PORTLAND HARBOR RI/FS

ROUND 3A WINTER 2007 HIGH-FLOW SURFACE WATER DATA REPORT

DRAFT

APPENDIX A

DATA QUALITY SUMMARY

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LIST OF ACRONYMS

Axys	Axys Analytical Services, Ltd.
CAS	Columbia Analytical Services
CLP	Contract Laboratory Program
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
FSP	field sampling plan
ICP	inductively coupled plasma
LCS/LCSD	laboratory control sample/laboratory control sample duplicate
MDL	method detection limit
MRL	method reporting limit
MS/MSD	matrix spike/matrix spike duplicate
OPR	ongoing precision and recovery
PAH	polycyclic aromatic hydrocarbon
PARCC	precision, accuracy, representativeness, completeness, comparability
PCB	polychlorinated biphenyl
PCDD/F	polychlorinated dibenzo-p-dioxin/furans
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RI/FS	remedial investigation and feasibility study
RPD	relative percent difference
SOP	standard operating procedure
SVOC	semivolatile organic compound

1.0 INTRODUCTION

This report summarizes the data quality of surface water samples collected during the Round 3A Winter 2007 high-flow sampling event, in support of the Portland Harbor remedial investigation and feasibility study (RI/FS). Samples were collected and analyzed for organic, inorganic, and conventional parameters according to the sample preparation and analytical procedures specified in Addendum to Round 2A Field Sampling Plan (FSP) Surface Water Sampling (Integral 2006a), Round 3A Surface Water FSP (Integral 2006c) and addenda (Integral 2006b, d), Round 2 Quality Assurance Project Plan (QAPP; Integral and Windward 2004); Round 2 QAPP Addendum 1: Surface Water (Integral 2004); and Round 2 QAPP Supplement 1 to Addendum 1: Round 3A Surface Water Sampling (Integral 2006e).

The laboratory methods of analysis for the Round 3A Winter 2007 high-flow surface water samples are included in Table A-1. All surface water samples collected by peristaltic pump methods were analyzed for conventionals, metals, butyltins, chlorinated herbicides, semivolatile organic compounds (SVOCs), phenols, phthalate esters, and polycyclic aromatic hydrocarbons (PAHs). Select peristaltic pump samples during the Winter 2007 high-flow sampling event were analyzed for organochlorine pesticides in accordance with the Round 3A Surface Water FSP (Integral 2006c). Surface water samples collected by the XAD system were analyzed for polychlorinated biphenyls (PCBs) only at nine stations and for organochlorine pesticides, PAHs, polychlorinated dibenzo-p-dioxin/furans (PCDD/Fs), and PCB congeners at the transect stations and three additional stations. Chemical analyses of surface water samples were completed by two laboratories:

- Axys Analytical Services, Ltd. (Axys; Sidney, BC, Canada) prepared XAD extracts and completed analyses for organochlorine pesticides, PAHs, PCDD/Fs, and PCB congeners in XAD-2 resin and 0.5-µm filter extracts.
- Columbia Analytical Services (CAS; Kelso, WA) completed all other analyses on bulk water samples collected with the peristaltic pump (i.e., conventional analyses, metals, butyltins, chlorinated herbicides, phenols, phthalate esters, PAHs, organochlorine pesticides, and SVOCs).

The sample analyses were conducted according to the Round 2 QAPP Addendum 1 (Integral 2004). Deviations from the QAPP are detailed in Section 3.1 of the main body of this report.

2.0 DATA QUALITY AND USABILITY

Data generated in the field and at the laboratories were verified and validated according to the criteria and procedures described in the Round 2 QAPP (Integral and Windward 2004). Data quality and usability were evaluated based on the results of the data validation and the data quality objectives (DQOs) for the Round 2 data. The performance criteria in the QAPP included project analytical goals for precision, accuracy, representativeness, completeness, and comparability (PARCC) of the Round 2 data.

The precision, accuracy, representativeness, and comparability of the Round 3A Winter 2007 high-flow surface water data were assessed during data validation, as described in the Data Validation section below and in the Round 2 QAPP. Completeness is calculated by comparing the total number of acceptable data (nonrejected data) to the total number of data points generated. Completeness for the Round 3A Winter 2007 high-flow surface water chemistry data is summarized by parameter group and sample type in Table A-2. Completeness was >99% for the Winter 2007 high-flow sampling event, and ranged from 99.7 to 100% for the various parameter groups and sample types.

2.1 DATA VALIDATION

Data validation was conducted as required by the Round 2 QAPP (Integral and Windward 2004) and is summarized in Section 3.3 of the main body of this report. The inorganic, organic, PCB congener, and PCDD/F data were validated in accordance with guidance specified in *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic and Organic Data Review*, by U.S Environmental Protection Agency (EPA) Region 10 standard operating procedures (SOPs) for validation of PCB congener data and PCDD/F data (EPA 1994a, 1995, 1996, 1999a), and by *Guidance on Environmental Data Verification and Validation* (EPA 2002). Modifications were made to the Functional Guidelines to accommodate quality assurance/quality control (QA/QC) requirements of the non-Contract Laboratory Program (CLP) methods that were used for this project.

Data validation was completed by EcoChem (Seattle, WA). The following deliverables were reviewed during Level 3 and full data validation:

- The case narrative discussing analytical problems (if any) and procedures
- Chain-of-custody documentation and laboratory sample receipt logs
- Instrument calibration results
- Method blank results

- Results for laboratory quality control samples required by the referenced method, including laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses, matrix spike/matrix spike duplicate (MS/MSD) analyses, surrogate recoveries, and other method-specific QC samples (e.g., serial dilutions for inductively coupled plasma [ICP] analyses)
- Results for field QC samples (i.e., equipment blanks and field duplicates)
- Analytical results for the surface water samples.

In addition to review and assessment of the documentation identified above, full validation included verification of reported concentrations of the results for field samples and QC samples, verification of intermediate transcriptions, and review of instrument data, such as mass spectra, to verify analyte identification procedures.

Data qualifiers were assigned during data validation if applicable control limits were not met, in accordance with the EPA data validation guidelines (EPA 1994a, 1995, 1996, 1999a) and the QC requirements included in the referenced methods. The QC limits for surrogate spikes, MS/MSD samples, laboratory control samples, and ongoing precision and recovery (OPR) for the Round 3A laboratories during each sampling event are summarized in Tables A-3 and A-4. The data validation qualifiers and definitions are summarized in Table A-5. Data quality reports generated by EcoChem are included in Appendix B of this report.

2.2 DATA QUALITY

The EcoChem data validation reports (Appendix B of this report) provide detailed information on the data quality issues and data validation qualifiers for each parameter group for each laboratory data package. A summary of the qualified data by parameter group for the Winter 2007 high-flow sampling event, with the reasons for qualification, is included in Table A-6.

The discussion below includes a comparison of the reported detection limits to the detection limits specified in the QAPP Addendum 1 (Integral 2004), followed by a summary of the qualified data for each parameter group and any limitations to the usability of the data.

2.2.1 Reported Detection Limits

Surface water data for Round 3A of the Portland Harbor RI/FS were reported to the method detection limit (MDL) in most cases (Table A-7). Sample-specific detection limits were reported for PCB congeners and PCDD/Fs, as specified in their respective method protocols (EPA methods 1668A and 1613B; EPA 1999b, 1994b). These detection limits are based on the signal-to-noise ratio of the analytical system for each analyte and sample.

MDLs and method reporting limits (MRLs) were elevated when results were restated as undetected during data validation because of possible sample contamination, as indicated by the presence of target analytes in an associated laboratory blank or equipment blank.

2.2.2 Field Quality Control Samples

Field quality control samples were used to assess sample variability (field replicates), evaluate potential sources of contamination (equipment rinsate blanks), or confirm proper storage conditions (temperature blanks). The Round 2 QAPP Addendum 1 (Integral 2004) required collection of the following field QC samples:

- Field replicate samples – 5% of the sample total
- Equipment rinsate blanks – near the beginning and end of each sampling event
- Decontamination blanks for the peristaltic pump – analyzed to ensure that the decontamination procedure used for the peristaltic pump equipment was adequate
- Temperature blanks – one per cooler.

The field QC samples were collected at the frequency specified in the QAPP, with the exception of a field replicate for the XAD-2 column and 0.5-µm filter samples during the Round 3A Winter 2007 high-flow sampling event; this is a deviation from the FSP (Integral 2006c) and is detailed in Section 3.1 of the main body of this report.

In several cases, target analytes were detected at low levels in the surface water equipment rinsate blanks. Selected data from the surface water samples were restated as undetected on the basis of detection of target analytes in the equipment rinsate blanks from both sampling events (see Table A-6).

Field replicates were collected to assess the variability of the results. Field replicate samples were generated by collecting an additional surface water sample at a designated station, processing this sample separately in the same manner as the original sample, and submitting the replicate as a separate sample for analysis at the laboratory. The Winter 2007 high-flow field replicate sample results are summarized in Table A-8.

The comparability of the replicate results was assessed by calculating the relative percent difference (RPD) of the results. Because there is no standard control limit for comparison of field replicate results, a target RPD of 50 was established for detected results greater than 5 times the reporting limit. Greater variability is expected for results within 5 to 10 times the reporting limit because the background signal variations (i.e., “noise”) are greater relative to the lower analyte levels. Overall, the precision of the surface water results is acceptable. Surface water data were not qualified based solely on the field replicate results.

2.2.3 Summary of Qualified Data

Selected data not meeting the data quality criteria were qualified as undetected, estimated, or rejected during validation, in accordance with the QAPP. A summary of the qualified data by parameter group, including the reasons for qualification, is included in Table A-6. A complete list of qualified results with reason codes is provided in Appendix B. Data qualified as undetected are usable for all intended purposes. Data qualified as estimated are usable for all intended purposes, with the knowledge that these data may be less precise or less accurate than unqualified data. Rejected data are not usable for any purpose and have been flagged as "not reportable" in the database.

The precision and accuracy of the Round 3A surface water data was acceptable, with the exception of the data (<1%) that were rejected during data validation. The completeness of the Round 3A Winter 2007 high-flow surface water data was >99%, respectively (Table A-2). The Round 3A Winter 2007 high-flow surface water data, excluding the rejected data, are usable for all project purposes. Overall, the data quality was acceptable and will meet program objectives and goals for the RI/FS.

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