

**Region 10
U.S. Environmental Protection
Agency**

DRAFT FINAL

**Phase I Sediment Sampling
Data Evaluation
Upper Columbia River Site
CERCLA RI/FS
Section 1 pages 12-15**

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SECTION 1

Introduction

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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 RIFS

LEGEND

- Cities
- ▲ EPA Information Repository Locations
- ▭ Tribal Lands
- ☁ Water Features
- - - Counties
- Major Roads
- Railroads
- River Miles (RM)

0 2.5 5
 Approximate scale in miles

