692C1	23-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	11.7 J	14.6 J	22.1%
RM692C1	23-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	299	330	9.9%
RM692C1	23-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	40100	39700	1.0%
RM692C1	23-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	550	475	14.6%
RM692C1	23-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	7490	7480	0.1%
RM692C1	23-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	828 J	816 J	1.5%
RM692C1	23-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.063 J	0.039 J	47.1%
RM692C1	23-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	9.7	10.7	9.8%
RM692C1	23-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1950	2540	26.3%
RM692C1	23-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	4.5	4.6	2.2%
RM692C1	23-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.2 UJ	1.2 UJ	NC
RM692C1	23-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	894	1200	29.2%
RM692C1	23-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	3 U	3 U	NC
RM692C1	23-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	23.8 U	24 U	NC
RM692C1	23-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	28.7	32.3	11.8%
RM692C1	23-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	4020	3570	11.9%
RM692C1	23-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	1 J	0.4 J	85.7%
RM692C1	23-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	5 U	5 U	NC
RM692C1	23-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	5 U	5 U	NC
RM692C1	23-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	5 U	5 U	NC
RM692C1	23-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	0.8 J	5 U	NC
RM692C1	23-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	5 U	5 U	NC
RM692C1	23-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	5 U	5 U	NC
RM692C1	23-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	0.6 J	5 U	NC
RM692C1	23-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	5 U	5 U	NC
RM692C1	23-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	2 J	5 U	NC
RM692C1	23-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	5 U	5 U	NC
RM692C1	23-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	0.6 J	5 U	NC
RM692C1	23-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	2 J	0.2 J	163.6%
RM692C1	23-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	5 U	5 U	NC
RM692C1	23-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	0.8 J	0.2 J	120.0%
RM692C1	23-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	2 J	4.3 U	NC
RM692C1	23-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	3 J	0.4 J	152.9%
RM692C1	23-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	2 J	5 U	NC
RM692C1	23-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1 U	1 U	NC
RM692C1	23-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	4.2 U	4.2 U	NC
RM692C1	23-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	4.2 U	4.2 U	NC
RM692C1	23-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1 U	1 U	NC
RM692C1	23-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1 U	1 U	NC
RM692C1	23-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1 U	1 U	NC
RM692C1	23-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1 U	1 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.84 U	0.84 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.84 U	0.84 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.84 U	0.84 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.84 U	0.84 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.84 U	0.84 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.84 U	0.84 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.41 U	0.41 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.41 U	0.41 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.41 U	0.41 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.41 U	0.41 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.41 U	0.41 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.41 U	0.41 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.84 U	0.84 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.41 U	0.41 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.84 U	0.84 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.84 U	0.84 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.84 U	0.84 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.84 U	0.84 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.84 U	0.84 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.41 U	0.41 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.41 U	0.41 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM692C1	23-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.41 U	0.41 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.41 U	0.41 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.41 U	0.41 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.41 U	0.41 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	4.1 U	4.1 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.41 U	0.41 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	41 U	41 U	NC
RM692C1	23-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.41 U	0.41 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	260 U	260 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	260 UJ	260 UJ	NC
RM692C1	23-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	260 U	260 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	260 U	260 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	260 U	260 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	260 U	260 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	260 U	260 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	100 UR	100 UR	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	260 UJ	260 UJ	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	100 UJ	100 UJ	NC
RM692C1	23-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	100 U	100 U	NC
RM692C1	23-Apr-05	Dioxins and Furans	% Moisture	%	20.3	25.2	21.5%
RM692C1	23-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	4.21	1.62 J	88.9%
RM692C1	23-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	0.867 J	0.342 J	86.8%
RM692C1	23-Apr-05	Dioxins and Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	0.0711 J	0.0353 J	67.3%
RM692C1	23-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	0.0917 J	0.0504 U	NC
RM692C1	23-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	0.119 J	0.0517 U	NC
RM692C1	23-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	0.238 J	0.102 U	NC
RM692C1	23-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	0.0744 J	0.0386 J	63.4%
RM692C1	23-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	0.134 J	0.0517 J	88.6%
RM692C1	23-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	PG/G	0.0492 J	0.064 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM692C1	23-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	0.0697 J	0.0366 J	62.3%
RM692C1	23-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	0.0956 U	0.0477 U	NC
RM692C1	23-Apr-05	Dioxins and Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	0.093 J	0.0405 U	NC
RM692C1	23-Apr-05	Dioxins and Furans	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	0.182 J	0.0948 J	63.0%
RM692C1	23-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	0.134 J	0.0726 U	NC
RM692C1	23-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzofuran	PG/G	4.04	2	67.5%
RM692C1	23-Apr-05	Dioxins and Furans	Heptachlorodibenzodioxin (Total)	PG/G	8.8	3.41	88.3%
RM692C1	23-Apr-05	Dioxins and Furans	Heptachlorodibenzofuran (Total)	PG/G	2.52	0.988	87.3%
RM692C1	23-Apr-05	Dioxins and Furans	Hexachlorodibenzodioxin (Total)	PG/G	2.06	0.812	86.9%
RM692C1	23-Apr-05	Dioxins and Furans	Hexachlorodibenzofuran (Total)	PG/G	1.51	0.491	101.8%
RM692C1	23-Apr-05	Dioxins and Furans	Octachlorodibenzodioxin	PG/G	34.1	13	89.6%
RM692C1	23-Apr-05	Dioxins and Furans	Octachlorodibenzofuran	PG/G	2.53 J	0.999 J	86.8%
RM692C1	23-Apr-05	Dioxins and Furans	Pentachlorodibenzodioxin (Total)	PG/G	0.265	0.309	15.3%
RM692C1	23-Apr-05	Dioxins and Furans	Pentachlorodibenzofuran (Total)	PG/G	1.53 J	0.594 J	88.1%
RM692C1	23-Apr-05	Dioxins and Furans	TEQ WHO-98	PG/G	0.8342	0.3139	90.6%
RM692C1	23-Apr-05	Dioxins and Furans	Tetrachlorodibenzodioxin (Total)	PG/G	0.258	0.0484	136.8%
RM692C1	23-Apr-05	Dioxins and Furans	Tetrachlorodibenzofuran (Total)	PG/G	9.79	4.4	76.0%
RM692X2	9-Apr-05	415.1	Total organic carbon	mg/Kg	25900	29800	14.0%
RM692X2	9-Apr-05	ASTMD422	<200 Total	Percent	94.2	95.4	1.3%
RM692X2	9-Apr-05	ASTMD422	Clay	Percent	16.014	17.172	7.0%
RM692X2	9-Apr-05	ASTMD422	Co. Sand	Percent	0.4	0.2	66.7%
RM692X2	9-Apr-05	ASTMD422	Colloids	Percent	15.072	15.264	1.3%
RM692X2	9-Apr-05	ASTMD422	Fine Sand	Percent	4.6	3.6	24.4%
RM692X2	9-Apr-05	ASTMD422	Gravel	Percent	0.2	0.2	0.0%
RM692X2	9-Apr-05	ASTMD422	Med. Sand	Percent	0.6	0.6	0.0%
RM692X2	9-Apr-05	ASTMD422	Sand Total	Percent	5.6	4.4	24.0%
RM692X2	9-Apr-05	ASTMD422	Silt	Percent	63.114	62.964	0.2%
RM692X2	9-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	13500	13500	0.0%
RM692X2	9-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	2.1 J	1.6 J	27.0%
RM692X2	9-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	8.6	8.6	0.0%
RM692X2	9-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	401	396	1.3%
RM692X2	9-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	1.2	1.2	0.0%
RM692X2	9-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	3.5	3.4	2.9%
RM692X2	9-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	14200	13900	2.1%
RM692X2	9-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	31.8	32.1	0.9%
RM692X2	9-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	11.1 J	11.1	0.0%
RM692X2	9-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	100	95.3	4.8%
RM692X2	9-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	27500	28100	2.2%
RM692X2	9-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	152	150	1.3%
RM692X2	9-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	11700	11500	1.7%
RM692X2	9-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	439	447	1.8%
RM692X2	9-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.3	0.34	12.5%
RM692X2	9-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	25.1	24.9	0.8%
RM692X2	9-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1920	1900	1.0%
RM692X2	9-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	8.3 U	7.6 U	NC
RM692X2	9-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	2.4 U	2.2 U	NC
RM692X2	9-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	217 J	210 J	3.3%
RM692X2	9-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	5.9 U	5.4 U	NC
RM692X2	9-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	47.3 U	43.2 U	NC
RM692X2	9-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	41	42.1	2.6%
RM692X2	9-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	635 J	629 J	0.9%
RM692X2	9-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.8 J	0.8 J	0.0%
RM692X2	9-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	10 U	10 U	NC
RM692X2	9-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	10 U	10 U	NC
RM692X2	9-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	10 U	10 U	NC
RM692X2	9-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	2 J	2 J	0.0%
RM692X2	9-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	10 U	10 U	NC
RM692X2	9-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	10 U	10 U	NC
RM692X2	9-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	1 J	0.8 J	22.2%
RM692X2	9-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	10 U	10 U	NC
RM692X2	9-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	3 J	2 J	40.0%
RM692X2	9-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	10 U	10 U	NC
RM692X2	9-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	10 U	10 U	NC
RM692X2	9-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	4 J	2 J	66.7%
RM692X2	9-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	10 U	10 U	NC
RM692X2	9-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	10 U	10 U	NC
RM692X2	9-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	2 J	1 J	66.7%
RM692X2	9-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	2 J	2 J	0.0%
RM692X2	9-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	3 J	2 J	40.0%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM692X2	9-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	2 U	2.1 U	NC
RM692X2	9-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	7.9 U	8.4 U	NC
RM692X2	9-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	7.9 U	8.4 U	NC
RM692X2	9-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	2 U	2.1 U	NC
RM692X2	9-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	2 U	2.1 U	NC
RM692X2	9-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	2 U	2.1 U	NC
RM692X2	9-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	2 U	2.1 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	1.6 U	1.7 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	1.6 U	1.7 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	1.6 U	1.7 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	1.6 U	1.7 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	1.6 U	1.7 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	1.6 U	1.7 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.78 U	0.83 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.78 U	0.83 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.78 U	0.83 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.78 U	0.83 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.78 U	0.83 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.78 U	0.83 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	1.6 U	1.7 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.78 U	0.83 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	1.6 U	1.7 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	1.6 U	1.7 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	1.6 U	1.7 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	1.6 U	1.7 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	1.6 U	1.7 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.78 U	0.83 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.78 U	0.83 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.78 U	0.83 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.78 U	0.83 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.78 U	0.83 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.78 U	0.83 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	7.8 U	8.3 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.78 U	0.83 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	78 U	83 U	NC
RM692X2	9-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.78 U	0.83 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	500 U	520 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	500 U	520 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	500 U	520 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	500 U	520 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	500 U	520 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	500 U	520 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	500 U	520 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	200 UJ	210 UJ	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	200 U	210 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM692X2	9-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	500 U	520 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	200 U	210 U	NC
RM692X2	9-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	200 U	210 U	NC
RM697B3	13-Apr-05	415.1	Total organic carbon	mg/Kg	23200	21900	5.8%
RM697B3	13-Apr-05	ASTMD422	<200 Total	Percent	86.2162	86.8571	0.7%
RM697B3	13-Apr-05	ASTMD422	Clay	Percent	22.1366	19.8531	10.9%
RM697B3	13-Apr-05	ASTMD422	Co. Sand	Percent	1.08108	1.42857	27.7%
RM697B3	13-Apr-05	ASTMD422	Colloids	Percent	5.82542	6.20408	6.3%
RM697B3	13-Apr-05	ASTMD422	Fine Sand	Percent	10	9.14286	9.0%
RM697B3	13-Apr-05	ASTMD422	Gravel	Percent	0	0.3	200.0%
RM697B3	13-Apr-05	ASTMD422	Med. Sand	Percent	2.7027	2.28571	16.7%
RM697B3	13-Apr-05	ASTMD422	Sand Total	Percent	13.7838	12.8571	7.0%
RM697B3	13-Apr-05	ASTMD422	Silt	Percent	58.2542	60.8	4.3%
RM697B3	13-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	13000	14100	8.1%
RM697B3	13-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	1.8 J	2.5 J	32.6%
RM697B3	13-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	2.3	1.9	19.0%
RM697B3	13-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	232	246	5.9%
RM697B3	13-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	1.2 J	1.3	8.0%
RM697B3	13-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	7.8	8.4	7.4%
RM697B3	13-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	5670	6150	8.1%
RM697B3	13-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	24.8	26.4	6.2%
RM697B3	13-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	8.7	9.2	5.6%
RM697B3	13-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	34	35.4	4.0%
RM697B3	13-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	18100	20000	10.0%
RM697B3	13-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	222	233	4.8%
RM697B3	13-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	5220	5530	5.8%
RM697B3	13-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	267	266	0.4%
RM697B3	13-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.8 J	0.87	8.4%
RM697B3	13-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	19.7	20.4	3.5%
RM697B3	13-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	2260	2390	5.6%
RM697B3	13-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	5.3 UR	5.8 UR	NC
RM697B3	13-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.5 UJ	1.7 UJ	NC
RM697B3	13-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	242 J	263 J	8.3%
RM697B3	13-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	3.8 U	4.2 U	NC
RM697B3	13-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	30.2 U	33.3 U	NC
RM697B3	13-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	29	31.4	7.9%
RM697B3	13-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	700	728	3.9%
RM697B3	13-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.6 J	0.6 J	0.0%
RM697B3	13-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	7 UJ	7 U	NC
RM697B3	13-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	7 U	7 U	NC
RM697B3	13-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	7 U	7 U	NC
RM697B3	13-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	0.6 J	0.6 J	0.0%
RM697B3	13-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	0.6 J	0.6 J	0.0%
RM697B3	13-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	0.8 J	0.6 J	28.6%
RM697B3	13-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	7 U	7 U	NC
RM697B3	13-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	0.6 J	7 U	NC
RM697B3	13-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	0.8 J	0.9 J	11.8%
RM697B3	13-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	7 U	7 U	NC
RM697B3	13-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	7 UJ	7 U	NC
RM697B3	13-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	1 J	0.9 J	10.5%
RM697B3	13-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	7 UJ	7 U	NC
RM697B3	13-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	7 U	7 U	NC
RM697B3	13-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	0.8 U	0.9 U	NC
RM697B3	13-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	1 J	0.9 J	10.5%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM697B3	13-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	0.8 J	0.6 J	28.6%
RM697B3	13-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1.4 U	1.4 U	NC
RM697B3	13-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	5.7 U	5.8 U	NC
RM697B3	13-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	5.7 U	5.8 U	NC
RM697B3	13-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1.4 U	1.4 U	NC
RM697B3	13-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1.4 U	1.4 U	NC
RM697B3	13-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1.4 U	1.4 U	NC
RM697B3	13-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1.4 U	1.4 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	1.1 U	1.2 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	1.1 U	1.2 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	1.1 U	1.2 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	1.1 U	1.2 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	1.1 U	1.2 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	1.1 U	1.2 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.56 U	0.57 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.56 U	0.57 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.56 U	0.57 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.56 U	0.57 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.56 U	0.57 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.56 U	0.57 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	1.1 U	1.2 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.56 U	0.57 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	1.1 U	1.2 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	1.1 U	1.2 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	1.1 U	1.2 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	1.1 U	1.2 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	1.1 U	1.2 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.56 U	0.57 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.56 U	0.57 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.56 U	0.57 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.56 U	0.57 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.56 U	0.57 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.56 U	0.57 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	5.6 U	5.7 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.56 U	0.57 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	56 U	57 U	NC
RM697B3	13-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.56 U	0.57 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	360 U	360 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	360 U	360 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	360 U	360 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	360 U	360 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	360 U	360 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	360 U	360 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	360 U	360 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	140 UJ	140 UJ	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM697B3	13-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	360 U	360 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	140 U	140 U	NC
RM697B3	13-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	8.58	9.89	14.2%
RM697B3	13-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	1.74	1.88	7.7%
RM697B3	13-Apr-05	Dioxins and Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	0.208 U	0.229 J	NC
RM697B3	13-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	0.178 J	0.31 J	54.1%
RM697B3	13-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	0.241 J	0.288 U	NC
RM697B3	13-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	0.772 J	0.859 U	NC
RM697B3	13-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	0.189 J	0.215 J	12.9%
RM697B3	13-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	0.514 U	0.535 U	NC
RM697B3	13-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	PG/G	0.213 U	0.15 U	NC
RM697B3	13-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	0.262 J	0.277 J	5.6%
RM697B3	13-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	0.243 J	0.25 J	2.8%
RM697B3	13-Apr-05	Dioxins and Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	0.21 U	0.238 J	NC
RM697B3	13-Apr-05	Dioxins and Furans	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	0.465 J	0.474 J	1.9%
RM697B3	13-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	0.245 J	0.255 U	NC
RM697B3	13-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzofuran	PG/G	16.1	15.5	3.8%
RM697B3	13-Apr-05	Dioxins and Furans	Heptachlorodibenzodioxin (Total)	PG/G	19.1 J	21.6 J	12.3%
RM697B3	13-Apr-05	Dioxins and Furans	Heptachlorodibenzofuran (Total)	PG/G	4.03	4.88	19.1%
RM697B3	13-Apr-05	Dioxins and Furans	Hexachlorodibenzodioxin (Total)	PG/G	6.23	5.85	6.3%
RM697B3	13-Apr-05	Dioxins and Furans	Hexachlorodibenzofuran (Total)	PG/G	2.26	3.16	33.2%
RM697B3	13-Apr-05	Dioxins and Furans	Octachlorodibenzodioxin	PG/G	50.9	85.2	50.4%
RM697B3	13-Apr-05	Dioxins and Furans	Octachlorodibenzofuran	PG/G	4.16	4.85	15.3%
RM697B3	13-Apr-05	Dioxins and Furans	Pentachlorodibenzodioxin (Total)	PG/G	0.999	1.28	24.7%
RM697B3	13-Apr-05	Dioxins and Furans	Pentachlorodibenzofuran (Total)	PG/G	3.11	3.43	9.8%
RM697B3	13-Apr-05	Dioxins and Furans	TEQ WHO-98	PG/G	2.6	2.287	12.8%
RM697B3	13-Apr-05	Dioxins and Furans	Tetrachlorodibenzodioxin (Total)	PG/G	0.723	0.19 U	NC
RM697B3	13-Apr-05	Dioxins and Furans	Tetrachlorodibenzofuran (Total)	PG/G	29.8	29.2	2.0%
RM700B3L	12-Apr-05	415.1	Total organic carbon	mg/Kg	472	422	11.2%
RM700B3L	12-Apr-05	ASTMD422	<200 Total	Percent	2	2	0.0%
RM700B3L	12-Apr-05	ASTMD422	Clay	Percent	0	0	0.0%
RM700B3L	12-Apr-05	ASTMD422	Co. Sand	Percent	5.9	5.1	14.5%
RM700B3L	12-Apr-05	ASTMD422	Colloids	Percent	0	0	0.0%
RM700B3L	12-Apr-05	ASTMD422	Fine Sand	Percent	33.2	27.3	19.5%
RM700B3L	12-Apr-05	ASTMD422	Gravel	Percent	15.2	27.3	56.9%
RM700B3L	12-Apr-05	ASTMD422	Med. Sand	Percent	43.7	38.3	13.2%
RM700B3L	12-Apr-05	ASTMD422	Sand Total	Percent	82.8	70.7	15.8%
RM700B3L	12-Apr-05	ASTMD422	Silt	Percent	2	2	0.0%
RM700B3L	12-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	4730	4190	12.1%
RM700B3L	12-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	0.45 UJ	0.57 UJ	NC
RM700B3L	12-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	1.5	1.8	18.2%
RM700B3L	12-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	36.9 J	42.1 J	13.2%
RM700B3L	12-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.35 J	0.27 J	25.8%
RM700B3L	12-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	0.19 J	0.12 J	45.2%
RM700B3L	12-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	2430	14800	143.6%
RM700B3L	12-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	10.3 J	9 J	13.5%
RM700B3L	12-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	3.8 J	2.9 J	26.9%
RM700B3L	12-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	10	8.9	11.6%
RM700B3L	12-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	10100	8760	14.2%
RM700B3L	12-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	7.6	6	23.5%
RM700B3L	12-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	3100	2540	19.9%
RM700B3L	12-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	147	130	12.3%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM700B3L	12-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.004 J	0.098 U	NC
RM700B3L	12-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	8.2	6.9	17.2%
RM700B3L	12-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	503	562	11.1%
RM700B3L	12-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	0.85 R	3.5 UR	NC
RM700B3L	12-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	0.9 U	1 U	NC
RM700B3L	12-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	98.1 U	98.8 U	NC
RM700B3L	12-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	2.2 U	2.5 U	NC
RM700B3L	12-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	17.9 UJ	20 UJ	NC
RM700B3L	12-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	20	18.7	6.7%
RM700B3L	12-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	40.2	33.3	18.8%
RM700B3L	12-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	4 U	4 U	NC
RM700B3L	12-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	4 U	4 U	NC
RM700B3L	12-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	4 U	4 U	NC
RM700B3L	12-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	4 U	4 U	NC
RM700B3L	12-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	4 U	4 U	NC
RM700B3L	12-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	4 U	4 U	NC
RM700B3L	12-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	4 U	4 U	NC
RM700B3L	12-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	4 U	4 U	NC
RM700B3L	12-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	4 U	4 U	NC
RM700B3L	12-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	4 U	0.2 J	NC
RM700B3L	12-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	4 U	4 U	NC
RM700B3L	12-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	4 U	4 U	NC
RM700B3L	12-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	4 U	4 U	NC
RM700B3L	12-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	4 U	4 U	NC
RM700B3L	12-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	4 U	4 U	NC
RM700B3L	12-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	3.5 U	3.6 U	NC
RM700B3L	12-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	4 U	4 U	NC
RM700B3L	12-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	4 U	0.2 J	NC
RM700B3L	12-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	0.86 U	0.85 U	NC
RM700B3L	12-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	3.5 U	3.4 U	NC
RM700B3L	12-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	3.5 U	3.4 U	NC
RM700B3L	12-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	0.86 U	0.85 U	NC
RM700B3L	12-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	0.86 U	0.85 U	NC
RM700B3L	12-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	0.86 U	0.85 U	NC
RM700B3L	12-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	0.86 U	0.85 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.7 U	0.69 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.7 U	0.69 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.7 U	0.69 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.7 U	0.69 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.7 U	0.69 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.7 U	0.69 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.34 U	0.34 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.34 U	0.34 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.34 U	0.34 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.34 U	0.34 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.34 U	0.34 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.34 U	0.34 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.7 U	0.69 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.34 U	0.34 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.7 U	0.69 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.7 U	0.69 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.7 U	0.69 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.7 U	0.69 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.7 U	0.69 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.34 U	0.34 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.34 U	0.34 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.34 U	0.34 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.34 U	0.34 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.34 U	0.34 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.34 U	0.34 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	3.4 U	3.4 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.34 U	0.34 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	34 U	34 U	NC
RM700B3L	12-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.34 U	0.34 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	85 U	85 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM700B3L	12-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	220 U	220 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	220 U	220 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	220 U	220 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	220 U	220 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	220 U	220 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	220 U	220 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	220 U	220 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	85 UJ	85 UJ	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	220 U	220 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	85 U	85 U	NC
RM700B3L	12-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	85 U	85 U	NC
RM704X3	8-Apr-05	415.1	Total organic carbon	mg/Kg	4730	4560	3.7%
RM704X3	8-Apr-05	ASTMD422	<200 Total	Percent	58.6	52	11.9%
RM704X3	8-Apr-05	ASTMD422	Clay	Percent	4.102	3.64	11.9%
RM704X3	8-Apr-05	ASTMD422	Co. Sand	Percent	0	0	0.0%
RM704X3	8-Apr-05	ASTMD422	Colloids	Percent	0.586	0.52	11.9%
RM704X3	8-Apr-05	ASTMD422	Fine Sand	Percent	40.8	47.4	15.0%
RM704X3	8-Apr-05	ASTMD422	Gravel	Percent	0	0	0.0%
RM704X3	8-Apr-05	ASTMD422	Med. Sand	Percent	0.6	0.6	0.0%
RM704X3	8-Apr-05	ASTMD422	Sand Total	Percent	41.4	48	14.8%
RM704X3	8-Apr-05	ASTMD422	Silt	Percent	53.912	47.84	11.9%
RM704X3	8-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	7120	6350	11.4%
RM704X3	8-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	7.6 UR	7.9 UR	NC
RM704X3	8-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	10	6.8	38.1%
RM704X3	8-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	853	863	1.2%
RM704X3	8-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.64	0.58 J	9.8%
RM704X3	8-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	4.7	4	16.1%
RM704X3	8-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	34900	30700	12.8%
RM704X3	8-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	17.8	16.6	7.0%
RM704X3	8-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	5.1 J	4.3 J	17.0%
RM704X3	8-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	42.4	35.9	16.6%
RM704X3	8-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	21000	19100	9.5%
RM704X3	8-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	254	216	16.2%
RM704X3	8-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	21200	18400	14.1%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM704X3	8-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	364	316	14.1%
RM704X3	8-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.62	0.92	39.0%
RM704X3	8-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	17.2	14.9	14.3%
RM704X3	8-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1310	1130	14.8%
RM704X3	8-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	4.4 UR	4.6 UR	NC
RM704X3	8-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.3 UJ	1.3 UJ	NC
RM704X3	8-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	125 J	106 J	16.5%
RM704X3	8-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	3.2 UJ	3.3 UJ	NC
RM704X3	8-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	25.3 UJ	26.4 UJ	NC
RM704X3	8-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	28.5	27.8	2.5%
RM704X3	8-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	896	743	18.7%
RM704X3	8-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.4 J	0.9 J	76.9%
RM704X3	8-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	6 U	6 U	NC
RM704X3	8-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	6 U	6 U	NC
RM704X3	8-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	6 U	6 U	NC
RM704X3	8-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	0.4 J	0.7 J	54.5%
RM704X3	8-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	6 U	6 U	NC
RM704X3	8-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	6 U	6 U	NC
RM704X3	8-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	6 U	0.7 J	NC
RM704X3	8-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	6 U	6 U	NC
RM704X3	8-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	0.7 J	0.9 J	25.0%
RM704X3	8-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	6 U	6 U	NC
RM704X3	8-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	0.2 J	0.4 J	66.7%
RM704X3	8-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	1 J	1 J	0.0%
RM704X3	8-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	6 U	6 U	NC
RM704X3	8-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	6 U	0.7 J	NC
RM704X3	8-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	4.5 U	1 J	NC
RM704X3	8-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	0.9 J	1 J	10.5%
RM704X3	8-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	0.9 J	0.9 J	0.0%
RM704X3	8-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1.1 U	1.1 U	NC
RM704X3	8-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	4.4 U	4.5 U	NC
RM704X3	8-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	4.4 U	4.5 U	NC
RM704X3	8-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1.1 U	1.1 U	NC
RM704X3	8-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1.1 U	1.1 U	NC
RM704X3	8-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1.1 U	1.1 U	NC
RM704X3	8-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1.1 U	1.1 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.88 U	0.89 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.88 U	0.89 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.88 U	0.89 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.88 U	0.89 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.88 U	0.89 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.88 U	0.89 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.43 U	0.44 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.43 U	0.44 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.43 U	0.44 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.43 U	0.44 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.43 U	0.44 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.43 U	0.44 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.88 U	0.89 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.43 U	0.44 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.88 U	0.89 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.88 U	0.89 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.88 U	0.89 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.88 U	0.89 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.88 U	0.89 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.43 U	0.44 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.43 U	0.44 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.43 U	0.44 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.43 U	0.44 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.43 U	0.44 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.43 U	0.44 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	4.3 U	4.4 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.43 U	0.44 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	43 U	44 U	NC
RM704X3	8-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.43 U	0.44 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	110 U	110 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM704X3	8-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	280 U	280 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	280 U	280 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	280 U	280 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	280 U	280 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	280 U	280 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	280 U	280 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	280 U	280 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	110 UJ	110 UJ	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	280 U	280 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	110 U	110 U	NC
RM704X3	8-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	110 U	110 U	NC
RM708B1	7-Apr-05	415.1	Total organic carbon	mg/Kg	3410	4990	37.6%
RM708B1	7-Apr-05	ASTMD422	<200 Total	Percent	35.2778	35.3125	0.1%
RM708B1	7-Apr-05	ASTMD422	Clay	Percent	1.46991	0.55176	90.8%
RM708B1	7-Apr-05	ASTMD422	Co. Sand	Percent	6.38889	6.875	7.3%
RM708B1	7-Apr-05	ASTMD422	Colloids	Percent	0	0	0.0%
RM708B1	7-Apr-05	ASTMD422	Fine Sand	Percent	47.5	45.9375	3.3%
RM708B1	7-Apr-05	ASTMD422	Gravel	Percent	0	0.9	200.0%
RM708B1	7-Apr-05	ASTMD422	Med. Sand	Percent	10.8333	10.9375	1.0%
RM708B1	7-Apr-05	ASTMD422	Sand Total	Percent	64.7222	63.75	1.5%
RM708B1	7-Apr-05	ASTMD422	Silt	Percent	33.8079	34.7607	2.8%
RM708B1	7-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	7310	6630	9.8%
RM708B1	7-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	6.2 UJ	0.52 J	NC
RM708B1	7-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	3.9 U	4.1 U	NC
RM708B1	7-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	101	102	1.0%
RM708B1	7-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.36 J	0.32 J	11.8%
RM708B1	7-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	1.6	1.3	20.7%
RM708B1	7-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	7110	8430	17.0%
RM708B1	7-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	14	13	7.4%
RM708B1	7-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	5.2	5.5	5.6%
RM708B1	7-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	14.1	14.6	3.5%
RM708B1	7-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	12700	13300	4.6%
RM708B1	7-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	52.3	45.9	13.0%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM708B1	7-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	4220	4750	11.8%
RM708B1	7-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	170	183	7.4%
RM708B1	7-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.078 J	0.061 J	24.5%
RM708B1	7-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	12.9	12.3	4.8%
RM708B1	7-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1070	991	7.7%
RM708B1	7-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	3.6 U	2.3 J	NC
RM708B1	7-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1 U	1.1 U	NC
RM708B1	7-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	95.9 J	56.7 J	51.4%
RM708B1	7-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	2.6 U	2.6 U	NC
RM708B1	7-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	7.5 J	21 U	NC
RM708B1	7-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	18.6	21.5	14.5%
RM708B1	7-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	186 J	178 J	4.4%
RM708B1	7-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	1 J	0.9 J	10.5%
RM708B1	7-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	0.3 J	0.2 J	40.0%
RM708B1	7-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	13 U	12 U	NC
RM708B1	7-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	13 U	12 U	NC
RM708B1	7-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	2 J	0.7 J	96.3%
RM708B1	7-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	0.5 J	0.5 J	0.0%
RM708B1	7-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	1 J	1 J	0.0%
RM708B1	7-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	0.5 J	0.2 J	85.7%
RM708B1	7-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	13 UJ	12 UJ	NC
RM708B1	7-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	2 J	1 J	66.7%
RM708B1	7-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	0.5 J	0.5 J	0.0%
RM708B1	7-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	0.3 J	12 U	NC
RM708B1	7-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	13 U	0.7 J	NC
RM708B1	7-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	0.3 J	0.2 J	40.0%
RM708B1	7-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	0.3 J	0.7 J	80.0%
RM708B1	7-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	7	7	0.0%
RM708B1	7-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	1 J	1 J	0.0%
RM708B1	7-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	1 J	0.7 J	35.3%
RM708B1	7-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1.2 U	1.2 U	NC
RM708B1	7-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	5 U	4.7 U	NC
RM708B1	7-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	5 U	4.7 U	NC
RM708B1	7-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1.2 U	1.2 U	NC
RM708B1	7-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1.2 U	1.2 U	NC
RM708B1	7-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1.2 U	1.2 U	NC
RM708B1	7-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1.2 U	1.2 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	1 U	0.94 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	1 U	0.94 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	1 U	0.94 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	1 U	0.94 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	1 U	0.94 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	1 U	0.94 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.5 U	0.46 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.5 U	0.46 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.5 U	0.46 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.5 U	0.46 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.5 U	0.46 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.5 U	0.46 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	1 U	0.94 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.5 U	0.46 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	1 U	0.94 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	1 U	0.94 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	1 U	0.94 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	1 U	0.94 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	1 U	0.94 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.5 U	0.46 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.5 U	0.46 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.5 U	0.46 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.5 U	0.46 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.5 U	0.46 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.5 U	0.46 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	5 U	4.6 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.5 U	0.46 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	50 U	46 U	NC
RM708B1	7-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.5 U	0.46 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	130 U	120 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM708B1	7-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	320 U	290 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	320 U	290 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	320 U	290 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	320 U	290 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	320 U	290 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	320 U	290 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	320 U	290 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	130 UJ	120 UJ	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	320 U	290 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	130 U	120 U	NC
RM708B1	7-Apr-05	Dioxins and Furans	% Moisture	%	12.4	12.7	2.4%
RM708B1	7-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	1.43 J	1.5 J	4.8%
RM708B1	7-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	0.393 J	0.41 U	NC
RM708B1	7-Apr-05	Dioxins and Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	0.123 U	0.0626 U	NC
RM708B1	7-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	0.0762 U	0.0538 U	NC
RM708B1	7-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	0.0516 U	0.0509 U	NC
RM708B1	7-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	0.0968 U	0.105 U	NC
RM708B1	7-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	0.0529 J	0.0476 U	NC
RM708B1	7-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	0.0752 U	0.0793 J	NC
RM708B1	7-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	PG/G	0.0642 U	0.0421 U	NC
RM708B1	7-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	0.0446 U	0.0308 U	NC
RM708B1	7-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	0.0432 U	0.0377 U	NC
RM708B1	7-Apr-05	Dioxins and Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	0.0561 U	0.0621 U	NC
RM708B1	7-Apr-05	Dioxins and Furans	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	0.0774 J	0.0879 J	12.7%
RM708B1	7-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	0.0397 U	0.0635 U	NC
RM708B1	7-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzofuran	PG/G	1.15	1.17	1.7%
RM708B1	7-Apr-05	Dioxins and Furans	Heptachlorodibenzodioxin (Total)	PG/G	2.84	3.07	7.8%
RM708B1	7-Apr-05	Dioxins and Furans	Heptachlorodibenzofuran (Total)	PG/G	0.617 J	0.889 J	36.1%
RM708B1	7-Apr-05	Dioxins and Furans	Hexachlorodibenzodioxin (Total)	PG/G	0.332	0.872	89.7%
RM708B1	7-Apr-05	Dioxins and Furans	Hexachlorodibenzofuran (Total)	PG/G	0.493	0.64	25.9%
RM708B1	7-Apr-05	Dioxins and Furans	Octachlorodibenzodioxin	PG/G	10.3	10.3	0.0%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM708B1	7-Apr-05	Dioxins and Furans	Octachlorodibenzofuran	PG/G	0.673 J	0.829 J	20.8%
RM708B1	7-Apr-05	Dioxins and Furans	Pentachlorodibenzodioxin (Total)	PG/G	0.0446 U	0.0308 U	NC
RM708B1	7-Apr-05	Dioxins and Furans	Pentachlorodibenzofuran (Total)	PG/G	0.526 J	0.504 J	4.3%
RM708B1	7-Apr-05	Dioxins and Furans	TEQ WHO-98	PG/G	0.276	0.1853	39.3%
RM708B1	7-Apr-05	Dioxins and Furans	Tetrachlorodibenzodioxin (Total)	PG/G	0.0397 U	0.0408 U	NC
RM708B1	7-Apr-05	Dioxins and Furans	Tetrachlorodibenzofuran (Total)	PG/G	2.32	2.27	2.2%
RM710X3	16-Apr-05	415.1	Total organic carbon	mg/Kg	7480	7800 J	4.2%
RM710X3	16-Apr-05	ASTMD422	<200 Total	Percent	16.6	16.8	1.2%
RM710X3	16-Apr-05	ASTMD422	Clay	Percent	0.498	0.672	29.7%
RM710X3	16-Apr-05	ASTMD422	Co. Sand	Percent	0.8	1	22.2%
RM710X3	16-Apr-05	ASTMD422	Colloids	Percent	0	3.864	200.0%
RM710X3	16-Apr-05	ASTMD422	Fine Sand	Percent	75.4	74.2	1.6%
RM710X3	16-Apr-05	ASTMD422	Gravel	Percent	0	0.2	200.0%
RM710X3	16-Apr-05	ASTMD422	Med. Sand	Percent	7.2	7.8	8.0%
RM710X3	16-Apr-05	ASTMD422	Sand Total	Percent	83.4	83	0.5%
RM710X3	16-Apr-05	ASTMD422	Silt	Percent	16.102	12.264	27.1%
RM710X3	16-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	11700	11200	4.4%
RM710X3	16-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	1.5 UR	1.9 J	NC
RM710X3	16-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	5.3	3.9	30.4%
RM710X3	16-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	120	123	2.5%
RM710X3	16-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.69 J	0.7 J	1.4%
RM710X3	16-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	1.1	1.4	24.0%
RM710X3	16-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	2560	2620	2.3%
RM710X3	16-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	14.3	14	2.1%
RM710X3	16-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	5.2 J	4.9 J	5.9%
RM710X3	16-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	13.9	14.8	6.3%
RM710X3	16-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	15400 J	13900 J	10.2%
RM710X3	16-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	85.3	92.4	8.0%
RM710X3	16-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	3000	2940	2.0%
RM710X3	16-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	214	199	7.3%
RM710X3	16-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.11 J	0.11 J	0.0%
RM710X3	16-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	10.8	10.9	0.9%
RM710X3	16-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	933	917	1.7%
RM710X3	16-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	3.9 UR	3.8 UR	NC
RM710X3	16-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.1 U	1.1 U	NC
RM710X3	16-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	124 J	125 J	0.8%
RM710X3	16-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	2.8 UJ	2.7 UJ	NC
RM710X3	16-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	22 UJ	21.9 UJ	NC
RM710X3	16-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	25.4	22.3	13.0%
RM710X3	16-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	182	188	3.2%
RM710X3	16-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.2 J	0.2 J	0.0%
RM710X3	16-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	5 U	5 U	NC
RM710X3	16-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	5 U	5 U	NC
RM710X3	16-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	0.4 J	5 U	NC
RM710X3	16-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	5 U	5 U	NC
RM710X3	16-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	5 U	5 U	NC
RM710X3	16-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	5 U	5 U	NC
RM710X3	16-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	5 U	5 U	NC
RM710X3	16-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	5 U	5 U	NC
RM710X3	16-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	5 U	0.2 J	NC
RM710X3	16-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	5 U	5 U	NC
RM710X3	16-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	5 U	5 U	NC
RM710X3	16-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	5 U	0.2 J	NC
RM710X3	16-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	5 U	5 U	NC
RM710X3	16-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	5 U	5 U	NC
RM710X3	16-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	4 U	4.1 U	NC
RM710X3	16-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	0.4 J	0.4 J	0.0%
RM710X3	16-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	5 U	5 U	NC
RM710X3	16-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	0.98 U	1 U	NC
RM710X3	16-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	4 U	4 U	NC
RM710X3	16-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	4 U	4 U	NC
RM710X3	16-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	0.98 U	1 U	NC
RM710X3	16-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	0.98 U	1 U	NC
RM710X3	16-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	0.98 U	1 U	NC
RM710X3	16-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	0.98 U	1 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.79 U	0.8 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.79 U	0.8 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.79 U	0.8 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.79 U	0.8 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM710X3	16-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.79 U	0.8 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.79 U	0.8 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.39 U	0.4 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.39 U	0.4 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.39 U	0.4 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.39 U	0.4 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.39 U	0.4 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.39 U	0.4 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.79 U	0.8 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.39 U	0.4 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.79 U	0.8 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.79 U	0.8 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.79 U	0.8 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.79 U	0.8 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.79 U	0.8 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.39 U	0.4 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.39 U	0.4 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.39 U	0.4 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.39 U	0.4 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.39 U	0.4 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.39 U	0.4 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	3.9 U	4 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.39 U	0.4 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	39 U	40 U	NC
RM710X3	16-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.39 U	0.4 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	250 U	250 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	250 U	250 UR	NC
RM710X3	16-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	250 U	250 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	250 U	250 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	250 U	250 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	250 U	250 UJ	NC
RM710X3	16-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	250 U	250 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	98 UR	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	98 U	100 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM710X3	16-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	250 U	250 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	98 U	100 U	NC
RM710X3	16-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	98 U	100 U	NC
RM713A1(X	23-Apr-05	415.1	Total organic carbon	mg/Kg	8710	9320	6.8%
RM713A1(X	23-Apr-05	ASTMD422	<200 Total	Percent	35	33	5.9%
RM713A1(X	23-Apr-05	ASTMD422	Clay	Percent	1.4	1.65	16.4%
RM713A1(X	23-Apr-05	ASTMD422	Co. Sand	Percent	2	1.2	50.0%
RM713A1(X	23-Apr-05	ASTMD422	Colloids	Percent	0.7	0.66	5.9%
RM713A1(X	23-Apr-05	ASTMD422	Fine Sand	Percent	60.8	60.2	1.0%
RM713A1(X	23-Apr-05	ASTMD422	Gravel	Percent	0	3.4	200.0%
RM713A1(X	23-Apr-05	ASTMD422	Med. Sand	Percent	2.2	2.2	0.0%
RM713A1(X	23-Apr-05	ASTMD422	Sand Total	Percent	65	63.6	2.2%
RM713A1(X	23-Apr-05	ASTMD422	Silt	Percent	32.9	30.69	7.0%
RM713A1(X	23-Apr-05	AVS/SEM	Antimony-SEM	umol/g	0.00164 U	0.00419	NC
RM713A1(X	23-Apr-05	AVS/SEM	Cadmium-SEM	umol/g	0.01512	0.01423	6.1%
RM713A1(X	23-Apr-05	AVS/SEM	Chromium-SEM	umol/g	0.10385	0.05577	60.2%
RM713A1(X	23-Apr-05	AVS/SEM	Copper-SEM	umol/g	1.00557	0.45321	75.7%
RM713A1(X	23-Apr-05	AVS/SEM	Lead-SEM	umol/g	0.83012 J	0.58398 J	34.8%
RM713A1(X	23-Apr-05	AVS/SEM	Mercury-SEM	umol/g	1.3E-05	8.5E-06 U	NC
RM713A1(X	23-Apr-05	AVS/SEM	Nickel-SEM	umol/g	1.80548	0.0494 U	NC
RM713A1(X	23-Apr-05	AVS/SEM	Sulfide-AVS	umol/g	0.084 J	0.16	62.3%
RM713A1(X	23-Apr-05	AVS/SEM	Zinc-SEM	umol/g	6.50145	5.15527	23.1%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	7810	5970	26.7%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	10.6 UJ	9.7 UJ	NC
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	6	3.2	60.9%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	291	243	18.0%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.92	0.73 J	23.0%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	3.6	2.1	52.6%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	9510	7840	19.3%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	22.7	18	23.1%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	8.2 J	6.3 J	26.2%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	80.3	49.6	47.3%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	19100	16100	17.0%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	183	113	47.3%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	7830	6190	23.4%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	294 J	253 J	15.0%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.65 J	0.45 J	36.4%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	18.4	13.6	30.0%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1420	1130	22.7%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	7	4.6 J	41.4%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.8 UJ	1.6 UJ	NC
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	126 J	122 J	3.2%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	4.4 U	4.1 U	NC
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	35.4 U	32.4 U	NC
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	29.7	26.4	11.8%
RM713A1(X	23-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	643	434	38.8%
RM713A1(X	23-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	1 J	1 J	0.0%
RM713A1(X	23-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	7 U	6 U	NC
RM713A1(X	23-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	7 U	6 U	NC
RM713A1(X	23-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	7 U	6 U	NC
RM713A1(X	23-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	1 J	0.5 J	66.7%
RM713A1(X	23-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	1 J	0.7 J	35.3%
RM713A1(X	23-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	7 U	6 U	NC
RM713A1(X	23-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	0.8 J	0.7 J	13.3%
RM713A1(X	23-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	7 U	6 U	NC
RM713A1(X	23-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	2 J	1 J	66.7%
RM713A1(X	23-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	7 U	6 U	NC
RM713A1(X	23-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	7 U	0.5 J	NC
RM713A1(X	23-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	2 J	2 J	0.0%
RM713A1(X	23-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	7 U	6 U	NC
RM713A1(X	23-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	1 J	0.7 J	35.3%
RM713A1(X	23-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	2 J	1 J	66.7%
RM713A1(X	23-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	2 J	2 J	0.0%
RM713A1(X	23-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	2 J	1 J	66.7%
RM713A1(X	23-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1.3 U	1.2 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM713A1(X	23-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	5.4 U	5 U	NC
RM713A1(X	23-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	5.4 U	5 U	NC
RM713A1(X	23-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1.3 U	1.2 U	NC
RM713A1(X	23-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1.3 U	1.2 U	NC
RM713A1(X	23-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1.3 U	1.2 U	NC
RM713A1(X	23-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1.3 U	1.2 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	1.1 U	1 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	1.1 U	1 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	1.1 U	1 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	1.1 U	1 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.12 J	0.11 J	8.7%
RM713A1(X	23-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	1.1 U	1 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.53 U	0.49 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.53 U	0.49 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.53 U	0.49 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.53 U	0.49 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.53 U	0.49 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.53 U	0.49 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	1.1 U	1 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.53 U	0.49 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	1.1 U	1 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	1.1 U	1 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	1.1 U	1 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	1.1 U	1 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	1.1 U	1 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.53 U	0.49 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.53 U	0.49 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.53 U	0.49 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.53 U	0.49 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.53 U	0.49 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.53 U	0.49 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	5.3 U	4.9 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.53 U	0.49 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	53 U	49 U	NC
RM713A1(X	23-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.53 U	0.49 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	340 U	320 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	340 UJ	320 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	340 U	320 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	340 U	320 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	340 U	320 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	340 U	320 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	340 U	320 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	130 UR	120 UR	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	130 U	120 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM713A1(X	23-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	130 U	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	340 UJ	320 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	130 UJ	120 U	NC
RM713A1(X	23-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	130 U	120 U	NC
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Aluminum	µg/L	44.9 J	200 U	NC
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Antimony	µg/L	60 U	60 U	NC
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Arsenic	µg/L	10 U	10 U	NC
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Barium	µg/L	326	259	22.9%
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Beryllium	µg/L	5 U	5 U	NC
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Cadmium	µg/L	5 U	5 U	NC
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Calcium	µg/L	58400	59400	1.7%
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Chromium	µg/L	1.6 J	1.8 J	11.8%
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Cobalt	µg/L	1.7 U	1.9 U	NC
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Copper	µg/L	5 J	3.3 J	41.0%
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Iron	µg/L	160 U	149 U	NC
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Lead	µg/L	2.3 J	10 U	NC
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Magnesium	µg/L	15000	15600	3.9%
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Manganese	µg/L	2070	2210	6.5%
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Mercury	µg/L	0.2 UJ	0.2 UJ	NC
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Nickel	µg/L	40 U	40 U	NC
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Potassium	µg/L	1990 J	2030 J	2.0%
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Selenium	µg/L	35 U	35 U	NC
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Silver	µg/L	10 U	10 U	NC
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Sodium	µg/L	3100 J	2990 J	3.6%
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Thallium	µg/L	25 U	25 U	NC
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Uranium	µg/L	200 U	200 U	NC
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Vanadium	µg/L	50 U	50 U	NC
RM713A1(X	8-May-05	CLP TAL TotMetals-PW	Zinc	µg/L	69.7	39.7 J	54.8%
RM715X1	15-Apr-05	415.1	Total organic carbon	mg/Kg	16800	20800	21.3%
RM715X1	15-Apr-05	ASTMD422	<200 Total	Percent	64.8649	65.7143	1.3%
RM715X1	15-Apr-05	ASTMD422	Clay	Percent	7.01242	7.04082	0.4%
RM715X1	15-Apr-05	ASTMD422	Co. Sand	Percent	1.89189	0.95238	66.1%
RM715X1	15-Apr-05	ASTMD422	Colloids	Percent	0.87655	0.78231	11.4%
RM715X1	15-Apr-05	ASTMD422	Fine Sand	Percent	30.5405	30.9524	1.3%
RM715X1	15-Apr-05	ASTMD422	Gravel	Percent	0.8	0	200.0%
RM715X1	15-Apr-05	ASTMD422	Med. Sand	Percent	1.89189	2.38095	22.9%
RM715X1	15-Apr-05	ASTMD422	Sand Total	Percent	34.3243	34.2857	0.1%
RM715X1	15-Apr-05	ASTMD422	Silt	Percent	56.9759	57.8912	1.6%
RM715X1	15-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	10400 J	8800 J	16.7%
RM715X1	15-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	2.7 J	2.4 J	11.8%
RM715X1	15-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	8.9	7.4	18.4%
RM715X1	15-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	483	399	19.0%
RM715X1	15-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.97	0.79	20.5%
RM715X1	15-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	5.6	5.2	7.4%
RM715X1	15-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	17300	16200	6.6%
RM715X1	15-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	25.9	22.5	14.0%
RM715X1	15-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	8.7	7.7	12.2%
RM715X1	15-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	105	92.7	12.4%
RM715X1	15-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	24000	20700	14.8%
RM715X1	15-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	275	232	17.0%
RM715X1	15-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	12300	11600	5.9%
RM715X1	15-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	315	280	11.8%
RM715X1	15-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	1.1	1.2	8.7%
RM715X1	15-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	20.9	18.5	12.2%
RM715X1	15-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1780	1530	15.1%
RM715X1	15-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	5.1 UR	5 UR	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM715X1	15-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.5 UJ	1.4 UJ	NC
RM715X1	15-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	198 J	128 J	42.9%
RM715X1	15-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	3.6 U	3.6 U	NC
RM715X1	15-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	23.2 J	20.2 J	13.8%
RM715X1	15-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	32	27.9	13.7%
RM715X1	15-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	971	870	11.0%
RM715X1	15-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	2 J	7 U	NC
RM715X1	15-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	7 U	7 U	NC
RM715X1	15-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	7 U	7 U	NC
RM715X1	15-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	7 U	7 U	NC
RM715X1	15-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	2 J	7 U	NC
RM715X1	15-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	2 J	7 U	NC
RM715X1	15-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	2 J	7 U	NC
RM715X1	15-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	7 U	7 U	NC
RM715X1	15-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	2 J	7 U	NC
RM715X1	15-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	3 J	7 U	NC
RM715X1	15-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	0.5 J	7 U	NC
RM715X1	15-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	7 U	7 U	NC
RM715X1	15-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	3 J	7 U	NC
RM715X1	15-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	7 U	7 U	NC
RM715X1	15-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	1 J	7 U	NC
RM715X1	15-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	3 U	5.4 U	NC
RM715X1	15-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	4 J	7 U	NC
RM715X1	15-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	3 J	7 U	NC
RM715X1	15-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1.3 U	1.3 U	NC
RM715X1	15-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	5.2 U	5.3 U	NC
RM715X1	15-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	5.2 U	5.3 U	NC
RM715X1	15-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1.3 U	1.3 U	NC
RM715X1	15-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1.3 U	1.3 U	NC
RM715X1	15-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1.3 U	1.3 U	NC
RM715X1	15-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1.3 U	1.3 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	1 U	1.1 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	1 U	1.1 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	1 U	0.2 J	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	1 U	1.1 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.18 J	0.19 J	5.4%
RM715X1	15-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.48 J	0.85 J	55.6%
RM715X1	15-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.51 U	0.52 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.51 U	0.52 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.51 U	0.52 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.51 U	0.52 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.51 U	0.52 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.51 U	0.52 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	1 U	1.1 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.51 U	0.52 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	1 U	1.1 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	1 U	1.1 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	1 U	1.1 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	1 U	1.1 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	1 U	1.1 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.51 U	0.52 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.51 U	0.52 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.51 U	0.52 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.51 U	0.52 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.51 U	0.52 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.51 U	0.52 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	5.1 U	5.2 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.51 U	0.52 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	51 U	52 U	NC
RM715X1	15-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.51 U	0.52 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	330 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	83 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	330 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	330 U	340 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	130 U	130 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM715X1	15-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	130 U	340 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	330 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	130 U	340 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	83 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	130 U	340 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	330 U	340 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	83 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	130 U	340 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	130 U	340 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	330 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	83 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	83 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	83 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	330 U	340 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	130 U	130 U	NC
RM715X1	15-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	130 U	130 U	NC
RM721R1	22-Apr-05	415.1	Total organic carbon	mg/Kg	20300	28500	33.6%
RM721R1	22-Apr-05	ASTMD422	<200 Total	Percent	30.2	41.6	31.8%
RM721R1	22-Apr-05	ASTMD422	Clay	Percent	2.416	3.328	31.8%
RM721R1	22-Apr-05	ASTMD422	Co. Sand	Percent	6.4	0.8	155.6%
RM721R1	22-Apr-05	ASTMD422	Colloids	Percent	0.604	1.248	69.5%
RM721R1	22-Apr-05	ASTMD422	Fine Sand	Percent	40	51	24.2%
RM721R1	22-Apr-05	ASTMD422	Gravel	Percent	14.8	0	200.0%
RM721R1	22-Apr-05	ASTMD422	Med. Sand	Percent	8.6	6.6	26.3%
RM721R1	22-Apr-05	ASTMD422	Sand Total	Percent	55	58.4	6.0%
RM721R1	22-Apr-05	ASTMD422	Silt	Percent	27.18	37.024	30.7%
RM721R1	22-Apr-05	AVS/SEM	Antimony-SEM	umol/g	0.00205 U	0.00189 U	NC
RM721R1	22-Apr-05	AVS/SEM	Cadmium-SEM	umol/g	0.00356	0.00472	28.0%
RM721R1	22-Apr-05	AVS/SEM	Chromium-SEM	umol/g	0.05385	0.03269	48.9%
RM721R1	22-Apr-05	AVS/SEM	Copper-SEM	umol/g	0.22189	0.11645	62.3%
RM721R1	22-Apr-05	AVS/SEM	Lead-SEM	umol/g	0.05116	0.05309	3.7%
RM721R1	22-Apr-05	AVS/SEM	Mercury-SEM	umol/g	4.9E-06 U	2.8E-06 U	NC
RM721R1	22-Apr-05	AVS/SEM	Nickel-SEM	umol/g	0.71368	0.04769	174.9%
RM721R1	22-Apr-05	AVS/SEM	Sulfide-AVS	umol/g	3.4 J	7.2 J	71.7%
RM721R1	22-Apr-05	AVS/SEM	Zinc-SEM	umol/g	0.42527	0.37326	13.0%
RM721R1	22-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	7730	7230	6.7%
RM721R1	22-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	14.7 UJ	8.4 UJ	NC
RM721R1	22-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	3.4	1.1 U	NC
RM721R1	22-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	119	74.5	46.0%
RM721R1	22-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.62 J	0.49 J	23.4%
RM721R1	22-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	0.57 J	0.26 J	74.7%
RM721R1	22-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	40600	22200	58.6%
RM721R1	22-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	24.6	19.8	21.6%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM721R1	22-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	6.8 J	6.7 J	1.5%
RM721R1	22-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	19.1	11	53.8%
RM721R1	22-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	15500	14700	5.3%
RM721R1	22-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	16.4	8.5	63.5%
RM721R1	22-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	5070	5220	2.9%
RM721R1	22-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	625	341	58.8%
RM721R1	22-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.062 J	0.008 J	154.3%
RM721R1	22-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	15.4	13.5	13.1%
RM721R1	22-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	940 J	820	13.6%
RM721R1	22-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	4.7 J	3.7 U	NC
RM721R1	22-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	2.5 UJ	1.4 UJ	NC
RM721R1	22-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	176 U	190 U	NC
RM721R1	22-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	6.1 U	3.5 U	NC
RM721R1	22-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	49 U	28 U	NC
RM721R1	22-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	27.7	30.4	9.3%
RM721R1	22-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	60.8	48.7	22.1%
RM721R1	22-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.3 J	0.3 J	0.0%
RM721R1	22-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	7 U	7 U	NC
RM721R1	22-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	7 U	7 U	NC
RM721R1	22-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	7 U	7 U	NC
RM721R1	22-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	7 U	7 U	NC
RM721R1	22-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	7 U	7 U	NC
RM721R1	22-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	7 U	7 U	NC
RM721R1	22-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	7 U	7 U	NC
RM721R1	22-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	7 UJ	7 UJ	NC
RM721R1	22-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	7 U	7 U	NC
RM721R1	22-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	7 U	7 U	NC
RM721R1	22-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	7 U	7 U	NC
RM721R1	22-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	7 U	7 U	NC
RM721R1	22-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	7 U	7 U	NC
RM721R1	22-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	7 U	7 U	NC
RM721R1	22-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	1 J	1 J	0.0%
RM721R1	22-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	7 U	7 U	NC
RM721R1	22-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	7 U	7 U	NC
RM721R1	22-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1.4 U	1.4 U	NC
RM721R1	22-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	5.6 U	5.6 U	NC
RM721R1	22-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	5.6 U	5.6 U	NC
RM721R1	22-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1.4 U	1.4 U	NC
RM721R1	22-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1.4 U	1.4 U	NC
RM721R1	22-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1.4 U	1.4 U	NC
RM721R1	22-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1.4 U	1.4 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	1.1 U	1.1 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	1.1 U	1.1 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	1.1 U	1.1 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	1.1 U	1.1 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	1.1 U	1.1 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	1.1 U	1.1 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.54 U	0.55 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.54 U	0.55 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.54 U	0.55 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.54 U	0.55 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.54 U	0.55 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.54 U	0.55 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	1.1 U	1.1 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.54 U	0.55 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	1.1 U	1.1 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	1.1 U	1.1 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	1.1 U	1.1 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	1.1 U	1.1 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	1.1 U	1.1 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.54 U	0.55 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.54 U	0.55 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.54 U	0.55 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.54 U	0.55 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.54 U	0.55 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.54 U	0.55 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	5.4 U	5.5 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.54 U	0.55 U	NC
RM721R1	22-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	54 U	55 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM721R1	22-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.54 U	0.55 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	340 U	350 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	340 U	350 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	340 U	350 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	340 U	350 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	340 U	350 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	340 U	350 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	340 U	350 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	340 U	350 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	140 U	140 U	NC
RM721R1	22-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	140 U	140 U	NC
RM721R1	5-May-05	CLP TAL TotMetals-PW	Aluminum	µg/L	87.5 J	51.6 J	51.6%
RM721R1	5-May-05	CLP TAL TotMetals-PW	Antimony	µg/L	60 U	60 U	NC
RM721R1	5-May-05	CLP TAL TotMetals-PW	Arsenic	µg/L	10 U	10 U	NC
RM721R1	5-May-05	CLP TAL TotMetals-PW	Barium	µg/L	237	299	23.1%
RM721R1	5-May-05	CLP TAL TotMetals-PW	Beryllium	µg/L	5 U	5 U	NC
RM721R1	5-May-05	CLP TAL TotMetals-PW	Cadmium	µg/L	5 U	5 U	NC
RM721R1	5-May-05	CLP TAL TotMetals-PW	Calcium	µg/L	107000	106000	0.9%
RM721R1	5-May-05	CLP TAL TotMetals-PW	Chromium	µg/L	1.9 J	2.2 J	14.6%
RM721R1	5-May-05	CLP TAL TotMetals-PW	Cobalt	µg/L	0.67 U	0.71 U	NC
RM721R1	5-May-05	CLP TAL TotMetals-PW	Copper	µg/L	2.2 J	2.8 J	24.0%
RM721R1	5-May-05	CLP TAL TotMetals-PW	Iron	µg/L	57.2 U	78.5 U	NC
RM721R1	5-May-05	CLP TAL TotMetals-PW	Lead	µg/L	10 U	10 U	NC
RM721R1	5-May-05	CLP TAL TotMetals-PW	Magnesium	µg/L	22900	22500	1.8%
RM721R1	5-May-05	CLP TAL TotMetals-PW	Manganese	µg/L	1980	1900	4.1%
RM721R1	5-May-05	CLP TAL TotMetals-PW	Mercury	µg/L	0.2 UJ	0.2 UJ	NC
RM721R1	5-May-05	CLP TAL TotMetals-PW	Nickel	µg/L	40 U	40 U	NC
RM721R1	5-May-05	CLP TAL TotMetals-PW	Potassium	µg/L	4280 J	4550 J	6.1%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM721R1	5-May-05	CLP TAL TotMetals-PW	Selenium	µg/L	35 U	35 U	NC
RM721R1	5-May-05	CLP TAL TotMetals-PW	Silver	µg/L	10 U	10 U	NC
RM721R1	5-May-05	CLP TAL TotMetals-PW	Sodium	µg/L	6320	6440	1.9%
RM721R1	5-May-05	CLP TAL TotMetals-PW	Thallium	µg/L	25 U	25 U	NC
RM721R1	5-May-05	CLP TAL TotMetals-PW	Uranium	µg/L	200 U	200 U	NC
RM721R1	5-May-05	CLP TAL TotMetals-PW	Vanadium	µg/L	50 U	50 U	NC
RM721R1	5-May-05	CLP TAL TotMetals-PW	Zinc	µg/L	42.2 J	57.5 J	30.7%
RM723X4	12-Apr-05	415.1	Total organic carbon	mg/Kg	754	1110	38.2%
RM723X4	12-Apr-05	ASTMD422	<200 Total	Percent	3.68421	5.51724	39.8%
RM723X4	12-Apr-05	ASTMD422	Clay	Percent	0	0	0.0%
RM723X4	12-Apr-05	ASTMD422	Co. Sand	Percent	1.92982	2.52874	26.9%
RM723X4	12-Apr-05	ASTMD422	Colloids	Percent	0.09695	0.09512	1.9%
RM723X4	12-Apr-05	ASTMD422	Fine Sand	Percent	51.7544	50.3448	2.8%
RM723X4	12-Apr-05	ASTMD422	Gravel	Percent	0	0.2	200.0%
RM723X4	12-Apr-05	ASTMD422	Med. Sand	Percent	42.6316	41.3793	3.0%
RM723X4	12-Apr-05	ASTMD422	Sand Total	Percent	96.3158	94.2529	2.2%
RM723X4	12-Apr-05	ASTMD422	Silt	Percent	3.58726	5.42212	40.7%
RM723X4	12-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	9080	9990	9.5%
RM723X4	12-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	5.9 J	4.8 J	20.6%
RM723X4	12-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	13.4	11.4	16.1%
RM723X4	12-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	302	300	0.7%
RM723X4	12-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.59	0.65	9.7%
RM723X4	12-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	2.2	2	9.5%
RM723X4	12-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	22400	24500	9.0%
RM723X4	12-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	20.7	20.7	0.0%
RM723X4	12-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	9.7	10.3	6.0%
RM723X4	12-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	339	333	1.8%
RM723X4	12-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	50500 D	49300 D	2.4%
RM723X4	12-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	224	205	8.9%
RM723X4	12-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	7270	7520	3.4%
RM723X4	12-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	1040	926	11.6%
RM723X4	12-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.18	0.092 J	64.7%
RM723X4	12-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	7.7	7.9	2.6%
RM723X4	12-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1810	2260	22.1%
RM723X4	12-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	3.2 UR	3.3 UR	NC
RM723X4	12-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	0.26 UJ	0.94 UJ	NC
RM723X4	12-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	916	1290	33.9%
RM723X4	12-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	2.3 U	2.4 U	NC
RM723X4	12-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	18 U	8.3 U	NC
RM723X4	12-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	24.5	29.2	17.5%
RM723X4	12-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	4070	3740	8.5%
RM723X4	12-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.3 J	0.4 J	28.6%
RM723X4	12-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	4 U	4 U	NC
RM723X4	12-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	4 U	4 U	NC
RM723X4	12-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	4 U	4 U	NC
RM723X4	12-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	4 U	4 U	NC
RM723X4	12-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	4 U	4 U	NC
RM723X4	12-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	4 U	0.4 J	NC
RM723X4	12-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	0.3 J	4 U	NC
RM723X4	12-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	4 U	0.4 J	NC
RM723X4	12-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	0.3 J	0.4 J	28.6%
RM723X4	12-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	4 U	4 U	NC
RM723X4	12-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	4 U	0.2 J	NC
RM723X4	12-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	0.3 J	0.4 J	28.6%
RM723X4	12-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	4 U	4 U	NC
RM723X4	12-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	4 U	4 U	NC
RM723X4	12-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	3.6 U	3.6 U	NC
RM723X4	12-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	0.5 J	0.5 J	0.0%
RM723X4	12-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	4 U	4 U	NC
RM723X4	12-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	0.88 U	0.89 U	NC
RM723X4	12-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	3.6 U	3.6 U	NC
RM723X4	12-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	3.6 U	3.6 U	NC
RM723X4	12-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	0.88 U	0.89 U	NC
RM723X4	12-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	0.88 U	0.89 U	NC
RM723X4	12-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	0.88 U	0.89 U	NC
RM723X4	12-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	0.88 U	0.89 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.71 U	0.72 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.71 U	0.72 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.71 U	0.72 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM723X4	12-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.71 U	0.72 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.71 U	0.72 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.71 U	0.72 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.35 U	0.35 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.35 U	0.35 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.35 U	0.35 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.35 U	0.35 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.35 U	0.35 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.35 U	0.35 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.71 U	0.72 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.35 U	0.35 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.71 U	0.72 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.71 U	0.72 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.71 U	0.72 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.71 U	0.72 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.71 U	0.72 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.35 U	0.35 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.35 U	0.35 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.35 U	0.35 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.35 U	0.35 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.35 U	0.35 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.35 U	0.35 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	3.5 U	3.6 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.35 U	0.35 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	35 U	35 U	NC
RM723X4	12-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.35 U	0.35 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	220 U	230 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	220 U	230 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	220 U	230 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	220 U	230 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	220 U	230 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	220 U	230 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	220 U	230 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	87 UJ	90 UJ	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	87 U	90 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM723X4	12-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	220 U	230 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	87 U	90 U	NC
RM723X4	12-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	87 U	90 U	NC
RM726X1	8-Apr-05	415.1	Total organic carbon	mg/Kg	7810 J	6610 J	16.6%
RM726X1	8-Apr-05	ASTMD422	<200 Total	Percent	14.4	14.8	2.7%
RM726X1	8-Apr-05	ASTMD422	Clay	Percent	0	0.148	200.0%
RM726X1	8-Apr-05	ASTMD422	Co. Sand	Percent	0	0	0.0%
RM726X1	8-Apr-05	ASTMD422	Colloids	Percent	0	0	0.0%
RM726X1	8-Apr-05	ASTMD422	Fine Sand	Percent	84.4	84	0.5%
RM726X1	8-Apr-05	ASTMD422	Gravel	Percent	0	0	0.0%
RM726X1	8-Apr-05	ASTMD422	Med. Sand	Percent	1.2	1.2	0.0%
RM726X1	8-Apr-05	ASTMD422	Sand Total	Percent	85.6	85.2	0.5%
RM726X1	8-Apr-05	ASTMD422	Silt	Percent	14.4	14.652	1.7%
RM726X1	8-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	6670	5320	22.5%
RM726X1	8-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	16.2 J	14.8 J	9.0%
RM726X1	8-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	10.6	6.3	50.9%
RM726X1	8-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	386	338	13.3%
RM726X1	8-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.61 J	0.53 J	14.0%
RM726X1	8-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	2	2.3	14.0%
RM726X1	8-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	20800	17700	16.1%
RM726X1	8-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	28.5	23.4	19.7%
RM726X1	8-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	12.4	10.5	16.6%
RM726X1	8-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	369	271	30.6%
RM726X1	8-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	36500	27600	27.8%
RM726X1	8-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	130	129	0.8%
RM726X1	8-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	9930	8870	11.3%
RM726X1	8-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	698	583	18.0%
RM726X1	8-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.2	0.35	54.5%
RM726X1	8-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	12.7	10.6	18.0%
RM726X1	8-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1210	1110	8.6%
RM726X1	8-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	4.7 UJ	5.4 UJ	NC
RM726X1	8-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.3 UJ	1.5 UJ	NC
RM726X1	8-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	306 J	241 J	23.8%
RM726X1	8-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	3.4 U	3.8 U	NC
RM726X1	8-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	26.9 U	30.7 U	NC
RM726X1	8-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	22.5	19.7	13.3%
RM726X1	8-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	2470	2040	19.1%
RM726X1	8-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.8 J	0.5 J	46.2%
RM726X1	8-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	7 U	7 U	NC
RM726X1	8-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	7 U	7 U	NC
RM726X1	8-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	1 J	7 U	NC
RM726X1	8-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	5 J	1 J	133.3%
RM726X1	8-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	5 J	2 J	85.7%
RM726X1	8-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	7 U	7 U	NC
RM726X1	8-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	3 J	7 U	NC
RM726X1	8-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	7 U	7 U	NC
RM726X1	8-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	5 J	2 J	85.7%
RM726X1	8-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	1 J	7 U	NC
RM726X1	8-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	7 U	7 U	NC
RM726X1	8-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	12	3 J	120.0%
RM726X1	8-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	7 U	7 U	NC
RM726X1	8-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	5 J	7 U	NC
RM726X1	8-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	1 J	5.4 U	NC
RM726X1	8-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	4 J	1 J	120.0%
RM726X1	8-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	8	2 J	120.0%
RM726X1	8-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1.3 U	1.3 U	NC
RM726X1	8-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	5.3 U	5.3 U	NC
RM726X1	8-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	5.3 U	5.3 U	NC
RM726X1	8-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1.3 U	1.3 U	NC
RM726X1	8-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1.3 U	1.3 U	NC
RM726X1	8-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1.3 U	1.3 U	NC
RM726X1	8-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1.3 U	1.3 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	1.1 U	1.1 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	1.1 U	1.1 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM726X1	8-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	1.1 U	1.1 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	1.1 U	1.1 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	1.1 U	1.1 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	1.1 U	1.1 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.52 U	0.53 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.52 U	0.53 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.52 U	0.53 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.52 U	0.53 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.52 U	0.53 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.52 U	0.53 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	1.1 U	1.1 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.52 U	0.53 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	1.1 U	1.1 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	1.1 U	1.1 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	1.1 U	1.1 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	1.1 U	1.1 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	1.1 U	1.1 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.52 U	0.53 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.52 U	0.53 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.52 U	0.53 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.52 U	0.53 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.52 U	0.53 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.52 U	0.53 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	5.2 U	5.3 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.52 U	0.53 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	52 U	53 U	NC
RM726X1	8-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.52 U	0.53 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	330 U	340 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	330 U	340 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	330 U	340 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	330 U	340 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	330 U	340 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	330 U	340 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	330 U	340 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	130 UJ	130 UJ	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	130 U	130 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM726X1	8-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	330 U	340 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	130 U	130 U	NC
RM726X1	8-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	130 U	130 U	NC
RM727A1(X	23-Apr-05	415.1	Total organic carbon	mg/Kg	6600	6890	4.3%
RM727A1(X	23-Apr-05	ASTMD422	<200 Total	Percent	19.1	19.5	2.1%
RM727A1(X	23-Apr-05	ASTMD422	Clay	Percent	0.955	0.8775	8.5%
RM727A1(X	23-Apr-05	ASTMD422	Co. Sand	Percent	0.9	0.6	40.0%
RM727A1(X	23-Apr-05	ASTMD422	Colloids	Percent	0.2865	0.195	38.0%
RM727A1(X	23-Apr-05	ASTMD422	Fine Sand	Percent	78.2	77.9	0.4%
RM727A1(X	23-Apr-05	ASTMD422	Gravel	Percent	0.4	0.5	22.2%
RM727A1(X	23-Apr-05	ASTMD422	Med. Sand	Percent	1.4	1.5	6.9%
RM727A1(X	23-Apr-05	ASTMD422	Sand Total	Percent	80.5	80	0.6%
RM727A1(X	23-Apr-05	ASTMD422	Silt	Percent	17.8585	18.4275	3.1%
RM727A1(X	23-Apr-05	AVS/SEM	Antimony-SEM	umol/g	0.00665	0.00517	25.0%
RM727A1(X	23-Apr-05	AVS/SEM	Cadmium-SEM	umol/g	0.01601	0.01868	15.4%
RM727A1(X	23-Apr-05	AVS/SEM	Chromium-SEM	umol/g	0.12501	0.10193	20.3%
RM727A1(X	23-Apr-05	AVS/SEM	Copper-SEM	umol/g	1.5359	1.38954	10.0%
RM727A1(X	23-Apr-05	AVS/SEM	Lead-SEM	umol/g	0.87838 J	0.89768 J	2.2%
RM727A1(X	23-Apr-05	AVS/SEM	Mercury-SEM	umol/g	3.9E-06 U	5.5E-06 U	NC
RM727A1(X	23-Apr-05	AVS/SEM	Nickel-SEM	umol/g	0.07154 U	0.06983	NC
RM727A1(X	23-Apr-05	AVS/SEM	Sulfide-AVS	umol/g	0.084 J	0.067 J	22.5%
RM727A1(X	23-Apr-05	AVS/SEM	Zinc-SEM	umol/g	16.2154	14.2573	12.9%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	6040	5760	4.7%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	5.6 J	5.8 J	3.5%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	9.1	6.6	31.8%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	371	304	19.9%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.61 J	0.57 J	6.8%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	3	3	0.0%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	27200	23100	16.3%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	20.1	17.6	13.3%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	7.3	7.3 J	0.0%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	126	134	6.2%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	24900	23100	7.5%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	170	169	0.6%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	14500	12000	18.9%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	374	358	4.4%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.37 J	0.28 J	27.7%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	12.6	12.1	4.0%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1030	995	3.5%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	6.5	6.2	4.7%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.2 UJ	1.5 UJ	NC
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	251 U	218 U	NC
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	3.1 U	3.7 U	NC
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	24.5 U	29.4 U	NC
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	25.7	21.5	17.8%
RM727A1(X	23-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	1310	1250	4.7%
RM727A1(X	23-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.5 J	0.7 J	33.3%
RM727A1(X	23-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	6 U	6 U	NC
RM727A1(X	23-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	6 U	6 U	NC
RM727A1(X	23-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	6 U	6 U	NC
RM727A1(X	23-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	2 J	0.5 J	120.0%
RM727A1(X	23-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	1 J	0.7 J	35.3%
RM727A1(X	23-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	2 J	6 U	NC
RM727A1(X	23-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	0.5 J	0.5 J	0.0%
RM727A1(X	23-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	0.7 J	6 UJ	NC
RM727A1(X	23-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	3 J	0.7 J	124.3%
RM727A1(X	23-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	6 U	0.2 J	NC
RM727A1(X	23-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	6 U	6 U	NC
RM727A1(X	23-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	1 J	1 J	0.0%
RM727A1(X	23-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	6 U	6 U	NC
RM727A1(X	23-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	0.7 J	6 U	NC
RM727A1(X	23-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	1 J	1 J	0.0%
RM727A1(X	23-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	1 J	1 J	0.0%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM727A1(X	23-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	1 J	0.7 J	35.3%
RM727A1(X	23-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1.2 U	1.2 U	NC
RM727A1(X	23-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	5 U	5 U	NC
RM727A1(X	23-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	5 U	5 U	NC
RM727A1(X	23-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1.2 U	1.2 U	NC
RM727A1(X	23-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1.2 U	1.2 U	NC
RM727A1(X	23-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1.2 U	1.2 U	NC
RM727A1(X	23-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1.2 U	1.2 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	1 U	1 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	1 U	1 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	1 U	1 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	1 U	1 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	1 U	1 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	1 U	0.5 J	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.49 U	0.49 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.49 U	0.49 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.49 U	0.49 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.49 U	0.49 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.49 U	0.49 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.49 U	0.49 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	1 U	1 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.49 U	0.49 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	1 U	1 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	1 U	1 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	1 U	1 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	1 U	1 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	1 U	1 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.49 U	0.49 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.49 U	0.49 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.49 U	0.49 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.49 U	0.49 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.49 U	0.49 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.49 U	0.49 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	4.9 U	4.9 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.49 U	0.49 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	49 U	49 U	NC
RM727A1(X	23-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.49 U	0.49 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	310 U	310 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	310 UJ	310 UJ	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	310 U	310 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	310 U	310 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	310 U	310 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	310 U	310 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	310 U	310 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	120 UR	120 UR	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM727A1(X	23-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	310 UJ	310 UJ	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	120 U	120 U	NC
RM727A1(X	23-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	120 U	120 U	NC
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Aluminum	µg/L	66.4 U	62.2 U	NC
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Antimony	µg/L	60 U	60 U	NC
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Arsenic	µg/L	10 U	10 U	NC
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Barium	µg/L	404	424	4.8%
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Beryllium	µg/L	5 U	5 U	NC
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Cadmium	µg/L	0.45 J	0.48 J	6.5%
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Calcium	µg/L	73100	75600	3.4%
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Chromium	µg/L	4.2 J	4.2 J	0.0%
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Cobalt	µg/L	1.6 U	2.3 U	NC
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Copper	µg/L	7.6 J	7.4 J	2.7%
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Iron	µg/L	80.4 U	83.3 U	NC
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Lead	µg/L	7.1 J	5.3 J	29.0%
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Magnesium	µg/L	11500	12000	4.3%
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Manganese	µg/L	1940	2110	8.4%
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Mercury	µg/L	0.021 J	0.021 J	0.0%
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Nickel	µg/L	40 U	40 U	NC
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Potassium	µg/L	1850 J	1930 J	4.2%
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Selenium	µg/L	35 U	35 U	NC
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Silver	µg/L	10 U	10 U	NC
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Sodium	µg/L	4710 J	4850 J	2.9%
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Thallium	µg/L	25 U	25 U	NC
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Uranium	µg/L	200 U	200 U	NC
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Vanadium	µg/L	5.7 J	4.8 J	17.1%
RM727A1(X	11-May-05	CLP TAL TotMetals-PW	Zinc	µg/L	97.2	104	6.8%
RM732X2	16-Apr-05	415.1	Total organic carbon	mg/Kg	1820	1450	22.6%
RM732X2	16-Apr-05	ASTMD422	<200 Total	Percent	2.1	1.6	27.0%
RM732X2	16-Apr-05	ASTMD422	Clay	Percent	0.0315	0.024	27.0%
RM732X2	16-Apr-05	ASTMD422	Co. Sand	Percent	21.8	20	8.6%
RM732X2	16-Apr-05	ASTMD422	Colloids	Percent	0	0	0.0%
RM732X2	16-Apr-05	ASTMD422	Fine Sand	Percent	25.9	23.8	8.5%
RM732X2	16-Apr-05	ASTMD422	Gravel	Percent	6	11.6	63.6%
RM732X2	16-Apr-05	ASTMD422	Med. Sand	Percent	44.2	43	2.8%
RM732X2	16-Apr-05	ASTMD422	Sand Total	Percent	91.9	86.8	5.7%
RM732X2	16-Apr-05	ASTMD422	Silt	Percent	2.0685	1.576	27.0%
RM732X2	16-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	10500	11900	12.5%
RM732X2	16-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	38.3 J	30.7 J	22.0%
RM732X2	16-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	17.5	19.9	12.8%
RM732X2	16-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	697	719	3.1%
RM732X2	16-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.74 J	0.79 J	6.5%
RM732X2	16-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	0.85	0.38 J	76.4%
RM732X2	16-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	24700	27800	11.8%
RM732X2	16-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	54.5	57.8	5.9%
RM732X2	16-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	26.9	27.4	1.8%
RM732X2	16-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	850	944	10.5%
RM732X2	16-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	80800 JD	88200 JD	8.8%
RM732X2	16-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	165	171	3.6%
RM732X2	16-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	5240	5430	3.6%
RM732X2	16-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	1700	1790	5.2%
RM732X2	16-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.045 J	0.022 J	68.7%
RM732X2	16-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	12.8	11.7	9.0%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM732X2	16-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1950	2240	13.8%
RM732X2	16-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	3.6 UR	3.4 UR	NC
RM732X2	16-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1 U	0.97 U	NC
RM732X2	16-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	892	981	9.5%
RM732X2	16-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	2.6 UJ	2.4 UJ	NC
RM732X2	16-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	20.6 UJ	19.5 UJ	NC
RM732X2	16-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	37.3	37.1	0.5%
RM732X2	16-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	6200 D	6950 D	11.4%
RM732X2	16-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	4 U	4 U	NC
RM732X2	16-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	4 U	4 U	NC
RM732X2	16-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	4 U	4 U	NC
RM732X2	16-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	4 U	4 U	NC
RM732X2	16-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	4 U	4 U	NC
RM732X2	16-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	4 U	4 U	NC
RM732X2	16-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	4 U	4 U	NC
RM732X2	16-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	4 U	4 U	NC
RM732X2	16-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	4 U	4 U	NC
RM732X2	16-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	4 U	4 U	NC
RM732X2	16-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	4 U	4 U	NC
RM732X2	16-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	4 U	4 U	NC
RM732X2	16-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	4 U	4 U	NC
RM732X2	16-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	4 U	4 U	NC
RM732X2	16-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	4 U	4 U	NC
RM732X2	16-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	3.6 U	3.6 U	NC
RM732X2	16-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	4 U	4 U	NC
RM732X2	16-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	4 U	4 U	NC
RM732X2	16-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	0.86 U	0.87 UJ	NC
RM732X2	16-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	3.5 U	3.6 UJ	NC
RM732X2	16-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	3.5 U	3.6 UJ	NC
RM732X2	16-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	0.86 U	0.87 UJ	NC
RM732X2	16-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	0.86 U	0.87 UJ	NC
RM732X2	16-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	0.86 U	0.87 UJ	NC
RM732X2	16-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	0.86 U	0.87 UJ	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.7 U	0.7 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.7 U	0.7 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.12 J	0.7 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.7 U	0.7 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.072 J	0.7 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.29 J	0.13 J	76.2%
RM732X2	16-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.34 U	0.35 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.34 U	0.35 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.34 U	0.35 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.34 U	0.35 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.34 U	0.35 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.34 U	0.35 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.7 U	0.7 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.34 U	0.35 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.7 U	0.7 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.7 U	0.7 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.7 U	0.7 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.7 U	0.7 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.7 U	0.7 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.34 U	0.35 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.34 U	0.35 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.34 U	0.35 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.34 U	0.35 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.34 U	0.35 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.34 U	0.35 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	3.4 U	3.5 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.34 U	0.35 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	34 U	35 U	NC
RM732X2	16-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.34 U	0.35 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	220 U	220 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM732X2	16-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	220 U	220 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	220 U	220 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	220 U	220 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	220 U	220 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	220 U	220 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	220 U	220 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	86 U	88 UR	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	220 U	220 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	86 U	88 U	NC
RM732X2	16-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	86 U	88 U	NC
RM735B3R	11-Apr-05	415.1	Total organic carbon	mg/Kg	5660 J	4250 J	28.5%
RM735B3R	11-Apr-05	ASTMD422	<200 Total	Percent	9.4	9.67742	2.9%
RM735B3R	11-Apr-05	ASTMD422	Clay	Percent	0.094	0.10406	10.2%
RM735B3R	11-Apr-05	ASTMD422	Co. Sand	Percent	1.1	1.29032	15.9%
RM735B3R	11-Apr-05	ASTMD422	Colloids	Percent	0.141	0.10406	30.1%
RM735B3R	11-Apr-05	ASTMD422	Fine Sand	Percent	84.1	82.9032	1.4%
RM735B3R	11-Apr-05	ASTMD422	Gravel	Percent	0.8	1.6	66.7%
RM735B3R	11-Apr-05	ASTMD422	Med. Sand	Percent	4.6	4.51613	1.8%
RM735B3R	11-Apr-05	ASTMD422	Sand Total	Percent	89.8	88.7097	1.2%
RM735B3R	11-Apr-05	ASTMD422	Silt	Percent	9.165	9.4693	3.3%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	6950	6950	0.0%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	15.6 J	18.8 J	18.6%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	10.2	10.2	0.0%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	534	627	16.0%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.57	0.61	6.8%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	4.8	4.7	2.1%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	46100	47100	2.1%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	33	36.2	9.2%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	14	15.3	8.9%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	491	525	6.7%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	51500	52000	1.0%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	217	236	8.4%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	16400	17200	4.8%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	961	1040	7.9%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.12 J	0.14	15.4%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM735B3R	11-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	11.9	12.5	4.9%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1290	1390	7.5%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	3.8 UJ	4.2 UJ	NC
RM735B3R	11-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.1 UJ	1.2 UJ	NC
RM735B3R	11-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	361 J	370 J	2.5%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	2.7 U	3 U	NC
RM735B3R	11-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	21.8 U	24.1 U	NC
RM735B3R	11-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	22.5	25	10.5%
RM735B3R	11-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	3910	4210	7.4%
RM735B3R	11-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.6 J	0.9 J	40.0%
RM735B3R	11-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	5 U	5 U	NC
RM735B3R	11-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	5 U	5 U	NC
RM735B3R	11-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	5 U	5 U	NC
RM735B3R	11-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	0.8 J	1 J	22.2%
RM735B3R	11-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	5 U	5 U	NC
RM735B3R	11-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	5 U	5 U	NC
RM735B3R	11-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	0.6 J	5 U	NC
RM735B3R	11-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	5 U	5 U	NC
RM735B3R	11-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	1 J	1 J	0.0%
RM735B3R	11-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	5 U	0.2 J	NC
RM735B3R	11-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	0.2 J	5 U	NC
RM735B3R	11-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	1 J	2 J	66.7%
RM735B3R	11-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	5 U	5 U	NC
RM735B3R	11-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	0.6 J	5 U	NC
RM735B3R	11-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	4.3 U	4.3 U	NC
RM735B3R	11-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	0.8 J	1 J	22.2%
RM735B3R	11-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	1 J	2 J	66.7%
RM735B3R	11-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1.1 U	1.1 U	NC
RM735B3R	11-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	4.2 U	4.3 U	NC
RM735B3R	11-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	4.2 U	4.3 U	NC
RM735B3R	11-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1.1 U	1.1 U	NC
RM735B3R	11-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1.1 U	1.1 U	NC
RM735B3R	11-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1.1 U	1.1 U	NC
RM735B3R	11-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1.1 U	1.1 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.85 U	0.86 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.85 U	0.86 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.85 U	0.86 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.85 U	0.86 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.85 U	0.86 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.85 U	0.86 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.42 U	0.42 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.42 U	0.42 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.42 U	0.42 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.42 U	0.42 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.42 U	0.42 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.42 U	0.42 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.85 U	0.86 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.42 U	0.42 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.85 U	0.86 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.85 U	0.86 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.85 U	0.86 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.85 U	0.86 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.85 U	0.86 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.42 U	0.42 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.42 U	0.42 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.42 U	0.42 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.42 U	0.42 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.42 U	0.42 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.42 U	0.42 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	4.2 U	4.2 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.42 U	0.42 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	42 U	42 U	NC
RM735B3R	11-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.42 U	0.42 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	110 U	110 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM735B3R	11-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	270 U	270 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	270 U	270 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	270 U	270 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	270 U	270 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	270 U	270 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	270 U	270 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	270 U	270 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	110 UJ	110 UJ	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	270 U	270 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	110 U	110 U	NC
RM735B3R	11-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	110 U	110 U	NC
RM735BSF	11-Apr-05	415.1	Total organic carbon	mg/Kg	3740 J	4190 J	11.3%
RM735BSF	11-Apr-05	ASTMD422	<200 Total	Percent	11.6	11.7108	1.0%
RM735BSF	11-Apr-05	ASTMD422	Clay	Percent	0.058	0.11925	69.1%
RM735BSF	11-Apr-05	ASTMD422	Co. Sand	Percent	0.7	0.9165	26.8%
RM735BSF	11-Apr-05	ASTMD422	Colloids	Percent	0.116	0.05963	64.2%
RM735BSF	11-Apr-05	ASTMD422	Fine Sand	Percent	56.9	57.5356	1.1%
RM735BSF	11-Apr-05	ASTMD422	Gravel	Percent	0.3	0.6	66.7%
RM735BSF	11-Apr-05	ASTMD422	Med. Sand	Percent	30.5	29.2261	4.3%
RM735BSF	11-Apr-05	ASTMD422	Sand Total	Percent	88.1	87.6782	0.5%
RM735BSF	11-Apr-05	ASTMD422	Silt	Percent	11.426	11.5319	0.9%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	11900	11000	7.9%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	33.3 J	29.8 J	11.1%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	17.7	15.6	12.6%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	1090 J	999 J	8.7%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.95	0.87	8.8%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	2.9	2.1	32.0%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	45500	42400	7.1%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	70.4 J	59.6 J	16.6%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	28.8	23.2	21.5%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	1340	1080	21.5%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	118000 D	93900 D	22.7%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	227	230	1.3%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	9610	9650	0.4%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	1980	1680	16.4%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM735BSF	11-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.075 J	0.16	72.3%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	13.4	12.7	5.4%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	2560	2140	17.9%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	3.4 UR	3.6 UR	NC
RM735BSF	11-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	0.97 U	1 U	NC
RM735BSF	11-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	1220	1040	15.9%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	2.4 U	2.6 U	NC
RM735BSF	11-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	15.8 J	20.4 UJ	NC
RM735BSF	11-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	30.7	28.4	7.8%
RM735BSF	11-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	10000 D	7890 D	23.6%
RM735BSF	11-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.6 J	0.4 J	40.0%
RM735BSF	11-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	5 U	5 U	NC
RM735BSF	11-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	5 U	5 U	NC
RM735BSF	11-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	5 U	5 U	NC
RM735BSF	11-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	1 J	1 J	0.0%
RM735BSF	11-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	2 J	2 J	0.0%
RM735BSF	11-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	5 U	5 U	NC
RM735BSF	11-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	1 J	1 J	0.0%
RM735BSF	11-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	5 U	5 U	NC
RM735BSF	11-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	2 J	2 J	0.0%
RM735BSF	11-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	0.4 J	5 U	NC
RM735BSF	11-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	0.4 J	5 U	NC
RM735BSF	11-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	3 J	3 J	0.0%
RM735BSF	11-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	5 U	5 U	NC
RM735BSF	11-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	2 J	1 J	66.7%
RM735BSF	11-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	3.9 U	3.9 U	NC
RM735BSF	11-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	2 J	2 J	0.0%
RM735BSF	11-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	3 J	3 J	0.0%
RM735BSF	11-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	0.96 U	0.96 U	NC
RM735BSF	11-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	3.9 U	3.9 U	NC
RM735BSF	11-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	3.9 U	3.9 U	NC
RM735BSF	11-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	0.96 U	0.96 U	NC
RM735BSF	11-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	0.96 U	0.96 U	NC
RM735BSF	11-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	0.96 U	0.96 U	NC
RM735BSF	11-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	0.96 U	0.96 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.77 U	0.78 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.77 U	0.78 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.77 U	0.78 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.77 U	0.78 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.77 U	0.78 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.77 U	0.78 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.38 U	0.38 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.38 U	0.38 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.38 U	0.38 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.38 U	0.38 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.38 U	0.38 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.38 U	0.38 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.77 U	0.78 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.38 U	0.38 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.77 U	0.78 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.77 U	0.78 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.77 U	0.78 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.77 U	0.78 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.77 U	0.78 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.38 U	0.38 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.38 U	0.38 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.38 U	0.38 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.38 U	0.38 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.38 U	0.38 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.38 U	0.38 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	3.8 U	3.8 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.38 U	0.38 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	38 U	38 U	NC
RM735BSF	11-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.38 U	0.38 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	96 U	97 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM735BSF	11-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	240 U	250 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	240 U	250 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	240 U	250 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	240 U	250 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	240 U	250 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	240 U	250 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	240 U	250 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	96 UJ	97 UJ	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	240 U	250 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	96 U	97 U	NC
RM735BSF	11-Apr-05	Dioxins and Furans	% Moisture	%	21.9	12.5	54.7%
RM735BSF	11-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	4.1	2.53	47.4%
RM735BSF	11-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	1.61 J	0.946 J	52.0%
RM735BSF	11-Apr-05	Dioxins and Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	0.0696 U	0.0318 U	NC
RM735BSF	11-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	0.0725 U	0.063 U	NC
RM735BSF	11-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	0.0649 U	0.0643 U	NC
RM735BSF	11-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	0.196 U	0.16 J	NC
RM735BSF	11-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	0.0609 U	0.0577 U	NC
RM735BSF	11-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	0.134 J	0.12 U	NC
RM735BSF	11-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	PG/G	0.0746 U	0.0219 U	NC
RM735BSF	11-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	0.0549 U	0.0491 J	NC
RM735BSF	11-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	0.0305 U	0.0351 U	NC
RM735BSF	11-Apr-05	Dioxins and Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	0.0668 U	0.059 U	NC
RM735BSF	11-Apr-05	Dioxins and Furans	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	0.0681 J	0.073 U	NC
RM735BSF	11-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	0.0643 U	0.0453 U	NC
RM735BSF	11-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzofuran	PG/G	0.77	0.72	6.7%
RM735BSF	11-Apr-05	Dioxins and Furans	Heptachlorodibenzodioxin (Total)	PG/G	8.34	5.78	36.3%
RM735BSF	11-Apr-05	Dioxins and Furans	Heptachlorodibenzofuran (Total)	PG/G	4.22 J	2.05 J	69.2%
RM735BSF	11-Apr-05	Dioxins and Furans	Hexachlorodibenzodioxin (Total)	PG/G	1.42	0.578	84.3%
RM735BSF	11-Apr-05	Dioxins and Furans	Hexachlorodibenzofuran (Total)	PG/G	1.5	0.942	45.7%
RM735BSF	11-Apr-05	Dioxins and Furans	Octachlorodibenzodioxin	PG/G	35.9	19.6	58.7%
RM735BSF	11-Apr-05	Dioxins and Furans	Octachlorodibenzofuran	PG/G	4.11	1.32 J	102.8%
RM735BSF	11-Apr-05	Dioxins and Furans	Pentachlorodibenzodioxin (Total)	PG/G	0.0819	0.162	65.7%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM735BSF	11-Apr-05	Dioxins and Furans	Pentachlorodibenzofuran (Total)	PG/G	0.394	0.333	16.8%
RM735BSF	11-Apr-05	Dioxins and Furans	TEQ WHO-98	PG/G	0.1587	0.174	9.2%
RM735BSF	11-Apr-05	Dioxins and Furans	Tetrachlorodibenzodioxin (Total)	PG/G	0.0643 U	0.0895	NC
RM735BSF	11-Apr-05	Dioxins and Furans	Tetrachlorodibenzofuran (Total)	PG/G	1.62	1.66	2.4%
RM735BSF	16-May-05	415.1-Sieved<75um	Total organic carbon	mg/Kg	--	12800	NC
RM735BSF	16-May-05	415.1-Sieved>75um	Total organic carbon	mg/Kg	2530	--	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Aluminum-Sieved <75 um	mg/Kg	--	8800	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Antimony-Sieved <75 um	mg/Kg	--	3.8 J	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Arsenic-Sieved <75 um	mg/Kg	--	12.1	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Barium-Sieved <75 um	mg/Kg	--	1000	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Beryllium-Sieved <75 um	mg/Kg	--	0.62 J	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Cadmium-Sieved <75 um	mg/Kg	--	5.5	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Calcium-Sieved <75 um	mg/Kg	--	27600	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Chromium-Sieved <75 um	mg/Kg	--	30.5	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Cobalt-Sieved <75 um	mg/Kg	--	13.1	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Copper-Sieved <75 um	mg/Kg	--	291 J	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Iron-Sieved <75 um	mg/Kg	--	37200	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Lead-Sieved <75 um	mg/Kg	--	321	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Magnesium-Sieved <75 um	mg/Kg	--	14100	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Manganese-Sieved <75 um	mg/Kg	--	719	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Mercury-Sieved <75 um	mg/Kg	--	0.41	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Nickel-Sieved <75 um	mg/Kg	--	21.2	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Potassium-Sieved <75 um	mg/Kg	--	1640	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Selenium-Sieved <75 um	mg/Kg	--	4	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Silver-Sieved <75 um	mg/Kg	--	0.95 UR	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Sodium-Sieved <75 um	mg/Kg	--	226 J	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Thallium-Sieved <75 um	mg/Kg	--	2.4 U	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Uranium-Sieved <75 um	mg/Kg	--	19.1 UJ	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Vanadium-Sieved <75 um	mg/Kg	--	41.3	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved<75um	Zinc-Sieved <75 um	mg/Kg	--	1890	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Aluminum-Sieved >75 um	mg/Kg	--	14000	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Antimony-Sieved >75 um	mg/Kg	--	45.2 J	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Arsenic-Sieved >75 um	mg/Kg	--	12.2	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Barium-Sieved >75 um	mg/Kg	--	1290	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Beryllium-Sieved >75 um	mg/Kg	--	0.74 J	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Cadmium-Sieved >75 um	mg/Kg	--	4.3	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Calcium-Sieved >75 um	mg/Kg	--	58000	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Chromium-Sieved >75 um	mg/Kg	--	85.8	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Cobalt-Sieved >75 um	mg/Kg	--	34.2	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Copper-Sieved >75 um	mg/Kg	--	1660 J	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Iron-Sieved >75 um	mg/Kg	--	130000 D	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Lead-Sieved >75 um	mg/Kg	--	322	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Magnesium-Sieved >75 um	mg/Kg	--	12700	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Manganese-Sieved >75 um	mg/Kg	--	2470	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Mercury-Sieved >75 um	mg/Kg	--	0.34	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Nickel-Sieved >75 um	mg/Kg	--	14.3	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Potassium-Sieved >75 um	mg/Kg	--	3200	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Selenium-Sieved >75 um	mg/Kg	--	7.7	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Silver-Sieved >75 um	mg/Kg	--	0.9 UR	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Sodium-Sieved >75 um	mg/Kg	--	1410	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Thallium-Sieved >75 um	mg/Kg	--	2.2 U	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Uranium-Sieved >75 um	mg/Kg	--	17.9 UJ	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Vanadium-Sieved >75 um	mg/Kg	--	39.3	NC
RM735BSF	16-May-05	CLP TAL TotMetals-Sieved>75um	Zinc-Sieved >75 um	mg/Kg	--	10700 D	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	2-Methylnaphthalene-Sieved <75 um	µg/Kg	--	1 J	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	Acenaphthene-Sieved <75 um	µg/Kg	--	4 U	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	Acenaphthylene-Sieved <75 um	µg/Kg	--	4 U	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	Anthracene-Sieved <75 um	µg/Kg	--	0.9 J	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	Benzo(a)anthracene-Sieved <75 um	µg/Kg	--	3 J	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	Benzo(a)pyrene-Sieved <75 um	µg/Kg	--	4 U	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	Benzo(b)fluoranthene-Sieved <75 um	µg/Kg	--	4 U	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	Benzo(ghi)perylene-Sieved <75 um	µg/Kg	--	4 U	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	Benzo(k)fluoranthene-Sieved <75 um	µg/Kg	--	4 U	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	Chrysene-Sieved <75 um	µg/Kg	--	5	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	Dibenzo(a,h)anthracene-Sieved <75 um	µg/Kg	--	1 J	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	Dibenzofuran-Sieved <75 um	µg/Kg	--	1 J	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	Fluoranthene-Sieved <75 um	µg/Kg	--	10	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	Fluorene-Sieved <75 um	µg/Kg	--	2 J	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	Indeno[1,2,3-cd]pyrene-Sieved <75 um	µg/Kg	--	4 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	Naphthalene-Sieved <75 um	µg/Kg	--	3 J	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	Phenanthrene-Sieved <75 um	µg/Kg	--	8	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved<75um	Pyrene-Sieved <75 um	µg/Kg	--	7	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	2-Methylnaphthalene-Sieved >75 um	µg/Kg	--	1 J	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	Acenaphthene-Sieved >75 um	µg/Kg	--	4 U	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	Acenaphthylene-Sieved >75 um	µg/Kg	--	4 U	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	Anthracene-Sieved >75 um	µg/Kg	--	0.5 J	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	Benzo(a)anthracene-Sieved >75 um	µg/Kg	--	2 J	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	Benzo(a)pyrene-Sieved >75 um	µg/Kg	--	2 J	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	Benzo(b)fluoranthene-Sieved >75 um	µg/Kg	--	4 U	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	Benzo(ghi)perylene-Sieved >75 um	µg/Kg	--	4 U	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	Benzo(k)fluoranthene-Sieved >75 um	µg/Kg	--	4 U	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	Chrysene-Sieved >75 um	µg/Kg	--	4	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	Dibenzo(a,h)anthracene-Sieved >75 um	µg/Kg	--	0.7 J	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	Dibenzofuran-Sieved >75 um	µg/Kg	--	0.7 J	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	Fluoranthene-Sieved >75 um	µg/Kg	--	7	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	Fluorene-Sieved >75 um	µg/Kg	--	4 U	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	Indeno[1,2,3-cd]pyrene-Sieved >75 um	µg/Kg	--	2 J	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	Naphthalene-Sieved >75 um	µg/Kg	--	2 J	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	Phenanthrene-Sieved >75 um	µg/Kg	--	5	NC
RM735BSF	16-May-05	CLP TCL PAH-Sieved>75um	Pyrene-Sieved >75 um	µg/Kg	--	6	NC
RM735BSF	16-May-05	CLP TCL PCBs-Sieved<75um	PCB-1016-Sieved <75 um	µg/Kg	--	1.7 U	NC
RM735BSF	16-May-05	CLP TCL PCBs-Sieved<75um	PCB-1221-Sieved <75 um	µg/Kg	--	7 U	NC
RM735BSF	16-May-05	CLP TCL PCBs-Sieved<75um	PCB-1232-Sieved <75 um	µg/Kg	--	7 U	NC
RM735BSF	16-May-05	CLP TCL PCBs-Sieved<75um	PCB-1242-Sieved <75 um	µg/Kg	--	1.7 U	NC
RM735BSF	16-May-05	CLP TCL PCBs-Sieved<75um	PCB-1248-Sieved <75 um	µg/Kg	--	1.7 U	NC
RM735BSF	16-May-05	CLP TCL PCBs-Sieved<75um	PCB-1254-Sieved <75 um	µg/Kg	--	1.7 U	NC
RM735BSF	16-May-05	CLP TCL PCBs-Sieved<75um	PCB-1260-Sieved <75 um	µg/Kg	--	1.7 U	NC
RM735BSF	16-May-05	CLP TCL PCBs-Sieved>75um	PCB-1016-Sieved >75 um	µg/Kg	--	1.7 U	NC
RM735BSF	16-May-05	CLP TCL PCBs-Sieved>75um	PCB-1221-Sieved >75 um	µg/Kg	--	6.7 U	NC
RM735BSF	16-May-05	CLP TCL PCBs-Sieved>75um	PCB-1232-Sieved >75 um	µg/Kg	--	6.7 U	NC
RM735BSF	16-May-05	CLP TCL PCBs-Sieved>75um	PCB-1242-Sieved >75 um	µg/Kg	--	1.7 U	NC
RM735BSF	16-May-05	CLP TCL PCBs-Sieved>75um	PCB-1248-Sieved >75 um	µg/Kg	--	1.7 U	NC
RM735BSF	16-May-05	CLP TCL PCBs-Sieved>75um	PCB-1254-Sieved >75 um	µg/Kg	--	1.7 U	NC
RM735BSF	16-May-05	CLP TCL PCBs-Sieved>75um	PCB-1260-Sieved >75 um	µg/Kg	--	1.7 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	2,4'-DDD-Sieved <75 um	µg/Kg	--	0.7 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	2,4'-DDE-Sieved <75 um	µg/Kg	--	0.7 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	2,4'-DDT-Sieved <75 um	µg/Kg	--	0.7 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	4,4'-DDD-Sieved <75 um	µg/Kg	--	0.7 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	4,4'-DDE-Sieved <75 um	µg/Kg	--	0.7 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	4,4'-DDT-Sieved <75 um	µg/Kg	--	0.7 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	Aldrin-Sieved <75 um	µg/Kg	--	0.34 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	alpha-BHC-Sieved <75 um	µg/Kg	--	0.34 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	alpha-Chlordane-Sieved <75 um	µg/Kg	--	0.34 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	beta-BHC-Sieved <75 um	µg/Kg	--	0.34 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	cis-Nonachlor-Sieved <75 um	µg/Kg	--	0.34 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	delta-BHC-Sieved <75 um	µg/Kg	--	0.34 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	Dieldrin-Sieved <75 um	µg/Kg	--	0.7 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	Endosulfan I-Sieved <75 um	µg/Kg	--	0.34 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	Endosulfan II-Sieved <75 um	µg/Kg	--	0.7 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	Endosulfan sulfate-Sieved <75 um	µg/Kg	--	0.7 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	Endrin aldehyde-Sieved <75 um	µg/Kg	--	0.7 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	Endrin ketone-Sieved <75 um	µg/Kg	--	0.7 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	Endrin-Sieved <75 um	µg/Kg	--	0.7 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	gamma-BHC (Lindane)-Sieved <75 um	µg/Kg	--	0.34 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	gamma-Chlordane-Sieved <75 um	µg/Kg	--	0.34 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	Heptachlor epoxide-Sieved <75 um	µg/Kg	--	0.34 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	Heptachlor-Sieved <75 um	µg/Kg	--	0.34 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	Hexachlorobenzene-Sieved <75 um	µg/Kg	--	0.34 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	Hexachlorobutadiene-Sieved <75 um	µg/Kg	--	0.34 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	Methoxychlor-Sieved <75 um	µg/Kg	--	3.4 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	Oxychlordane-Sieved <75 um	µg/Kg	--	0.34 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	Toxaphene-Sieved <75 um	µg/Kg	--	34 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved<75um	trans-Nonachlor-Sieved <75 um	µg/Kg	--	0.34 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	2,4'-DDD-Sieved >75 um	µg/Kg	--	0.67 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	2,4'-DDE-Sieved >75 um	µg/Kg	--	0.67 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	2,4'-DDT-Sieved >75 um	µg/Kg	--	0.67 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	4,4'-DDD-Sieved >75 um	µg/Kg	--	0.67 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	4,4'-DDE-Sieved >75 um	µg/Kg	--	0.67 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	4,4'-DDT-Sieved >75 um	µg/Kg	--	0.67 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	Aldrin-Sieved >75 um	µg/Kg	--	0.33 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	alpha-BHC-Sieved >75 um	µg/Kg	--	0.33 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	alpha-Chlordane-Sieved >75 um	µg/Kg	--	0.33 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	beta-BHC-Sieved >75 um	µg/Kg	--	0.33 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	cis-Nonachlor-Sieved >75 um	µg/Kg	--	0.33 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	delta-BHC-Sieved >75 um	µg/Kg	--	0.33 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	Dieldrin-Sieved >75 um	µg/Kg	--	0.67 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	Endosulfan I-Sieved >75 um	µg/Kg	--	0.33 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	Endosulfan II-Sieved >75 um	µg/Kg	--	0.67 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	Endosulfan sulfate-Sieved >75 um	µg/Kg	--	0.67 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	Endrin aldehyde-Sieved >75 um	µg/Kg	--	0.67 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	Endrin ketone-Sieved >75 um	µg/Kg	--	0.67 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	Endrin-Sieved >75 um	µg/Kg	--	0.67 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	gamma-BHC (Lindane)-Sieved >75 um	µg/Kg	--	0.33 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	gamma-Chlordane-Sieved >75 um	µg/Kg	--	0.33 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	Heptachlor epoxide-Sieved >75 um	µg/Kg	--	0.33 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	Heptachlor-Sieved >75 um	µg/Kg	--	0.33 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	Hexachlorobenzene-Sieved >75 um	µg/Kg	--	0.33 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	Hexachlorobutadiene-Sieved >75 um	µg/Kg	--	0.33 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	Methoxychlor-Sieved >75 um	µg/Kg	--	3.3 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	Oxychlordane-Sieved >75 um	µg/Kg	--	0.33 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	Toxaphene-Sieved >75 um	µg/Kg	--	33 U	NC
RM735BSF	16-May-05	CLP TCL Pesticides-Sieved>75um	trans-Nonachlor-Sieved >75 um	µg/Kg	--	0.33 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	1,1'-Biphenyl-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	1,2,4-Trichlorobenzene-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	1,2-Dichlorobenzene-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	1,3-Dichlorobenzene-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	1,4-Dichlorobenzene-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	2,2'-Oxybis(1-Chloropropane)-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	2,4,5-Trichlorophenol-Sieved <75 um	µg/Kg	--	220 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	2,4,6-Trichlorophenol-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	2,4-Dichlorophenol-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	2,4-Dimethylphenol-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	2,4-Dinitrophenol-Sieved <75 um	µg/Kg	--	220 UJ	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	2,4-Dinitrotoluene-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	2,6-Dinitrotoluene-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	2-Chloronaphthalene-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	2-Chlorophenol-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	2-Methylphenol-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	2-Nitroaniline-Sieved <75 um	µg/Kg	--	220 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	2-Nitrophenol-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	3,3-Dichlorobenzidine-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	3-Nitroaniline-Sieved <75 um	µg/Kg	--	220 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	4,6-Dinitro-2-methylphenol-Sieved <75 um	µg/Kg	--	220 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	4-Bromophenyl-phenylether-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	4-Chloro-3-methylphenol-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	4-Chloroaniline-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	4-Chlorophenyl-phenyl ether-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	4-Methylphenol-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	4-Nitroaniline-Sieved <75 um	µg/Kg	--	220 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	4-Nitrophenol-Sieved <75 um	µg/Kg	--	220 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Acetophenone-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Atrazine-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Benzaldehyde-Sieved <75 um	µg/Kg	--	87 UJ	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Benzoic acid-Sieved <75 um	µg/Kg	--	87 UR	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Benzyl alcohol-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Bis(2-Chloroethoxy)methane-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Bis(2-Chloroethyl)ether-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Bis(2-ethylhexyl)phthalate-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Butyl benzyl phthalate-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Caprolactam-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Carbazole-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Di-n-butyl phthalate-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Di-n-octylphthalate-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Diethyl phthalate-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Dimethyl phthalate-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Hexachloroethane-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Isophorone-Sieved <75 um	µg/Kg	--	87 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	N-Nitrosodi-n-propylamine-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	N-Nitrosodiphenylamine-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Nitrobenzene-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Pentachlorophenol-Sieved <75 um	µg/Kg	--	220 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Perchlorocyclopentadiene-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved<75um	Phenol-Sieved <75 um	µg/Kg	--	87 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	1,1'-Biphenyl-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	1,2,4-Trichlorobenzene-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	1,2-Dichlorobenzene-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	1,3-Dichlorobenzene-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	1,4-Dichlorobenzene-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	2,2'-Oxybis(1-Chloropropane)-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	2,4,5-Trichlorophenol-Sieved >75 um	µg/Kg	--	210 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	2,4,6-Trichlorophenol-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	2,4-Dichlorophenol-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	2,4-Dimethylphenol-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	2,4-Dinitrophenol-Sieved >75 um	µg/Kg	--	210 UJ	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	2,4-Dinitrotoluene-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	2,6-Dinitrotoluene-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	2-Chloronaphthalene-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	2-Chlorophenol-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	2-Methylphenol-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	2-Nitroaniline-Sieved >75 um	µg/Kg	--	210 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	2-Nitrophenol-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	3,3-Dichlorobenzidine-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	3-Nitroaniline-Sieved >75 um	µg/Kg	--	210 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	4,6-Dinitro-2-methylphenol-Sieved >75 um	µg/Kg	--	210 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	4-Bromophenyl-phenylether-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	4-Chloro-3-methylphenol-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	4-Chloroaniline-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	4-Chlorophenyl-phenyl ether-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	4-Methylphenol-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	4-Nitroaniline-Sieved >75 um	µg/Kg	--	210 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	4-Nitrophenol-Sieved >75 um	µg/Kg	--	210 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Acetophenone-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Atrazine-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Benzaldehyde-Sieved >75 um	µg/Kg	--	83 UJ	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Benzoic acid-Sieved >75 um	µg/Kg	--	83 UR	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Benzyl alcohol-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Bis(2-Chloroethoxy)methane-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Bis(2-Chloroethyl)ether-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Bis(2-ethylhexyl)phthalate-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Butyl benzyl phthalate-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Caprolactam-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Carbazole-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Di-n-butyl phthalate-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Di-n-octylphthalate-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Diethyl phthalate-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Dimethyl phthalate-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Hexachloroethane-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Isophorone-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	N-Nitrosodi-n-propylamine-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	N-Nitrosodiphenylamine-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Nitrobenzene-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Pentachlorophenol-Sieved >75 um	µg/Kg	--	210 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Perchlorocyclopentadiene-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	CLP TCL SVOC-Sieved>75um	Phenol-Sieved >75 um	µg/Kg	--	83 U	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	% Moisture	%	--	1.9	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	--	9.85	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	--	3.99 J	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	--	0.14 U	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	--	0.26 U	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	--	0.209 J	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	--	0.706 J	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	--	0.19 U	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	--	0.428 J	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	1,2,3,7,8,9-Hexachlorodibenzofuran	PG/G	--	0.0915 J	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	--	0.159 U	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	--	0.159 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	--	0.189 U	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	--	0.219 J	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	--	0.0795 U	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	2,3,7,8-Tetrachlorodibenzofuran	PG/G	--	1.69	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	Heptachlorodibenzodioxin (Total)	PG/G	--	21.4	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	Heptachlorodibenzofuran (Total)	PG/G	--	7.97	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	Hexachlorodibenzodioxin (Total)	PG/G	--	5.27	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	Hexachlorodibenzofuran (Total)	PG/G	--	3.58 J	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	Octachlorodibenzodioxin	PG/G	--	77.8	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	Octachlorodibenzofuran	PG/G	--	4.89 J	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	Pentachlorodibenzodioxin (Total)	PG/G	--	0.891	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	Pentachlorodibenzofuran (Total)	PG/G	--	1.89 J	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	TEQ WHO-98	PG/G	--	0.5683	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	Tetrachlorodibenzodioxin (Total)	PG/G	--	0.471	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved<75um	Tetrachlorodibenzofuran (Total)	PG/G	--	3.47	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	% Moisture	%	0.8	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	1.5 J	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	0.721 J	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	0.148 U	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	0.122 U	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	0.0901 U	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	0.165 U	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	0.0869 U	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	0.128 J	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	1,2,3,7,8,9-Hexachlorodibenzofuran	PG/G	0.125 U	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	0.0732 J	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	0.107 U	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	0.0857 U	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	0.126 U	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	0.0774 U	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	2,3,7,8-Tetrachlorodibenzofuran	PG/G	0.749 J	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	Heptachlorodibenzodioxin (Total)	PG/G	3.38	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	Heptachlorodibenzofuran (Total)	PG/G	1.44	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	Hexachlorodibenzodioxin (Total)	PG/G	0.388	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	Hexachlorodibenzofuran (Total)	PG/G	0.764 J	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	Octachlorodibenzodioxin	PG/G	11	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	Octachlorodibenzofuran	PG/G	0.745 J	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	Pentachlorodibenzodioxin (Total)	PG/G	0.0732	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	Pentachlorodibenzofuran (Total)	PG/G	0.317 J	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	TEQ WHO-98	PG/G	0.1843	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	Tetrachlorodibenzodioxin (Total)	PG/G	0.0774 U	--	NC
RM735BSF	16-May-05	Dioxins and Furans-Sieved>75um	Tetrachlorodibenzofuran (Total)	PG/G	1.19	--	NC
RM735X1	14-Apr-05	415.1	Total organic carbon	mg/Kg	4000	2260	55.6%
RM735X1	14-Apr-05	ASTMD422	<200 Total	Percent	10.8	11.7	8.0%
RM735X1	14-Apr-05	ASTMD422	Clay	Percent	0.054	0.117	73.7%
RM735X1	14-Apr-05	ASTMD422	Co. Sand	Percent	0.1	0	200.0%
RM735X1	14-Apr-05	ASTMD422	Colloids	Percent	0.108	0.0585	59.5%
RM735X1	14-Apr-05	ASTMD422	Fine Sand	Percent	85	84.3	0.8%
RM735X1	14-Apr-05	ASTMD422	Gravel	Percent	0	0	0.0%
RM735X1	14-Apr-05	ASTMD422	Med. Sand	Percent	4.1	4	2.5%
RM735X1	14-Apr-05	ASTMD422	Sand Total	Percent	89.2	88.3	1.0%
RM735X1	14-Apr-05	ASTMD422	Silt	Percent	10.638	11.5245	8.0%
RM735X1	14-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	6970	7820	11.5%
RM735X1	14-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	29.1 J	5.1 J	140.4%
RM735X1	14-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	15.9	14.5	9.2%
RM735X1	14-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	591	636	7.3%
RM735X1	14-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.6 J	0.71	16.8%
RM735X1	14-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	1.8	2.1	15.4%
RM735X1	14-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	24100	28400	16.4%
RM735X1	14-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	42.3	42.1	0.5%
RM735X1	14-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	21.6	20.8	3.8%
RM735X1	14-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	650	579	11.6%
RM735X1	14-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	53400	52400	1.9%
RM735X1	14-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	134	145	7.9%
RM735X1	14-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	7260	10600	37.4%
RM735X1	14-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	1130	1090	3.6%
RM735X1	14-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.087 J	0.13	39.6%
RM735X1	14-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	10	12	18.2%
RM735X1	14-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1390	1460	4.9%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM735X1	14-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	3.8 UR	4 UR	NC
RM735X1	14-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.1 UJ	1.1 UJ	NC
RM735X1	14-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	593	611	3.0%
RM735X1	14-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	2.7 U	2.8 U	NC
RM735X1	14-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	8.7 U	22.8 U	NC
RM735X1	14-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	21.6	27.1	22.6%
RM735X1	14-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	4150	3780	9.3%
RM735X1	14-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.4 J	0.4 J	0.0%
RM735X1	14-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	5 U	5 U	NC
RM735X1	14-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	5 U	5 U	NC
RM735X1	14-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	0.2 J	5 U	NC
RM735X1	14-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	0.7 J	0.6 J	15.4%
RM735X1	14-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	0.9 J	0.8 J	11.8%
RM735X1	14-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	1 J	1 J	0.0%
RM735X1	14-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	0.7 J	0.6 J	15.4%
RM735X1	14-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	0.9 J	0.8 J	11.8%
RM735X1	14-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	1 J	1 J	0.0%
RM735X1	14-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	0.4 J	5 U	NC
RM735X1	14-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	5 U	5 U	NC
RM735X1	14-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	2 J	2 J	0.0%
RM735X1	14-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	0.2 J	5 U	NC
RM735X1	14-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	0.7 J	0.8 J	13.3%
RM735X1	14-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	3.8 U	3.9 U	NC
RM735X1	14-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	1 J	1 J	0.0%
RM735X1	14-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	1 J	1 J	0.0%
RM735X1	14-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	0.92 U	0.96 U	NC
RM735X1	14-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	3.7 U	3.9 U	NC
RM735X1	14-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	3.7 U	3.9 U	NC
RM735X1	14-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	0.92 U	0.96 U	NC
RM735X1	14-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	0.92 U	0.96 U	NC
RM735X1	14-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	0.92 U	0.96 U	NC
RM735X1	14-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	0.92 U	0.96 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.74 U	0.77 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.74 U	0.77 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.74 U	0.16 J	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.74 U	0.77 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.74 U	0.097 J	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.31 J	0.49 J	45.0%
RM735X1	14-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.37 U	0.38 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.37 U	0.38 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.37 U	0.38 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.37 U	0.38 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.37 U	0.38 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.37 U	0.38 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.74 U	0.77 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.37 U	0.38 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.74 U	0.77 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.74 U	0.77 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.74 U	0.77 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.74 U	0.77 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.74 U	0.77 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.37 U	0.38 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.37 U	0.38 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.37 U	0.38 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.37 U	0.38 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.37 U	0.38 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.37 U	0.38 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	3.7 U	3.8 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.37 U	0.38 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	37 U	38 U	NC
RM735X1	14-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.37 U	0.38 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	240 U	240 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	93 U	96 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM735X1	14-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	240 UJ	240 UJ	NC
RM735X1	14-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	93 UJ	96 UJ	NC
RM735X1	14-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	240 U	240 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	240 U	240 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	240 UJ	240 UJ	NC
RM735X1	14-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	240 U	240 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	240 U	240 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	240 UR	240 UR	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	93 UJ	96 UJ	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	240 U	240 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	93 U	96 U	NC
RM735X1	14-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	93 U	96 U	NC
RM739X1	11-Apr-05	415.1	Total organic carbon	mg/Kg	3380	7990	81.1%
RM739X1	11-Apr-05	ASTMD422	<200 Total	Percent	6.2	5.3	15.7%
RM739X1	11-Apr-05	ASTMD422	Clay	Percent	0	0.0265	200.0%
RM739X1	11-Apr-05	ASTMD422	Co. Sand	Percent	0	0	0.0%
RM739X1	11-Apr-05	ASTMD422	Colloids	Percent	0	0	0.0%
RM739X1	11-Apr-05	ASTMD422	Fine Sand	Percent	89	90.9	2.1%
RM739X1	11-Apr-05	ASTMD422	Gravel	Percent	0	0	0.0%
RM739X1	11-Apr-05	ASTMD422	Med. Sand	Percent	4.8	3.8	23.3%
RM739X1	11-Apr-05	ASTMD422	Sand Total	Percent	93.8	94.7	1.0%
RM739X1	11-Apr-05	ASTMD422	Silt	Percent	6.2	5.2735	16.2%
RM739X1	11-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	9880	8490	15.1%
RM739X1	11-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	23.2 J	29.9 J	25.2%
RM739X1	11-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	14.7	12	20.2%
RM739X1	11-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	846 J	746 J	12.6%
RM739X1	11-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	0.84	0.73	14.0%
RM739X1	11-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	3	2.9	3.4%
RM739X1	11-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	34000	30800	9.9%
RM739X1	11-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	64.8 J	55.5 J	15.5%
RM739X1	11-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	31.9	26.1	20.0%
RM739X1	11-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	1050	926	12.6%
RM739X1	11-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	86400 D	75500 D	13.5%
RM739X1	11-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	273	238	13.7%
RM739X1	11-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	8110	7940	2.1%
RM739X1	11-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	1630	1430	13.1%
RM739X1	11-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.12 J	0.12 J	0.0%
RM739X1	11-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	13	11.2	14.9%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM739X1	11-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	1830	1630	11.6%
RM739X1	11-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	4.5 UR	3.8 UR	NC
RM739X1	11-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.3 U	1.1 U	NC
RM739X1	11-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	941	811	14.8%
RM739X1	11-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	1.2 J	2.7 U	NC
RM739X1	11-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	6.8 J	8.2 J	18.7%
RM739X1	11-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	27.1	25.5	6.1%
RM739X1	11-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	7240 D	6520 D	10.5%
RM739X1	11-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	0.2 J	0.4 J	66.7%
RM739X1	11-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	5 U	6 U	NC
RM739X1	11-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	5 U	6 U	NC
RM739X1	11-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	5 U	6 U	NC
RM739X1	11-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	0.4 J	1 J	85.7%
RM739X1	11-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	0.4 J	2 J	133.3%
RM739X1	11-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	5 U	2 J	NC
RM739X1	11-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	5 U	1 J	NC
RM739X1	11-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	5 U	2 J	NC
RM739X1	11-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	0.6 J	3 J	133.3%
RM739X1	11-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	5 U	6 U	NC
RM739X1	11-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	5 U	6 U	NC
RM739X1	11-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	0.6 J	4 J	147.8%
RM739X1	11-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	5 U	6 U	NC
RM739X1	11-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	0.2 J	2 J	163.6%
RM739X1	11-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	4.4 U	4.5 U	NC
RM739X1	11-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	0.4 J	2 J	133.3%
RM739X1	11-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	0.6 J	4 J	147.8%
RM739X1	11-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1.1 U	1.1 U	NC
RM739X1	11-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	4.3 U	4.4 U	NC
RM739X1	11-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	4.3 U	4.4 U	NC
RM739X1	11-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1.1 U	1.1 U	NC
RM739X1	11-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1.1 U	1.1 U	NC
RM739X1	11-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1.1 U	1.1 U	NC
RM739X1	11-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1.1 U	1.1 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.85 U	0.88 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.85 U	0.88 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.85 U	0.88 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.85 U	0.88 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.85 U	0.88 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.85 U	0.88 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.42 U	0.43 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.42 U	0.43 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.42 U	0.43 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.42 U	0.43 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.42 U	0.43 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.42 U	0.43 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.85 U	0.88 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.42 U	0.43 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.85 U	0.88 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.85 U	0.88 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.85 U	0.88 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.85 U	0.88 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.85 U	0.88 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.42 U	0.43 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.42 U	0.43 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.42 U	0.43 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.42 U	0.43 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.42 U	0.43 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.42 U	0.43 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	4.2 U	4.3 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.42 U	0.43 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	42 U	43 U	NC
RM739X1	11-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.42 U	0.43 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	270 U	280 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM739X1	11-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	270 U	280 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	270 U	280 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	270 U	280 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	270 U	280 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	270 U	280 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	270 U	280 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	110 UJ	110 UJ	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	270 U	280 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	110 U	110 U	NC
RM739X1	11-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	110 U	110 U	NC
RM742B2	9-Apr-05	415.1	Total organic carbon	mg/Kg	771	3040 J	119.1%
RM742B2	9-Apr-05	ASTMD422	<200 Total	Percent	2.2	3.4	42.9%
RM742B2	9-Apr-05	ASTMD422	Clay	Percent	0	0.017	200.0%
RM742B2	9-Apr-05	ASTMD422	Co. Sand	Percent	0	0.1	200.0%
RM742B2	9-Apr-05	ASTMD422	Colloids	Percent	0	0	0.0%
RM742B2	9-Apr-05	ASTMD422	Fine Sand	Percent	43.8	44	0.5%
RM742B2	9-Apr-05	ASTMD422	Gravel	Percent	0	0	0.0%
RM742B2	9-Apr-05	ASTMD422	Med. Sand	Percent	54	52.5	2.8%
RM742B2	9-Apr-05	ASTMD422	Sand Total	Percent	97.8	96.6	1.2%
RM742B2	9-Apr-05	ASTMD422	Silt	Percent	2.2	3.383	42.4%
RM742B2	9-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	18600	18900	1.6%
RM742B2	9-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	52.3 J	41.3 J	23.5%
RM742B2	9-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	25.2	24.6	2.4%
RM742B2	9-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	1680	1710	1.8%
RM742B2	9-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	1.3	1.3	0.0%
RM742B2	9-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	1.2	1.2	0.0%
RM742B2	9-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	63300	64400	1.7%
RM742B2	9-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	123	121	1.6%
RM742B2	9-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	48.6	47.3	2.7%
RM742B2	9-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	2240	2190	2.3%
RM742B2	9-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	187000 D	197000 D	5.2%
RM742B2	9-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	231	251	8.3%
RM742B2	9-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	7070	7580	7.0%
RM742B2	9-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	3680 D	3600 D	2.2%
RM742B2	9-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.03 J	0.01 J	100.0%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM742B2	9-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	12.1	12.4	2.4%
RM742B2	9-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	3610	3680	1.9%
RM742B2	9-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	3.3 UR	3.7 U	NC
RM742B2	9-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	0.93 UJ	1.1 U	NC
RM742B2	9-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	1770	1730	2.3%
RM742B2	9-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	2.3 UJ	2.7 U	NC
RM742B2	9-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	84.3 J	84.3	0.0%
RM742B2	9-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	38.3	39.1	2.1%
RM742B2	9-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	15200 D	16000 J	5.1%
RM742B2	9-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	4 U	4 U	NC
RM742B2	9-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	4 U	4 U	NC
RM742B2	9-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	4 U	4 U	NC
RM742B2	9-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	4 U	4 U	NC
RM742B2	9-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	4 U	4 U	NC
RM742B2	9-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	4 U	4 U	NC
RM742B2	9-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	4 U	4 U	NC
RM742B2	9-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	4 U	4 U	NC
RM742B2	9-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	4 U	4 U	NC
RM742B2	9-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	4 U	4 U	NC
RM742B2	9-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	4 U	4 U	NC
RM742B2	9-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	4 U	4 U	NC
RM742B2	9-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	4 U	4 U	NC
RM742B2	9-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	4 U	4 U	NC
RM742B2	9-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	4 U	4 U	NC
RM742B2	9-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	4 U	4 U	NC
RM742B2	9-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	0.3 J	4 U	NC
RM742B2	9-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	4 U	4 U	NC
RM742B2	9-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	0.85 UJ	0.84 U	NC
RM742B2	9-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	3.4 UJ	3.4 U	NC
RM742B2	9-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	3.4 UJ	3.4 U	NC
RM742B2	9-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	0.85 UJ	0.84 U	NC
RM742B2	9-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	0.85 UJ	0.84 U	NC
RM742B2	9-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	0.85 UJ	0.84 U	NC
RM742B2	9-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	0.85 UJ	0.84 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.68 U	0.68 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.68 U	0.68 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.68 U	0.68 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.68 U	0.68 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.68 U	0.68 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.68 U	0.68 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.34 U	0.34 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.34 U	0.34 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.34 U	0.34 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.34 U	0.34 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.34 U	0.34 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.34 U	0.34 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.68 U	0.68 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.34 U	0.34 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.68 U	0.68 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.68 U	0.68 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.68 U	0.68 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.68 U	0.68 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.68 U	0.68 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.34 U	0.34 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.34 U	0.34 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.34 U	0.34 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.34 U	0.34 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.34 U	0.34 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.34 U	0.34 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	3.4 U	3.4 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.34 U	0.34 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	34 U	34 U	NC
RM742B2	9-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.34 U	0.34 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	85 U	85 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM742B2	9-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	210 U	210 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	210 U	210 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	210 U	210 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	210 U	210 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	210 U	210 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	210 U	210 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	210 U	210 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	85 UJ	85 UJ	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	210 U	210 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	85 U	85 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	% Moisture	%	2	2	0.0%
RM742B2	9-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	0.226 U	0.252 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	0.0943 U	0.0751 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	0.0376 U	0.043 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	0.0558 U	0.0612 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	0.027 U	0.0244 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	0.0548 U	0.0605 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	0.0276 U	0.0316 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	0.0554 U	0.061 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	PG/G	0.0362 U	0.0427 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	0.0259 U	0.0314 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	0.0186 U	0.0277 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	0.0272 U	0.0237 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	0.0342 U	0.0395 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	0.0337 U	0.0371 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzofuran	PG/G	0.428	0.424	0.9%
RM742B2	9-Apr-05	Dioxins and Furans	Heptachlorodibenzodioxin (Total)	PG/G	0.47	0.527	11.4%
RM742B2	9-Apr-05	Dioxins and Furans	Heptachlorodibenzofuran (Total)	PG/G	0.165 J	0.0823 J	66.9%
RM742B2	9-Apr-05	Dioxins and Furans	Hexachlorodibenzodioxin (Total)	PG/G	0.0666	0.0609 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	Hexachlorodibenzofuran (Total)	PG/G	0.0292 U	0.115	NC
RM742B2	9-Apr-05	Dioxins and Furans	Octachlorodibenzodioxin	PG/G	1.28 U	1.42 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	Octachlorodibenzofuran	PG/G	0.129 U	0.13 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	Pentachlorodibenzodioxin (Total)	PG/G	0.0259 U	0.0314 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	Pentachlorodibenzofuran (Total)	PG/G	0.064	0.0356	57.0%

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM742B2	9-Apr-05	Dioxins and Furans	TEQ WHO-98	PG/G	0 U	0.0424	NC
RM742B2	9-Apr-05	Dioxins and Furans	Tetrachlorodibenzodioxin (Total)	PG/G	0.0337 U	0.0371 U	NC
RM742B2	9-Apr-05	Dioxins and Furans	Tetrachlorodibenzofuran (Total)	PG/G	0.743	0.7	6.0%
RM744X2	8-Apr-05	415.1	Total organic carbon	mg/Kg	433	327 UJ	NC
RM744X2	8-Apr-05	ASTMD422	<200 Total	Percent	2.5	13.2	136.3%
RM744X2	8-Apr-05	ASTMD422	Clay	Percent	0.0125	0	200.0%
RM744X2	8-Apr-05	ASTMD422	Co. Sand	Percent	0.3	0.4	28.6%
RM744X2	8-Apr-05	ASTMD422	Colloids	Percent	0	0	0.0%
RM744X2	8-Apr-05	ASTMD422	Fine Sand	Percent	27	13.4	67.3%
RM744X2	8-Apr-05	ASTMD422	Gravel	Percent	0	0	0.0%
RM744X2	8-Apr-05	ASTMD422	Med. Sand	Percent	70.2	73	3.9%
RM744X2	8-Apr-05	ASTMD422	Sand Total	Percent	97.5	86.8	11.6%
RM744X2	8-Apr-05	ASTMD422	Silt	Percent	2.4875	13.2	136.6%
RM744X2	8-Apr-05	CLP TAL TotMetals	Aluminum	mg/Kg	19700	19600	0.5%
RM744X2	8-Apr-05	CLP TAL TotMetals	Antimony	mg/Kg	54.9 J	34 J	47.0%
RM744X2	8-Apr-05	CLP TAL TotMetals	Arsenic	mg/Kg	29.1	28.3	2.8%
RM744X2	8-Apr-05	CLP TAL TotMetals	Barium	mg/Kg	1880	1840	2.2%
RM744X2	8-Apr-05	CLP TAL TotMetals	Beryllium	mg/Kg	1.4	1.4	0.0%
RM744X2	8-Apr-05	CLP TAL TotMetals	Cadmium	mg/Kg	2.9	2.6	10.9%
RM744X2	8-Apr-05	CLP TAL TotMetals	Calcium	mg/Kg	64100	64100	0.0%
RM744X2	8-Apr-05	CLP TAL TotMetals	Chromium	mg/Kg	131	128	2.3%
RM744X2	8-Apr-05	CLP TAL TotMetals	Cobalt	mg/Kg	57.4	55.8	2.8%
RM744X2	8-Apr-05	CLP TAL TotMetals	Copper	mg/Kg	2380	2330	2.1%
RM744X2	8-Apr-05	CLP TAL TotMetals	Iron	mg/Kg	198000 D	190000 D	4.1%
RM744X2	8-Apr-05	CLP TAL TotMetals	Lead	mg/Kg	262	273	4.1%
RM744X2	8-Apr-05	CLP TAL TotMetals	Magnesium	mg/Kg	5640	5940	5.2%
RM744X2	8-Apr-05	CLP TAL TotMetals	Manganese	mg/Kg	3770 D	3640	3.5%
RM744X2	8-Apr-05	CLP TAL TotMetals	Mercury	mg/Kg	0.011 J	0.015 J	30.8%
RM744X2	8-Apr-05	CLP TAL TotMetals	Nickel	mg/Kg	12.3	12.8	4.0%
RM744X2	8-Apr-05	CLP TAL TotMetals	Potassium	mg/Kg	3800	3980	4.6%
RM744X2	8-Apr-05	CLP TAL TotMetals	Selenium	mg/Kg	3.8 UR	4.3 UR	NC
RM744X2	8-Apr-05	CLP TAL TotMetals	Silver	mg/Kg	1.1 UJ	1.2 UJ	NC
RM744X2	8-Apr-05	CLP TAL TotMetals	Sodium	mg/Kg	1980	1940	2.0%
RM744X2	8-Apr-05	CLP TAL TotMetals	Thallium	mg/Kg	1.4 J	0.84 J	50.0%
RM744X2	8-Apr-05	CLP TAL TotMetals	Uranium	mg/Kg	21.5 UJ	24.8 UJ	NC
RM744X2	8-Apr-05	CLP TAL TotMetals	Vanadium	mg/Kg	41	41.9	2.2%
RM744X2	8-Apr-05	CLP TAL TotMetals	Zinc	mg/Kg	15200	14900 D	2.0%
RM744X2	8-Apr-05	CLP TCL PAH	2-Methylnaphthalene	µg/Kg	5 U	5 U	NC
RM744X2	8-Apr-05	CLP TCL PAH	Acenaphthene	µg/Kg	5 U	5 U	NC
RM744X2	8-Apr-05	CLP TCL PAH	Acenaphthylene	µg/Kg	5 U	5 U	NC
RM744X2	8-Apr-05	CLP TCL PAH	Anthracene	µg/Kg	5 U	5 U	NC
RM744X2	8-Apr-05	CLP TCL PAH	Benzo(a)anthracene	µg/Kg	0.6 J	5 U	NC
RM744X2	8-Apr-05	CLP TCL PAH	Benzo(a)pyrene	µg/Kg	0.4 J	5 U	NC
RM744X2	8-Apr-05	CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	5 U	5 U	NC
RM744X2	8-Apr-05	CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	0.4 J	5 U	NC
RM744X2	8-Apr-05	CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	5 U	5 U	NC
RM744X2	8-Apr-05	CLP TCL PAH	Chrysene	µg/Kg	0.6 J	5 U	NC
RM744X2	8-Apr-05	CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	5 U	5 U	NC
RM744X2	8-Apr-05	CLP TCL PAH	Dibenzofuran	µg/Kg	5 U	5 U	NC
RM744X2	8-Apr-05	CLP TCL PAH	Fluoranthene	µg/Kg	0.8 J	5 U	NC
RM744X2	8-Apr-05	CLP TCL PAH	Fluorene	µg/Kg	5 U	5 U	NC
RM744X2	8-Apr-05	CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	5 U	5 U	NC
RM744X2	8-Apr-05	CLP TCL PAH	Naphthalene	µg/Kg	4.1 U	4 U	NC
RM744X2	8-Apr-05	CLP TCL PAH	Phenanthrene	µg/Kg	0.8 J	5 U	NC
RM744X2	8-Apr-05	CLP TCL PAH	Pyrene	µg/Kg	1 J	5 U	NC
RM744X2	8-Apr-05	CLP TCL PCBs	PCB-1016	µg/Kg	1 U	0.99 U	NC
RM744X2	8-Apr-05	CLP TCL PCBs	PCB-1221	µg/Kg	4.1 U	4 U	NC
RM744X2	8-Apr-05	CLP TCL PCBs	PCB-1232	µg/Kg	4.1 U	4 U	NC
RM744X2	8-Apr-05	CLP TCL PCBs	PCB-1242	µg/Kg	1 U	0.99 U	NC
RM744X2	8-Apr-05	CLP TCL PCBs	PCB-1248	µg/Kg	1 U	0.99 U	NC
RM744X2	8-Apr-05	CLP TCL PCBs	PCB-1254	µg/Kg	1 U	0.99 U	NC
RM744X2	8-Apr-05	CLP TCL PCBs	PCB-1260	µg/Kg	1 U	0.99 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	2,4'-DDD	µg/Kg	0.81 U	0.8 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	2,4'-DDE	µg/Kg	0.81 U	0.8 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	2,4'-DDT	µg/Kg	0.81 U	0.8 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	4,4'-DDD	µg/Kg	0.81 U	0.8 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	4,4'-DDE	µg/Kg	0.81 U	0.8 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	4,4'-DDT	µg/Kg	0.81 U	0.47 J	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	Aldrin	µg/Kg	0.4 U	0.39 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM744X2	8-Apr-05	CLP TCL Pesticides	alpha-BHC	µg/Kg	0.4 U	0.39 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	alpha-Chlordane	µg/Kg	0.4 U	0.39 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	beta-BHC	µg/Kg	0.4 U	0.39 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	cis-Nonachlor	µg/Kg	0.4 U	0.39 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	delta-BHC	µg/Kg	0.4 U	0.39 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	Dieldrin	µg/Kg	0.81 U	0.8 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	Endosulfan I	µg/Kg	0.4 U	0.39 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	Endosulfan II	µg/Kg	0.81 U	0.8 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	0.81 U	0.8 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	Endrin	µg/Kg	0.81 U	0.8 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	Endrin aldehyde	µg/Kg	0.81 U	0.8 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	Endrin ketone	µg/Kg	0.81 U	0.8 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	0.4 U	0.39 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	gamma-Chlordane	µg/Kg	0.4 U	0.39 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	Heptachlor	µg/Kg	0.4 U	0.39 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	0.4 U	0.39 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	0.4 U	0.39 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	0.4 U	0.39 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	Methoxychlor	µg/Kg	4 U	3.9 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	Oxychlordane	µg/Kg	0.4 U	0.39 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	Toxaphene	µg/Kg	40 U	39 U	NC
RM744X2	8-Apr-05	CLP TCL Pesticides	trans-Nonachlor	µg/Kg	0.4 U	0.39 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	250 U	250 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	250 U	250 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	2-Chlorophenol	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	2-Methylphenol	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	2-Nitroaniline	µg/Kg	250 U	250 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	2-Nitrophenol	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	3-Nitroaniline	µg/Kg	250 U	250 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	250 U	250 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	4-Chloroaniline	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	4-Methylphenol	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	4-Nitroaniline	µg/Kg	250 U	250 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	4-Nitrophenol	µg/Kg	250 U	250 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Acetophenone	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Atrazine	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Benzaldehyde	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Benzoic acid	µg/Kg	100 UJ	99 UJ	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Benzyl alcohol	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Caprolactam	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Carbazole	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Diethyl phthalate	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Dimethyl phthalate	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Hexachloroethane	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Isophorone	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	100 U	99 U	NC

TABLE B-1

Primary vs Field Duplicate Evaluation

Upper Columbia River RI/FS

Object Name	Collection Date	Method Type	Analyte	Units	Primary Sample	Field Duplicate	RPD
RM744X2	8-Apr-05	CLP TCL SVOC	Nitrobenzene	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Pentachlorophenol	µg/Kg	250 U	250 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	100 U	99 U	NC
RM744X2	8-Apr-05	CLP TCL SVOC	Phenol	µg/Kg	100 U	99 U	NC

TABLE B-2

Field Rinsate Blank Results

Upper Columbia River RI/FS

Sample ID	Collection Date	Sample Type	Method Type	Analyte	Result	Qualifier Code	Project Qualifier Code	Validation Qualifier Code	Units
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	0.0025		U	U	ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.0027		U	U	ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.0021	U	U		ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzodioxin	0.0018	U	U		ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	0.0010	U	U		ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzodioxin	0.0018	U	U		ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	0.0011	U	U		ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzodioxin	0.0018	U	U		ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	0.0015	U	U		ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzofuran	7.28E-04	U	U		ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.0013	U	U		ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	9.68E-04		U	U	ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	2,3,4,7,8-Pentachlorodibenzofuran	7.10E-04	U	U		ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzodioxin	0.0012	U	U		ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	2,3,7,8-Tetrachlorodibenzofuran	0.0012	U	U		ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	Heptachlorodibenzodioxin (Total)	0.0025				ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	Heptachlorodibenzofuran (Total)	0.0027		U	U	ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	Hexachlorodibenzodioxin (Total)	0.0018	U	U		ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	Hexachlorodibenzofuran (Total)	9.68E-04		U	U	ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	Octachlorodibenzodioxin	0.011		U	U	ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	Octachlorodibenzofuran	0.0034	U	U		ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	Pentachlorodibenzodioxin (Total)	0.0013	U	U		ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	Pentachlorodibenzofuran (Total)	7.19E-04	U	U		ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	TEQ WHO-98	0		U	U	ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	Tetrachlorodibenzodioxin (Total)	0.0012	U	U		ng/L
05164058	16-May-05	Field Rinsate Blank	Dioxins and Furans	Tetrachlorodibenzofuran (Total)	0.0012	U	U		ng/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL PCBs	PCB-1016	1.0	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL PCBs	PCB-1221	2.0	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL PCBs	PCB-1232	1.0	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL PCBs	PCB-1242	1.0	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL PCBs	PCB-1248	1.0	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL PCBs	PCB-1254	1.0	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL PCBs	PCB-1260	1.0	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	2,4'-DDD	1.0	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	2,4'-DDE	1.0	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	2,4'-DDT	1.0	U	U		µg/L

TABLE B-2

Field Rinsate Blank Results

Upper Columbia River RI/FS

Sample ID	Collection Date	Sample Type	Method Type	Analyte	Result	Qualifier Code	Project Qualifier Code	Validation Qualifier Code	Units
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	4,4'-DDD	0.10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	4,4'-DDE	0.10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	4,4'-DDT	0.10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	Aldrin	0.050	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	alpha-BHC	0.050	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	alpha-Chlordane	0.050	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	beta-BHC	0.050	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	cis-Nonachlor	0.050	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	delta-BHC	0.050	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	Dieldrin	0.10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	Endosulfan I	0.050	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	Endosulfan II	0.10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	Endosulfan sulfate	0.10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	Endrin	0.10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	Endrin aldehyde	0.10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	Endrin ketone	0.10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	gamma-BHC (Lindane)	0.050	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	gamma-Chlordane	0.050	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	Heptachlor	0.050	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	Heptachlor epoxide	0.050	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	Hexachlorobenzene	0.050	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	Hexachlorobutadiene	0.050	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	Methoxychlor	0.50	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	Oxychlordane	0.050	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	Toxaphene	5.0	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL Pesticides	trans-Nonachlor	0.050	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	1,1'-Biphenyl	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	1,2,4-Trichlorobenzene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	1,2-Dichlorobenzene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	1,3-Dichlorobenzene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	1,4-Dichlorobenzene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	2,4,5-Trichlorophenol	25	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	2,4,6-Trichlorophenol	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	2,4-Dichlorophenol	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	2,4-Dimethylphenol	10	U	U		µg/L

TABLE B-2

Field Rinsate Blank Results

Upper Columbia River RI/FS

Sample ID	Collection Date	Sample Type	Method Type	Analyte	Result	Qualifier Code	Project Qualifier Code	Validation Qualifier Code	Units
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	2,4-Dinitrophenol	25	U	UJ	UJ	µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	2,4-Dinitrotoluene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	2,6-Dinitrotoluene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	2-Chloronaphthalene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	2-Chlorophenol	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	2-Methylnaphthalene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	2-Methylphenol	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	2-Nitroaniline	25	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	2-Nitrophenol	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	3,3'-Dichlorobenzidine	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	3-Nitroaniline	25	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	4,6-Dinitro-2-methylphenol	25	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	4-Bromophenyl-phenylether	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	4-Chloro-3-methylphenol	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	4-Chloroaniline	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	4-Chlorophenyl-phenyl ether	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	4-Methylphenol	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	4-Nitroaniline	25	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	4-Nitrophenol	25	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Acenaphthene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Acenaphthylene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Acetophenone	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Anthracene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Atrazine	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Benzaldehyde	10	U	UJ	UJ	µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Benzo(a)anthracene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Benzo(a)pyrene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Benzo(b)fluoranthene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Benzo(ghi)perylene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Benzo(k)fluoranthene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Benzoic acid	10	U	UR	R	µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Benzyl alcohol	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	bis(2-Chloroethoxy)methane	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Bis(2-chloroethyl)ether	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Butyl benzyl phthalate	10	U	U		µg/L

TABLE B-2

Field Rinsate Blank Results

Upper Columbia River RI/FS

Sample ID	Collection Date	Sample Type	Method Type	Analyte	Result	Qualifier Code	Project Qualifier Code	Validation Qualifier Code	Units
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Caprolactam	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Carbazole	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Chrysene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Dibenzo(a,h)anthracene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Dibenzofuran	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Diethyl phthalate	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Dimethyl phthalate	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Di-n-butyl phthalate	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Di-n-octylphthalate	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Fluoranthene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Fluorene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Hexachloroethane	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Indeno[1,2,3-cd]pyrene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Isophorone	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Naphthalene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Nitrobenzene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	N-Nitrosodi-n-propylamine	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	N-Nitrosodiphenylamine	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Pentachlorophenol	25	U	UJ	UJ	µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Perchlorocyclopentadiene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Phenanthrene	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Phenol	10	U	U		µg/L
J4J21	16-May-05	Field Rinsate Blank	CLP TCL SVOC	Pyrene	10	U	U		µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Aluminum	56	J	U	U	µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Antimony	60	U	U		µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Arsenic	10	U	U		µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Barium	31	J	J		µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Beryllium	5.0	U	U		µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Cadmium	5.0	U	U		µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Calcium	8,790				µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Chromium	2.1	J	J		µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Cobalt	50	U	U	U	µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Copper	3.2	J	J		µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Iron	96	J	U	U	µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Lead	2.6	J	J		µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Magnesium	1,770	J	J		µg/L

TABLE B-2

Field Rinsate Blank Results

Upper Columbia River RI/FS

Sample ID	Collection Date	Sample Type	Method Type	Analyte	Result	Qualifier Code	Project Qualifier Code	Validation Qualifier Code	Units
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Manganese	8.0	J	J		µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Mercury	0.20	U	UJ	UJ	µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Nickel	40	U	U		µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Potassium	263	E	J	J	µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Selenium	35	U	U		µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Silver	10	U	U		µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Sodium	659	J	J		µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Thallium	25	U	U		µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Uranium	200	U	U		µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Vanadium	50	U	U		µg/L
MJ4GY0	9-May-05	Field Rinsate Blank	CLP TAL TotMetals	Zinc	38	J	J		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Aluminum	52	J	U	U	µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Antimony	60	U	U		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Arsenic	10	U	U		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Barium	0.59	J	U	U	µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Beryllium	5.0	U	U		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Cadmium	5.0	U	U		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Calcium	247	J	U	U	µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Chromium	4.2	J	J		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Cobalt	50	U	U		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Copper	25	U	U		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Iron	61	J	J		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Lead	10	U	U		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Magnesium	42	J	J		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Manganese	5.6	J	J		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Mercury	0.20	U	U		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Nickel	40	U	U		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Potassium	5,000	U	U		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Selenium	35	U	U		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Silver	10	U	U		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Sodium	5,000	U	U		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Thallium	25	U	U		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Uranium	200	U	U		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Vanadium	50	U	U		µg/L
MJ4J08	13-May-05	Field Rinsate Blank	CLP TAL TotMetals	Zinc	24	J	J		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Aluminum	200	U	U		µg/L

TABLE B-2

Field Rinsate Blank Results

Upper Columbia River RI/FS

Sample ID	Collection Date	Sample Type	Method Type	Analyte	Result	Qualifier Code	Project Qualifier Code	Validation Qualifier Code	Units
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Antimony	60	U	U		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Arsenic	10	U	U		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Barium	200	U	U		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Beryllium	5.0	U	U		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Cadmium	5.0	U	U		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Calcium	199	J	U	U	µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Chromium	10	U	U		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Cobalt	50	U	U		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Copper	4.1	J	J		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Iron	30	J	J		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Lead	10	U	U		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Magnesium	40	J	J		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Manganese	1.2	J	J		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Mercury	0.20	U	U		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Nickel	40	U	U		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Potassium	5,000	U	U		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Selenium	35	U	U		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Silver	10	U	U		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Sodium	166	J	J		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Thallium	25	U	U		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Uranium	200	U	U		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Vanadium	50	U	U		µg/L
MJ4J21	16-May-05	Field Rinsate Blank	CLP TAL TotMetals	Zinc	60	U	U		µg/L

APPENDIX C

Summaries of Phase I Sediment Analytical Data and Listings of Sample Assignments

TABLE C-1

Summary of Phase I Sediment Analytical Data - River Group (Transect and Bioassay)

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
River Group										
415.1	Total organic carbon	mg/Kg	245	246	0	100%	376	376	262	54,500
CLP TAL TotMetals	Aluminum	mg/Kg	246	246	0	100%	--	--	2,530	34,000
CLP TAL TotMetals	Antimony	mg/Kg	88	131	115	67%	0.27	19	0.35	63
CLP TAL TotMetals	Arsenic	mg/Kg	231	246	0	94%	0.73	4.5	0.65	74
CLP TAL TotMetals	Barium	mg/Kg	246	246	0	100%	--	--	29	2,280
CLP TAL TotMetals	Beryllium	mg/Kg	246	246	0	100%	--	--	0.22	2.7
CLP TAL TotMetals	Cadmium	mg/Kg	216	246	0	88%	0.047	0.62	0.036	16
CLP TAL TotMetals	Calcium	mg/Kg	246	246	0	100%	--	--	1,320	76,500
CLP TAL TotMetals	Chromium	mg/Kg	246	246	0	100%	--	--	1.2	156
CLP TAL TotMetals	Cobalt	mg/Kg	246	246	0	100%	--	--	2.5	75
CLP TAL TotMetals	Copper	mg/Kg	241	246	0	98%	6.0	8.7	3.0	3,030
CLP TAL TotMetals	Iron	mg/Kg	246	246	0	100%	--	--	5,140	248,000
CLP TAL TotMetals	Lead	mg/Kg	246	246	0	100%	--	--	2.6	2,760
CLP TAL TotMetals	Magnesium	mg/Kg	246	246	0	100%	--	--	1,760	23,000
CLP TAL TotMetals	Manganese	mg/Kg	246	246	0	100%	--	--	92	4,920
CLP TAL TotMetals	Mercury	mg/Kg	203	242	4	84%	0.0070	0.14	0.0040	2.4
CLP TAL TotMetals	Nickel	mg/Kg	246	246	0	100%	--	--	0.68	53
CLP TAL TotMetals	Potassium	mg/Kg	246	246	0	100%	--	--	372	5,260
CLP TAL TotMetals	Selenium	mg/Kg	95	149	97	64%	0.76	10	1.3	23
CLP TAL TotMetals	Silver	mg/Kg	7	220	26	3%	0.26	4.2	0.71	12
CLP TAL TotMetals	Sodium	mg/Kg	223	246	0	91%	45	251	20	2,840
CLP TAL TotMetals	Thallium	mg/Kg	6	246	0	2%	1.8	11	0.68	1.5
CLP TAL TotMetals	Uranium	mg/Kg	51	246	0	21%	6.4	84	4.6	127
CLP TAL TotMetals	Vanadium	mg/Kg	246	246	0	100%	--	--	7.7	71
CLP TAL TotMetals	Zinc	mg/Kg	246	246	0	100%	--	--	16	26,600
CLP TCL PAH	2-Methylnaphthalene	µg/Kg	187	246	0	76%	4.0	12	0.20	5.0
CLP TCL PAH	Acenaphthene	µg/Kg	8	246	0	3%	4.0	18	0.20	2.0
CLP TCL PAH	Acenaphthylene	µg/Kg	1	246	0	0%	4.0	18	3.0	3.0
CLP TCL PAH	Anthracene	µg/Kg	24	246	0	10%	4.0	18	0.20	7.0
CLP TCL PAH	Benzo(a)anthracene	µg/Kg	129	246	0	52%	4.0	17	0.20	32
CLP TCL PAH	Benzo(a)pyrene	µg/Kg	71	246	0	29%	4.0	18	0.20	16
CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	68	246	0	28%	4.0	18	0.20	38
CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	86	246	0	35%	4.0	18	0.20	8.0
CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	68	246	0	28%	4.0	18	0.20	30
CLP TCL PAH	Chrysene	µg/Kg	157	246	0	64%	4.0	16	0.20	77
CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	37	246	0	15%	4.0	18	0.20	4.0
CLP TCL PAH	Dibenzofuran	µg/Kg	51	246	0	21%	4.0	18	0.20	3.0

TABLE C-1

Summary of Phase I Sediment Analytical Data - River Group (Transect and Bioassay)

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL PAH	Fluoranthene	µg/Kg	160	246	0	65%	4.0	14	0.20	200
CLP TCL PAH	Fluorene	µg/Kg	18	246	0	7%	4.0	18	0.20	4.0
CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	83	246	0	34%	4.0	16	0.20	13
CLP TCL PAH	Naphthalene	µg/Kg	118	246	0	48%	0.40	9.0	0.50	7.0
CLP TCL PAH	Phenanthrene	µg/Kg	164	246	0	67%	4.0	14	0.20	72
CLP TCL PAH	Pyrene	µg/Kg	152	246	0	62%	4.0	16	0.20	110
CLP TCL PCBs	Aroclor-1016	µg/Kg	1	243	3	0%	0.83	4.8	25	25
CLP TCL PCBs	Aroclor-1221	µg/Kg	--	243	3	0%	3.3	19	--	--
CLP TCL PCBs	Aroclor-1232	µg/Kg	--	243	3	0%	3.3	19	--	--
CLP TCL PCBs	Aroclor-1242	µg/Kg	--	243	3	0%	0.83	4.8	--	--
CLP TCL PCBs	Aroclor-1248	µg/Kg	--	243	3	0%	0.83	4.8	--	--
CLP TCL PCBs	Aroclor-1254	µg/Kg	--	243	3	0%	0.83	4.8	--	--
CLP TCL PCBs	Aroclor-1260	µg/Kg	1	243	3	0%	0.83	4.8	9.4	9.4
CLP TCL Pesticides	2,4'-DDD	µg/Kg	--	246	0	0%	0.67	2.8	--	--
CLP TCL Pesticides	2,4'-DDE	µg/Kg	4	246	0	2%	0.67	2.8	0.090	0.48
CLP TCL Pesticides	2,4'-DDT	µg/Kg	13	246	0	5%	0.67	2.8	0.090	6.5
CLP TCL Pesticides	4,4'-DDD	µg/Kg	2	246	0	1%	0.67	2.8	0.35	2.1
CLP TCL Pesticides	4,4'-DDE	µg/Kg	26	246	0	11%	0.67	2.8	0.072	5.2
CLP TCL Pesticides	4,4'-DDT	µg/Kg	54	246	0	22%	0.67	2.8	0.080	20
CLP TCL Pesticides	Aldrin	µg/Kg	1	246	0	0%	0.33	1.4	0.17	0.17
CLP TCL Pesticides	alpha-BHC	µg/Kg	1	246	0	0%	0.33	1.4	0.18	0.18
CLP TCL Pesticides	alpha-Chlordane	µg/Kg	1	246	0	0%	0.33	1.4	1.1	1.1
CLP TCL Pesticides	beta-BHC	µg/Kg	--	246	0	0%	0.33	1.4	--	--
CLP TCL Pesticides	cis-Nonachlor	µg/Kg	--	246	0	0%	0.33	1.4	--	--
CLP TCL Pesticides	delta-BHC	µg/Kg	--	246	0	0%	0.33	1.4	--	--
CLP TCL Pesticides	Dieldrin	µg/Kg	--	246	0	0%	0.67	2.8	--	--
CLP TCL Pesticides	Endosulfan I	µg/Kg	--	246	0	0%	0.33	1.4	--	--
CLP TCL Pesticides	Endosulfan II	µg/Kg	--	246	0	0%	0.67	2.8	--	--
CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	--	246	0	0%	0.67	2.8	--	--
CLP TCL Pesticides	Endrin	µg/Kg	--	246	0	0%	0.67	2.8	--	--
CLP TCL Pesticides	Endrin aldehyde	µg/Kg	--	246	0	0%	0.67	2.8	--	--
CLP TCL Pesticides	Endrin ketone	µg/Kg	--	246	0	0%	0.67	2.8	--	--
CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	--	246	0	0%	0.33	1.4	--	--
CLP TCL Pesticides	gamma-Chlordane	µg/Kg	2	246	0	1%	0.33	1.4	0.075	0.84
CLP TCL Pesticides	Heptachlor	µg/Kg	--	246	0	0%	0.33	1.4	--	--
CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	--	246	0	0%	0.33	1.4	--	--
CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	2	246	0	1%	0.33	1.4	0.096	0.30
CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	--	246	0	0%	0.33	1.4	--	--

TABLE C-1

Summary of Phase I Sediment Analytical Data - River Group (Transect and Bioassay)

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL Pesticides	Methoxychlor	µg/Kg	4	246	0	2%	3.3	14	0.75	3.5
CLP TCL Pesticides	Oxychlordane	µg/Kg	--	246	0	0%	0.33	1.4	--	--
CLP TCL Pesticides	Toxaphene	µg/Kg	--	246	0	0%	33	140	--	--
CLP TCL Pesticides	trans-Nonachlor	µg/Kg	1	246	0	0%	0.33	1.4	1.0	1.0
CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	--	246	0	0%	210	880	--	--
CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	--	196	50	0%	130	880	--	--
CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	2-Chlorophenol	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	2-Methylphenol	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	2-Nitroaniline	µg/Kg	--	246	0	0%	130	880	--	--
CLP TCL SVOC	2-Nitrophenol	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	3-Nitroaniline	µg/Kg	--	246	0	0%	130	880	--	--
CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	--	246	0	0%	210	880	--	--
CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	4-Chloroaniline	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	4-Methylphenol	µg/Kg	1	246	0	0%	83	350	120	120
CLP TCL SVOC	4-Nitroaniline	µg/Kg	--	246	0	0%	130	880	--	--
CLP TCL SVOC	4-Nitrophenol	µg/Kg	--	246	0	0%	130	880	--	--
CLP TCL SVOC	Acetophenone	µg/Kg	1	246	0	0%	83	350	26	26
CLP TCL SVOC	Atrazine	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	Benzaldehyde	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	Benzoic acid	µg/Kg	--	101	145	0%	85	600	--	--
CLP TCL SVOC	Benzyl alcohol	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	--	246	0	0%	83	350	--	--

TABLE C-1

Summary of Phase I Sediment Analytical Data - River Group (Transect and Bioassay)

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	1	246	0	0%	83	350	63	63
CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	4	246	0	2%	83	350	25	40
CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	Caprolactam	µg/Kg	3	246	0	1%	83	350	43	76
CLP TCL SVOC	Carbazole	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	Diethyl phthalate	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	Dimethyl phthalate	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	Hexachloroethane	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	Isophorone	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	Nitrobenzene	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	Pentachlorophenol	µg/Kg	--	246	0	0%	210	880	--	--
CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	--	246	0	0%	83	350	--	--
CLP TCL SVOC	Phenol	µg/Kg	--	246	0	0%	83	350	--	--

TABLE C-2

Summary of Phase I Sediment Analytical Data - Beach Group (Composites, Discrete Grabs, Size Fractionation)

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
Beach Group										
415.1	Total organic carbon	mg/Kg	66	67	0	99%	286	286	357	23,200
415.1-Sieved<75um	Total organic carbon	mg/Kg	2	2	0	100%	--	--	12,200	12,600
415.1-Sieved>75um	Total organic carbon	mg/Kg	4	4	0	100%	--	--	569	5,680
CLP TAL TotMetals	Aluminum	mg/Kg	66	66	0	100%	--	--	2,760	23,100
CLP TAL TotMetals	Antimony	mg/Kg	35	57	9	61%	0.29	8.1	0.53	53
CLP TAL TotMetals	Arsenic	mg/Kg	64	66	0	97%	0.97	3.9	0.97	36
CLP TAL TotMetals	Barium	mg/Kg	66	66	0	100%	--	--	21	2,250
CLP TAL TotMetals	Beryllium	mg/Kg	66	66	0	100%	--	--	0.21	1.7
CLP TAL TotMetals	Cadmium	mg/Kg	57	66	0	86%	0.058	0.52	0.056	7.8
CLP TAL TotMetals	Calcium	mg/Kg	66	66	0	100%	--	--	879	80,300
CLP TAL TotMetals	Chromium	mg/Kg	66	66	0	100%	--	--	5.6	145
CLP TAL TotMetals	Cobalt	mg/Kg	66	66	0	100%	--	--	2.1	57
CLP TAL TotMetals	Copper	mg/Kg	66	66	0	100%	--	--	4.2	3,290
CLP TAL TotMetals	Iron	mg/Kg	66	66	0	100%	--	--	4,930	254,000
CLP TAL TotMetals	Lead	mg/Kg	66	66	0	100%	--	--	3.1	535
CLP TAL TotMetals	Magnesium	mg/Kg	66	66	0	100%	--	--	1,390	16,400
CLP TAL TotMetals	Manganese	mg/Kg	66	66	0	100%	--	--	95	4,780
CLP TAL TotMetals	Mercury	mg/Kg	45	66	0	68%	0.098	0.11	0.0040	0.81
CLP TAL TotMetals	Nickel	mg/Kg	66	66	0	100%	--	--	4.1	30
CLP TAL TotMetals	Potassium	mg/Kg	66	66	0	100%	--	--	317	4,730
CLP TAL TotMetals	Selenium	mg/Kg	5	19	47	26%	3.3	3.9	1.1	4.3
CLP TAL TotMetals	Silver	mg/Kg	--	66	0	0%	0.80	1.5	--	--
CLP TAL TotMetals	Sodium	mg/Kg	58	66	0	88%	91	124	49	2,780
CLP TAL TotMetals	Thallium	mg/Kg	3	66	0	5%	2.0	3.8	0.83	1.3
CLP TAL TotMetals	Uranium	mg/Kg	19	66	0	29%	9.8	30	4.6	84
CLP TAL TotMetals	Vanadium	mg/Kg	66	66	0	100%	--	--	8.4	50
CLP TAL TotMetals	Zinc	mg/Kg	66	66	0	100%	--	--	21	22,200
CLP TAL TotMetals-Sieved<75um	Aluminum-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	8,400	16,400
CLP TAL TotMetals-Sieved<75um	Antimony-Sieved <75 um	mg/Kg	1	1	2	100%	--	--	3.9	3.9
CLP TAL TotMetals-Sieved<75um	Arsenic-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	2.0	10
CLP TAL TotMetals-Sieved<75um	Barium-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	175	1,030
CLP TAL TotMetals-Sieved<75um	Beryllium-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	0.59	0.85
CLP TAL TotMetals-Sieved<75um	Cadmium-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	0.82	5.5
CLP TAL TotMetals-Sieved<75um	Calcium-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	3,900	27,700
CLP TAL TotMetals-Sieved<75um	Chromium-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	21	33
CLP TAL TotMetals-Sieved<75um	Cobalt-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	10	13
CLP TAL TotMetals-Sieved<75um	Copper-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	24	278

TABLE C-2

Summary of Phase I Sediment Analytical Data - Beach Group (Composites, Discrete Grabs, Size Fractionation)

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TAL TotMetals-Sieved<75um	Iron-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	21,000	35,100
CLP TAL TotMetals-Sieved<75um	Lead-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	22	325
CLP TAL TotMetals-Sieved<75um	Magnesium-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	4,750	14,200
CLP TAL TotMetals-Sieved<75um	Manganese-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	389	690
CLP TAL TotMetals-Sieved<75um	Mercury-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	0.031	0.32
CLP TAL TotMetals-Sieved<75um	Nickel-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	19	27
CLP TAL TotMetals-Sieved<75um	Potassium-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	1,630	2,850
CLP TAL TotMetals-Sieved<75um	Selenium-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	1.5	3.9
CLP TAL TotMetals-Sieved<75um	Silver-Sieved <75 um	mg/Kg	--	0	3	0%	--	--	--	--
CLP TAL TotMetals-Sieved<75um	Sodium-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	214	355
CLP TAL TotMetals-Sieved<75um	Thallium-Sieved <75 um	mg/Kg	--	3	0	0%	2.4	2.6	--	--
CLP TAL TotMetals-Sieved<75um	Uranium-Sieved <75 um	mg/Kg	--	3	0	0%	19	20	--	--
CLP TAL TotMetals-Sieved<75um	Vanadium-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	32	47
CLP TAL TotMetals-Sieved<75um	Zinc-Sieved <75 um	mg/Kg	3	3	0	100%	--	--	106	1,860
CLP TAL TotMetals-Sieved>75um	Aluminum-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	6,430	12,300
CLP TAL TotMetals-Sieved>75um	Antimony-Sieved >75 um	mg/Kg	1	1	2	100%	--	--	47	47
CLP TAL TotMetals-Sieved>75um	Arsenic-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	1.2	10
CLP TAL TotMetals-Sieved>75um	Barium-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	59	1,230
CLP TAL TotMetals-Sieved>75um	Beryllium-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	0.33	0.71
CLP TAL TotMetals-Sieved>75um	Cadmium-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	0.34	4.8
CLP TAL TotMetals-Sieved>75um	Calcium-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	2,080	55,000
CLP TAL TotMetals-Sieved>75um	Chromium-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	13	80
CLP TAL TotMetals-Sieved>75um	Cobalt-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	5.3	34
CLP TAL TotMetals-Sieved>75um	Copper-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	9.8	1,530
CLP TAL TotMetals-Sieved>75um	Iron-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	12,800	126,000
CLP TAL TotMetals-Sieved>75um	Lead-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	7.5	267
CLP TAL TotMetals-Sieved>75um	Magnesium-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	3,670	13,100
CLP TAL TotMetals-Sieved>75um	Manganese-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	187	2,380
CLP TAL TotMetals-Sieved>75um	Mercury-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	0.0080	0.072
CLP TAL TotMetals-Sieved>75um	Nickel-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	11	15
CLP TAL TotMetals-Sieved>75um	Potassium-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	955	2,970
CLP TAL TotMetals-Sieved>75um	Selenium-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	0.94	8.0
CLP TAL TotMetals-Sieved>75um	Silver-Sieved >75 um	mg/Kg	--	0	3	0%	--	--	--	--
CLP TAL TotMetals-Sieved>75um	Sodium-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	77	1,210
CLP TAL TotMetals-Sieved>75um	Thallium-Sieved >75 um	mg/Kg	--	3	0	0%	1.9	2.3	--	--
CLP TAL TotMetals-Sieved>75um	Uranium-Sieved >75 um	mg/Kg	--	3	0	0%	16	19	--	--
CLP TAL TotMetals-Sieved>75um	Vanadium-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	20	39
CLP TAL TotMetals-Sieved>75um	Zinc-Sieved >75 um	mg/Kg	3	3	0	100%	--	--	45	10,100

TABLE C-2

Summary of Phase I Sediment Analytical Data - Beach Group (Composites, Discrete Grabs, Size Fractionation)

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL PAH	2-Methylnaphthalene	µg/Kg	23	66	0	35%	4.0	8.0	0.20	30
CLP TCL PAH	Acenaphthene	µg/Kg	7	66	0	11%	4.0	9.0	0.20	3.0
CLP TCL PAH	Acenaphthylene	µg/Kg	9	66	0	14%	4.0	13	0.20	9.0
CLP TCL PAH	Anthracene	µg/Kg	8	66	0	12%	3.7	13	0.50	7.0
CLP TCL PAH	Benzo(a)anthracene	µg/Kg	20	66	0	30%	4.0	8.0	0.30	12
CLP TCL PAH	Benzo(a)pyrene	µg/Kg	17	66	0	26%	4.0	8.0	0.40	13
CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	16	66	0	24%	4.0	8.0	0.30	9.0
CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	22	66	0	33%	4.0	8.0	0.20	9.0
CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	9	66	0	14%	4.0	13	0.30	7.0
CLP TCL PAH	Chrysene	µg/Kg	37	66	0	56%	4.0	8.0	0.20	17
CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	12	66	0	18%	3.7	8.0	0.40	3.0
CLP TCL PAH	Dibenzofuran	µg/Kg	15	66	0	23%	4.0	8.0	0.20	10
CLP TCL PAH	Fluoranthene	µg/Kg	32	66	0	48%	4.0	13	0.20	36
CLP TCL PAH	Fluorene	µg/Kg	9	66	0	14%	4.0	8.0	0.20	3.0
CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	17	66	0	26%	4.0	8.0	0.20	11
CLP TCL PAH	Naphthalene	µg/Kg	10	66	0	15%	0.40	8.6	1.0	43
CLP TCL PAH	Phenanthrene	µg/Kg	29	66	0	44%	4.0	8.0	0.20	41
CLP TCL PAH	Pyrene	µg/Kg	32	66	0	48%	4.0	8.0	0.20	36
CLP TCL PAH-Sieved<75um	2-Methylnaphthalene-Sieved <75 um	µg/Kg	2	2	0	100%	--	--	0.90	1.0
CLP TCL PAH-Sieved<75um	Acenaphthene-Sieved <75 um	µg/Kg	1	2	0	50%	4.0	4.0	0.50	0.50
CLP TCL PAH-Sieved<75um	Acenaphthylene-Sieved <75 um	µg/Kg	--	2	0	0%	4.0	4.0	--	--
CLP TCL PAH-Sieved<75um	Anthracene-Sieved <75 um	µg/Kg	1	2	0	50%	4.0	4.0	1.0	1.0
CLP TCL PAH-Sieved<75um	Benzo(a)anthracene-Sieved <75 um	µg/Kg	2	2	0	100%	--	--	0.30	3.0
CLP TCL PAH-Sieved<75um	Benzo(a)pyrene-Sieved <75 um	µg/Kg	--	2	0	0%	4.0	4.0	--	--
CLP TCL PAH-Sieved<75um	Benzo(b)fluoranthene-Sieved <75 um	µg/Kg	--	2	0	0%	4.0	4.0	--	--
CLP TCL PAH-Sieved<75um	Benzo(ghi)perylene-Sieved <75 um	µg/Kg	--	2	0	0%	4.0	4.0	--	--
CLP TCL PAH-Sieved<75um	Benzo(k)fluoranthene-Sieved <75 um	µg/Kg	--	2	0	0%	4.0	4.0	--	--
CLP TCL PAH-Sieved<75um	Chrysene-Sieved <75 um	µg/Kg	2	2	0	100%	--	--	1.0	6.0
CLP TCL PAH-Sieved<75um	Dibenzo(a,h)anthracene-Sieved <75 um	µg/Kg	--	2	0	0%	4.0	4.0	--	--
CLP TCL PAH-Sieved<75um	Dibenzofuran-Sieved <75 um	µg/Kg	2	2	0	100%	--	--	2.0	2.0
CLP TCL PAH-Sieved<75um	Fluoranthene-Sieved <75 um	µg/Kg	2	2	0	100%	--	--	2.0	12
CLP TCL PAH-Sieved<75um	Fluorene-Sieved <75 um	µg/Kg	2	2	0	100%	--	--	2.0	3.0
CLP TCL PAH-Sieved<75um	Indeno[1,2,3-cd]pyrene-Sieved <75 um	µg/Kg	--	2	0	0%	4.0	4.0	--	--
CLP TCL PAH-Sieved<75um	Naphthalene-Sieved <75 um	µg/Kg	2	2	0	100%	--	--	2.0	3.0
CLP TCL PAH-Sieved<75um	Phenanthrene-Sieved <75 um	µg/Kg	2	2	0	100%	--	--	5.0	12
CLP TCL PAH-Sieved<75um	Pyrene-Sieved <75 um	µg/Kg	1	2	0	50%	4.0	4.0	8.0	8.0
CLP TCL PAH-Sieved>75um	2-Methylnaphthalene-Sieved >75 um	µg/Kg	3	3	0	100%	--	--	0.30	0.80
CLP TCL PAH-Sieved>75um	Acenaphthene-Sieved >75 um	µg/Kg	--	3	0	0%	4.0	4.0	--	--

TABLE C-2

Summary of Phase I Sediment Analytical Data - Beach Group (Composites, Discrete Grabs, Size Fractionation)

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL PAH-Sieved>75um	Acenaphthylene-Sieved >75 um	µg/Kg	--	3	0	0%	4.0	4.0	--	--
CLP TCL PAH-Sieved>75um	Anthracene-Sieved >75 um	µg/Kg	--	3	0	0%	4.0	4.0	--	--
CLP TCL PAH-Sieved>75um	Benzo(a)anthracene-Sieved >75 um	µg/Kg	1	3	0	33%	4.0	4.0	1.0	1.0
CLP TCL PAH-Sieved>75um	Benzo(a)pyrene-Sieved >75 um	µg/Kg	1	3	0	33%	4.0	4.0	2.0	2.0
CLP TCL PAH-Sieved>75um	Benzo(b)fluoranthene-Sieved >75 um	µg/Kg	1	3	0	33%	4.0	4.0	2.0	2.0
CLP TCL PAH-Sieved>75um	Benzo(ghi)perylene-Sieved >75 um	µg/Kg	--	3	0	0%	4.0	4.0	--	--
CLP TCL PAH-Sieved>75um	Benzo(k)fluoranthene-Sieved >75 um	µg/Kg	1	3	0	33%	4.0	4.0	2.0	2.0
CLP TCL PAH-Sieved>75um	Chrysene-Sieved >75 um	µg/Kg	3	3	0	100%	--	--	0.20	2.0
CLP TCL PAH-Sieved>75um	Dibenzo(a,h)anthracene-Sieved >75 um	µg/Kg	--	3	0	0%	4.0	4.0	--	--
CLP TCL PAH-Sieved>75um	Dibenzofuran-Sieved >75 um	µg/Kg	3	3	0	100%	--	--	0.30	0.70
CLP TCL PAH-Sieved>75um	Fluoranthene-Sieved >75 um	µg/Kg	3	3	0	100%	--	--	0.30	4.0
CLP TCL PAH-Sieved>75um	Fluorene-Sieved >75 um	µg/Kg	1	3	0	33%	4.0	4.0	0.80	0.80
CLP TCL PAH-Sieved>75um	Indeno[1,2,3-cd]pyrene-Sieved >75 um	µg/Kg	--	3	0	0%	4.0	4.0	--	--
CLP TCL PAH-Sieved>75um	Naphthalene-Sieved >75 um	µg/Kg	3	3	0	100%	--	--	1.0	2.0
CLP TCL PAH-Sieved>75um	Phenanthrene-Sieved >75 um	µg/Kg	3	3	0	100%	--	--	1.0	3.0
CLP TCL PAH-Sieved>75um	Pyrene-Sieved >75 um	µg/Kg	--	3	0	0%	4.0	4.0	--	--
CLP TCL PCBs	Aroclor-1016	µg/Kg	--	66	0	0%	0.84	6.3	--	--
CLP TCL PCBs	Aroclor-1221	µg/Kg	--	66	0	0%	3.4	25	--	--
CLP TCL PCBs	Aroclor-1232	µg/Kg	--	66	0	0%	3.4	25	--	--
CLP TCL PCBs	Aroclor-1242	µg/Kg	--	66	0	0%	0.84	6.3	--	--
CLP TCL PCBs	Aroclor-1248	µg/Kg	--	66	0	0%	0.84	6.3	--	--
CLP TCL PCBs	Aroclor-1254	µg/Kg	--	66	0	0%	0.84	6.3	--	--
CLP TCL PCBs	Aroclor-1260	µg/Kg	--	66	0	0%	0.84	6.3	--	--
CLP TCL PCBs-Sieved<75um	Aroclor-1016-Sieved <75 um	µg/Kg	--	2	0	0%	1.7	1.7	--	--
CLP TCL PCBs-Sieved<75um	Aroclor-1221-Sieved <75 um	µg/Kg	--	2	0	0%	6.9	6.9	--	--
CLP TCL PCBs-Sieved<75um	Aroclor-1232-Sieved <75 um	µg/Kg	--	2	0	0%	6.9	6.9	--	--
CLP TCL PCBs-Sieved<75um	Aroclor-1242-Sieved <75 um	µg/Kg	--	2	0	0%	1.7	1.7	--	--
CLP TCL PCBs-Sieved<75um	Aroclor-1248-Sieved <75 um	µg/Kg	--	2	0	0%	1.7	1.7	--	--
CLP TCL PCBs-Sieved<75um	Aroclor-1254-Sieved <75 um	µg/Kg	--	2	0	0%	1.7	1.7	--	--
CLP TCL PCBs-Sieved<75um	Aroclor-1260-Sieved <75 um	µg/Kg	--	2	0	0%	1.7	1.7	--	--
CLP TCL PCBs-Sieved>75um	Aroclor-1016-Sieved >75 um	µg/Kg	--	3	0	0%	1.7	1.7	--	--
CLP TCL PCBs-Sieved>75um	Aroclor-1221-Sieved >75 um	µg/Kg	--	3	0	0%	6.8	6.9	--	--
CLP TCL PCBs-Sieved>75um	Aroclor-1232-Sieved >75 um	µg/Kg	--	3	0	0%	6.8	6.9	--	--
CLP TCL PCBs-Sieved>75um	Aroclor-1242-Sieved >75 um	µg/Kg	--	3	0	0%	1.7	1.7	--	--
CLP TCL PCBs-Sieved>75um	Aroclor-1248-Sieved >75 um	µg/Kg	--	3	0	0%	1.7	1.7	--	--
CLP TCL PCBs-Sieved>75um	Aroclor-1254-Sieved >75 um	µg/Kg	--	3	0	0%	1.7	1.7	--	--
CLP TCL PCBs-Sieved>75um	Aroclor-1260-Sieved >75 um	µg/Kg	--	3	0	0%	1.7	1.7	--	--
CLP TCL Pesticides	2,4'-DDD	µg/Kg	--	66	0	0%	0.68	5.1	--	--

TABLE C-2

Summary of Phase I Sediment Analytical Data - Beach Group (Composites, Discrete Grabs, Size Fractionation)

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL Pesticides	2,4'-DDE	µg/Kg	4	66	0	6%	0.68	1.3	0.32	17
CLP TCL Pesticides	2,4'-DDT	µg/Kg	8	66	0	12%	0.68	1.3	0.33	57
CLP TCL Pesticides	4,4'-DDD	µg/Kg	1	66	0	2%	0.68	1.3	2.1	2.1
CLP TCL Pesticides	4,4'-DDE	µg/Kg	8	66	0	12%	0.68	1.3	0.12	63
CLP TCL Pesticides	4,4'-DDT	µg/Kg	22	66	0	33%	0.68	1.1	0.12	200
CLP TCL Pesticides	Aldrin	µg/Kg	--	66	0	0%	0.34	2.6	--	--
CLP TCL Pesticides	alpha-BHC	µg/Kg	1	66	0	2%	0.34	2.6	0.23	0.23
CLP TCL Pesticides	alpha-Chlordane	µg/Kg	--	66	0	0%	0.34	2.6	--	--
CLP TCL Pesticides	beta-BHC	µg/Kg	--	66	0	0%	0.34	2.6	--	--
CLP TCL Pesticides	cis-Nonachlor	µg/Kg	--	66	0	0%	0.34	2.6	--	--
CLP TCL Pesticides	delta-BHC	µg/Kg	--	66	0	0%	0.34	2.6	--	--
CLP TCL Pesticides	Dieldrin	µg/Kg	--	66	0	0%	0.68	5.1	--	--
CLP TCL Pesticides	Endosulfan I	µg/Kg	--	66	0	0%	0.34	2.6	--	--
CLP TCL Pesticides	Endosulfan II	µg/Kg	--	66	0	0%	0.68	5.1	--	--
CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	--	66	0	0%	0.68	5.1	--	--
CLP TCL Pesticides	Endrin	µg/Kg	--	66	0	0%	0.68	5.1	--	--
CLP TCL Pesticides	Endrin aldehyde	µg/Kg	--	66	0	0%	0.68	5.1	--	--
CLP TCL Pesticides	Endrin ketone	µg/Kg	--	66	0	0%	0.68	5.1	--	--
CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	--	66	0	0%	0.34	2.6	--	--
CLP TCL Pesticides	gamma-Chlordane	µg/Kg	--	66	0	0%	0.34	2.6	--	--
CLP TCL Pesticides	Heptachlor	µg/Kg	--	66	0	0%	0.34	2.6	--	--
CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	--	66	0	0%	0.34	2.6	--	--
CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	5	66	0	8%	0.34	2.6	0.092	8.5
CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	--	66	0	0%	0.34	2.6	--	--
CLP TCL Pesticides	Methoxychlor	µg/Kg	3	66	0	5%	3.4	25	0.75	3.4
CLP TCL Pesticides	Oxychlordane	µg/Kg	--	66	0	0%	0.34	2.6	--	--
CLP TCL Pesticides	Toxaphene	µg/Kg	--	66	0	0%	34	250	--	--
CLP TCL Pesticides	trans-Nonachlor	µg/Kg	--	66	0	0%	0.34	2.6	--	--
CLP TCL Pesticides-Sieved<75um	2,4'-DDD-Sieved <75 um	µg/Kg	--	2	0	0%	0.69	0.69	--	--
CLP TCL Pesticides-Sieved<75um	2,4'-DDE-Sieved <75 um	µg/Kg	--	2	0	0%	0.69	0.69	--	--
CLP TCL Pesticides-Sieved<75um	2,4'-DDT-Sieved <75 um	µg/Kg	--	2	0	0%	0.69	0.69	--	--
CLP TCL Pesticides-Sieved<75um	4,4'-DDD-Sieved <75 um	µg/Kg	--	2	0	0%	0.69	0.69	--	--
CLP TCL Pesticides-Sieved<75um	4,4'-DDE-Sieved <75 um	µg/Kg	2	2	0	100%	--	--	0.22	0.74
CLP TCL Pesticides-Sieved<75um	4,4'-DDT-Sieved <75 um	µg/Kg	1	2	0	50%	0.69	0.69	3.5	3.5
CLP TCL Pesticides-Sieved<75um	Aldrin-Sieved <75 um	µg/Kg	--	2	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved<75um	alpha-BHC-Sieved <75 um	µg/Kg	--	2	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved<75um	alpha-Chlordane-Sieved <75 um	µg/Kg	--	2	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved<75um	beta-BHC-Sieved <75 um	µg/Kg	--	2	0	0%	0.34	0.34	--	--

TABLE C-2

Summary of Phase I Sediment Analytical Data - Beach Group (Composites, Discrete Grabs, Size Fractionation)

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL Pesticides-Sieved<75um	cis-Nonachlor-Sieved <75 um	µg/Kg	--	2	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved<75um	delta-BHC-Sieved <75 um	µg/Kg	--	2	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved<75um	Dieldrin-Sieved <75 um	µg/Kg	--	2	0	0%	0.69	0.69	--	--
CLP TCL Pesticides-Sieved<75um	Endosulfan I-Sieved <75 um	µg/Kg	--	2	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved<75um	Endosulfan II-Sieved <75 um	µg/Kg	--	2	0	0%	0.69	0.69	--	--
CLP TCL Pesticides-Sieved<75um	Endosulfan sulfate-Sieved <75 um	µg/Kg	--	2	0	0%	0.69	0.69	--	--
CLP TCL Pesticides-Sieved<75um	Endrin aldehyde-Sieved <75 um	µg/Kg	--	2	0	0%	0.69	0.69	--	--
CLP TCL Pesticides-Sieved<75um	Endrin ketone-Sieved <75 um	µg/Kg	--	2	0	0%	0.69	0.69	--	--
CLP TCL Pesticides-Sieved<75um	Endrin-Sieved <75 um	µg/Kg	--	2	0	0%	0.69	0.69	--	--
CLP TCL Pesticides-Sieved<75um	gamma-BHC (Lindane)-Sieved <75 um	µg/Kg	--	2	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved<75um	gamma-Chlordane-Sieved <75 um	µg/Kg	--	2	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved<75um	Heptachlor epoxide-Sieved <75 um	µg/Kg	--	2	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved<75um	Heptachlor-Sieved <75 um	µg/Kg	--	2	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved<75um	Hexachlorobenzene-Sieved <75 um	µg/Kg	1	2	0	50%	0.34	0.34	6.5	6.5
CLP TCL Pesticides-Sieved<75um	Hexachlorobutadiene-Sieved <75 um	µg/Kg	--	2	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved<75um	Methoxychlor-Sieved <75 um	µg/Kg	--	2	0	0%	3.4	3.4	--	--
CLP TCL Pesticides-Sieved<75um	Oxychlordane-Sieved <75 um	µg/Kg	--	2	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved<75um	Toxaphene-Sieved <75 um	µg/Kg	--	2	0	0%	34	34	--	--
CLP TCL Pesticides-Sieved<75um	trans-Nonachlor-Sieved <75 um	µg/Kg	--	2	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved>75um	2,4'-DDD-Sieved >75 um	µg/Kg	--	3	0	0%	0.68	0.69	--	--
CLP TCL Pesticides-Sieved>75um	2,4'-DDE-Sieved >75 um	µg/Kg	--	3	0	0%	0.68	0.69	--	--
CLP TCL Pesticides-Sieved>75um	2,4'-DDT-Sieved >75 um	µg/Kg	2	3	0	67%	0.68	0.68	0.19	0.54
CLP TCL Pesticides-Sieved>75um	4,4'-DDD-Sieved >75 um	µg/Kg	--	3	0	0%	0.68	0.69	--	--
CLP TCL Pesticides-Sieved>75um	4,4'-DDE-Sieved >75 um	µg/Kg	--	3	0	0%	0.68	0.69	--	--
CLP TCL Pesticides-Sieved>75um	4,4'-DDT-Sieved >75 um	µg/Kg	2	3	0	67%	0.68	0.68	0.98	1.9
CLP TCL Pesticides-Sieved>75um	Aldrin-Sieved >75 um	µg/Kg	--	3	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved>75um	alpha-BHC-Sieved >75 um	µg/Kg	--	3	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved>75um	alpha-Chlordane-Sieved >75 um	µg/Kg	--	3	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved>75um	beta-BHC-Sieved >75 um	µg/Kg	--	3	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved>75um	cis-Nonachlor-Sieved >75 um	µg/Kg	--	3	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved>75um	delta-BHC-Sieved >75 um	µg/Kg	--	3	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved>75um	Dieldrin-Sieved >75 um	µg/Kg	--	3	0	0%	0.68	0.69	--	--
CLP TCL Pesticides-Sieved>75um	Endosulfan I-Sieved >75 um	µg/Kg	--	3	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved>75um	Endosulfan II-Sieved >75 um	µg/Kg	--	3	0	0%	0.68	0.69	--	--
CLP TCL Pesticides-Sieved>75um	Endosulfan sulfate-Sieved >75 um	µg/Kg	--	3	0	0%	0.68	0.69	--	--
CLP TCL Pesticides-Sieved>75um	Endrin aldehyde-Sieved >75 um	µg/Kg	--	3	0	0%	0.68	0.69	--	--
CLP TCL Pesticides-Sieved>75um	Endrin ketone-Sieved >75 um	µg/Kg	--	3	0	0%	0.68	0.69	--	--
CLP TCL Pesticides-Sieved>75um	Endrin-Sieved >75 um	µg/Kg	--	3	0	0%	0.68	0.69	--	--

TABLE C-2

Summary of Phase I Sediment Analytical Data - Beach Group (Composites, Discrete Grabs, Size Fractionation)

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL Pesticides-Sieved>75um	gamma-BHC (Lindane)-Sieved >75 um	µg/Kg	--	3	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved>75um	gamma-Chlordane-Sieved >75 um	µg/Kg	--	3	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved>75um	Heptachlor epoxide-Sieved >75 um	µg/Kg	--	3	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved>75um	Heptachlor-Sieved >75 um	µg/Kg	--	3	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved>75um	Hexachlorobenzene-Sieved >75 um	µg/Kg	1	3	0	33%	0.34	0.34	3.6	3.6
CLP TCL Pesticides-Sieved>75um	Hexachlorobutadiene-Sieved >75 um	µg/Kg	--	3	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved>75um	Methoxychlor-Sieved >75 um	µg/Kg	--	3	0	0%	3.4	3.4	--	--
CLP TCL Pesticides-Sieved>75um	Oxychlordane-Sieved >75 um	µg/Kg	--	3	0	0%	0.34	0.34	--	--
CLP TCL Pesticides-Sieved>75um	Toxaphene-Sieved >75 um	µg/Kg	--	3	0	0%	34	34	--	--
CLP TCL Pesticides-Sieved>75um	trans-Nonachlor-Sieved >75 um	µg/Kg	--	3	0	0%	0.34	0.34	--	--
CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	--	66	0	0%	210	400	--	--
CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	--	56	10	0%	210	400	--	--
CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	2-Chlorophenol	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	2-Methylphenol	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	2-Nitroaniline	µg/Kg	--	66	0	0%	210	400	--	--
CLP TCL SVOC	2-Nitrophenol	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	3-Nitroaniline	µg/Kg	--	66	0	0%	210	400	--	--
CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	--	66	0	0%	210	400	--	--
CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	4-Chloroaniline	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	4-Methylphenol	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	4-Nitroaniline	µg/Kg	--	66	0	0%	210	400	--	--
CLP TCL SVOC	4-Nitrophenol	µg/Kg	--	66	0	0%	210	400	--	--

TABLE C-2

Summary of Phase I Sediment Analytical Data - Beach Group (Composites, Discrete Grabs, Size Fractionation)

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL SVOC	Acetophenone	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	Atrazine	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	Benzaldehyde	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	Benzoic acid	µg/Kg	--	49	17	0%	85	160	--	--
CLP TCL SVOC	Benzyl alcohol	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	Caprolactam	µg/Kg	2	66	0	3%	85	160	55	150
CLP TCL SVOC	Carbazole	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	Diethyl phthalate	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	Dimethyl phthalate	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	Hexachloroethane	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	Isophorone	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	Nitrobenzene	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	Pentachlorophenol	µg/Kg	--	66	0	0%	210	400	--	--
CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC	Phenol	µg/Kg	--	66	0	0%	85	160	--	--
CLP TCL SVOC-Sieved<75um	1,1'-Biphenyl-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	1,2,4-Trichlorobenzene-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	1,2-Dichlorobenzene-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	1,3-Dichlorobenzene-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	1,4-Dichlorobenzene-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	2,2'-Oxybis(1-Chloropropane)-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	2,4,5-Trichlorophenol-Sieved <75 um	µg/Kg	--	2	0	0%	220	220	--	--
CLP TCL SVOC-Sieved<75um	2,4,6-Trichlorophenol-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	2,4-Dichlorophenol-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	2,4-Dimethylphenol-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	2,4-Dinitrophenol-Sieved <75 um	µg/Kg	--	2	0	0%	220	220	--	--
CLP TCL SVOC-Sieved<75um	2,4-Dinitrotoluene-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	2,6-Dinitrotoluene-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	2-Chloronaphthalene-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	2-Chlorophenol-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--

TABLE C-2

Summary of Phase I Sediment Analytical Data - Beach Group (Composites, Discrete Grabs, Size Fractionation)

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL SVOC-Sieved<75um	2-Methylphenol-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	2-Nitroaniline-Sieved <75 um	µg/Kg	--	2	0	0%	220	220	--	--
CLP TCL SVOC-Sieved<75um	2-Nitrophenol-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	3,3-Dichlorobenzidine-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	3-Nitroaniline-Sieved <75 um	µg/Kg	--	2	0	0%	220	220	--	--
CLP TCL SVOC-Sieved<75um	4,6-Dinitro-2-methylphenol-Sieved <75 um	µg/Kg	--	2	0	0%	220	220	--	--
CLP TCL SVOC-Sieved<75um	4-Bromophenyl-phenylether-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	4-Chloro-3-methylphenol-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	4-Chloroaniline-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	4-Chlorophenyl-phenyl ether-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	4-Methylphenol-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	4-Nitroaniline-Sieved <75 um	µg/Kg	--	2	0	0%	220	220	--	--
CLP TCL SVOC-Sieved<75um	4-Nitrophenol-Sieved <75 um	µg/Kg	--	2	0	0%	220	220	--	--
CLP TCL SVOC-Sieved<75um	Acetophenone-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	Atrazine-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	Benzaldehyde-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	Benzoic acid-Sieved <75 um	µg/Kg	--	0	2	0%	--	--	--	--
CLP TCL SVOC-Sieved<75um	Benzyl alcohol-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	Bis(2-Chloroethoxy)methane-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	Bis(2-Chloroethyl)ether-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	Bis(2-ethylhexyl)phthalate-Sieved <75 um	µg/Kg	1	2	0	50%	85	85	45	45
CLP TCL SVOC-Sieved<75um	Butyl benzyl phthalate-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	Caprolactam-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	Carbazole-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	Di-n-butyl phthalate-Sieved <75 um	µg/Kg	1	2	0	50%	85	85	25	25
CLP TCL SVOC-Sieved<75um	Di-n-octylphthalate-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	Diethyl phthalate-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	Dimethyl phthalate-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	Hexachloroethane-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	Isophorone-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	N-Nitrosodi-n-propylamine-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	N-Nitrosodiphenylamine-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	Nitrobenzene-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	Pentachlorophenol-Sieved <75 um	µg/Kg	--	2	0	0%	220	220	--	--
CLP TCL SVOC-Sieved<75um	Perchlorocyclopentadiene-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved<75um	Phenol-Sieved <75 um	µg/Kg	--	2	0	0%	85	85	--	--
CLP TCL SVOC-Sieved>75um	1,1'-Biphenyl-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	1,2,4-Trichlorobenzene-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--

TABLE C-2

Summary of Phase I Sediment Analytical Data - Beach Group (Composites, Discrete Grabs, Size Fractionation)

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL SVOC-Sieved>75um	1,2-Dichlorobenzene-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	1,3-Dichlorobenzene-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	1,4-Dichlorobenzene-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	2,2'-Oxybis(1-Chloropropane)-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	2,4,5-Trichlorophenol-Sieved >75 um	µg/Kg	--	3	0	0%	210	210	--	--
CLP TCL SVOC-Sieved>75um	2,4,6-Trichlorophenol-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	2,4-Dichlorophenol-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	2,4-Dimethylphenol-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	2,4-Dinitrophenol-Sieved >75 um	µg/Kg	--	3	0	0%	210	210	--	--
CLP TCL SVOC-Sieved>75um	2,4-Dinitrotoluene-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	2,6-Dinitrotoluene-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	2-Chloronaphthalene-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	2-Chlorophenol-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	2-Methylphenol-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	2-Nitroaniline-Sieved >75 um	µg/Kg	--	3	0	0%	210	210	--	--
CLP TCL SVOC-Sieved>75um	2-Nitrophenol-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	3,3-Dichlorobenzidine-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	3-Nitroaniline-Sieved >75 um	µg/Kg	--	3	0	0%	210	210	--	--
CLP TCL SVOC-Sieved>75um	4,6-Dinitro-2-methylphenol-Sieved >75 um	µg/Kg	--	3	0	0%	210	210	--	--
CLP TCL SVOC-Sieved>75um	4-Bromophenyl-phenylether-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	4-Chloro-3-methylphenol-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	4-Chloroaniline-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	4-Chlorophenyl-phenyl ether-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	4-Methylphenol-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	4-Nitroaniline-Sieved >75 um	µg/Kg	--	3	0	0%	210	210	--	--
CLP TCL SVOC-Sieved>75um	4-Nitrophenol-Sieved >75 um	µg/Kg	--	3	0	0%	210	210	--	--
CLP TCL SVOC-Sieved>75um	Acetophenone-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	Atrazine-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	Benzaldehyde-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	Benzoic acid-Sieved >75 um	µg/Kg	--	0	3	0%	--	--	--	--
CLP TCL SVOC-Sieved>75um	Benzyl alcohol-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	Bis(2-Chloroethoxy)methane-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	Bis(2-Chloroethyl)ether-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	Bis(2-ethylhexyl)phthalate-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	Butyl benzyl phthalate-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	Caprolactam-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	Carbazole-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	Di-n-butyl phthalate-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--

TABLE C-2

Summary of Phase I Sediment Analytical Data - Beach Group (Composites, Discrete Grabs, Size Fractionation)

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL SVOC-Sieved>75um	Di-n-octylphthalate-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	Diethyl phthalate-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	Dimethyl phthalate-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	Hexachloroethane-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	Isophorone-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	N-Nitrosodi-n-propylamine-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	N-Nitrosodiphenylamine-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	Nitrobenzene-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	Pentachlorophenol-Sieved >75 um	µg/Kg	--	3	0	0%	210	210	--	--
CLP TCL SVOC-Sieved>75um	Perchlorocyclopentadiene-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
CLP TCL SVOC-Sieved>75um	Phenol-Sieved >75 um	µg/Kg	--	3	0	0%	84	85	--	--
Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	25	49	0	51%	0.10	2.0	0.95	11
Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	26	49	0	53%	0.047	0.42	0.076	11
Dioxins and Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	1	49	0	2%	0.034	0.21	0.062	0.062
Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	20	49	0	41%	0.034	0.16	0.026	0.23
Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	6	49	0	12%	0.018	0.28	0.022	0.24
Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	24	49	0	49%	0.035	0.67	0.051	0.84
Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	10	49	0	20%	0.027	0.20	0.019	0.19
Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	20	49	0	41%	0.034	0.51	0.036	0.60
Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	PG/G	3	49	0	6%	0.025	0.21	0.024	0.10
Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	13	49	0	27%	0.024	0.17	0.022	0.26
Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	10	49	0	20%	0.019	0.27	0.026	0.33
Dioxins and Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	7	49	0	14%	0.018	0.24	0.016	0.079
Dioxins and Furans	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	16	49	0	33%	0.024	0.19	0.028	0.61
Dioxins and Furans	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	7	49	0	14%	0.032	0.11	0.094	0.28
Dioxins and Furans	2,3,7,8-Tetrachlorodibenzofuran	PG/G	33	49	0	67%	0.057	0.20	0.072	24
Dioxins and Furans	Heptachlorodibenzodioxin (Total)	PG/G	41	49	0	84%	0.39	2.3	0.28	25
Dioxins and Furans	Heptachlorodibenzofuran (Total)	PG/G	34	49	0	69%	0.056	1.2	0.078	17
Dioxins and Furans	Hexachlorodibenzodioxin (Total)	PG/G	41	49	0	84%	0.034	0.083	0.053	7.2
Dioxins and Furans	Hexachlorodibenzofuran (Total)	PG/G	44	49	0	90%	0.029	0.12	0.018	5.8
Dioxins and Furans	Octachlorodibenzodioxin	PG/G	30	49	0	61%	1.3	7.9	4.0	87
Dioxins and Furans	Octachlorodibenzofuran	PG/G	29	49	0	59%	0.097	0.68	0.16	5.5
Dioxins and Furans	Pentachlorodibenzodioxin (Total)	PG/G	25	49	0	51%	0.024	0.13	0.022	1.8
Dioxins and Furans	Pentachlorodibenzofuran (Total)	PG/G	29	49	0	59%	0.017	0.25	0.032	4.2
Dioxins and Furans	TEQ WHO-98	PG/G	46	49	0	94%	0	0	0.0010	3.5
Dioxins and Furans	Tetrachlorodibenzodioxin (Total)	PG/G	22	49	0	45%	0.032	0.076	0.037	0.93
Dioxins and Furans	Tetrachlorodibenzofuran (Total)	PG/G	40	49	0	82%	0.052	0.14	0.14	47
Dioxins and Furans-Sieved<75um	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	2	2	0	100%	--	--	4.6	10.0

TABLE C-2

Summary of Phase I Sediment Analytical Data - Beach Group (Composites, Discrete Grabs, Size Fractionation)

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
Dioxins and Furans-Sieved<75um	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	2	2	0	100%	--	--	0.71	4.4
Dioxins and Furans-Sieved<75um	1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	1	2	0	50%	0.13	0.13	0.24	0.24
Dioxins and Furans-Sieved<75um	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	2	2	0	100%	--	--	0.19	0.29
Dioxins and Furans-Sieved<75um	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	1	2	0	50%	0.083	0.083	0.30	0.30
Dioxins and Furans-Sieved<75um	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	2	2	0	100%	--	--	0.34	0.72
Dioxins and Furans-Sieved<75um	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	1	2	0	50%	0.095	0.095	0.29	0.29
Dioxins and Furans-Sieved<75um	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	2	2	0	100%	--	--	0.30	0.50
Dioxins and Furans-Sieved<75um	1,2,3,7,8,9-Hexachlorodibenzofuran	PG/G	--	2	0	0%	0.14	0.19	--	--
Dioxins and Furans-Sieved<75um	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	1	2	0	50%	0.13	0.13	0.30	0.30
Dioxins and Furans-Sieved<75um	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	1	2	0	50%	0.14	0.14	0.20	0.20
Dioxins and Furans-Sieved<75um	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	1	2	0	50%	0.13	0.13	0.27	0.27
Dioxins and Furans-Sieved<75um	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	1	2	0	50%	0.24	0.24	0.29	0.29
Dioxins and Furans-Sieved<75um	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	--	2	0	0%	0.089	0.15	--	--
Dioxins and Furans-Sieved<75um	2,3,7,8-Tetrachlorodibenzofuran	PG/G	2	2	0	100%	--	--	1.6	4.0
Dioxins and Furans-Sieved<75um	Heptachlorodibenzodioxin (Total)	PG/G	2	2	0	100%	--	--	12	22
Dioxins and Furans-Sieved<75um	Heptachlorodibenzofuran (Total)	PG/G	2	2	0	100%	--	--	0.71	8.5
Dioxins and Furans-Sieved<75um	Hexachlorodibenzodioxin (Total)	PG/G	2	2	0	100%	--	--	3.2	5.5
Dioxins and Furans-Sieved<75um	Hexachlorodibenzofuran (Total)	PG/G	1	2	0	50%	0.67	0.67	4.0	4.0
Dioxins and Furans-Sieved<75um	Octachlorodibenzodioxin	PG/G	2	2	0	100%	--	--	37	76
Dioxins and Furans-Sieved<75um	Octachlorodibenzofuran	PG/G	2	2	0	100%	--	--	2.5	4.9
Dioxins and Furans-Sieved<75um	Pentachlorodibenzodioxin (Total)	PG/G	2	2	0	100%	--	--	0.20	0.92
Dioxins and Furans-Sieved<75um	Pentachlorodibenzofuran (Total)	PG/G	2	2	0	100%	--	--	1.3	1.7
Dioxins and Furans-Sieved<75um	TEQ WHO-98	PG/G	2	2	0	100%	--	--	0.54	1.0
Dioxins and Furans-Sieved<75um	Tetrachlorodibenzodioxin (Total)	PG/G	2	2	0	100%	--	--	0.30	0.48
Dioxins and Furans-Sieved<75um	Tetrachlorodibenzofuran (Total)	PG/G	2	2	0	100%	--	--	3.4	8.0
Dioxins and Furans-Sieved>75um	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	4	4	0	100%	--	--	0.54	2.3
Dioxins and Furans-Sieved>75um	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	4	4	0	100%	--	--	0.067	0.85
Dioxins and Furans-Sieved>75um	1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	--	4	0	0%	0.14	0.18	--	--
Dioxins and Furans-Sieved>75um	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	--	4	0	0%	0.085	0.12	--	--
Dioxins and Furans-Sieved>75um	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	--	4	0	0%	0.061	0.094	--	--
Dioxins and Furans-Sieved>75um	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	2	4	0	50%	0.084	0.17	0.15	0.17
Dioxins and Furans-Sieved>75um	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	--	4	0	0%	0.063	0.087	--	--
Dioxins and Furans-Sieved>75um	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	1	4	0	25%	0.085	0.16	0.13	0.13
Dioxins and Furans-Sieved>75um	1,2,3,7,8,9-Hexachlorodibenzofuran	PG/G	--	4	0	0%	0.090	0.13	--	--
Dioxins and Furans-Sieved>75um	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	1	4	0	25%	0.11	0.15	0.073	0.073
Dioxins and Furans-Sieved>75um	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	--	4	0	0%	0.084	0.11	--	--
Dioxins and Furans-Sieved>75um	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	2	4	0	50%	0.060	0.086	0.059	0.081
Dioxins and Furans-Sieved>75um	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	--	4	0	0%	0.074	0.13	--	--

TABLE C-2

Summary of Phase I Sediment Analytical Data - Beach Group (Composites, Discrete Grabs, Size Fractionation)

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
Dioxins and Furans-Sieved>75um	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	--	4	0	0%	0.077	0.11	--	--
Dioxins and Furans-Sieved>75um	2,3,7,8-Tetrachlorodibenzofuran	PG/G	4	4	0	100%	--	--	0.12	1.2
Dioxins and Furans-Sieved>75um	Heptachlorodibenzodioxin (Total)	PG/G	4	4	0	100%	--	--	0.93	5.1
Dioxins and Furans-Sieved>75um	Heptachlorodibenzofuran (Total)	PG/G	4	4	0	100%	--	--	0.067	1.9
Dioxins and Furans-Sieved>75um	Hexachlorodibenzodioxin (Total)	PG/G	3	4	0	75%	0.084	0.084	0.24	0.42
Dioxins and Furans-Sieved>75um	Hexachlorodibenzofuran (Total)	PG/G	3	4	0	75%	0.17	0.17	0.33	0.88
Dioxins and Furans-Sieved>75um	Octachlorodibenzodioxin	PG/G	4	4	0	100%	--	--	3.7	23
Dioxins and Furans-Sieved>75um	Octachlorodibenzofuran	PG/G	3	4	0	75%	0.32	0.32	0.70	1.6
Dioxins and Furans-Sieved>75um	Pentachlorodibenzodioxin (Total)	PG/G	1	4	0	25%	0.11	0.15	0.073	0.073
Dioxins and Furans-Sieved>75um	Pentachlorodibenzofuran (Total)	PG/G	3	4	0	75%	0.074	0.074	0.25	0.41
Dioxins and Furans-Sieved>75um	TEQ WHO-98	PG/G	4	4	0	100%	--	--	0.018	0.18
Dioxins and Furans-Sieved>75um	Tetrachlorodibenzodioxin (Total)	PG/G	1	4	0	25%	0.077	0.096	0.18	0.18
Dioxins and Furans-Sieved>75um	Tetrachlorodibenzofuran (Total)	PG/G	4	4	0	100%	--	--	0.12	1.7

TABLE C-3

Summary of Phase I Sediment Analytical Data - Core Samples

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
Core Samples										
415.1	Total organic carbon	mg/Kg	44	44	0	100%	--	--	261	32,200
CLP TAL TotMetals	Aluminum	mg/Kg	44	44	0	100%	--	--	6,390	23,000
CLP TAL TotMetals	Antimony	mg/Kg	13	28	16	46%	0.82	15	0.71	43
CLP TAL TotMetals	Arsenic	mg/Kg	40	44	0	91%	1.2	1.9	0.95	18
CLP TAL TotMetals	Barium	mg/Kg	44	44	0	100%	--	--	39	1,610
CLP TAL TotMetals	Beryllium	mg/Kg	44	44	0	100%	--	--	0.49	1.9
CLP TAL TotMetals	Cadmium	mg/Kg	39	44	0	89%	0.48	0.52	0.050	18
CLP TAL TotMetals	Calcium	mg/Kg	44	44	0	100%	--	--	2,000	68,700
CLP TAL TotMetals	Chromium	mg/Kg	44	44	0	100%	--	--	9.0	109
CLP TAL TotMetals	Cobalt	mg/Kg	44	44	0	100%	--	--	4.1	42
CLP TAL TotMetals	Copper	mg/Kg	44	44	0	100%	--	--	9.2	2,240
CLP TAL TotMetals	Iron	mg/Kg	44	44	0	100%	--	--	12,500	266,000
CLP TAL TotMetals	Lead	mg/Kg	44	44	0	100%	--	--	4.4	1,230
CLP TAL TotMetals	Magnesium	mg/Kg	44	44	0	100%	--	--	2,920	23,100
CLP TAL TotMetals	Manganese	mg/Kg	44	44	0	100%	--	--	189	4,690
CLP TAL TotMetals	Mercury	mg/Kg	37	44	0	84%	0.0040	0.014	0.0050	3.2
CLP TAL TotMetals	Nickel	mg/Kg	44	44	0	100%	--	--	6.6	33
CLP TAL TotMetals	Potassium	mg/Kg	44	44	0	100%	--	--	1,150	4,660
CLP TAL TotMetals	Selenium	mg/Kg	34	44	0	77%	2.0	3.5	0.93	9.5
CLP TAL TotMetals	Silver	mg/Kg	--	33	11	0%	0.86	2.6	--	--
CLP TAL TotMetals	Sodium	mg/Kg	42	44	0	95%	219	260	62	2,270
CLP TAL TotMetals	Thallium	mg/Kg	1	44	0	2%	2.1	6.6	0.69	0.69
CLP TAL TotMetals	Uranium	mg/Kg	6	44	0	14%	17	53	20	90
CLP TAL TotMetals	Vanadium	mg/Kg	44	44	0	100%	--	--	13	49
CLP TAL TotMetals	Zinc	mg/Kg	44	44	0	100%	--	--	30	24,800
CLP TCL PAH	2-Methylnaphthalene	µg/Kg	42	44	0	95%	4.0	5.0	0.20	11
CLP TCL PAH	Acenaphthene	µg/Kg	1	44	0	2%	4.0	12	0.40	0.40
CLP TCL PAH	Acenaphthylene	µg/Kg	--	44	0	0%	4.0	12	--	--
CLP TCL PAH	Anthracene	µg/Kg	3	44	0	7%	4.0	12	0.60	2.0
CLP TCL PAH	Benzo(a)anthracene	µg/Kg	15	44	0	34%	4.0	11	0.30	6.0
CLP TCL PAH	Benzo(a)pyrene	µg/Kg	14	44	0	32%	4.0	12	0.80	7.0
CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	1	44	0	2%	4.0	12	3.0	3.0
CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	13	44	0	30%	4.0	9.0	0.20	5.0
CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	1	44	0	2%	4.0	12	2.0	2.0
CLP TCL PAH	Chrysene	µg/Kg	21	44	0	48%	4.0	11	0.20	12
CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	3	44	0	7%	4.0	12	0.60	2.0
CLP TCL PAH	Dibenzofuran	µg/Kg	8	44	0	18%	4.0	12	0.20	6.0

TABLE C-3

Summary of Phase I Sediment Analytical Data - Core Samples

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL PAH	Fluoranthene	µg/Kg	21	44	0	48%	4.0	6.0	0.20	15
CLP TCL PAH	Fluorene	µg/Kg	--	44	0	0%	4.0	12	--	--
CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	11	44	0	25%	4.0	9.0	0.20	3.0
CLP TCL PAH	Naphthalene	µg/Kg	30	44	0	68%	3.6	4.7	0.90	10
CLP TCL PAH	Phenanthrene	µg/Kg	25	44	0	57%	4.0	6.0	0.20	19
CLP TCL PAH	Pyrene	µg/Kg	17	44	0	39%	4.0	11	0.40	8.0
CLP TCL PCBs	Aroclor-1016	µg/Kg	--	43	0	0%	0.86	4.4	--	--
CLP TCL PCBs	Aroclor-1221	µg/Kg	--	43	0	0%	3.5	18	--	--
CLP TCL PCBs	Aroclor-1232	µg/Kg	--	43	0	0%	3.5	18	--	--
CLP TCL PCBs	Aroclor-1242	µg/Kg	--	43	0	0%	0.86	4.4	--	--
CLP TCL PCBs	Aroclor-1248	µg/Kg	--	43	0	0%	0.86	4.4	--	--
CLP TCL PCBs	Aroclor-1254	µg/Kg	--	43	0	0%	0.86	4.4	--	--
CLP TCL PCBs	Aroclor-1260	µg/Kg	--	43	0	0%	0.86	4.4	--	--
CLP TCL Pesticides	2,4'-DDD	µg/Kg	--	44	0	0%	0.69	1.9	--	--
CLP TCL Pesticides	2,4'-DDE	µg/Kg	1	44	0	2%	0.69	1.9	0.32	0.32
CLP TCL Pesticides	2,4'-DDT	µg/Kg	--	44	0	0%	0.69	1.9	--	--
CLP TCL Pesticides	4,4'-DDD	µg/Kg	--	44	0	0%	0.69	1.9	--	--
CLP TCL Pesticides	4,4'-DDE	µg/Kg	4	44	0	9%	0.70	1.9	0.16	0.81
CLP TCL Pesticides	4,4'-DDT	µg/Kg	2	44	0	5%	0.69	1.9	1.0	2.6
CLP TCL Pesticides	Aldrin	µg/Kg	--	44	0	0%	0.34	0.93	--	--
CLP TCL Pesticides	alpha-BHC	µg/Kg	--	44	0	0%	0.34	0.93	--	--
CLP TCL Pesticides	alpha-Chlordane	µg/Kg	--	44	0	0%	0.34	0.93	--	--
CLP TCL Pesticides	beta-BHC	µg/Kg	--	44	0	0%	0.34	0.93	--	--
CLP TCL Pesticides	cis-Nonachlor	µg/Kg	--	44	0	0%	0.34	0.93	--	--
CLP TCL Pesticides	delta-BHC	µg/Kg	--	44	0	0%	0.34	0.93	--	--
CLP TCL Pesticides	Dieldrin	µg/Kg	--	44	0	0%	0.69	1.9	--	--
CLP TCL Pesticides	Endosulfan I	µg/Kg	--	44	0	0%	0.34	0.93	--	--
CLP TCL Pesticides	Endosulfan II	µg/Kg	--	44	0	0%	0.69	1.9	--	--
CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	--	44	0	0%	0.69	1.9	--	--
CLP TCL Pesticides	Endrin	µg/Kg	--	44	0	0%	0.69	1.9	--	--
CLP TCL Pesticides	Endrin aldehyde	µg/Kg	1	44	0	2%	0.69	1.8	0.42	0.42
CLP TCL Pesticides	Endrin ketone	µg/Kg	--	44	0	0%	0.69	1.9	--	--
CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	--	44	0	0%	0.34	0.93	--	--
CLP TCL Pesticides	gamma-Chlordane	µg/Kg	--	44	0	0%	0.34	0.93	--	--
CLP TCL Pesticides	Heptachlor	µg/Kg	--	44	0	0%	0.34	0.93	--	--
CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	--	44	0	0%	0.34	0.93	--	--
CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	--	44	0	0%	0.34	0.93	--	--
CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	--	44	0	0%	0.34	0.93	--	--

TABLE C-3

Summary of Phase I Sediment Analytical Data - Core Samples

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL Pesticides	Methoxychlor	µg/Kg	--	44	0	0%	3.4	9.3	--	--
CLP TCL Pesticides	Oxychlordane	µg/Kg	1	44	0	2%	0.34	0.93	0.35	0.35
CLP TCL Pesticides	Toxaphene	µg/Kg	--	44	0	0%	34	93	--	--
CLP TCL Pesticides	trans-Nonachlor	µg/Kg	--	44	0	0%	0.34	0.93	--	--
CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	--	44	0	0%	220	580	--	--
CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	--	44	0	0%	220	580	--	--
CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	2-Chlorophenol	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	2-Methylphenol	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	2-Nitroaniline	µg/Kg	--	44	0	0%	220	580	--	--
CLP TCL SVOC	2-Nitrophenol	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	3-Nitroaniline	µg/Kg	--	44	0	0%	220	580	--	--
CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	--	44	0	0%	220	580	--	--
CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	4-Chloroaniline	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	4-Methylphenol	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	4-Nitroaniline	µg/Kg	--	44	0	0%	220	580	--	--
CLP TCL SVOC	4-Nitrophenol	µg/Kg	--	44	0	0%	220	580	--	--
CLP TCL SVOC	Acetophenone	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	Atrazine	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	Benzaldehyde	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	Benzoic acid	µg/Kg	--	0	44	0%	--	--	--	--
CLP TCL SVOC	Benzyl alcohol	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	--	44	0	0%	86	230	--	--

TABLE C-3

Summary of Phase I Sediment Analytical Data - Core Samples

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	2	44	0	5%	86	230	37	71
CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	Caprolactam	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	Carbazole	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	Diethyl phthalate	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	Dimethyl phthalate	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	Hexachloroethane	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	Isophorone	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	Nitrobenzene	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	Pentachlorophenol	µg/Kg	--	44	0	0%	220	580	--	--
CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	--	44	0	0%	86	230	--	--
CLP TCL SVOC	Phenol	µg/Kg	--	44	0	0%	86	230	--	--
Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzodioxin	PG/G	17	23	0	74%	0.16	0.29	0.27	45
Dioxins and Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	17	23	0	74%	0.052	0.081	0.076	12
Dioxins and Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	13	23	0	57%	0.045	0.17	0.056	0.56
Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzodioxin	PG/G	11	23	0	48%	0.055	0.16	0.050	0.66
Dioxins and Furans	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	10	23	0	43%	0.020	0.24	0.12	0.94
Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzodioxin	PG/G	13	23	0	57%	0.051	0.10	0.12	2.6
Dioxins and Furans	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	6	23	0	26%	0.020	0.63	0.074	0.66
Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzodioxin	PG/G	13	23	0	57%	0.051	0.10	0.091	1.9
Dioxins and Furans	1,2,3,7,8,9-Hexachlorodibenzofuran	PG/G	6	23	0	26%	0.019	0.23	0.049	0.34
Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	11	23	0	48%	0.032	0.12	0.060	0.67
Dioxins and Furans	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	6	23	0	26%	0.020	0.29	0.37	0.72
Dioxins and Furans	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	15	23	0	65%	0.022	0.16	0.021	0.94
Dioxins and Furans	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	10	23	0	43%	0.023	0.27	0.18	1.5
Dioxins and Furans	2,3,7,8-Tetrachlorodibenzodioxin	PG/G	11	23	0	48%	0.023	0.064	0.11	0.59
Dioxins and Furans	2,3,7,8-Tetrachlorodibenzofuran	PG/G	21	23	0	91%	0.089	0.10	0.076	53
Dioxins and Furans	Heptachlorodibenzodioxin (Total)	PG/G	17	23	0	74%	0.16	0.53	0.43	94
Dioxins and Furans	Heptachlorodibenzofuran (Total)	PG/G	19	23	0	83%	0.052	0.10	0.11	28
Dioxins and Furans	Hexachlorodibenzodioxin (Total)	PG/G	16	23	0	70%	0.036	0.10	0.10	26
Dioxins and Furans	Hexachlorodibenzofuran (Total)	PG/G	19	23	0	83%	0.046	0.093	0.048	15
Dioxins and Furans	Octachlorodibenzodioxin	PG/G	17	23	0	74%	0.94	2.7	1.5	338
Dioxins and Furans	Octachlorodibenzofuran	PG/G	18	23	0	78%	0.094	0.25	0.12	22

TABLE C-3

Summary of Phase I Sediment Analytical Data - Core Samples

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
Dioxins and Furans	Pentachlorodibenzodioxin (Total)	PG/G	15	23	0	65%	0.032	0.084	0.063	15
Dioxins and Furans	Pentachlorodibenzofuran (Total)	PG/G	18	23	0	78%	0.034	0.13	0.021	13
Dioxins and Furans	TEQ WHO-98	PG/G	23	23	0	100%	--	--	0.013	7.6
Dioxins and Furans	Tetrachlorodibenzodioxin (Total)	PG/G	11	23	0	48%	0.023	0.064	0.24	4.2
Dioxins and Furans	Tetrachlorodibenzofuran (Total)	PG/G	21	23	0	91%	0.049	0.72	0.15	106

TABLE C-4

Summary of Phase I Sediment Analytical Data - Reference Samples

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
Reference Samples										
415.1	Total organic carbon	mg/Kg	6	6	0	100%	--	--	15,200	39,100
CLP TAL TotMetals	Aluminum	mg/Kg	6	6	0	100%	--	--	3,170	8,840
CLP TAL TotMetals	Antimony	mg/Kg	--	6	0	0%	8.2	15	--	--
CLP TAL TotMetals	Arsenic	mg/Kg	3	6	0	50%	1.4	1.9	3.1	3.4
CLP TAL TotMetals	Barium	mg/Kg	6	6	0	100%	--	--	45	234
CLP TAL TotMetals	Beryllium	mg/Kg	5	6	0	83%	0.075	0.075	0.42	0.70
CLP TAL TotMetals	Cadmium	mg/Kg	6	6	0	100%	--	--	0.16	1.3
CLP TAL TotMetals	Calcium	mg/Kg	6	6	0	100%	--	--	3,450	229,000
CLP TAL TotMetals	Chromium	mg/Kg	6	6	0	100%	--	--	6.9	25
CLP TAL TotMetals	Cobalt	mg/Kg	6	6	0	100%	--	--	2.1	7.5
CLP TAL TotMetals	Copper	mg/Kg	6	6	0	100%	--	--	5.5	19
CLP TAL TotMetals	Iron	mg/Kg	6	6	0	100%	--	--	5,090	15,600
CLP TAL TotMetals	Lead	mg/Kg	6	6	0	100%	--	--	3.8	26
CLP TAL TotMetals	Magnesium	mg/Kg	6	6	0	100%	--	--	2,070	5,070
CLP TAL TotMetals	Manganese	mg/Kg	6	6	0	100%	--	--	138	625
CLP TAL TotMetals	Mercury	mg/Kg	5	5	1	100%	--	--	0.0080	0.062
CLP TAL TotMetals	Nickel	mg/Kg	6	6	0	100%	--	--	4.9	24
CLP TAL TotMetals	Potassium	mg/Kg	6	6	0	100%	--	--	675	1,590
CLP TAL TotMetals	Selenium	mg/Kg	6	6	0	100%	--	--	2.2	10
CLP TAL TotMetals	Silver	mg/Kg	--	6	0	0%	1.4	2.5	--	--
CLP TAL TotMetals	Sodium	mg/Kg	2	6	0	33%	163	199	61	92
CLP TAL TotMetals	Thallium	mg/Kg	--	6	0	0%	3.4	6.1	--	--
CLP TAL TotMetals	Uranium	mg/Kg	--	6	0	0%	27	49	--	--
CLP TAL TotMetals	Vanadium	mg/Kg	6	6	0	100%	--	--	8.5	34
CLP TAL TotMetals	Zinc	mg/Kg	6	6	0	100%	--	--	26	73
CLP TCL PAH	2-Methylnaphthalene	µg/Kg	6	6	0	100%	--	--	0.30	0.70
CLP TCL PAH	Acenaphthene	µg/Kg	--	6	0	0%	7.0	9.0	--	--
CLP TCL PAH	Acenaphthylene	µg/Kg	--	6	0	0%	7.0	9.0	--	--
CLP TCL PAH	Anthracene	µg/Kg	--	6	0	0%	7.0	9.0	--	--
CLP TCL PAH	Benzo(a)anthracene	µg/Kg	3	6	0	50%	7.0	9.0	0.30	1.0
CLP TCL PAH	Benzo(a)pyrene	µg/Kg	--	6	0	0%	7.0	9.0	--	--
CLP TCL PAH	Benzo(b)fluoranthene	µg/Kg	--	6	0	0%	7.0	9.0	--	--
CLP TCL PAH	Benzo(ghi)perylene	µg/Kg	--	6	0	0%	7.0	9.0	--	--
CLP TCL PAH	Benzo(k)fluoranthene	µg/Kg	--	6	0	0%	7.0	9.0	--	--
CLP TCL PAH	Chrysene	µg/Kg	2	6	0	33%	7.0	9.0	1.0	2.0
CLP TCL PAH	Dibenzo(a,h)anthracene	µg/Kg	--	6	0	0%	7.0	9.0	--	--
CLP TCL PAH	Dibenzofuran	µg/Kg	--	6	0	0%	7.0	9.0	--	--

TABLE C-4

Summary of Phase I Sediment Analytical Data - Reference Samples

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL PAH	Fluoranthene	µg/Kg	4	6	0	67%	7.0	9.0	0.60	16
CLP TCL PAH	Fluorene	µg/Kg	--	6	0	0%	7.0	9.0	--	--
CLP TCL PAH	Indeno[1,2,3-cd]pyrene	µg/Kg	--	6	0	0%	7.0	9.0	--	--
CLP TCL PAH	Naphthalene	µg/Kg	6	6	0	100%	--	--	0.90	3.0
CLP TCL PAH	Phenanthrene	µg/Kg	5	6	0	83%	7.0	7.0	0.30	22
CLP TCL PAH	Pyrene	µg/Kg	2	5	0	40%	7.0	9.0	1.0	3.0
CLP TCL PCBs	Aroclor-1016	µg/Kg	--	6	0	0%	1.4	1.8	--	--
CLP TCL PCBs	Aroclor-1221	µg/Kg	--	6	0	0%	5.6	7.2	--	--
CLP TCL PCBs	Aroclor-1232	µg/Kg	--	6	0	0%	5.6	7.2	--	--
CLP TCL PCBs	Aroclor-1242	µg/Kg	--	6	0	0%	1.4	1.8	--	--
CLP TCL PCBs	Aroclor-1248	µg/Kg	--	6	0	0%	1.4	1.8	--	--
CLP TCL PCBs	Aroclor-1254	µg/Kg	--	6	0	0%	1.4	1.8	--	--
CLP TCL PCBs	Aroclor-1260	µg/Kg	--	6	0	0%	1.4	1.8	--	--
CLP TCL Pesticides	2,4'-DDD	µg/Kg	--	6	0	0%	1.1	1.4	--	--
CLP TCL Pesticides	2,4'-DDE	µg/Kg	--	6	0	0%	1.1	1.4	--	--
CLP TCL Pesticides	2,4'-DDT	µg/Kg	--	6	0	0%	1.1	1.4	--	--
CLP TCL Pesticides	4,4'-DDD	µg/Kg	--	6	0	0%	1.1	1.4	--	--
CLP TCL Pesticides	4,4'-DDE	µg/Kg	--	6	0	0%	1.1	1.4	--	--
CLP TCL Pesticides	4,4'-DDT	µg/Kg	--	6	0	0%	1.1	1.4	--	--
CLP TCL Pesticides	Aldrin	µg/Kg	--	6	0	0%	0.54	0.71	--	--
CLP TCL Pesticides	alpha-BHC	µg/Kg	--	6	0	0%	0.54	0.71	--	--
CLP TCL Pesticides	alpha-Chlordane	µg/Kg	--	6	0	0%	0.54	0.71	--	--
CLP TCL Pesticides	beta-BHC	µg/Kg	--	6	0	0%	0.54	0.71	--	--
CLP TCL Pesticides	cis-Nonachlor	µg/Kg	--	6	0	0%	0.54	0.71	--	--
CLP TCL Pesticides	delta-BHC	µg/Kg	--	6	0	0%	0.54	0.71	--	--
CLP TCL Pesticides	Dieldrin	µg/Kg	--	6	0	0%	1.1	1.4	--	--
CLP TCL Pesticides	Endosulfan I	µg/Kg	--	6	0	0%	0.54	0.71	--	--
CLP TCL Pesticides	Endosulfan II	µg/Kg	--	6	0	0%	1.1	1.4	--	--
CLP TCL Pesticides	Endosulfan sulfate	µg/Kg	--	6	0	0%	1.1	1.4	--	--
CLP TCL Pesticides	Endrin	µg/Kg	--	6	0	0%	1.1	1.4	--	--
CLP TCL Pesticides	Endrin aldehyde	µg/Kg	--	6	0	0%	1.1	1.4	--	--
CLP TCL Pesticides	Endrin ketone	µg/Kg	--	6	0	0%	1.1	1.4	--	--
CLP TCL Pesticides	gamma-BHC (Lindane)	µg/Kg	--	6	0	0%	0.54	0.71	--	--
CLP TCL Pesticides	gamma-Chlordane	µg/Kg	--	6	0	0%	0.54	0.71	--	--
CLP TCL Pesticides	Heptachlor	µg/Kg	--	6	0	0%	0.54	0.71	--	--
CLP TCL Pesticides	Heptachlor epoxide	µg/Kg	--	6	0	0%	0.54	0.71	--	--
CLP TCL Pesticides	Hexachlorobenzene	µg/Kg	--	6	0	0%	0.54	0.71	--	--
CLP TCL Pesticides	Hexachlorobutadiene	µg/Kg	--	6	0	0%	0.54	0.71	--	--

TABLE C-4

Summary of Phase I Sediment Analytical Data - Reference Samples

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL Pesticides	Methoxychlor	µg/Kg	--	6	0	0%	5.4	7.1	--	--
CLP TCL Pesticides	Oxychlordane	µg/Kg	--	6	0	0%	0.54	0.71	--	--
CLP TCL Pesticides	Toxaphene	µg/Kg	--	6	0	0%	54	71	--	--
CLP TCL Pesticides	trans-Nonachlor	µg/Kg	--	6	0	0%	0.54	0.71	--	--
CLP TCL SVOC	1,1'-Biphenyl	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	1,2,4-Trichlorobenzene	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	1,2-Dichlorobenzene	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	1,3-Dichlorobenzene	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	1,4-Dichlorobenzene	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	2,2'-oxybis(1-chloropropane)	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	2,4,5-Trichlorophenol	µg/Kg	--	6	0	0%	340	450	--	--
CLP TCL SVOC	2,4,6-Trichlorophenol	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	2,4-Dichlorophenol	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	2,4-Dimethylphenol	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	2,4-Dinitrophenol	µg/Kg	--	6	0	0%	340	450	--	--
CLP TCL SVOC	2,4-Dinitrotoluene	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	2,6-Dinitrotoluene	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	2-Chloronaphthalene	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	2-Chlorophenol	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	2-Methylphenol	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	2-Nitroaniline	µg/Kg	--	6	0	0%	340	450	--	--
CLP TCL SVOC	2-Nitrophenol	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	3,3'-Dichlorobenzidine	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	3-Nitroaniline	µg/Kg	--	6	0	0%	340	450	--	--
CLP TCL SVOC	4,6-Dinitro-2-methylphenol	µg/Kg	--	6	0	0%	340	450	--	--
CLP TCL SVOC	4-Bromophenyl-phenylether	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	4-Chloro-3-methylphenol	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	4-Chloroaniline	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	4-Chlorophenyl-phenyl ether	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	4-Methylphenol	µg/Kg	1	6	0	17%	140	180	200	200
CLP TCL SVOC	4-Nitroaniline	µg/Kg	--	6	0	0%	340	450	--	--
CLP TCL SVOC	4-Nitrophenol	µg/Kg	--	6	0	0%	340	450	--	--
CLP TCL SVOC	Acetophenone	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	Atrazine	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	Benzaldehyde	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	Benzoic acid	µg/Kg	--	3	3	0%	140	170	--	--
CLP TCL SVOC	Benzyl alcohol	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	bis(2-Chloroethoxy)methane	µg/Kg	--	6	0	0%	140	180	--	--

TABLE C-4

Summary of Phase I Sediment Analytical Data - Reference Samples

Upper Columbia River RI/FS

Method	Analyte	Units	Number of Detects	Number of Samples	Number of Rejected Samples	Frequency of Detection	Minimum Nondetect Value	Maximum Nondetect Value	Minimum Detected Value	Maximum Detected Value
CLP TCL SVOC	Bis(2-chloroethyl)ether	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	Bis(2-ethylhexyl)phthalate	µg/Kg	1	6	0	17%	140	180	82	82
CLP TCL SVOC	Butyl benzyl phthalate	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	Caprolactam	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	Carbazole	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	Di-n-butyl phthalate	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	Di-n-octylphthalate	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	Diethyl phthalate	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	Dimethyl phthalate	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	Hexachloroethane	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	Isophorone	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	N-Nitrosodi-n-propylamine	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	N-Nitrosodiphenylamine	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	Nitrobenzene	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	Pentachlorophenol	µg/Kg	--	6	0	0%	340	450	--	--
CLP TCL SVOC	Perchlorocyclopentadiene	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	Phenol	µg/Kg	--	6	0	0%	140	180	--	--
CLP TCL SVOC	Pyrene	µg/Kg	1	1	0	100%	--	--	34	34

TABLE C-5

Samples Used for Constituent of Interest Identification

Upper Columbia River RI/FS

Grouping	Type	Sample Location	Collection Date	Top Depth	Base Depth	Depth Unit
Beach Group	Beach Subsample	RM642B1c	4/15/2005	0	6	inches
Beach Group	Beach Subsample	RM642B1L	4/15/2005	0	6	inches
Beach Group	Beach Subsample	RM642B1R	4/15/2005	0	6	inches
Beach Group	Beach Subsample	RM642B2c	4/15/2005	0	6	inches
Beach Group	Beach Subsample	RM642B2L	4/15/2005	0	6	inches
Beach Group	Beach Subsample	RM642B2R	4/15/2005	0	6	inches
Beach Group	Beach Subsample	RM642B3c	4/15/2005	0	6	inches
Beach Group	Beach Subsample	RM642B3L	4/15/2005	0	6	inches
Beach Group	Beach Subsample	RM642B3R	4/15/2005	0	6	inches
Beach Group	Beach Subsample	RM700B1c	4/12/2005	0	6	inches
Beach Group	Beach Subsample	RM700B1L	4/12/2005	0	6	inches
Beach Group	Beach Subsample	RM700B1R	4/12/2005	0	6	inches
Beach Group	Beach Subsample	RM700B2c	4/12/2005	0	6	inches
Beach Group	Beach Subsample	RM700B2L	4/12/2005	0	6	inches
Beach Group	Beach Subsample	RM700B2R	4/12/2005	0	6	inches
Beach Group	Beach Subsample	RM700B3c	4/12/2005	0	6	inches
Beach Group	Beach Subsample	RM700B3L	4/12/2005	0	6	inches
Beach Group	Beach Subsample	RM700B3R	4/12/2005	0	6	inches
Beach Group	Beach Subsample	RM735B1c	4/11/2005	0	6	inches
Beach Group	Beach Subsample	RM735B1L	4/11/2005	0	6	inches
Beach Group	Beach Subsample	RM735B1R	4/11/2005	0	6	inches
Beach Group	Beach Subsample	RM735B2c	4/11/2005	0	6	inches
Beach Group	Beach Subsample	RM735B2L	4/11/2005	0	6	inches
Beach Group	Beach Subsample	RM735B2R	4/11/2005	0	6	inches
Beach Group	Beach Subsample	RM735B3c	4/11/2005	0	6	inches
Beach Group	Beach Subsample	RM735B3L	4/11/2005	0	6	inches
Beach Group	Beach Subsample	RM735B3R	4/11/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM600B1	4/19/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM600B2	4/19/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM600B3	4/19/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM615B1	4/19/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM615B2	4/19/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM615B3	4/19/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM633B1	4/18/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM633B2	4/18/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM633B3	4/18/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM642B1	4/15/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM642B2	4/15/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM642B3	4/15/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM658B1	4/14/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM658B2	4/14/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM658B3	4/14/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM673B1	4/16/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM673B2	4/16/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM673B3	4/16/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM675B1	4/16/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM675B2	4/16/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM675B3	4/16/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM690B1	4/13/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM690B2	4/13/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM690B3	4/13/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM697B1	4/13/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM697B2	4/13/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM697B3	4/13/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM700B1	4/12/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM700B2	4/12/2005	0	6	inches

TABLE C-5

Samples Used for Constituent of Interest Identification

Upper Columbia River RI/FS

Grouping	Type	Sample Location	Collection Date	Top Depth	Base Depth	Depth Unit
Beach Group	Beach Subsample Composite	RM700B3	4/12/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM708B1	4/7/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM708B2	4/7/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM708B3	4/7/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM718B1	4/6/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM718B2	4/6/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM718B3	4/6/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM729B1	4/8/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM729B2	4/8/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM729B3	4/8/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM735B1	4/11/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM735B2	4/11/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM735B3	4/11/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM742B1	4/9/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM742B2	4/9/2005	0	6	inches
Beach Group	Beach Subsample Composite	RM742B3	4/9/2005	0	6	inches
Beach Group	Size Fractioned Sample	RM642BSF	4/15/2005	0	6	inches
Beach Group	Size Fractioned Sample	RM642BSF	5/11/2005	0	6	inches
Beach Group	Size Fractioned Sample	RM700BSF	4/12/2005	0	6	inches
Beach Group	Size Fractioned Sample	RM700BSF	5/13/2005	0	6	inches
Beach Group	Size Fractioned Sample	RM735BSF	4/11/2005	0	6	inches
Beach Group	Size Fractioned Sample	RM735BSF	5/10/2005	0	6	inches
Beach Group	Size Fractioned Sample	RM735BSF	5/16/2005	0	6	inches
Core Samples	Core Sample	RM605C1	5/3/2005	0	1	feet
Core Samples	Core Sample	RM605C1	5/3/2005	1	3	feet
Core Samples	Core Sample	RM605C1	5/3/2005	3	5	feet
Core Samples	Core Sample	RM622C1	5/2/2005	0	0.5	feet
Core Samples	Core Sample	RM622C1	5/2/2005	0	1	feet
Core Samples	Core Sample	RM622C1	5/2/2005	1	3	feet
Core Samples	Core Sample	RM622C1	5/2/2005	3	5	feet
Core Samples	Core Sample	RM622C1	5/2/2005	5	7	feet
Core Samples	Core Sample	RM622C1	5/2/2005	7	9	feet
Core Samples	Core Sample	RM637C1	4/29/2005	0	0.5	inches
Core Samples	Core Sample	RM637C1	4/29/2005	0	1	inches
Core Samples	Core Sample	RM637C1	4/29/2005	1	3	feet
Core Samples	Core Sample	RM637C1	4/29/2005	3	5	feet
Core Samples	Core Sample	RM644C1	4/26/2005	0	0.5	inches
Core Samples	Core Sample	RM644C1	4/26/2005	0	1	inches
Core Samples	Core Sample	RM644C1	4/26/2005	1	3	feet
Core Samples	Core Sample	RM644C1	4/26/2005	3	5	feet
Core Samples	Core Sample	RM644C1	4/26/2005	5	7	feet
Core Samples	Core Sample	RM661C1	4/29/2005	0	0.5	feet
Core Samples	Core Sample	RM661C1	4/29/2005	0	1	feet
Core Samples	Core Sample	RM661C1	4/29/2005	1	3	feet
Core Samples	Core Sample	RM661C1	4/29/2005	3	5	feet
Core Samples	Core Sample	RM661C1	4/29/2005	5	7	feet
Core Samples	Core Sample	RM676C1	4/25/2005	0	0.5	feet
Core Samples	Core Sample	RM676C1	4/25/2005	0	1	feet
Core Samples	Core Sample	RM676C1	4/25/2005	1	3	feet
Core Samples	Core Sample	RM676C1	4/25/2005	3	5	feet
Core Samples	Core Sample	RM676C1	4/25/2005	5	7	feet
Core Samples	Core Sample	RM692C1	4/23/2005	0	0.5	feet
Core Samples	Core Sample	RM692C1	4/23/2005	0	1	feet
Core Samples	Core Sample	RM692C1	4/23/2005	1	3	feet
Core Samples	Core Sample	RM692C1	4/23/2005	3	5	feet
Core Samples	Core Sample	RM692C1	4/23/2005	5	7	feet

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Samples Used for Constituent of Interest Identification

Upper Columbia River RI/FS

Grouping	Type	Sample Location	Collection Date	Top Depth	Base Depth	Depth Unit
Core Samples	Core Sample	RM704C1	4/22/2005	0	0.5	feet
Core Samples	Core Sample	RM704C1	4/22/2005	0	1	feet
Core Samples	Core Sample	RM704C1	4/22/2005	1	3	feet
Core Samples	Core Sample	RM704C1	4/22/2005	3	5	feet
Core Samples	Core Sample	RM704C1	4/22/2005	5	7	feet
Core Samples	Core Sample	RM704C1	4/22/2005	7	9	feet
Core Samples	Core Sample	RM708C1	4/23/2005	0	0.5	feet
Core Samples	Core Sample	RM708C1	4/23/2005	0	1	feet
Core Samples	Core Sample	RM708C1	4/23/2005	1	3	feet
Core Samples	Core Sample	RM708C1	4/23/2005	3	5	feet
Core Samples	Core Sample	RM708C1	4/23/2005	5	7	feet
Reference Samples	Reference/Bioassay/Pore Water	RM685R1	4/23/2005	0	6	inches
Reference Samples	Reference/Bioassay/Pore Water	RM686R1	4/23/2005	0	6	inches
Reference Samples	Reference/Bioassay/Pore Water	RM705R1	4/23/2005	0	6	inches
Reference Samples	Reference/Bioassay/Pore Water	RM721R1	4/22/2005	0	6	inches
Reference Samples	Reference/Bioassay/Pore Water	RM726R1	4/22/2005	0	6	inches
Reference Samples	Reference/Bioassay/Pore Water	RM732R1	4/22/2005	0	6	inches
River Group	Bioassay/Pore Water Sample	RM687A1	4/20/2005	0	6	inches
River Group	Bioassay/Pore Water Sample	RM730A1	4/23/2005	0	6	inches
River Group	Bioassay/Pore Water Sample	RM734A1	4/22/2005	0	6	inches
River Group	Transect Sample	RM600X1	4/29/2005	0	6	inches
River Group	Transect Sample	RM600X2	4/29/2005	0	6	inches
River Group	Transect Sample	RM600X3	4/29/2005	0	6	inches
River Group	Transect Sample	RM603X2	4/28/2005	0	6	inches
River Group	Transect Sample	RM603X3	4/28/2005	0	6	inches
River Group	Transect Sample	RM604X1	4/28/2005	0	6	inches
River Group	Transect Sample	RM604X2	4/28/2005	0	6	inches
River Group	Transect Sample	RM604X3	4/29/2005	0	6	inches
River Group	Transect Sample	RM605X2	4/30/2005	0	6	inches
River Group	Transect Sample	RM605X3	4/29/2005	0	6	inches
River Group	Transect Sample	RM605X4	4/29/2005	0	6	inches
River Group	Transect Sample	RM605X5	4/29/2005	0	6	inches
River Group	Transect Sample	RM605X6	4/30/2005	0	6	inches
River Group	Transect Sample	RM605X7	4/30/2005	0	6	inches
River Group	Transect Sample	RM605X9	4/30/2005	0	6	inches
River Group	Transect Sample	RM606X1	4/30/2005	0	6	inches
River Group	Transect Sample	RM606X2	4/30/2005	0	6	inches
River Group	Transect Sample	RM607X1	4/30/2005	0	6	inches
River Group	Transect Sample	RM607X2	4/30/2005	0	6	inches
River Group	Transect Sample	RM607X3	4/30/2005	0	6	inches
River Group	Transect Sample	RM610X1	4/30/2005	0	6	inches
River Group	Transect Sample	RM610X2	4/30/2005	0	6	inches
River Group	Transect Sample	RM610X3	4/30/2005	0	6	inches
River Group	Transect Sample	RM613X1	4/30/2005	0	6	inches
River Group	Transect Sample	RM613X2	5/2/2005	0	6	inches
River Group	Transect Sample	RM613X3	5/2/2005	0	6	inches
River Group	Transect Sample	RM616X1	4/29/2005	0	6	inches
River Group	Transect Sample	RM616X2	4/29/2005	0	6	inches
River Group	Transect Sample	RM619X1	4/29/2005	0	6	inches
River Group	Transect Sample	RM619X2	4/29/2005	0	6	inches
River Group	Transect Sample	RM619X3	4/29/2005	0	6	inches
River Group	Transect Sample	RM622X1	4/28/2005	0	6	inches
River Group	Transect Sample	RM622X2	4/28/2005	0	6	inches
River Group	Transect Sample	RM625X1	4/28/2005	0	6	inches
River Group	Transect Sample	RM625X2	4/28/2005	0	6	inches
River Group	Transect Sample	RM625X3	4/28/2005	0	6	inches

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Samples Used for Constituent of Interest Identification

Upper Columbia River RI/FS

Grouping	Type	Sample Location	Collection Date	Top Depth	Base Depth	Depth Unit
River Group	Transect Sample	RM628X2	5/2/2005	0	6	inches
River Group	Transect Sample	RM628X3	5/2/2005	0	6	inches
River Group	Transect Sample	RM631X1	4/30/2005	0	6	inches
River Group	Transect Sample	RM631X2	4/30/2005	0	6	inches
River Group	Transect Sample	RM631X3	4/30/2005	0	6	inches
River Group	Transect Sample	RM634X2	4/30/2005	0	6	inches
River Group	Transect Sample	RM634X3	4/30/2005	0	6	inches
River Group	Transect Sample	RM637X2	4/29/2005	0	6	inches
River Group	Transect Sample	RM637X3	4/29/2005	0	6	inches
River Group	Transect Sample	RM637X4	4/30/2005	0	6	inches
River Group	Transect Sample	RM637X5	4/30/2005	0	6	inches
River Group	Transect Sample	RM637X6	4/30/2005	0	6	inches
River Group	Transect Sample	RM637X7	4/30/2005	0	6	inches
River Group	Transect Sample	RM640X1	4/28/2005	0	6	inches
River Group	Transect Sample	RM640X2	4/28/2005	0	6	inches
River Group	Transect Sample	RM641X2	4/29/2005	0	6	inches
River Group	Transect Sample	RM641X3	4/29/2005	0	6	inches
River Group	Transect Sample	RM642X2	4/28/2005	0	6	inches
River Group	Transect Sample	RM642X3	4/28/2005	0	6	inches
River Group	Transect Sample	RM642X4	4/28/2005	0	6	inches
River Group	Transect Sample	RM642X5	4/28/2005	0	6	inches
River Group	Transect Sample	RM642X6	4/29/2005	0	6	inches
River Group	Transect Sample	RM642X7	4/29/2005	0	6	inches
River Group	Transect Sample	RM643X1	4/28/2005	0	6	inches
River Group	Transect Sample	RM643X2	4/28/2005	0	6	inches
River Group	Transect Sample	RM643X3	4/28/2005	0	6	inches
River Group	Transect Sample	RM644X1	4/23/2005	0	6	inches
River Group	Transect Sample	RM644X2	4/23/2005	0	6	inches
River Group	Transect Sample	RM646X1	4/23/2005	0	6	inches
River Group	Transect Sample	RM646X2	4/23/2005	0	6	inches
River Group	Transect Sample	RM646X3	4/23/2005	0	6	inches
River Group	Transect Sample	RM649X1	4/22/2005	0	6	inches
River Group	Transect Sample	RM649X2	4/22/2005	0	6	inches
River Group	Transect Sample	RM649X3	4/23/2005	0	6	inches
River Group	Transect Sample	RM652X1	4/22/2005	0	6	inches
River Group	Transect Sample	RM652X2	4/19/2005	0	6	inches
River Group	Transect Sample	RM652X3	4/19/2005	0	6	inches
River Group	Transect Sample	RM655X1	4/19/2005	0	6	inches
River Group	Transect Sample	RM655X2	4/19/2005	0	6	inches
River Group	Transect Sample	RM655X3	4/19/2005	0	6	inches
River Group	Transect Sample	RM658X1	4/19/2005	0	6	inches
River Group	Transect Sample	RM658X2	4/19/2005	0	6	inches
River Group	Transect Sample	RM661X2	4/19/2005	0	6	inches
River Group	Transect Sample	RM661X3	4/19/2005	0	6	inches
River Group	Transect Sample	RM664X1	4/19/2005	0	6	inches
River Group	Transect Sample	RM664X2	4/19/2005	0	6	inches
River Group	Transect Sample	RM664X3	4/19/2005	0	6	inches
River Group	Transect Sample	RM667X1	4/15/2005	0	6	inches
River Group	Transect Sample	RM667X2	4/15/2005	0	6	inches
River Group	Transect Sample	RM667X3	4/15/2005	0	6	inches
River Group	Transect Sample	RM670X1	4/14/2005	0	6	inches
River Group	Transect Sample	RM670X2	4/14/2005	0	6	inches
River Group	Transect Sample	RM670X3	4/15/2005	0	6	inches
River Group	Transect Sample	RM673X1	4/14/2005	0	6	inches
River Group	Transect Sample	RM673X2	4/14/2005	0	6	inches
River Group	Transect Sample	RM673X3	4/14/2005	0	6	inches

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Samples Used for Constituent of Interest Identification

Upper Columbia River RI/FS

Grouping	Type	Sample Location	Collection Date	Top Depth	Base Depth	Depth Unit
River Group	Transect Sample	RM676X1	4/14/2005	0	6	inches
River Group	Transect Sample	RM676X2	4/14/2005	0	6	inches
River Group	Transect Sample	RM677X1	4/13/2005	0	6	inches
River Group	Transect Sample	RM677X2	4/13/2005	0	6	inches
River Group	Transect Sample	RM678X2	4/12/2005	0	6	inches
River Group	Transect Sample	RM678X3	4/13/2005	0	6	inches
River Group	Transect Sample	RM678X4	4/13/2005	0	6	inches
River Group	Transect Sample	RM678X5	4/13/2005	0	6	inches
River Group	Transect Sample	RM678X6	4/13/2005	0	6	inches
River Group	Transect Sample	RM678X7	4/13/2005	0	6	inches
River Group	Transect Sample	RM679X1	4/12/2005	0	6	inches
River Group	Transect Sample	RM679X2	4/12/2005	0	6	inches
River Group	Transect Sample	RM679X3	4/12/2005	0	6	inches
River Group	Transect Sample	RM680X2	4/12/2005	0	6	inches
River Group	Transect Sample	RM681X1	4/12/2005	0	6	inches
River Group	Transect Sample	RM683X1	4/11/2005	0	6	inches
River Group	Transect Sample	RM683X2	4/11/2005	0	6	inches
River Group	Transect Sample	RM683X3	4/11/2005	0	6	inches
River Group	Transect Sample	RM686X1	4/11/2005	0	6	inches
River Group	Transect Sample	RM686X2	4/11/2005	0	6	inches
River Group	Transect Sample	RM689X1	4/11/2005	0	6	inches
River Group	Transect Sample	RM689X2	4/11/2005	0	6	inches
River Group	Transect Sample	RM692X2	4/9/2005	0	6	inches
River Group	Transect Sample	RM693X1	4/12/2005	0	6	inches
River Group	Transect Sample	RM695X1	4/9/2005	0	6	inches
River Group	Transect Sample	RM695X2	4/9/2005	0	6	inches
River Group	Transect Sample	RM695X3	4/9/2005	0	6	inches
River Group	Transect Sample	RM698X2	4/9/2005	0	6	inches
River Group	Transect Sample	RM698X3	4/9/2005	0	6	inches
River Group	Transect Sample	RM701X1	4/8/2005	0	6	inches
River Group	Transect Sample	RM701X2	4/8/2005	0	6	inches
River Group	Transect Sample	RM701X3	4/8/2005	0	6	inches
River Group	Transect Sample	RM704X2	4/7/2005	0	6	inches
River Group	Transect Sample	RM704X3	4/8/2005	0	6	inches
River Group	Transect Sample	RM705X1	4/7/2005	0	6	inches
River Group	Transect Sample	RM705X2	4/7/2005	0	6	inches
River Group	Transect Sample	RM705X3	4/7/2005	0	6	inches
River Group	Transect Sample	RM706X2	4/15/2005	0	6	inches
River Group	Transect Sample	RM706X3	4/16/2005	0	6	inches
River Group	Transect Sample	RM706X4	4/16/2005	0	6	inches
River Group	Transect Sample	RM706X5	4/16/2005	0	6	inches
River Group	Transect Sample	RM706X6	4/16/2005	0	6	inches
River Group	Transect Sample	RM707X1	4/18/2005	0	6	inches
River Group	Transect Sample	RM707X2	4/18/2005	0	6	inches
River Group	Transect Sample	RM707X3	4/18/2005	0	6	inches
River Group	Transect Sample	RM708X1	4/16/2005	0	6	inches
River Group	Transect Sample	RM708X2	4/18/2005	0	6	inches
River Group	Transect Sample	RM710X1	4/16/2005	0	6	inches
River Group	Transect Sample	RM710X2	4/15/2005	0	6	inches
River Group	Transect Sample	RM710X3	4/16/2005	0	6	inches
River Group	Transect Sample	RM713X1	4/15/2005	0	6	inches
River Group	Transect Sample	RM715X1	4/15/2005	0	6	inches
River Group	Transect Sample	RM715X3	4/14/2005	0	6	inches
River Group	Transect Sample	RM718X1	4/14/2005	0	6	inches
River Group	Transect Sample	RM718X2	4/14/2005	0	6	inches
River Group	Transect Sample	RM718X3	4/14/2005	0	6	inches

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Samples Used for Constituent of Interest Identification

Upper Columbia River RI/FS

Grouping	Type	Sample Location	Collection Date	Top Depth	Base Depth	Depth Unit
River Group	Transect Sample	RM721X1	4/14/2005	0	6	inches
River Group	Transect Sample	RM721X2	4/13/2005	0	6	inches
River Group	Transect Sample	RM721X3	4/14/2005	0	6	inches
River Group	Transect Sample	RM722X1	4/13/2005	0	6	inches
River Group	Transect Sample	RM722X2	4/13/2005	0	6	inches
River Group	Transect Sample	RM722X3	4/13/2005	0	6	inches
River Group	Transect Sample	RM723X4	4/12/2005	0	6	inches
River Group	Transect Sample	RM723X5	4/12/2005	0	6	inches
River Group	Transect Sample	RM724X2	4/11/2005	0	6	inches
River Group	Transect Sample	RM725X1	4/11/2005	0	6	inches
River Group	Transect Sample	RM725X3	4/11/2005	0	6	inches
River Group	Transect Sample	RM726X1	4/8/2005	0	6	inches
River Group	Transect Sample	RM726X2	4/9/2005	0	6	inches
River Group	Transect Sample	RM726X3	4/9/2005	0	6	inches
River Group	Transect Sample	RM727X3	4/8/2005	0	6	inches
River Group	Transect Sample	RM728X1	4/7/2005	0	6	inches
River Group	Transect Sample	RM728X3	4/7/2005	0	6	inches
River Group	Transect Sample	RM729X2	4/18/2005	0	6	inches
River Group	Transect Sample	RM729X3	4/18/2005	0	6	inches
River Group	Transect Sample	RM730X1	4/18/2005	0	6	inches
River Group	Transect Sample	RM731X1	4/18/2005	0	6	inches
River Group	Transect Sample	RM731X3	4/16/2005	0	6	inches
River Group	Transect Sample	RM732X1	4/16/2005	0	6	inches
River Group	Transect Sample	RM732X2	4/16/2005	0	6	inches
River Group	Transect Sample	RM732X3	4/16/2005	0	6	inches
River Group	Transect Sample	RM733X2	4/15/2005	0	6	inches
River Group	Transect Sample	RM733X3	4/15/2005	0	6	inches
River Group	Transect Sample	RM734X3	4/15/2005	0	6	inches
River Group	Transect Sample	RM735X1	4/14/2005	0	6	inches
River Group	Transect Sample	RM735X3	4/14/2005	0	6	inches
River Group	Transect Sample	RM736X3	4/13/2005	0	6	inches
River Group	Transect Sample	RM737X1	4/12/2005	0	6	inches
River Group	Transect Sample	RM737X2	4/12/2005	0	6	inches
River Group	Transect Sample	RM738X1	4/11/2005	0	6	inches
River Group	Transect Sample	RM739X1	4/11/2005	0	6	inches
River Group	Transect Sample	RM740X3	4/9/2005	0	6	inches
River Group	Transect Sample	RM741X1	4/9/2005	0	6	inches
River Group	Transect Sample	RM744X2	4/8/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM603A1(X1)	4/28/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM605A1(X1)	4/26/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM605A2(X8)	4/28/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM606A1(X3)	4/26/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM616A1(X3)	4/26/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM622A1(X3)	4/28/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM628A1(X1)	4/26/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM634A1(X1)	4/26/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM637A1(X1)	4/26/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM640A1(X3)	4/26/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM641A1(X1)	4/26/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM642A1(X1)	4/26/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM644A1(X3)	4/26/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM658A1(X3)	4/22/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM661A1(X1)	4/22/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM676A1(X3)	4/21/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM677A1(X3)	4/21/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM678A1(X1)	4/21/2005	0	6	inches

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Samples Used for Constituent of Interest Identification

Upper Columbia River RI/FS

Grouping	Type	Sample Location	Collection Date	Top Depth	Base Depth	Depth Unit
River Group	Transect/Bioassay/Pore Water	RM680A1(X1)	4/21/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM686A1(X3)	4/21/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM689A1(X3)	4/20/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM692A1(X1)	4/20/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM698A1(X1)	4/20/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM704A1(X1)	4/20/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM706A1(X1)	4/20/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM706A2(X7)	4/20/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM708A1(X3)	4/21/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM713A1(X3)	4/23/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM723A1(X1)	4/22/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM723A2(X3)	4/22/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM724A1(X1)	4/21/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM724A2(X3)	4/22/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM727A1(X1)	4/23/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM729A1(X1)	4/23/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM733A1(X1)	4/23/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM736A1(X1)	4/22/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM737A1(X3)	4/22/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM738A1(X3)	4/22/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM739A1(X3)	4/22/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM740A1(X1)	4/21/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM741A1(X3)	4/21/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM742A1(X1)	4/21/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM742A2(X5)	4/21/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM743A1(X1)	4/21/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM743A2(X3)	4/20/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM744A1(X1)	4/20/2005	0	6	inches
River Group	Transect/Bioassay/Pore Water	RM744A2(X3)	4/20/2005	0	6	inches
River Group	Tributary Sample	RM616T1	4/29/2005	0	6	inches
River Group	Tributary Sample	RM616T2	5/2/2005	0	6	inches
River Group	Tributary Sample	RM639T1	4/29/2005	0	6	inches
River Group	Tributary Sample	RM639T2	4/29/2005	0	6	inches
River Group	Tributary Sample	RM699T1	4/8/2005	0	6	inches
River Group	Tributary Sample	RM706T1	4/16/2005	0	6	inches
River Group	Tributary Sample	RM706T2	4/16/2005	0	6	inches
River Group	Tributary Sample	RM729T2	4/18/2005	0	6	inches
River Group	Tributary Sample	RM730T1	4/18/2005	0	6	inches
River Group	Tributary Sample	RM736T1	4/13/2005	0	6	inches

TABLE C-6
Samples Used in Evaluation of Longitudinal Metals Distribution
Upper Columbia River RI/FS

Sample Location	River Mile	Longitudinal Evaluation Group	Top Depth	Base Depth	Depth Unit	Type
RM600B1	600	Left Beach	0	6	Inches	Beach Subsample Composite
RM600B2	600	Left Beach	0	6	Inches	Beach Subsample Composite
RM600B3	600	Left Beach	0	6	Inches	Beach Subsample Composite
RM600X1	600	Left	0	6	Inches	Transect Sample
RM600X2	600	Middle	0	6	Inches	Transect Sample
RM600X3	600	Right	0	6	Inches	Transect Sample
RM603A1(X1)	603	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM603X2	603	Middle	0	6	Inches	Transect Sample
RM603X3	603	Right	0	6	Inches	Transect Sample
RM604X1	604	Left	0	6	Inches	Transect Sample
RM604X2	604	Middle	0	6	Inches	Transect Sample
RM604X3	604	Right	0	6	Inches	Transect Sample
RM605A1(X1)	605	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM605X5	605	Middle	0	6	Inches	Transect Sample
RM605X9	605	Right	0	6	Inches	Transect Sample
RM606A1(X3)	606	Right	0	6	Inches	Transect/Bioassay/Pore Water
RM606X1	606	Left	0	6	Inches	Transect Sample
RM606X2	606	Middle	0	6	Inches	Transect Sample
RM607X1	607	Left	0	6	Inches	Transect Sample
RM607X2	607	Middle	0	6	Inches	Transect Sample
RM607X3	607	Right	0	6	Inches	Transect Sample
RM610X1	610	Left	0	6	Inches	Transect Sample
RM610X2	610	Middle	0	6	Inches	Transect Sample
RM610X3	610	Right	0	6	Inches	Transect Sample
RM613X1	613	Left	0	6	Inches	Transect Sample
RM613X2	613	Middle	0	6	Inches	Transect Sample
RM613X3	613	Right	0	6	Inches	Transect Sample
RM615B1	615	Left Beach	0	6	Inches	Beach Subsample Composite
RM615B2	615	Left Beach	0	6	Inches	Beach Subsample Composite
RM615B3	615	Left Beach	0	6	Inches	Beach Subsample Composite
RM616A1(X3)	616	Right	0	6	Inches	Transect/Bioassay/Pore Water
RM616T1	616	Right Trib	0	6	Inches	Tributary Sample
RM616T2	616	Right Trib	0	6	Inches	Tributary Sample
RM616X1	616	Left	0	6	Inches	Transect Sample
RM616X2	616	Middle	0	6	Inches	Transect Sample
RM619X1	619	Left	0	6	Inches	Transect Sample
RM619X2	619	Middle	0	6	Inches	Transect Sample
RM619X3	619	Right	0	6	Inches	Transect Sample
RM622A1(X3)	622	Right	0	6	Inches	Transect/Bioassay/Pore Water
RM622X1	622	Left	0	6	Inches	Transect Sample
RM622X2	622	Middle	0	6	Inches	Transect Sample
RM625X1	625	Left	0	6	Inches	Transect Sample
RM625X2	625	Middle	0	6	Inches	Transect Sample
RM625X3	625	Right	0	6	Inches	Transect Sample
RM628A1(X1)	628	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM628X2	628	Middle	0	6	Inches	Transect Sample
RM628X3	628	Right	0	6	Inches	Transect Sample
RM631X1	631	Left	0	6	Inches	Transect Sample
RM631X2	631	Middle	0	6	Inches	Transect Sample
RM631X3	631	Right	0	6	Inches	Transect Sample
RM633B1	633	Right Beach	0	6	Inches	Beach Subsample Composite
RM633B2	633	Right Beach	0	6	Inches	Beach Subsample Composite
RM633B3	633	Right Beach	0	6	Inches	Beach Subsample Composite
RM634A1(X1)	634	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM634X2	634	Middle	0	6	Inches	Transect Sample
RM634X3	634	Right	0	6	Inches	Transect Sample
RM637A1(X1)	637	Left	0	6	Inches	Transect/Bioassay/Pore Water

TABLE C-6
Samples Used in Evaluation of Longitudinal Metals Distribution
Upper Columbia River RI/FS

Sample Location	River Mile	Longitudinal Evaluation Group	Top Depth	Base Depth	Depth Unit	Type
RM637X4	637	Middle	0	6	Inches	Transect Sample
RM637X7	637	Right	0	6	Inches	Transect Sample
RM639T1	639	Left Trib	0	6	Inches	Tributary Sample
RM639T2	639	Left Trib	0	6	Inches	Tributary Sample
RM640A1(X3)	640	Right	0	6	Inches	Transect/Bioassay/Pore Water
RM640X1	640	Left	0	6	Inches	Transect Sample
RM640X2	640	Middle	0	6	Inches	Transect Sample
RM641A1(X1)	641	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM641X2	641	Middle	0	6	Inches	Transect Sample
RM641X3	641	Right	0	6	Inches	Transect Sample
RM642A1(X1)	642	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM642B1c	642	Left Beach	0	6	Inches	Beach Subsample
RM642B1L	642	Left Beach	0	6	Inches	Beach Subsample
RM642B1R	642	Left Beach	0	6	Inches	Beach Subsample
RM642B2c	642	Left Beach	0	6	Inches	Beach Subsample
RM642B2L	642	Left Beach	0	6	Inches	Beach Subsample
RM642B2R	642	Left Beach	0	6	Inches	Beach Subsample
RM642B3c	642	Left Beach	0	6	Inches	Beach Subsample
RM642B3L	642	Left Beach	0	6	Inches	Beach Subsample
RM642B3R	642	Left Beach	0	6	Inches	Beach Subsample
RM642BSF	642	Left Beach	0	6	Inches	Size Fractioned Sample
RM642X4	642	Middle	0	6	Inches	Transect Sample
RM642X7	642	Right	0	6	Inches	Transect Sample
RM643X1	643	Left	0	6	Inches	Transect Sample
RM643X2	643	Middle	0	6	Inches	Transect Sample
RM643X3	643	Right	0	6	Inches	Transect Sample
RM644X1	644	Left	0	6	Inches	Transect Sample
RM644X2	644	Middle	0	6	Inches	Transect Sample
RM646X1	646	Left	0	6	Inches	Transect Sample
RM646X2	646	Middle	0	6	Inches	Transect Sample
RM646X3	646	Right	0	6	Inches	Transect Sample
RM649X1	649	Left	0	6	Inches	Transect Sample
RM649X2	649	Middle	0	6	Inches	Transect Sample
RM649X3	649	Right	0	6	Inches	Transect Sample
RM652X1	652	Left	0	6	Inches	Transect Sample
RM652X2	652	Middle	0	6	Inches	Transect Sample
RM652X3	652	Right	0	6	Inches	Transect Sample
RM655X1	655	Left	0	6	Inches	Transect Sample
RM655X2	655	Middle	0	6	Inches	Transect Sample
RM655X3	655	Right	0	6	Inches	Transect Sample
RM658B1	658	Right Beach	0	6	Inches	Beach Subsample Composite
RM658B2	658	Right Beach	0	6	Inches	Beach Subsample Composite
RM658B3	658	Right Beach	0	6	Inches	Beach Subsample Composite
RM658X1	658	Left	0	6	Inches	Transect Sample
RM658X2	658	Middle	0	6	Inches	Transect Sample
RM661A1(X1)	661	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM661X2	661	Middle	0	6	Inches	Transect Sample
RM661X3	661	Right	0	6	Inches	Transect Sample
RM664X1	664	Left	0	6	Inches	Transect Sample
RM664X2	664	Middle	0	6	Inches	Transect Sample
RM664X3	664	Right	0	6	Inches	Transect Sample
RM667X1	667	Left	0	6	Inches	Transect Sample
RM667X2	667	Middle	0	6	Inches	Transect Sample
RM667X3	667	Right	0	6	Inches	Transect Sample
RM670X1	670	Left	0	6	Inches	Transect Sample
RM670X2	670	Middle	0	6	Inches	Transect Sample
RM670X3	670	Right	0	6	Inches	Transect Sample

TABLE C-6
Samples Used in Evaluation of Longitudinal Metals Distribution
Upper Columbia River RI/FS

Sample Location	River Mile	Longitudinal Evaluation Group	Top Depth	Base Depth	Depth Unit	Type
RM673B1	673	Right Beach	0	6	Inches	Beach Subsample Composite
RM673B2	673	Right Beach	0	6	Inches	Beach Subsample Composite
RM673B3	673	Right Beach	0	6	Inches	Beach Subsample Composite
RM673X1	673	Left	0	6	Inches	Transect Sample
RM673X2	673	Middle	0	6	Inches	Transect Sample
RM673X3	673	Right	0	6	Inches	Transect Sample
RM675B1	675	Left Beach	0	6	Inches	Beach Subsample Composite
RM675B2	675	Left Beach	0	6	Inches	Beach Subsample Composite
RM675B3	675	Left Beach	0	6	Inches	Beach Subsample Composite
RM676A1(X3)	676	Right	0	6	Inches	Transect/Bioassay/Pore Water
RM676X1	676	Left	0	6	Inches	Transect Sample
RM676X2	676	Middle	0	6	Inches	Transect Sample
RM677A1(X3)	677	Right	0	6	Inches	Transect/Bioassay/Pore Water
RM677X1	677	Left	0	6	Inches	Transect Sample
RM677X2	677	Middle	0	6	Inches	Transect Sample
RM678A1(X1)	678	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM678X4	678	Middle	0	6	Inches	Transect Sample
RM678X7	678	Right	0	6	Inches	Transect Sample
RM679X1	679	Left	0	6	Inches	Transect Sample
RM679X2	679	Middle	0	6	Inches	Transect Sample
RM679X3	679	Right	0	6	Inches	Transect Sample
RM680A1(X1)	680	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM680X2	680	Middle	0	6	Inches	Transect Sample
RM681X1	681	Left	0	6	Inches	Transect Sample
RM683X1	683	Left	0	6	Inches	Transect Sample
RM683X2	683	Middle	0	6	Inches	Transect Sample
RM683X3	683	Right	0	6	Inches	Transect Sample
RM686A1(X3)	686	Right	0	6	Inches	Transect/Bioassay/Pore Water
RM686X1	686	Left	0	6	Inches	Transect Sample
RM686X2	686	Middle	0	6	Inches	Transect Sample
RM687A1	687	Left	0	6	Inches	Bioassay/Pore Water Sample
RM689A1(X3)	689	Right	0	6	Inches	Transect/Bioassay/Pore Water
RM689X1	689	Left	0	6	Inches	Transect Sample
RM689X2	689	Middle	0	6	Inches	Transect Sample
RM690B1	690	Right Beach	0	6	Inches	Beach Subsample Composite
RM690B2	690	Right Beach	0	6	Inches	Beach Subsample Composite
RM690B3	690	Right Beach	0	6	Inches	Beach Subsample Composite
RM692A1(X1)	692	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM692X2	692	Middle	0	6	Inches	Transect Sample
RM693X1	693	Left	0	6	Inches	Transect Sample
RM695X1	694	Left	0	6	Inches	Transect Sample
RM695X2	694	Middle	0	6	Inches	Transect Sample
RM695X3	694	Right	0	6	Inches	Transect Sample
RM697B1	697	Right Beach	0	6	Inches	Beach Subsample Composite
RM697B2	697	Right Beach	0	6	Inches	Beach Subsample Composite
RM697B3	697	Right Beach	0	6	Inches	Beach Subsample Composite
RM698A1(X1)	698	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM698X2	698	Middle	0	6	Inches	Transect Sample
RM698X3	698	Right	0	6	Inches	Transect Sample
RM699T1	699	Left Trib	0	6	Inches	Tributary Sample
RM700B1c	700	Left Beach	0	6	Inches	Beach Subsample
RM700B1L	700	Left Beach	0	6	Inches	Beach Subsample
RM700B1R	700	Left Beach	0	6	Inches	Beach Subsample
RM700B2c	700	Left Beach	0	6	Inches	Beach Subsample
RM700B2L	700	Left Beach	0	6	Inches	Beach Subsample
RM700B2R	700	Left Beach	0	6	Inches	Beach Subsample
RM700B3c	700	Left Beach	0	6	Inches	Beach Subsample

TABLE C-6
Samples Used in Evaluation of Longitudinal Metals Distribution
Upper Columbia River RI/FS

Sample Location	River Mile	Longitudinal Evaluation Group	Top Depth	Base Depth	Depth Unit	Type
RM700B3L	700	Left Beach	0	6	Inches	Beach Subsample
RM700B3R	700	Left Beach	0	6	Inches	Beach Subsample
RM700BSF	700	Left Beach	0	6	Inches	Size Fractioned Sample
RM701X1	701	Left	0	6	Inches	Transect Sample
RM701X2	701	Middle	0	6	Inches	Transect Sample
RM701X3	701	Right	0	6	Inches	Transect Sample
RM704A1(X1)	704	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM704X2	704	Middle	0	6	Inches	Transect Sample
RM704X3	704	Right	0	6	Inches	Transect Sample
RM705X1	705	Left	0	6	Inches	Transect Sample
RM705X2	705	Middle	0	6	Inches	Transect Sample
RM705X3	705	Right	0	6	Inches	Transect Sample
RM706A1(X1)	706	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM706A2(X7)	706	Right	0	6	Inches	Transect/Bioassay/Pore Water
RM706T1	706	Right Trib	0	6	Inches	Tributary Sample
RM706T2	706	Right Trib	0	6	Inches	Tributary Sample
RM706X4	706	Middle	0	6	Inches	Transect Sample
RM707X1	707	Left	0	6	Inches	Transect Sample
RM707X2	707	Middle	0	6	Inches	Transect Sample
RM707X3	707	Right	0	6	Inches	Transect Sample
RM708A1(X3)	708	Right	0	6	Inches	Transect/Bioassay/Pore Water
RM708B1	708	Left Beach	0	6	Inches	Beach Subsample Composite
RM708B2	708	Left Beach	0	6	Inches	Beach Subsample Composite
RM708B3	708	Left Beach	0	6	Inches	Beach Subsample Composite
RM708X1	708	Left	0	6	Inches	Transect Sample
RM708X2	708	Middle	0	6	Inches	Transect Sample
RM710X1	710	Left	0	6	Inches	Transect Sample
RM710X2	710	Middle	0	6	Inches	Transect Sample
RM710X3	710	Right	0	6	Inches	Transect Sample
RM713A1(X3)	713	Right	0	6	Inches	Transect/Bioassay/Pore Water
RM713X1	713	Left	0	6	Inches	Transect Sample
RM715X1	715	Left	0	6	Inches	Transect Sample
RM715X3	715	Right	0	6	Inches	Transect Sample
RM718B1	718	Left Beach	0	6	Inches	Beach Subsample Composite
RM718B2	718	Left Beach	0	6	Inches	Beach Subsample Composite
RM718B3	718	Left Beach	0	6	Inches	Beach Subsample Composite
RM718X1	718	Left	0	6	Inches	Transect Sample
RM718X2	718	Middle	0	6	Inches	Transect Sample
RM718X3	718	Right	0	6	Inches	Transect Sample
RM721X1	721	Left	0	6	Inches	Transect Sample
RM721X2	721	Middle	0	6	Inches	Transect Sample
RM721X3	721	Right	0	6	Inches	Transect Sample
RM722X1	722	Left	0	6	Inches	Transect Sample
RM722X2	722	Middle	0	6	Inches	Transect Sample
RM722X3	722	Right	0	6	Inches	Transect Sample
RM723A1(X1)	723	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM723X5	723	Right	0	6	Inches	Transect Sample
RM724A1(X1)	724	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM724A2(X3)	724	Right	0	6	Inches	Transect/Bioassay/Pore Water
RM724X2	724	Middle	0	6	Inches	Transect Sample
RM725X1	725	Left	0	6	Inches	Transect Sample
RM725X3	725	Right	0	6	Inches	Transect Sample
RM726X1	726	Left	0	6	Inches	Transect Sample
RM726X2	726	Middle	0	6	Inches	Transect Sample
RM726X3	726	Right	0	6	Inches	Transect Sample
RM727A1(X1)	727	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM727X3	727	Right	0	6	Inches	Transect Sample

TABLE C-6
Samples Used in Evaluation of Longitudinal Metals Distribution
Upper Columbia River RI/FS

Sample Location	River Mile	Longitudinal Evaluation Group	Top Depth	Base Depth	Depth Unit	Type
RM728X1	728	Left	0	6	Inches	Transect Sample
RM728X3	728	Right	0	6	Inches	Transect Sample
RM729A1(X1)	729	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM729B1	729	Left Beach	0	6	Inches	Beach Subsample Composite
RM729B2	729	Left Beach	0	6	Inches	Beach Subsample Composite
RM729B3	729	Left Beach	0	6	Inches	Beach Subsample Composite
RM729T2	729	Left Trib	0	6	Inches	Tributary Sample
RM729X2	729	Middle	0	6	Inches	Transect Sample
RM729X3	729	Right	0	6	Inches	Transect Sample
RM730A1	730	Left	0	6	Inches	Bioassay/Pore Water Sample
RM730T1	730	Left Trib	0	6	Inches	Tributary Sample
RM730X1	730	Left	0	6	Inches	Transect Sample
RM731X1	731	Left	0	6	Inches	Transect Sample
RM731X3	731	Right	0	6	Inches	Transect Sample
RM732X1	732	Left	0	6	Inches	Transect Sample
RM732X2	732	Right	0	6	Inches	Transect Sample
RM732X3	732	Right	0	6	Inches	Transect Sample
RM733A1(X1)	733	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM733X2	733	Right	0	6	Inches	Transect Sample
RM733X3	733	Right	0	6	Inches	Transect Sample
RM734A1	734	Left	0	6	Inches	Bioassay/Pore Water Sample
RM734X3	734	Right	0	6	Inches	Transect Sample
RM735B1c	735	Left Beach	0	6	Inches	Beach Subsample
RM735B1L	735	Left Beach	0	6	Inches	Beach Subsample
RM735B1R	735	Left Beach	0	6	Inches	Beach Subsample
RM735B2c	735	Left Beach	0	6	Inches	Beach Subsample
RM735B2L	735	Left Beach	0	6	Inches	Beach Subsample
RM735B2R	735	Left Beach	0	6	Inches	Beach Subsample
RM735B3c	735	Left Beach	0	6	Inches	Beach Subsample
RM735B3L	735	Left Beach	0	6	Inches	Beach Subsample
RM735B3R	735	Left Beach	0	6	Inches	Beach Subsample
RM735BSF	735	Left Beach	0	6	Inches	Size Fractioned Sample
RM735X1	735	Left	0	6	Inches	Transect Sample
RM735X3	735	Right	0	6	Inches	Transect Sample
RM736A1(X1)	736	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM736T1	736	Left Trib	0	6	Inches	Tributary Sample
RM736X3	736	Right	0	6	Inches	Transect Sample
RM737A1(X3)	737	Right	0	6	Inches	Transect/Bioassay/Pore Water
RM737X1	737	Left	0	6	Inches	Transect Sample
RM737X2	737	Left	0	6	Inches	Transect Sample
RM739A1(X3)	739	Right	0	6	Inches	Transect/Bioassay/Pore Water
RM739X1	739	Left	0	6	Inches	Transect Sample
RM740A1(X1)	740	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM740X3	710	Right	0	6	Inches	Transect Sample
RM741A1(X3)	741	Right	0	6	Inches	Transect/Bioassay/Pore Water
RM741X1	741	Left	0	6	Inches	Transect Sample
RM742A1(X1)	742	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM742A2(X5)	742	Right	0	6	Inches	Transect/Bioassay/Pore Water
RM742B1	742	Left Beach	0	6	Inches	Beach Subsample Composite
RM742B2	742	Left Beach	0	6	Inches	Beach Subsample Composite
RM742B3	742	Left Beach	0	6	Inches	Beach Subsample Composite
RM743A1(X1)	743	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM743A2(X3)	743	Right	0	6	Inches	Transect/Bioassay/Pore Water
RM744A1(X1)	744	Left	0	6	Inches	Transect/Bioassay/Pore Water
RM744A2(X3)	744	Right	0	6	Inches	Transect/Bioassay/Pore Water