



PORTLAND HARBOR RI/FS
DRAFT FINAL
SEDIMENT CHEMICAL MOBILITY
TESTING
FIELD SAMPLING PLAN

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Recommended for Inclusion in Administrative Record

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LIST OF ACRONYMS

ARI	Analytical Resources, Inc.
CDF	Confined Disposal Facility
CERCLA	Comprehensive Environmental Regulation and Liability Act
CLP	Contract Laboratory Program
CCC	Continuous Concentration Criteria
CRD	Columbia River Datum
DDI	distilled-deionized
DGPS	differential global positioning system
DOC	dissolved organic carbon
EET	Effluent Elutriate Test
EPA	U.S. Environmental Protection Agency
FSP	Field Sampling Plan
HSP	Health and Safety Plan
iAOPC	Initial Area of Potential Concern
iCOC	Initial Chemical of Concern
LWG	Lower Willamette Group
MET	Modified Elutriate Test
NAD83	North American Datum of 1983
NAPL	non-aqueous phase liquid
PCBs	polychlorinated biphenyls
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
RI/FS	Remedial Investigation/Feasibility Study
SBLT	Sequential Batch Leachate Test
Site	Portland Harbor Superfund Site
SOP	Standard Operating Procedure
SVOC	semivolatile organic compound
TCLP	Toxicity Characteristic Leaching Procedure
TDS	total dissolved solids
TOC	total organic carbon
TSS	total suspended solids
USACE	U.S. Army Corps of Engineers
VOC	volatile organic compound
TPH	total petroleum hydrocarbons

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1.0 INTRODUCTION

This Sediment Chemical Mobility Testing Field Sampling Plan (FSP) presents the approach and procedures to implement supplemental sediment chemical mobility tests for the Remedial Investigation and Feasibility Study (RI/FS) of the Portland Harbor Superfund Site (Site; Figure 1-1). Specifically, this information will be used in the FS portion of the project to evaluate chemical mobility under various physical removal and disposal scenarios. This FSP describes the field sampling and laboratory procedures for this testing and is supported by the Sediment Chemical Mobility Quality Assurance Project Plan Addendum (QAPP Addendum 11; Integral 2008, in prep.). The FSP and QAPP Addendum provide the procedures to accomplish the following types of data collection:

- Perform Modified Elutriate Test (MET¹), Sequential Batch Leachate Test (SBLT) (USACE 2003), and Toxicity Characteristic Leaching Procedure (TCLP) (40 CFR §261.24) chemical mobility tests on sediments from select initial areas of potential concern (iAOPCs) with elevated concentrations of initial chemicals of concern (iCOCs)
- Bulk sediment chemistry to evaluate the sediment quality of the sediment collected to perform the MET, SBLT, and TCLP tests
- Surface water chemistry and conventional water quality parameters on Site waters used in the MET tests

The field study sampling procedures, methods, and analyses for sediment and surface water to be used are described in this document and build upon previous experience collecting sediments and surface waters for the RI/FS as described in the Round 2 FSP (Integral et al. 2004a), Round 2A FSP (Integral 2004), Round 2 QAPP (Integral and Windward 2004) and Round 2 QAPP Addendum 10 (Integral 2007a). Field work will follow the project health and safety plans (HSP; Integral 2004b, 2007b) already established for similar types of sampling.

1.1 BACKGROUND

The Portland Harbor RI/FS began in 2001 and has proceeded through three rounds of data collection including physical conditions; fish, shellfish and invertebrate tissue chemistry; surface and subsurface sediment chemistry; sediment toxicity testing; surface water chemistry; transition zone water chemistry and supporting measurements; and stormwater data among others. Currently, Round 3B sampling is being completed this year and will include final data collection to support the FS. This FSP, as well as a side scan sonar survey, will complete Round 3B sampling.

¹ This test is now named the Effluent Elutriate Test (EET) in the most recent U.S. Army of Corps of Engineers (USACE) guidance on these tests (USACE 2003). However, we continue to use the older term MET for convenience given that more people are familiar with that historical name.

The U.S. Environmental Protection Agency (EPA) has requested that sediment chemical mobility testing be conducted in sampling Round 3B to support the FS to evaluate the chemical mobility of contaminated material that may potentially be removed from selected iAOPCs. At this time in the RI/FS process, exact locations of potential dredge areas, dredge volumes, and the range of conditions where dredged materials may be disposed are unknown. The MET, SBLT, and TCLP sediment mobility tests provide the most value at the FS stage of the project given that identification of dredge material and disposal options is preliminary at this time. This information will be used directly in the FS evaluation of the feasibility of capping, dredging, containment, and disposal options. The term “chemical mobility” in this document refers to the movement of chemicals in aqueous dissolved and particulate phases as it may occur during sediment remediation and disposal. It does not refer to the movement or transport of bulk sediment chemicals from one location to another under non-remedial scenarios (e.g., erosion of contaminated sediments).

1.2 SEDIMENT CHEMICAL MOBILITY SAMPLING OBJECTIVES

The objectives of the Sediment Chemical Mobility sampling program are to assess the mobility of chemicals in sediments from iAOPCs where iCOC concentrations are relatively high for the Site. At the FS stage of the project, it is reasonable to assume that areas with higher chemical concentrations will be more likely to have physical removal at least as an evaluated option later in the FS. Sampling efforts will target these areas where known sediment chemical concentrations are elevated, and will focus on collecting sediments that would represent a range of chemical concentrations within each selected area. Although areas of higher concentrations are more likely to be subject to removal, disposal, and capping, these technologies will be applied to relatively wide areas and large volumes of sediments. Thus, the sampling should not focus exclusively on just the area represented by a single location of highest concentrations within each iAOPC. In addition, EPA has selected some additional locations that EPA has indicated are overall “representative” of the Site without necessarily being areas of “high” concentrations.

The sampling effort will include collection of sediments that will be subjected to three types of elutriate or leachate production protocols: MET, SBLT, and TCLP tests. These tests are commonly used to understand potential environmental impacts associated with various remediation and disposal technologies for contaminated sediments (USACE 2003). These tests are most commonly performed in design phases of work, but can and have also been conducted for sediment FS reports and other preliminary evaluations. The MET, SBLT, and TCLP test protocols are intended to provide information about leachate or elutriate production and chemical concentrations during various stages of removal and disposal. The MET test is intended to mimic conditions in effluent from a confined disposal facility (CDF) as it is being filled using Site sediments and surface waters. The SBLT test is intended to provide information on the leaching characteristics of chemicals in sediments that can be applied to several types of disposal situations and is also useful in evaluating chemical migration in in-situ capping scenarios. The TCLP test is a standard regulatory procedure for simulating leachate production in an upland landfill. Federal regulations (40

CFR §261.24) use the results of this test to determine whether a material should be classified as a hazardous waste. To support these tests, analysis of subsurface bulk sediment chemistry and surface water chemistry will also be conducted to understand the chemical levels already present in the materials used in the tests.

Elutriate and leachate data will be used in the FS to:

- Predict effluent chemical concentrations for dredged material from a confined disposal facility (MET elutriate)
- Estimate leaching of sediments in various confined disposal scenarios (SBLT leachate)
- Estimate the range of disposal facility sizes for dredged contaminated sediment such as CDFs (MET elutriate)
- Refine evaluations and costs for the use of disposal facilities (MET and SBLT)
- Refine evaluations and the effectiveness of in-situ caps at the Site (SBLT)
- Evaluate Site sediments for hazardous waste criteria (TCLP).

Bulk sediment data collected will allow an understanding of the relationship between bulk sediment chemical levels and leachate/elutriate chemical levels. In the case of the SBLT, the paired sediment/leachate data allows derivation of site-specific partitioning relationships. Surface water chemistry data collected will be used to understand whether chemicals present in MET elutriates originate from Site surface water, rather than the sediments.

1.3 DOCUMENT ORGANIZATION

The remaining sections of this document describe the sampling plan and field procedures that will be used to collect surface water samples during the Sediment Chemical Mobility sampling. Section 2 describes the sampling location rationale for the MET, SBLT, and TCLP sediment samples. Section 3 describes the project organization and key personnel roles as well as the project schedule. Sections 4 to 6 describes the sampling approaches for MET, SBLT, and TCLP tests, respectively. Section 7 summarizes sample procedures that will be used in the field, including specific sampling methods for collecting surface water. Section 8 summarizes laboratory analysis. Section 9 summarizes field data management. Section 10 summarizes how the data will be reported. References are provided in Section 11.