

# Appendix A

## PDI Chemistry Data

### PDI Evaluation Report

**Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling**  
**Portland Harbor Superfund Site**  
**Portland, Oregon**

AECOM Project Number: 60566335  
Geosyntec Project Number: PNG0767A

June 17, 2019

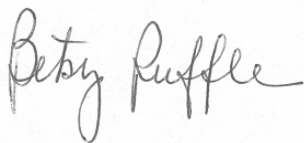
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## CERTIFICATION

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June 17, 2019

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Betsy Ruffle  
PDI Project Coordinator  
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Date

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## ACRONYMS AND ABBREVIATIONS

AECOM	AECOM Technical Services
ALS	ALS Environmental
ARI	Analytical Resources Inc.
CR	Change Request
DVA	Data Validation Assistant
DVR	data validation report
D/U Reach	Downtown/Upriver Reach
EDD	electronic data deliverables
EPA	Environmental Protection Agency
GIS	Geographic information system
MS	Microsoft
Pre-RD AOC Group	Pre-Remedial Design Agreement and Order on Consent Group
PCB	polychlorinated biphenyl
PDF	portable document format
PDI	Pre-Remedial Design Investigation
QAPP	Quality Assurance Project Plan
RM	river mile
ROD	Record of Decision
SDG	Sample Delivery Group
Site	Portland Harbor Superfund Site
UJ	not detected qualifier

# 1. INTRODUCTION

The Pre-Remedial Design Agreement and Order on Consent Group (Pre-RD AOC Group) for the Portland Harbor Superfund Site (Site) in Portland, Oregon, has developed and implemented a Pre-Remedial Design Investigation (PDI) for the Site. The Site Record of Decision (ROD) (United States Environmental Protection Agency [EPA] 2017) described a post-ROD sampling effort for the Site to delineate and better refine the sediment management area footprints, refine the Conceptual Site Model, determine baseline conditions, and support remedial design. The PDI studies were conducted by the Pre-RD AOC Group pursuant to a PDI Work Plan (Geosyntec Consultants, Inc. [Geosyntec] 2017) as a foundational step to update current conditions since collection of data during the remedial investigation/feasibility study.

The Site is located on a 10-mile stretch of the lower Willamette River from river mile (RM) 1.9 upstream to RM 11.8. The Site covers approximately 2,200 acres<sup>1</sup> of an active industrial, commercial, and urbanized harbor and is located immediately downstream of the urban downtown. There are two reaches located immediately upstream of the Site. The Downtown Reach, which includes the urbanized area of downtown Portland, is defined by EPA as extending from RM 11.8 to RM 16.6. EPA defines the Upriver Reach as extending from RM 16.6 to RM 28.4. Collectively, RM 11.8 to RM 28.4 is referred to as the Downtown/Upriver Reach (D/U Reach).

## 1.1 Chemistry Analysis Overview

Chemical analyses and physical testing for surface sediments, sediment cores, sediment traps, surface water, fish tissue, and porewater were performed as described in the programmatic Quality Assurance Project Plan (QAPP) (AECOM Technical Services [AECOM] and Geosyntec 2018a). Laboratory services were provided by TestAmerica Laboratories, Inc., located in Tacoma, Washington; Knoxville, Tennessee; Sacramento, California; and Burlington, Vermont; ALS Environmental (ALS) located in Kelso, Washington, and Burlington, Ontario, Canada; Analytical Resources Inc. (ARI) located in Tukwila, Washington; and SGS AXYS located in Sidney, British Columbia, Canada. The laboratories, assigned analyses, and sample counts for each media sampled are summarized in Table 1.

The laboratories provided summary reports (Level 2), data packages (Level 4), and EQUIS electronic deliverables to AECOM, as described in the QAPP (AECOM and Geosyntec 2018a) and the Data Quality Management Plan (AECOM and Geosyntec 2018b) for each sample group submitted to each laboratory. All chemical and physical data collected in 2018 and 2019 for the PDI are presented in this appendix.

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<sup>1</sup> The ROD states the Site is approximately 2,190 acres and extends from RM 1.9 to RM 11.8. However, when mapped in GIS, the 2,190 acres only covers the area from RM 1.9 to 11.6 (at the end of the authorized navigation channel). The acreage from RM 1.9 up to RM 11.8 is more accurately 2,203 acres.

The PDI data were validated by AECOM and Geosyntec chemists using the references and procedures described in Section 6 of the QAPP (AECOM and Geosyntec 2018a). A data validation report (DVR) was prepared for each laboratory report documenting the review, issues identified, and assignment of data qualifiers, if any. An EPA Stage 2A/3 review was conducted on all data, and an EPA Stage 4 review was conducted on 10% of the data. Summary data tables, laboratory group identification lists, DVRs, and summary laboratory reports (Level 2) for each sample media and associated quality assurance samples (rinsate blanks and reference materials) are provided on DVD.

## 1.2 Summary of Data Quality

Data quality and usability were evaluated based on the results of the data validation and the data quality objectives established for the PDI (AECOM and Geosyntec 2018a).

The performance criteria in the QAPP include goals for precision, accuracy, representativeness, completeness, and comparability. Completeness was calculated by dividing the total number of acceptable data (non-rejected data) by the total number of data points generated. For each media, completeness was greater than 99%, which exceeds the QAPP completeness objective of 95%. Only 32 sample results from 4 samples collected during the PDI were rejected (R qualified), as noted below.

- Surface Sediment – The result for dieldrin in sample PDI-SG-B154-BL1 (RM 5.6E) was rejected based on a matrix spike recovery.
- Fish Tissue – The results for several polychlorinated biphenyl (PCB) congeners in fish tissue sample PDI-TF-SMB075 were rejected. Recoveries for labeled standards for congeners PCB-1, PCB-3, PCB-4, PCB-15, and PCB-19 were below levels required for accurate quantitation of associated PCB congeners. Therefore, the sample results for congeners PCB-1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12/13 (coeluters), -14, -15, and -19 were rejected.
- Surface Water – The results for several PCB congeners in rinsate blanks associated with the first and second sampling events were rejected because they were not quantifiable due to an interference that originated during sample extraction. PCB congeners -1, -2, and -3 were rejected in rinsate blank PDI-RB-XF-180820 from the first sampling event. PCB congeners -1, -2, -3, -5, -6, -7, -8, -9 -10, -11, -12/13 (coeluters), -14, and -15 were rejected in rinsate blank PDI-RB-XF-181129 from the second sampling event. These rejections did not adversely affect evaluation of the associated surface water sample data.

All other sample results were deemed usable. Some results were qualified based on findings during data validation. Results were qualified as estimated (“J” qualifier) or tentatively identified (“JN” qualifier) based on one of the following: (i) laboratory quality control/method criteria, including holding time, instrument calibration, method blank contamination, surrogate recovery, labeled compound recovery, internal standards; (ii) laboratory control samples/duplicates, matrix

spike/matrix spike duplicates, serial dilutions, field duplicates, rinsate blanks; or (iii) quantitation and identification requirements, as described in the DVRs.

In some cases, sample results were qualified due to method blank contamination as not detected (“U” or “UJ” qualifier) at the detection or reporting limits provided by the laboratory. The reporting limits and/or method detection limits (MDLs) and/or estimated detection limits (EDLs) generally met the ROD-specified cleanup levels, except as noted in the QAPP (AECOM and Geosyntec 2018a). Exceptions were dieldrin in most of the sediment samples, bis-(2-ethylhexyl)phthalate (14 D/U Reach sediment samples), chrysene (three D/U Reach sediment samples), dibenzo(a,h)anthracene (one D/U Reach sediment sample), and bis-(2-ethylhexyl)phthalate in all of the fish tissue samples. These exceptions are discussed in the associated DVRs. The elevated detection limits were generally due to dilutions or the adjusted sample volume necessary to address matrix interferences and/or elevated concentrations of other compounds in a sample.

Data qualified as undetected are usable. Data qualified as estimated or tentatively identified are usable with the knowledge that these data may be less precise or less accurate than unqualified data. Rejected data are not usable. Rejected data in the database are identified with an “R” qualifier, and the numerical result, if provided by the laboratory, has been removed.

The 2018/2019 PDI sample data, excluding the rejected results described above, are usable. Overall, the data quality was acceptable and meets program objectives and goals for the PDI.

### **1.3 Laboratory Deviations from the QAPP**

Laboratory deviations from the QAPP were limited and were approved by EPA via Change Requests (CRs) 6, 7, 9, and 16 or email notification. Tables 2a through 2e of the QAPP (AECOM and Geosyntec 2018a) included the analytical requirements for each sample media and the associated laboratory assignments. Changes to the content of these tables were made to correct and/or clarify information for the laboratories and data validators to minimize data quality issues and confusion with laboratory reporting (CR 6). Changes were also made to laboratory assignments to redistribute the analytical work to alleviate schedule conflicts that became apparent during the program (CRs 7 and 9). A change to the analytical method for pentachlorophenol in surface water was necessary to achieve a detection limit below the ROD cleanup level. This change also resulted in a laboratory reassignment (CR 16). The changes did not adversely affect data quality.

### **1.4 Data Management**

All laboratory data submittals and data validation processes for the project were managed through a combination of e-mail transmissions, Microsoft (MS) SharePoint, and an enterprise implementation of EQUIS V6.6.0 tabular relational database. Lab interactions were tracked individually in a custom SharePoint List designed to record milestones in the lab data management process from submittal of samples to the laboratory, through receipt of Sample

Delivery Group (SDG) package transmittals, completion of the data validation process, and DVR generation.

Laboratory electronic data deliverables (EDDs) were transmitted to project chemists via email in the AECOM v2.5.3 format, a four-file deliverable consisting of sample, test results, and lab batch information zipped into an SDG package, as specified in the Data Quality Management Plan (AECOM and Geosyntec 2018b). EDDs were loaded to EQuIS after first seeding appropriate project, location, and sample detailed information. Lab data were subsequently exported to an Excel format using the EQuIS Data Validation Assistant (DVA) utility. These workbooks were provided to project chemists for assignment of validation flags in a single, editable column of the workbook based on a review of the lab Level 2 and Level 4 reports. Once the validation review was completed, the DVA workbooks were synchronized with EQuIS to update and save changes within the project database.

In some cases, EDDs were resubmitted by the labs due to re-sampling or other lab reporting adjustments. These EDDs were reloaded to the project database and the DVA workbooks and validation process was repeated. Also, as a result of normal project database and lab data quality assurance/quality control procedures, some datasets uploaded to the project database may have required minor adjustments that did not warrant a reissue or another iteration of the EDD from the laboratory. These types of changes were typically applied directly in the project database through a semi-manual process.

Data were exported as needed in the standard ARII, text file format export from EQuIS for sharing with project team members and EPA and for data analysis purposes. The data were provided to EPA in several formats, including an Excel flat file format, a text-based lab EDD source file format, and a portable document format (PDF) associated with the lab Level 2 and Level 4 reports. This combination of electronic transmittals provided EPA with validated data in an easy to review format (MS Excel) and laboratory results in a source file format, as requested. Validated results, laboratory reports, and data validation reports were posted for EPA review beginning in November 2018. Sample coordinate data for all sampling locations were also provided to EPA in an Excel format, including appropriate geodetic specifications for use in geographic information systems (GIS). Sediment sampling location elevation data and GIS files were also provided to EPA upon request.



## 2. REFERENCES

AECOM and Geosyntec. 2018a. Quality Assurance Project Plan. Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling. Portland Harbor Superfund Site. 19 October. Approved 19 December.

AECOM and Geosyntec. 2018b. Data Quality Management Plan. Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling. Portland Harbor Superfund Site. 20 February Approved 22 February.

EPA. 2017. Record of Decision Portland Harbor Superfund Site, Portland Oregon. United States Environmental Protection Agency Region 10, Seattle, Washington. January.

Geosyntec. 2017. Pre-Remedial Design Investigation Work Plan. Portland Harbor Superfund Site. Prepared for the Portland Harbor Pre-Remedial Design Group. 19 December.

## **TABLES**

**Table 1. Analytical Laboratory Assignment and Project Sample Count**

Study	Laboratory	Analytical Methods	Parent Samples	Field Duplicates	Rinsate Blanks	Trip Blanks	MS/MSD			
Surface Sediment	TA Knoxville	PCB Congeners	714	39	38	0	30			
	TA Sacramento	Dioxins/Furans					0			
	TA Seattle	TPH Diesel					24			
							Metals	47 (Sediment Samples) 9 (Rinsate Blanks)		
		Mercury					46 (Sediment Samples) 8 (Rinsate Blanks)			
							11			
		PAHs					12			
		BEHP					6			
		Tributyltin					0			
		Grain size					57 (Sediment Samples) 6 (Rinsate Blanks)			
		Total organic carbon					0			
		Total solids					0			
	TA Burlington	Atterberg Limits					15	0	0	0
	ALS Kelso	Chlorinated Pesticides					60			
							Total solids	0		
PAHs			46							
BEHP			36							
Tributyltin	36									
Subsurface Sediment (90 core locations)	TA Sacramento	Dioxins/Furans	423	22	25	0	0			
	TA Seattle	Grain size					0			
		PCB Aroclors					29			
		PAHs					31			
		Total organic carbon					29 (sediment samples) 1 (Rinsate Blank)			
		Total solids					0			
	TA Burlington	Atterberg Limits					19	0	0	0
	ALS Burlington	Chlorinated Pesticides					2			
							Total solids	0		
	Surface Water	TA Seattle					Ethylbenzene	63	4	2
MCP							3			
Total Metals							4			
Total Suspended Solids							0			
Total Dissolved Solids			21	3	3					
Dissolved Metals + Hardness as CaCO3 (Method SW6010C)							6 (SW Samples) 1 (Rinsate Blank)			
Dissolved Metals (Method SW6020B)							1			
Total Organic Carbon			11	2	2		2			
SGS AXYS		PCB Congeners	21	0	5		0			
			Dioxin/Furans							
			PAHs							
			Chlorinated Pesticides + HCB							
ALS Kelso		BEHP	21	3	3		4			
			Tributyltin							
			Pentachlorophenol	14	2	2		3		
ARI		Pentachlorophenol	21	3	3		5			
			Total Organic Carbon							
			Dissolved Organic Carbon	10	1	1		3		

**Table 1. Analytical Laboratory Assignment and Project Sample Count**

Study	Laboratory	Analytical Methods	Parent Samples	Field Duplicates	Rinsate Blanks	Trip Blanks	MS/MSD
Sediment Trap	TA Knoxville	PCB Congeners	12	0	3	0	0
	TA Sacramento	Dioxins/Furans					
	TA Seattle	TPH Diesel					
		Metals					
		Mercury					
		Grain size					
		Total organic carbon					
	ALS Kelso	Total solids					3
		Chlorinated Pesticides					
		PAHs					
BEHP							
Tributyltin							
Fish Tissue	ALS Kelso	Arsenic	135	0	0	0	7
		Mercury					
		BEHP					
		Pentachlorophenol					
	SGS AXYS	Chlorinated Pesticides + HCB					
		Dioxins/Furans					
		Lipids					0
		PBDE					
PCB Congeners							
Porewater	TA Seattle	Bromide	9	1	0	0	
		Metals (Arsenic, Manganese)					0

**Acronyms:**

ALS = ALS Environmental  
ARI = Analytical Resources Incorporated  
BEHP = bis(2-ethylhexyl) phthalate  
CaCO<sub>2</sub> = calcium carbonate  
HCB = hexachlorobenzene  
MCPP = methylchlorophenoxypropionic acid  
MS = Matrix Spike  
MSD = Matrix Spike Duplicate  
PAH = polycyclic aromatic hydrocarbon  
PBDE = polybrominated diphenyl ether  
PCB = polychlorinated biphenyl  
SW = surface water  
TA = TestAmerica  
TPH = total petroleum hydrocarbon

## **EXHIBIT A**

### **Data Summary Tables, Laboratory Reports and Data Validation Reports PDI Data (Provided on DVD)**

- A.1 Surface Sediment
  - A.1a Chemistry Data Tables
  - A.1b Stratified Random – DVRs/Lab Reports/COCs (on DVD)
  - A.1c Sediment Management Areas – DVRs/Lab Reports/COCs (on DVD)
  - A.1d Downtown/Upriver – DVRs/Lab Reports/COCs (on DVD)
- A.2 Sediment Core
  - A.2a Chemistry Data Tables
  - A.2b Laboratory Group ID Table (on DVD)
  - A.2c ALS Burlington – DVRs/Lab Reports/COCs (on DVD)
  - A.2d TestAmerica – DVRs/Lab Reports/COCs (on DVD)
- A.3 Sediment Trap
  - A.3a Chemistry Data Tables
  - A.3b Laboratory Group ID Table (on DVD)
  - A.3c ALS Kelso – DVRs/Lab Reports/COCs (on DVD)
  - A.3d TestAmerica – DVRs/Lab Reports/COCs (on DVD)
- A.4 Surface Water
  - A.4a Chemistry Data Tables
  - A.4b Laboratory Group ID Table (on DVD)
  - A.4c ALS Kelso – DVRs/Lab Reports/COCs (on DVD)
  - A.4d Analytical Resources Inc.– DVRs/Lab Reports/COCs (on DVD)
  - A.4e SGS AXYS – DVRs/Lab Reports/COCs (on DVD)
  - A.4f TestAmerica – DVRs/Lab Reports/COCs (on DVD)

- A.5 Fish Tissue
  - A.5a Chemistry Data Tables
  - A.5b Laboratory Group ID Table (on DVD)
  - A.5c ALS Kelso – DVRs/Lab Reports/COCs (on DVD)
  - A.5d SGS AXYS – DVRs/Lab Reports/COCs (on DVD)
- A.6 Background Porewater
  - A.6a Chemistry Data Tables
  - A.6b Laboratory Group ID Table (on DVD)
  - A.6c TestAmerica – DVRs/Lab Reports/COCs (on DVD)

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