September 2018
Shelton Harbor Sediment Cleanup Unit
Oakland Bay and Shelton Harbor Sediments Cleanup Site (Cleanup Site ID: 13007)

ANCHOR QEA

Shelton Harbor Interim Action Basis of Design Report

APPENDIX A: Pre-Remedial Design Investigation Report*

Prepared for Simpson Timber Company

*This appendix was extracted from the main document to allow for smaller electronic file size

Appendix A
Pre-Design Investigation Data Report

September 2018
Shelton Harbor Sediment Cleanup Unit
Oakland Bay and Shelton Harbor Sediments Cleanup Site (Cleanup Site ID: 13007)

Appendix A: Pre-Remedial Design Investigation Data Report

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1 Introduction

In accordance with Agreed Order DE 14091 and under oversight by the Washington State Department of Ecology (Ecology), in early 2018 Simpson Timber Company performed a Pre-Remedial Design Investigation (PDI) within the Shelton Harbor Sediment Cleanup Unit (SCU; Figure A-1) in accordance with the Ecology-approved Pre-Remedial Design Work Plan (PDI Work Plan; Anchor QEA 2018a). This Data Report summarizes field sample collection activities and analytical results, consistent with the methods summarized in the Sampling and Quality Assurance Project Plan (SQAPP; Appendix A of Anchor QEA 2017) and SQAPP Addendum (Appendix A of Anchor QEA 2018a). Also included in this Data Report are surface sediment dioxin/furan retesting results of archived sediments initially reported in Appendix A of the Shelton Harbor Interim Action Plan (2017 Retest Results; Anchor QEA 2018b).

1.1 Document Organization

This 2018 Data Report is organized as follows:

- Section 2 – Analytical Data Quality
- Section 3 – Chemical Testing Sample Acquisition and Results
- Section 4 – Base Map Development
- Section 5 – References

2 Analytical Data Quality

This section describes the quality and management aspects of the data acquired.

2.1 Analytical Data Quality

The 2017 Retest Result and PDI data quality objectives and quality assurance procedures are provided in the SQAPP (Anchor QEA 2017). Additional quality assurance procedures not addressed in the scope of the SQAPP are presented in the SQAPP Addendum (Anchor QEA 2018a). Chemical analyses were performed by AXYS Analytical Services Ltd. in Sidney, British Columbia, Canada, and Analytical Resources, Inc., in Tukwila, Washington. Stage 2B and/or Stage 4 (dioxin/furan) data validation was performed on all data (EPA 2009). During the validation process, analytical data were evaluated for method quality control and laboratory quality control compliance, and their validity and applicability for program purposes was determined. Based on the findings of the validation process, data validation qualifiers were assigned.

The data package was validated by Laboratory Data Consultants and Anchor QEA, LLC. Laboratory data reports are on file at Ecology and available upon request, and data validation reports are provided in Attachment A-1. All qualifiers applied to the data during final validation have been incorporated into the database for this project. Data qualifiers assigned during data validation included the following:

- "J" indicates that the result is an estimated concentration.
- "U" indicates a method detection limit below which the analyte was not detected.
- "UJ" indicates an estimated method detection limit below which the analyte was not detected.

The validation process resulted in some J-qualified data (estimated values) based on a specified protocol or technical advisory, as discussed in the attached data validation reports (Attachment A-1). Overall, all reporting limits were acceptable and met the SQAPP objectives (Appendix A of Anchor QEA 2017). All data are considered useable for site characterization as reported or as qualified. For the purpose of the remedial design, the 2017 Retest Results superseded averaged collocated results previously reported in the *Shelton Harbor Interim Action Plan* (IAP; Anchor QEA 2018b).

Geotechnical data were collected concurrent with the chemical testing mobilization and is reported in Appendix B of the Basis of Design Report.

2.2 Data Management

The validated project data, including qualifiers, were entered into the project database, enabling this information to be retained or retrieved, as needed. Validated data have also been submitted to Ecology's Environmental Information Management database (EIM).

3 Chemical Testing Sample Acquisition and Results

As identified in the PDI Work Plan (Anchor QEA 2018a), additional data were collected to delineate the footprint of each Sediment Management Area (SMA). Delineation sampling was conducted from April 25 to May 1, 2018, collecting 55 grab samples (Figure A-1). Surface sediment grab samples were collected in each of the three SMAs described in the PDI Work Plan. Samples were analyzed immediately upon receipt by the laboratory. No archive sample analyses were analyzed following review of the preliminary data because all needed results were obtained to inform the design. However, the samples will remain on archive for use in the remedial investigation/feasibility study, where necessary. Table A-1 presents the collected coordinates of the tested and archived locations. A sediment matrix and observation summary are presented in Table A-2 and field sample collection forms are provided in as Attachment A-2.

3.1 SMA-1

Surface (0- to 10-centimeter) sediment samples were collected from SMA-1 at 20 gridded target locations and submitted for dioxin/furan testing. Validated sediment dioxin/furan concentrations ranged from 1.2 to 202 nanograms per kilogram toxicity equivalence (ng/kg TEQ), both above and below the remedial action level (RAL) of 42 ng/kg TEQ. To assess the variability of the processed sample homogenate, two duplicate tests were conducted at locations SMA1-SG08 and SMA1-SG11 and resulted in relative percent differences (RPD) of 8% and 5%, respectively. Small-scale bedded sediment variability was assessed by collecting three replicate grabs from location SMA1-SG07 (replicate IDs of SG1007 and SD2007). The replicate testing resulted in an average of 1.54 ng/kg TEQ with a standard error of ± 0.20 ng/kg TEQ, corresponding to an RPD of approximately 13%. SMA-1 dioxin/furan results are presented in Table A-3 and Figure A-2.

3.2 SMA-2

Surface sediment samples were collected from SMA-2 at eight gridded target locations and were analyzed for tributyltin (TBT), copper, and total organic carbon. Dioxin/furan testing was conducted at five of the offshore locations in SMA-2. Samples were archived for testing in the future at seven locations for a full suite and three locations for dioxin/furans, as necessary (Table A-1).

Validated copper concentrations ranged from 34 to 119 milligrams per kilograms (mg/kg), well below the RAL of 390 mg/kg. Similarly, total organic carbon normalized (OC) TBT concentrations ranged from 0.01 to 4.6 mg/kg-OC, well below the RAL of 7.5 mg/kg-OC. Dioxin/furan concentrations ranged from 29 to 86 ng/kg TEQ, again both above and below the RAL of 42 ng/kg TEQ. A single homogenization duplicate was tested at location SG-06 that resulted in RPDs of 2% for copper, 84% for TBT, and 11% for dioxin/furans. SMA-2 dioxin/furan results are presented in Table A-4 and Figure A-2.

3.3 SMA-3

In accordance with the SQAPP, Surface sediment samples were collected from SMA-3 at six gridded target locations and submitted for dioxin/furan testing. Fourteen additional samples were collected and archived (Table A-1). Validated dioxin/furan concentrations ranged from 60.8 to 137 ng/kg TEQ, all above the RAL of 42 ng/kg TEQ. Sample homogenate duplicate tests were conducted at location SMA1-SG01 and resulted in a RPD of 6%. Small-scale bedded sediment variability was assessed by collecting three replicate grabs from location SMA3-SG04 (replicate IDs of SG4007 and SD4007). The replicate testing resulted in an average of 117 ng/kg TEQ with a standard error of ±14 ng/kg TEQ, corresponding to an RPD of approximately 12%. SMA-3 dioxin/furan results are presented in Table A-5 and Figure A-3.

In addition to the sediment testing in the SQAPP, opportunistic outfall grab (OG) sediment sample SMA3-OG1 was collected at the terminus of a historical 36-inch concrete outfall pipe, as shown in Figure A-3. The sediment at the terminus largely composed gravel and cobble, which required sieving to remove material greater than 2 millimeters to produce the final extraction mass. The SMA3-OG1 dioxin/furan TEQ result is 9.4 ng/kg TEQ, as reported in Table A-5.

Free hydrogen sulfide porewater concentrations were measured by ex situ diffusive gradient thin film (DGT) passive sampling methodology at 15 locations in SMA-3, in accordance with the SQAPP Addendum. Of the 15 stations tested, 6 resulted in detections that ranged from 0.005 to 0.032 milligrams per liter (mg/L), which are all below ecological risk-based benchmark of 0.072 mg/L (Podger [date unknown]). Similar to the dioxin/furan sampling, two predefined porewater sulfide locations (PDI-SMA3-DGT02 and PDI-SMA3-DGT05) were sampled in triplicate to characterize small-scale variability. In addition, field duplicates were collected in which two DGT membranes were deployed in the same bag to assess the sampler variability. All replicate and duplicate results were not detected above the method detection limit of 0.004 mg/L. SMA-3 DGT data are presented in Table A-6.

3.4 2017 Retest Results

To evaluate the accuracy of the dioxin/furan testing results previously reported in the IAP (Anchor QEA 2018b), split sampling was originally conducted at three locations within the Sediment Cleanup Unit dataset. In consultation with Ecology and the analytical laboratory, all surface sediment locations that were collected and analyzed in 2017 were retested. The 2017 Retest Results ranged from 7.2 to 413 ng/kg TEQ and are presented in Table A-7. For the purpose of remedial design, the 2017 Retest Results superseded averaged collocated results previously reported in the IAP. The 2017 Retest Results are included in Figures A-1 through A-4. A summary table showing both the initial and 2017 Dioxin/Furan TEQ are presented in Table A-8.

4 Base Map Development

On April 2 and 3, 2018, a marine surveying team from eTrac Inc. collected bathymetric data from each of the three SMAs. The survey results were integrated into the existing bathymetry to inform the remedial design.

5 References

Anchor QEA (Anchor QEA, LLC), 2017. *Shelton Harbor Sediment Cleanup Unit Remedial Investigation/Feasibility Study Work Plan*. Prepared for Simpson Timber Company and the Washington State Department of Ecology. June 2017.

Anchor QEA, 2018a. *Shelton Harbor Pre-Remedial Design Work Plan*. Oakland Bay and Shelton Harbor Sediments Cleanup Site. April 2018.

Anchor QEA, 2018b. *Shelton Harbor Interim Action Plan*. Shelton Harbor Sediment Cleanup Unit, Oakland Bay and Shelton Harbor Sediments Cleanup Site (Cleanup Site ID: 13007). Prepared for Simpson Timber Company and the Washington State Department of Ecology. January 2018.

EPA (U.S. Environmental Protection Agency), 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. U.S. Environmental Protection Agency Office of Solid Waste and Emergency Response. EPA 540-R-08-005. January 2009.

Podger, D., [date unknown]. Sulfide Effects on Aquatic Organisms: Literature Review. [Date Unknown].

Tables

Table A-1
As-Collected PDI Stations and Testing Parameters

Station	Date	X	Y	Estimated Elevation	Replicate	Dioxin/Furan	TBT/TOC/Cu	Porewater Hydrogen Sulfide	Archive
SMA1									
PDI-SMA1-SG01	4/25/2018	996619.831	695940.295	-1.9	--	X	--	--	--
PDI-SMA1-SG02	4/25/2018	996755.765	696003.341	2.2	--	X	--	--	--
PDI-SMA1-SG03	4/25/2018	996890.457	696066.43	2.3	--	X	--	--	--
PDI-SMA1-SG04	4/25/2018	996950.435	695936.733	3.1	--	X	--	--	--
PDI-SMA1-SG05	4/25/2018	997018.1	695801.31	3.9	--	X	--	--	--
PDI-SMA1-SG06	4/25/2018	996882.773	695731.551	1.9	--	X	--	--	--
PDI-SMA1-SG07	4/25/2018	996747.999	695666.032	-0.4	X	X	--	--	--
PDI-SMA1-SG1007	4/25/2018	996742.677	695668.032	-0.5					
PDI-SMA1-SG2007	4/25/2018	996746.957	695672.149	-0.3					
PDI-SMA1-SG08	4/25/2018	996682.919	695804.413	-1.2	--	X	--	--	--
PDI-SMA1-SG09	4/25/2018	996687.215	696136.97	3.9	--	X	--	--	--
PDI-SMA1-SG10	4/25/2018	997025.861	696138.619	0.2	--	X	--	--	--
PDI-SMA1-SG11	4/25/2018	997089.167	695996.649	0.6	--	X	--	--	--
PDI-SMA1-SG12	4/25/2018	997155.176	695861.281	2.2	--	X	--	--	--
PDI-SMA1-SG13	4/25/2018	997082.534	695668.426	1.3	--	X	--	--	--
PDI-SMA1-SG14	4/25/2018	996953.062	695600.299	0.3	--	X	--	--	--
PDI-SMA1-SG15	4/25/2018	996812.058	695534.377	1.4	--	X	--	--	--
PDI-SMA1-SG16	4/25/2018	996610.112	695606.699	1.2	--	X	--	--	--
PDI-SMA1-SG17	4/25/2018	996551.123	695741.231	-1.4	--	X	--	--	--
PDI-SMA1-SG18	4/25/2018	996483.007	695875.454	-4.0	--	X	--	--	--
PDI-SMA1-SG19	4/25/2018	996553.491	696078.109	-0.6	--	X	--	--	--
PDI-SMA1-SG20	4/25/2018	996419.366	696007.097	-1.0	--	X	--	--	--
SMA2									
PDI-SMA2-SG01	4/27/2018	997351.751	696303.863	8.2	--	--	X	--	X
PDI-SMA2-SG02	4/30/2018	997437.526	696294.191	3.2	--	X	X	--	--
PDI-SMA2-SG03	4/27/2018	997503.611	696266.504	3.0	--	X	X	--	--
PDI-SMA2-SG04[a]	4/27/2018	997342.032	696271.649	7.1	--	--	X	--	X
PDI-SMA2-SG04-C1	4/24/2018	997330.903	696280.175	8.4	na	na	na	na	na
PDI-SMA2-SG04-C2	4/24/2018	997348.776	696275.198	6.7					
PDI-SMA2-SG04-C3	4/24/2018	997360.871	696275.418	5.8					
PDI-SMA2-SG04-C4	4/24/2018	997328.973	696268.056	7.9					
PDI-SMA2-SG04-C5	4/24/2018	997343.391	696263.272	6.4					
PDI-SMA2-SG04-C6	4/24/2018	997355.884	696261.824	5.3					
PDI-SMA2-SG05	4/24/2018	997335.904	696251.542	5.5	--	--	X	--	X
PDI-SMA2-SG06	4/30/2018	997405.082	696219.846	2.6	--	X	X	--	--
PDI-SMA2-SG07	4/30/2018	997487.7	696194.012	1.2	--	X	X	--	--
PDI-SMA2-SG08	4/27/2018	997444.248	696333.293	4.6	--	--	--	--	X
PDI-SMA2-SG09	4/27/2018	997516.486	696324.236	1.5	--	--	--	--	X
PDI-SMA2-SG10	4/30/2018	997591.469	696236.832	2.2	--	--	--	--	X
PDI-SMA2-SG11	4/30/2018	997575.394	696214.247	1.1	--	--	--	--	X
PDI-SMA2-SG12	4/30/2018	997557.979	696138.182	0.0	--	--	--	--	X
PDI-SMA2-SG13	4/30/2018	997475.68	696156.088	1.0	--	X	X	--	--
PDI-SMA2-SG14	4/30/2018	997402.883	696173.075	1.8	--	--	--	--	X
PDI-SMA2-SG15	4/27/2018	997322.776	696194.002	4.3	--	--	--	--	X
SMA3									
PDI-SMA3-OG01	5/2/2018	995842.972	693659.884	8.7	--	X	--	--	--
PDI-SMA3-SG01	4/26/2018	995703.931	694164.595	-9.1	--	X	--	--	--
PDI-SMA3-SG02	4/26/2018	995910.095	694106.722	-5.3	--	X	--	--	--
PDI-SMA3-SG03	4/26/2018	996110.857	694048.42	-4.2	--	X	--	X	--
PDI-SMA3-SG04	4/26/2018	996185.782	693919.446	-1.9	X	X	--	--	--
PDI-SMA3-SG1004	4/26/2018	996184.854	693916.436	-1.9					
PDI-SMA3-SG2004	4/26/2018	996188.995	693916.3	-1.9					
PDI-SMA3-SG05	4/26/2018	996258.992	693788.704	-5.9	--	X	--	X	--
PDI-SMA3-SG06	4/26/2018	996332.697	693660.38	10.8	--	X	--	--	--
PDI-SMA3-SG07	4/26/2018	995776.783	694035.687	0.2	--	--	--	X	X
PDI-SMA3-SG08	4/26/2018	995978.848	693979.166	1.2	--	--	--	X	X
PDI-SMA3-SG09	4/26/2018	996054.755	693842.253	4.7	--	--	--	--	X
PDI-SMA3-SG10	4/26/2018	996126.702	693710.944	-0.3	--	--	--	X	X
PDI-SMA3-SG11	4/26/2018	996463.525	693731.499	-6.9	--	--	--	--	X
PDI-SMA3-SG12	4/26/2018	996392.264	693858.527	-6.1	--	--	--	X	X
PDI-SMA3-SG13	4/26/2018	996317.023	693990.551	-4.5	--	--	--	--	X
PDI-SMA3-SG14	4/26/2018	996243.814	694121.293	-6.8	--	--	--	X	X
PDI-SMA3-SG15	4/26/2018	996169.917	694256.315	-7.6	--	--	--	--	X
PDI-SMA3-SG16	4/26/2018	996039.465	694183.969	-8.4	--	--	--	--	X
PDI-SMA3-SG17	4/26/2018	995968.603	694310.377	-8.7	--	--	--	--	X
PDI-SMA3-SG18	4/26/2018	995836.08	694238.1	-10.3	--	--	--	X	X
PDI-SMA3-SG19	4/26/2018	995894.983	694441.133	-7.8	--	--	--	X	X
PDI-SMA3-SG20	4/26/2018	995632.856	694297.093	-6.0	--	--	--	--	X
PDI-SMA3-DGT01	4/30/2018	995749.471	693938.622	6.2	--	--	--	X	--
PDI-SMA3-DGT02	4/26/2018	995755.822	693967.201	2.9	--	--	--	X	--
PDI-SMA3-DGT03	4/26/2018	995922.007	693934.388	12.6	--	--	--	X	--
PDI-SMA3-DGT04	4/26/2018	995949.529	693956.616	5.6	--	--	--	X	--
PDI-SMA3-DGT05	4/26/2018	996082.104	693691.99	8.1	--	--	--	X	--
PDI-SMA3-DGT06	4/26/2018	996103.581	693703.613	4.6	--	--	--	X	--

Notes:
Horizontal datum is Washington State Plane South North American Datum 1983 US feet
Elevation is mean lower low water (feet)
a. centroid of six point composite (C1 to C6)
Cu: copper
na: not applicable
PDI: pre-remedial design investigation
SMA: sediment management area
TOC: total organic carbon
TBT: tributyl tin

Table A-2
Summary of Sediment Matrix and Observations

Station ID	Sediment Matrix	H_2S Odor Present?	Wood Present?	Comments
SMA1				
SMA1-SG01	sandy silt	No	Yes	Trace organic material – stick and twigs
SMA1-SG02	sandy silt	No	Yes	Trace wood
SMA1-SG03	sandy silt	No	Yes	Abundant organic material – wood and leaves
SMA1-SG04	sandy silt	Yes	Yes	Substantial wood
SMA1-SG05	sandy silt	Yes	Yes	Abundant wood
SMA1-SG06	sandy silt	No	Yes	Trace wood
SMA1-SG07	sandy silt	No	Yes	Trace wood
SMA1-SG08	sandy silt	No	Yes	Trace wood
SMA1-SG09	silty sand	No	No	--
SMA1-SG10	sandy silt	No	No	--
SMA1-SG11	sandy silt	No	Yes	Trace organic material – leaves and twigs
SMA1-SG12	sandy silt	No	Yes	Moderate wood
SMA1-SG13	silt	Yes	Yes	Abundant wood
SMA1-SG14	sandy silt	Yes	Yes	Abundant wood
SMA1-SG15	sandy silt	No	Yes	Trace wood
SMA1-SG16	sandy silt	No	Yes	Moderate woody
SMA1-SG17	sandy silt	No	Yes	Trace woody
SMA1-SG18	sandy silt	No	Yes	Trace organic material – leaves and twigs
SMA1-SG19	sandy silt	No	No	Trace organic material – leaves
SMA1-SG20	sandy silt	No	Yes	Trace organic material – sticks, leaves, and twigs
SMA2				
SMA2-SG01	gravely sand	No	No	--
SMA2-SG02	silt	No	No	--
SMA2-SG03	silt	No	No	--
SMA2-SG04	sand	No	No	--
SMA2-SG05	sandy silt	No	No	--
SMA2-SG06	silt	No	No	--
SMA2-SG07	silt	No	No	--
SMA2-SG08	silt	No	No	--
SMA2-SG09	silt	No	No	--
SMA2-SG10	silt	No	No	--
SMA2-SG11	silt	No	No	--
SMA2-SG12	sandy silt	No	No	--
SMA2-SG13	silt	No	No	--
SMA2-SG14	silt	No	No	--
SMA2-SG15	silt	No	No	Trace organic material

Table A-2
Summary of Sediment Matrix and Observations

Station ID	Sediment Matrix	H_2S Odor Present?	Wood Present?	Comments
SMA3				
SMA3-0G01	silty sand	No	No	--
SMA3-SG01	sandy silt	No	No	--
SMA3-SG02	silt	No	No	--
SMA3-SG03	silt	No	No	--
SMA3-SG04	sandy silt	No	No	--
SMA3-SG05	silt	No	No	--
SMA3-SG06	sandy silt	No	Yes	Trace wood
SMA3-SG07	sandy silt	No	No	--
SMA3-SG08	sandy silt	No	No	--
SMA3-SG09	silty sand	No	No	--
SMA3-SG10	silt	No	No	--
SMA3-SG11	sandy silt	No	Yes	Trace wood
SMA3-SG12	sandy silt	No	No	--
SMA3-SG13	sandy silt	No	No	--
SMA3-SG14	sandy silt	No	No	--
SMA3-SG15	silt	No	Yes	Trace organic material – roots and sticks
SMA3-SG16	sandy silt	No	No	--
SMA3-SG17	sandy silt	No	No	--
SMA3-SG18	sandy silt	No	Yes	Trace wood
SMA3-SG19	sandy silt	No	No	--
SMA3-SG20	sandy silt	No	No	--

Note:

H_2S: hydrogen sulfide

Table A-3
SMA-1 PDI Sediment Results

	Task	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018
	Location ID	PDI-SMA1-SG01-180425	PDI-SMA1-SG02-180425	PDI-SMA1-SG03-180425	PDI-SMA1-SG04-180425	PDI-SMA1-SG05-180425	PDI-SMA1-SG06-180425	PDI-SMA1-SG07-180425	PDI-SMA1-SG1007-1804	PDI-SMA1-SG2007-1804
	Sample ID	PDI-SMA1-SG01-180425	PDI-SMA1-SG02-180425	PDI-SMA1-SG03-180425	PDI-SMA1-SG04-180425	PDI-SMA1-SG05-180425	PDI-SMA1-SG06-180425	PDI-SMA1-SG07-180425	PDI-SMA1-SG1007-180425	PDI-SMA1-SG2007-180425
	Sample Date	4/25/2018	4/25/2018	4/25/2018	4/25/2018	4/25/2018	4/25/2018	4/25/2018	4/25/2018	4/25/2018
	Depth	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm
	Sample Type	N	N	N	N	N	N	N	N	N
	Matrix	SE	SE	SE	SE	SE	SE	SE	SE	SE
	X	996619.831	996755.765	996890.457	996950.435	997018.1	996882.773	996747.999	996742.677	996746.957
	Y	695940.295	696003.341	696066.43	695936.733	695801.31	695731.551	695666.032	695668.032	695672.149
	RAL									
Dioxin Furans (ng/kg)										
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)		**1.57 J**	**1.92 J**	**3.38 J**	**6.24**	**5.11**	**2.46 J**	0.273 U	**0.317 J**	**0.309 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)		**8.84 J**	**8.43 J**	**20.1 J**	**30.4**	**25.4**	**10.6 J**	**0.269 J**	**0.441 J**	0.333 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		**16.2 J**	**15.8 J**	**33.9**	**53.9**	**48.2**	**16.9 J**	**0.517 J**	**0.612 J**	**0.6 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		**54.3**	**62.2**	**122**	**233**	**132**	**59.1**	**1.33 J**	**1.63 J**	**1.31 J**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)		**28.9**	**27.2**	**54.3**	**100**	**80.1**	**32.7**	0.792 U	1.22 U	0.945 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)		**1250**	**1150**	**2220**	**5720**	**1760**	**891**	**26.2**	**37.7**	**29.9**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)		**13400**	**10100**	**18400**	**48200**	**12100**	**7090**	**217**	**321**	**274**
Total Tetrachlorodibenzo-p-dioxin (TCDD)		**604 J**	**514 J**	**1370 J**	**2750 J**	**2210 J**	**754 J**	**12.5 J**	**9.9 J**	**13.8 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)		**591 J**	**612 J**	**1370 J**	**2180 J**	**2550 J**	**771 J**	**10.9 J**	**14.5 J**	**11.9 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)		**1050**	**1020**	**2140**	**2740**	**3420**	**1350 J**	**25.8 J**	**32.6 J**	**25.8 J**
Total Heptachlorodibenzo-p-dioxin (HpCDD)		**3200**	**2930**	**5480**	**12500**	**4310**	**2140**	**62.8 J**	**89.6**	**74.1**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)		**4.33 J**	**4.3 J**	**8.26**	**11.3**	**13.3**	**6**	0.252 U	0.255 U	0.256 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)		**4.03 J**	**4.66 J**	**8.63 J**	**12.8 J**	**11.8 J**	**4.76 J**	0.252 U	0.255 U	0.346 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)		**6.65 J**	**6.25 J**	**14.3 J**	**31.9**	**15.9 J**	**7.54 J**	0.252 U	**0.288 J**	0.346 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)		**28.8**	**30**	**51.7**	**155**	**42.4**	**21.2 J**	**0.874 J**	**0.782 J**	**0.741 J**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)		**10.8 J**	**11.8 J**	**20.4 J**	**46.8**	**21.7 J**	**10.4 J**	**0.349 J**	**0.356 J**	**0.419 J**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)		**1.08 J**	**0.96 J**	**1.71 J**	**2.72 J**	**2.03 J**	**1.44 J**	0.252 U	0.347 U	0.256 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)		**8.22 J**	**9.38 J**	**17.2 J**	**33.3**	**16.7 J**	**7.62 J**	**0.268 J**	0.347 U	0.256 U
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)		**367**	**352**	**660**	**1800**	**433**	**238**	**8.18 J**	**15.2 J**	**9.82 J**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)		**22.7 J**	**22.5 J**	**31**	**72.2**	**24 J**	**13.8 J**	**0.49 J**	**0.677 J**	**0.804 J**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)		**1360**	**1070**	**1670**	**5590**	**1060**	**724**	**22.3 J**	**40.2 J**	**29.5 J**
Total Tetrachlorodibenzofuran (TCDF)		**101 J**	**108 J**	**223 J**	**313 J**	**309 J**	**140 J**	**2.28 J**	**1.83 J**	**3.61 J**
Total Pentachlorodibenzofuran (PeCDF)		**143 J**	**157 J**	**324 J**	**658 J**	**317 J**	**159 J**	**2.31 J**	**4.36 J**	**3.24 J**
Total Hexachlorodibenzofuran (HxCDF)		**497 J**	**562 J**	**1000 J**	**2310 J**	**670 J**	**377 J**	**9.73 J**	**15.5 J**	**12.8 J**
Total Heptachlorodibenzofuran (HpCDF)		**1490 J**	**1360 J**	**2390**	**6760**	**1480**	**934**	**26.3 J**	**52 J**	**34.7**
Dioxin Furans (ng/kg)										
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)		**48.6139 J**	**47.1248 J**	**94.1069 J**	**202.255 J**	**97.395 J**	**44.773 J**	**1.02329 J**	**1.82653 J**	**1.11229 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	*	**48.6139 J**	**47.1248 J**	**94.1069 J**	**202.255 J**	**97.395 J**	**44.773 J**	**1.26617 J**	**1.938805 J**	**1.42153 J**

Notes:

Bold: detected result

*Surface-weighted average concentration RAL (42 ng/kg TEQ)

cm: centimeter

FD: field duplicate

J: estimated value

N: normal sample

ng/kg: nanograms per kilogram

PDI: pre-remedial design investigation

RAL: Remedial Action Level

SE: sediment matrix

SMA: sediment management area

TEQ: toxicity equivalence

U: compound analyzed, but not detected above detection limit

Table A-3
SMA-1 PDI Sediment Results

	Task	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018
	Location ID	PDI-SMA1-SG08-180425	PDI-SMA1-SG08-180425	PDI-SMA1-SG09-180425	PDI-SMA1-SG10-180425	PDI-SMA1-SG11-180425	PDI-SMA1-SG11-180425	PDI-SMA1-SG12-180425	PDI-SMA1-SG13-180425	PDI-SMA1-SG14-180425
	Sample ID	PDI-SMA1-SG08-180425	PDI-SMA1-SG108-180425	PDI-SMA1-SG09-180425	PDI-SMA1-SG10-180425	PDI-SMA1-SG111-180425	PDI-SMA1-SG11-180425	PDI-SMA1-SG12-180425	PDI-SMA1-SG13-180425	PDI-SMA1-SG14-180425
	Sample Date	4/25/2018	4/25/2018	4/25/2018	4/25/2018	4/25/2018	4/25/2018	4/25/2018	4/25/2018	4/25/2018
	Depth	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm
	Sample Type	N	FD	N	N	FD	N	N	N	N
	Matrix	SE	SE	SE	SE	SE	SE	SE	SE	SE
	X	996682.919	996682.919	996687.215	997025.861	997089.167	997089.167	997155.177	997082.534	996953.062
	Y	695804.413	695804.413	696136.97	696138.619	695996.649	695996.649	695861.281	695668.426	695600.299
	RAL									
Dioxin Furans (ng/kg)										
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)		**1.84 J**	**1.85 J**	**0.539 J**	**2.27 J**	**1.85 J**	**2.46 J**	**1.58 J**	**2.87 J**	**0.581 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)		**8.72 J**	**7.5 J**	**1.17 J**	**11.4 J**	**11.5 J**	**12.4 J**	**6.77 J**	**8.33 J**	**2.79 J**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		**16.5 J**	**14.4 J**	**2.04 J**	**22.9 J**	**24.1**	**22.4 J**	**13.7 J**	**7.18 J**	**8.1 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		**61.8**	**51.9**	**5.86 J**	**66.8**	**69.1**	**71.2**	**45.5**	**21.7 J**	**181**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)		**37.3 J**	**26.8**	**3.12 J**	**36.5**	**43.9**	**39.4**	**22.3 J**	**12.3 J**	**17.8 J**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)		**1130**	**1100**	**112**	**1170**	**1160**	**1270**	**930**	**283**	**5730**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)		**11000**	**10600**	**896**	**9460**	**9140**	**9660**	**7200**	**1970**	**42600**
Total Tetrachlorodibenzo-p-dioxin (TCDD)		**678 J**	**521 J**	**44.6 J**	**921 J**	**1090 J**	**1490 J**	**542 J**	**313 J**	**135 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)		**703 J**	**535 J**	**50 J**	**915 J**	**1020 J**	**1260**	**528 J**	**298 J**	**126 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)		**1340**	**976**	**88.8**	**1410**	**1580**	**1560**	**971**	**411**	**675**
Total Heptachlorodibenzo-p-dioxin (HpCDD)		**2750**	**2810**	**233**	**2900**	**2860**	**3160**	**3210**	**650**	**9580**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)		**4.1 J**	**4.66 J**	**0.711 J**	**5.07**	**6.93**	**6.14**	**3.91 J**	**9.31**	**5.22**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)		**3.77 J**	**3.7 J**	**0.773 J**	**4.85 J**	**6.93 J**	**6.39 J**	**4.4 J**	**6.52 J**	**12.2 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)		**5.47 J**	**5.46 J**	**0.808 J**	**6.8 J**	**8.73 J**	**9.29 J**	**5.78 J**	**9.09 J**	**35.5**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)		**25.3**	**25**	**3.01 J**	**29.8**	**30.5**	**31.1**	**21.1 J**	**11.3 J**	**210**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)		**10.4 J**	**9.71 J**	**1.35 J**	**12.8 J**	**13.1 J**	**14.1 J**	**8.7 J**	**7.9 J**	**40.1**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)		**0.844 J**	**1.14 J**	0.246 U	**1.02 J**	**1.18 J**	**1.37 J**	**0.898 J**	**0.965 J**	**4.2 J**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)		**7.46 J**	**8.06 J**	**1.14 J**	**9.98 J**	**10.2 J**	**10.8 J**	**6.68 J**	**7.04 J**	**17.6 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)		**334**	**338**	**32.8**	**328**	**353**	**370**	**229**	**109**	**2360**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)		**18.5 J**	**25**	**2.31 J**	**19.7 J**	**20.5 J**	**20.5 J**	**13.4 J**	**5.33 J**	**159**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)		**1160**	**1030**	**106**	**942**	**944**	**973**	**552**	**247**	**17100**
Total Tetrachlorodibenzofuran (TCDF)		**95.4 J**	**94.7 J**	**15.1 J**	**123 J**	**162 J**	**158 J**	**95.4 J**	**272 J**	**46.8 J**
Total Pentachlorodibenzofuran (PeCDF)		**129 J**	**135 J**	**16.8 J**	**165 J**	**193 J**	**207 J**	**137 J**	**263 J**	**399 J**
Total Hexachlorodibenzofuran (HxCDF)		**437 J**	**454 J**	**50.2 J**	**478 J**	**504 J**	**519 J**	**349 J**	**215 J**	**3150**
Total Heptachlorodibenzofuran (HpCDF)		**1310**	**1300**	**128 J**	**1230 J**	**1260**	**1330**	**836**	**342 J**	**16300**
Dioxin Furans (ng/kg)										
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)		**47.1575 J**	**43.385 J**	**5.46939 J**	**52.6401 J**	**54.4381 J**	**57.2846 J**	**36.5444 J**	**26.5305 J**	**163.189 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	*	**47.1575 J**	**43.385 J**	**5.48169 J**	**52.6401 J**	**54.4381 J**	**57.2846 J**	**36.5444 J**	**26.5305 J**	**163.189 J**

Notes:

Bold: detected result

*Surface-weighted average concentration RAL (42 ng/kg TEQ)

cm: centimeter

FD: field duplicate

J: estimated value

N: normal sample

ng/kg: nanograms per kilogram

PDI: pre-remedial design investigation

RAL: Remedial Action Level

SE: sediment matrix

SMA: sediment management area

TEQ: toxicity equivalence

U: compound analyzed, but not detected above detection limit

Table A-3
SMA-1 PDI Sediment Results

	Task	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018
	Location ID	PDI-SMA1-SG15-180425	PDI-SMA1-SG16-180425	PDI-SMA1-SG17-180425	PDI-SMA1-SG18-180425	PDI-SMA1-SG19-180425	PDI-SMA1-SG20-180425
	Sample ID	PDI-SMA1-SG15-180425	PDI-SMA1-SG16-180425	PDI-SMA1-SG17-180425	PDI-SMA1-SG18-180425	PDI-SMA1-SG19-180425	PDI-SMA1-SG20-180425
	Sample Date	4/25/2018	4/25/2018	4/25/2018	4/25/2018	4/25/2018	4/25/2018
	Depth	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm
	Sample Type	N	N	N	N	N	N
	Matrix	SE	SE	SE	SE	SE	SE
	X	996812.058	996610.112	996551.123	996483.007	996553.49	996419.366
	Y	695534.376	695606.699	695741.231	695875.454	696078.109	696007.097
	RAL						
Dioxin Furans (ng/kg)							
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)		**0.284 J**	0.625 U	**1.61 J**	**1.55 J**	**2.42 J**	**2.13 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)		**0.392 J**	**1.32 J**	**6.52 J**	**7.56 J**	**9.66 J**	**9.6 J**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		**0.605 J**	**3.34 J**	**13.5 J**	**14.7 J**	**18.3 J**	**16.6 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		**1.92 J**	**11.3 J**	**64**	**53.3**	**62.2**	**55.3**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)		**1.06 J**	**5.55 J**	**23.2 J**	**28.6**	**34.8**	**28.7**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)		**35.7**	**260**	**1530**	**1150**	**1240**	**1190**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)		**317**	**3130**	**14000**	**13800**	**12900**	**14300**
Total Tetrachlorodibenzo-p-dioxin (TCDD)		**11.7 J**	**63.8 J**	**285 J**	**467 J**	**599 J**	**504 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)		**14.3 J**	**82 J**	**316 J**	**522 J**	**690 J**	**537 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)		**35.9 J**	**186 J**	**709 J**	**1050**	**1240**	**1040**
Total Heptachlorodibenzo-p-dioxin (HpCDD)		**87.5**	**639**	**3410**	**3190**	**3160**	**3240**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)		**0.258 J**	**0.9 J**	**3.95 J**	**4.33 J**	**5.11**	**5.08**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)		**0.259 J**	**1.32 J**	**4.54 J**	**4.82 J**	**4.84 J**	**5.23 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)		0.246 U	**1.7 J**	**6.64 J**	**6.9 J**	**7.51 J**	**7.47 J**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)		**1.08 J**	**7.41 J**	**45.7**	**29.3**	**29**	**29**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)		**0.531 J**	**2.8 J**	**12.4 J**	**11.1 J**	**13 J**	**12.4 J**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)		0.246 U	0.699 U	**1.39 J**	**0.926 J**	**1.47 J**	**1.43 J**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)		**0.459 J**	**2.29 J**	**8.08 J**	**8.54 J**	**9.38 J**	**9.15 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)		**13.8 J**	**90.3**	**549**	**339**	**402**	**349**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)		**0.743 J**	**5.56 J**	**38.3**	**21 J**	**21.7 J**	**20 J**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)		**30 J**	**363**	**2430**	**1030**	**1170**	**957**
Total Tetrachlorodibenzofuran (TCDF)		**3.15 J**	**15.8 J**	**85.6 J**	**98.1 J**	**115 J**	**105 J**
Total Pentachlorodibenzofuran (PeCDF)		**3.78 J**	**26 J**	**140 J**	**149 J**	**166 J**	**167 J**
Total Hexachlorodibenzofuran (HxCDF)		**15.5 J**	**114 J**	**644 J**	**500 J**	**534 J**	**514 J**
Total Heptachlorodibenzofuran (HpCDF)		**41**	**361 J**	**2830**	**1350**	**1530**	**1300 J**
Dioxin Furans (ng/kg)							
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)		**1.8816 J**	**9.8351 J**	**53.5822 J**	**45.9532 J**	**52.6622 J**	**50.061 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	*	**1.9308 J**	**10.18255 J**	**53.5822 J**	**45.9532 J**	**52.6622 J**	**50.061 J**

Notes:

Bold: detected result

*Surface-weighted average concentration RAL (42 ng/kg TEQ)

cm: centimeter

FD: field duplicate

J: estimated value

N: normal sample

ng/kg: nanograms per kilogram

PDI: pre-remedial design investigation

RAL: Remedial Action Level

SE: sediment matrix

SMA: sediment management area

TEQ: toxicity equivalence

U: compound analyzed, but not detected above detection limit

Table A-4
SMA-2 PDI Sediment Results

	Task	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018
	Location ID	PDI-SMA2-SG01-180427	PDI-SMA2-SG02-180430	PDI-SMA2-SG03-180427	PDI-SMA2-SG04-180427	PDI-SMA2-SG05-180501	PDI-SMA2-SG06-180427	PDI-SMA2-SG06-180427	PDI-SMA2-SG07-180430	PDI-SMA2-SG13-180430
	Sample ID	PDI-SMA2-SG01-180427	PDI-SMA2-SG02-180430	PDI-SMA2-SG03-180427	PDI-SMA2-SG04-180427	PDI-SMA2-SG05-180501	PDI-SMA2-SG06-180427	PDI-SMA2-SG106-180427	PDI-SMA2-SG07-180430	PDI-SMA2-SG13-180430
	Sample Date	4/27/2018	4/30/2018	4/27/2018	4/27/2018	5/1/2018	4/27/2018	4/27/2018	4/30/2018	4/30/2018
	Depth	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm
	Sample Type	N	N	N	N	N	N	FD	N	N
	Matrix	SE	SE	SE	SE	SE	SE	SE	SE	SE
	X	997351.751	997437.526	997503.611	997342.032	997335.904	997405.082	997405.082	997487.7	997475.68
	Y	696303.863	696294.191	696266.504	696271.649	696251.542	696219.846	696219.846	696194.012	696156.088
	RAL									
Conventional Parameters (pct)										
Total organic carbon		**0.63**	**3.25**	**0.81**	**0.74**	**2.41**	**2**	**2.66**	**1.92**	**1.96**
Total solids		**89.13**	**43.02**	**68**	**64.05**	**55.29**	**45.39**	**45.53**	**45.1**	**36.18**
Metals (mg/kg)										
Copper	390	**106**	**49.6**	**34.1**	**119**	**59.7**	**47.1**	**46.3**	**47.7**	**48.8**
Organometallic Compounds (µg/kg)										
Butyltin (ion)		4.46 U	**3.26 J**	6 U	**10.8**	**7.74**	**8.75**	9.19 U	**2.26 J**	**2.73 J**
Dibutyltin (ion)		**2.98 J**	**6.39**	8.5 U	**68.9**	**60.7**	**24.2**	**8.42 J**	**5.99**	**5.03 J**
Tetrabutyltin		5.46 U	4.93 U	7.35 U	7.52 U	4.81 U	10.6 U	11.3 U	4.82 U	4.76 U
Tributyltin (ion)		**1.74 J**	**6.88**	**0.716 J**	**33.8**	**79**	**9.2**	**4.99 J**	**10**	**7.65**
Organometallic Compounds (mg/kg-OC)										
Tributyltin (ion)	7.5	**0.27619 J**	**0.21169**	**0.088395 J**	**4.5676**	**3.278**	**0.46**	**0.18759 J**	**0.5208**	**0.39031**
Dioxin Furans (ng/kg)										
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)		--	**1.91 J**	**1.03 J**	--	--	**5.6**	**4 J**	**4.99 J**	**4.39 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)		--	**10.4 J**	**6.18 J**	--	--	**21.7 J**	**20.5 J**	**21 J**	**19.2 J**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		--	**20.4 J**	**12 J**	--	--	**48.8**	**42.5**	**41.6**	**37.2**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		--	**62.3**	**35.9**	--	--	**121**	**107**	**104**	**95.8**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)		--	**33.3**	**19.5 J**	--	--	**71.7**	**65.9**	**60.6**	**48.8**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)		--	**1190**	**656**	--	--	**1450**	**1320**	**1310**	**1330**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)		--	**9430**	**5050**	--	--	**9590**	**8880**	**8760**	**8810**
Total Tetrachlorodibenzo-p-dioxin (TCDD)		--	**867 J**	**554 J**	--	--	**3160 J**	**3480 J**	**3470 J**	**2800**
Total Pentachlorodibenzo-p-dioxin (PeCDD)		--	**815 J**	**509**	--	--	**2620**	**2980 J**	**2790**	**2390**
Total Hexachlorodibenzo-p-dioxin (HxCDD)		--	**1340**	**830**	--	--	**3430**	**3340**	**3070**	**2700**
Total Heptachlorodibenzo-p-dioxin (HpCDD)		--	**3160**	**1730**	--	--	**3600**	**3300**	**3260**	**3800**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)		--	**5.37**	**3.55 J**	--	--	**11.4**	**9.58**	**10.5**	**9.63**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)		--	**5.53 J**	**3.31 J**	--	--	**9.68 J**	**8.66 J**	**9.66 J**	**8.12 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)		--	**7.98 J**	**4.49 J**	--	--	**15.6 J**	**13 J**	**14.3 J**	**14.1 J**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)		--	**27.5**	**17.6 J**	--	--	**36.6**	**35.7**	**36.7**	**38.5**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)		--	**12.5 J**	**7.72 J**	--	--	**18.2 J**	**16.1 J**	**17.4 J**	**16.1 J**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)		--	**1.3 J**	**0.754 J**	--	--	**2.04 J**	**1.28 J**	**1.74 J**	**1.8 J**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)		--	**9.77 J**	**6.04 J**	--	--	**13.5 J**	**12.2 J**	**13.4 J**	**12.8 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)		--	**338**	**208**	--	--	**360**	**326**	**337**	**348**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)		--	**19.3 J**	**15.5 J**	--	--	**24.5**	**20.4 J**	**20.2 J**	**21.7 J**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)		--	**845**	**513**	--	--	**954**	**841**	**808**	**888**
Total Tetrachlorodibenzofuran (TCDF)		--	**128 J**	**80.4 J**	--	--	**311 J**	**270 J**	**286 J**	**252 J**
Total Pentachlorodibenzofuran (PeCDF)		--	**174 J**	**105 J**	--	--	**305 J**	**266 J**	**291 J**	**307 J**
Total Hexachlorodibenzofuran (HxCDF)		--	**456 J**	**290**	--	--	**583 J**	**546 J**	**574 J**	**650**
Total Heptachlorodibenzofuran (HpCDF)		--	**1210**	**760**	--	--	**1340**	**1210**	**1220**	**1330**
Dioxin Furans (ng/kg)										
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)		--	**50.6694 J**	**29.4266 J**	--	--	**86.1026 J**	**77.2661 J**	**78.7062 J**	**74.033 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	*	--	**50.6694 J**	**29.4266 J**	--	--	**86.1026 J**	**77.2661 J**	**78.7062 J**	**74.033 J**

Notes:

Bold: detected result
* Surface-weighted average concentration RAL (42 ng/kg TEQ)
µg/kg: micrograms per kilogram
cm: centimeter
FD: field duplicate
J: estimated value
mg/kg: milligrams per kilogram
N: normal sample
ng/kg: nanograms per kilogram
-OC: organic carbon normalized
pct: percent
PDI: pre-remedial design investigation
RAL: Remedial Action Level
SE: sediment matrix
SMA: sediment management area
TEQ: toxicity equivalence
U: compound analyzed, but not detected above detection limit

Table A-5
SMA-3 PDI Sediment Results

Task		SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018	SheltonRI_FS_2018
Location ID		PDI-SMA3-OG01-180502	PDI-SMA3-SG01-180426	PDI-SMA3-SG01-180426	PDI-SMA3-SG02-180426	PDI-SMA3-SG03-180426	PDI-SMA3-SG04-180426	PDI-SMA3-SG1004-1804	PDI-SMA3-SG2004-1804	PDI-SMA3-SG05-180426	PDI-SMA3-SG06-180426
Sample ID		PDI-SMA3-OG01-180502	PDI-SMA3-SG01-180426	PDI-SMA3-SG101-180426	PDI-SMA3-SG02-180426	PDI-SMA3-SG03-180426	PDI-SMA3-SG04-180426	PDI-SMA3-SG1004-180426	PDI-SMA3-SG2004-180426	PDI-SMA3-SG05-180426	PDI-SMA3-SG06-180426
Sample Date		5/2/2018	4/26/2018	4/26/2018	4/26/2018	4/26/2018	4/26/2018	4/26/2018	4/26/2018	4/26/2018	4/26/2018
Depth		0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm
Sample Type		N	N	FD	N	N	N	N	N	N	N
Matrix		SE	SE	SE	SE	SE	SE	SE	SE	SE	SE
X		995842.972	995703.931	995703.931	995910.095	996110.857	996185.782	996184.854	996188.995	996258.992	996332.697
Y		693659.884	694164.595	694164.595	694106.722	694048.42	693919.446	693916.436	693916.3	693788.704	693660.38
	RAL										
Dioxin Furans (ng/kg)											
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)		**0.248 J**	**3.57 J**	**3.94 J**	**3.75 J**	**3.6 J**	**6.36**	**7.34**	**5.42**	**3.23 J**	**2.6 J**
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)		**1.39 J**	**13.3 J**	**13.7 J**	**15.9 J**	**14.8 J**	**27.3**	**29.4**	**18.8 J**	**15 J**	**11.2 J**
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		**2.06 J**	**21.3 J**	**24.7**	**27.5**	**22.9 J**	**52**	**60.8**	**34.3**	**24.6**	**20.9 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)		**11**	**83.5**	**86**	**91.4**	**89.3**	**161**	**157**	**114**	**82.8**	**70.5**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)		**3.58 J**	**36.6**	**47.2**	**43**	**38.7**	**72.9**	**89.2**	**43.6**	**42.4**	**34**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)		**276**	**1700**	**1840**	**1890**	**1760**	**2910**	**2150**	**1780**	**1560**	**1410**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)		**3740**	**14700**	**15000**	**15000**	**14300**	**20300**	**14300**	**14100**	**13700**	**12200**
Total Tetrachlorodibenzo-p-dioxin (TCDD)		**53.7 J**	**652 J**	**870 J**	**1800 J**	**1150 J**	**4220 J**	**3520**	**2240**	**987 J**	**468 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)		**48.2 J**	**702**	**842**	**1210**	**921**	**3320**	**2860**	**1780**	**984**	**659 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)		**102**	**1380**	**1550**	**1730**	**1590**	**3410**	**4160**	**2420**	**1580**	**1330**
Total Heptachlorodibenzo-p-dioxin (HpCDD)		**664**	**4850**	**4890**	**5140**	**4950**	**6940**	**5420**	**4780**	**4290**	**3770**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)		**0.836 J**	**12.9**	**15**	**13.4**	**14**	**21.8**	**23.1**	**13.6**	**11.2**	**8.46**
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)		**0.827 J**	**9.95 J**	**10.7 J**	**11.3 J**	**10.5 J**	**16.8 J**	**18.1 J**	**14.5 J**	**10.3 J**	**8.06 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)		**0.941 J**	**14.2 J**	**14.5 J**	**15 J**	**15 J**	**26.7**	**26.2**	**20 J**	**12.8 J**	**11.4 J**
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)		**4.32 J**	**49.9**	**48.6**	**51.6**	**54.1**	**104**	**63.3**	**56.9**	**44.4**	**38.1**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)		**2.23 J**	**20 J**	**19.9 J**	**21 J**	**21.1 J**	**32.4**	**27.2**	**23.3 J**	**18.4 J**	**16.7 J**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)		0.263 U	**1.81 J**	**1.73 J**	**2.09 J**	**2.1 J**	**2.99 J**	**2.52 J**	**2.04 J**	**1.73 J**	**1.5 J**
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)		**1.51 J**	**15.4 J**	**15 J**	**15.7 J**	**15.5 J**	**22.7 J**	**21 J**	**16.4 J**	**13.8 J**	**12.5 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)		**90.9**	**608**	**650**	**674**	**829**	**1030**	**637**	**652**	**507**	**467**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)		**7.37**	**41.4**	**47.5**	**36.3**	**51.1**	**78.1**	**38.7**	**34.3**	**28.7**	**26.5**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)		**213**	**1700**	**1950**	**2070**	**1570**	**4150**	**1370**	**1670**	**1340**	**1140**
Total Tetrachlorodibenzofuran (TCDF)		**16.7 J**	**290 J**	**321 J**	**309 J**	**319 J**	**595 J**	**593 J**	**457 J**	**279 J**	**183 J**
Total Pentachlorodibenzofuran (PeCDF)		**25.2 J**	**290 J**	**285 J**	**317 J**	**327 J**	**522 J**	**529 J**	**413 J**	**282 J**	**223 J**
Total Hexachlorodibenzofuran (HxCDF)		**95.6 J**	**776**	**786 J**	**835**	**872**	**1470**	**1020**	**949**	**696**	**620**
Total Heptachlorodibenzofuran (HpCDF)		**355**	**2380**	**2670**	**2730**	**2600**	**4880**	**2260**	**2730**	**1830**	**1660**
Dioxin Furans (ng/kg)											
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)		**9.42731 J**	**73.9835 J**	**78.584 J**	**82.182 J**	**80.147 J**	**136.669 J**	**122.513 J**	**90.463 J**	**71.781 J**	**60.7648 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)		**9.44046 J**	**73.9835 J**	**78.584 J**	**82.182 J**	**80.147 J**	**136.669 J**	**122.513 J**	**90.463 J**	**71.781 J**	**60.7648 J**

Notes:

Bold: detected result

* Surface-weighted average concentration RAL (42 ng/kg TEQ)

cm: centimeter

FD: field duplicate

J: estimated value

N: normal sample

ng/kg: nanograms per kilograms

PDI: pre-remedial design investigation

RAL: Remedial Action Level

SE: sediment matrix

SMA: sediment management area

TEQ: toxicity equivalence

U: compound analyzed, but not detected above detection limit

Table A-6
SMA-3 PDI Porewater Hydrogen Sulfide Results

Sample ID	Sulfide (mg/L as H_2S)
PDI-SMA3-DGT01	0.004 U
PDI-SMA3-DGT02	0.004 U
PDI-SMA3-DGT1002 (duplicate)	0.004 U
PDI-SMA3-DGT2002 (triplicate)	0.004 U
PDI-SMA3-DGT03	0.004 U
PDI-SMA3-DGT04	0.004 U
PDI-SMA3-DGT05	0.004 U
PDI-SMA3-DGT1005 (duplicate)	0.004 U
PDI-SMA3-DGT2005 (triplicate)	0.004 U
PDI-SMA3-DGT06	0.004 U
PDI-SMA3-DGT106 (duplicate)	0.004 U
PDI-SMA3-SG03	0.032
PDI-SMA3-SG05	0.004 U
PDI-SMA3-SG07	0.006
PDI-SMA3-SG08	0.01
PDI-SMA3-SG10	0.004 U
PDI-SMA3-SG12	0.005
PDI-SMA3-SG14	0.012
PDI-SMA3-SG18	0.004 U
PDI-SMA3-SG19	0.012

Notes:

H_2S: hydrogen sulfide

mg/L: milligrams per liter

PDI: pre-remedial design investigation

SMA: sediment management area

U: not detected above the method detection limit

Table A-7
Shelton SCU Surface Sediment Dioxin/Furan 2017 Retest Results

Task	SheltonRI_FS_2017	SheltonRI_FS_2017	SheltonRI_FS_2017	SheltonRI_FS_2017	SheltonRI_FS_2017	SheltonRI_FS_2017	SheltonRI_FS_2017	SheltonRI_FS_2017	SheltonRI_FS_2017	SheltonRI_FS_2017
Location ID	SG-01-170713	SH-03-170809	SH-04-170713	SH-13A-170713	SH-14-170712	SH-19-170712	SH-21-170712	SH-22-170712	SH-24-170713	SH-28-170712
Sample ID	SG-01-SG-170713	SH-03-SC-0-10-170809	SH-04-SG-170713	SH-13A-SG-170713	SH-14-SG-170712	SH-19-SG-170712	SH-21-SG-170712	SH-22-SG-170712	SH-24-SG-170713	SH-28-SG-170712
Sample Date	7/13/2017	8/9/2017	7/13/2017	7/13/2017	7/12/2017	7/12/2017	7/12/2017	7/12/2017	7/13/2017	7/12/2017
Depth	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm	0–10 cm
Sample Type	N	N	N	N	N	N	N	N	N	N
Matrix	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE
X	996049.125	996814.446	996383.079	996153.767	999092.728	996183.628	996872.434	997441.609	998145.069	998803.183
Y	696269.737	695861.948	695943.332	693698.315	694408.1	694198.083	694494.339	693708.26	693633.613	695034.68
Dioxin Furans (ng/kg)										
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1.35 U	**8.38 J**	1.38 U	**4.55**	1.55 U	2.51 U	1.56 U	0.936 U	1.58 U	1.81 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	**2.5 J**	**37.2**	**7.88**	**15.1**	**3.53 J**	**6.39 J**	**7.79**	0.892 U	**1.69 J**	1.17 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	**4.09**	**74.8**	**16.5 J**	**20.8**	**6.17**	**11.1**	**18.6**	**5.2 J**	**2.42 J**	**1.57 J**
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	**26.6**	**471**	**68.5**	**55.3**	**29.4**	**50.8**	**63.4**	**31.2**	**11.1**	**9.98**
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	**8.14**	**151**	**29.2**	**28.2**	**10.2 J**	**16.1 J**	**29.7**	**7.81 J**	**4.26 J**	**3.63 J**
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	**596**	**13300 J**	**1350**	**796**	**493**	**925**	**1510**	**1190**	**230**	**174**
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	**2240**	**145000 J**	**14700**	**7420**	**4160**	**7310**	**12700**	**7900**	**1960**	**1550**
Total Tetrachlorodibenzo-p-dioxin (TCDD)	**46.5 J**	**1170 J**	**492 J**	**1160 J**	**210 J**	**387**	**514 J**	**76.3 J**	**45.6**	**73.4 J**
Total Pentachlorodibenzo-p-dioxin (PeCDD)	**57 J**	**1430 J**	**681 J**	**1050**	**235 J**	**359 J**	**663 J**	**93.1 J**	**75 J**	**64.1 J**
Total Hexachlorodibenzo-p-dioxin (HxCDD)	**147 J**	**4800**	**1060 J**	**1050**	**461 J**	**581 J**	**1200**	**616 J**	**156 J**	**208 J**
Total Heptachlorodibenzo-p-dioxin (HpCDD)	**915**	**35100**	**3200**	**2170**	**1370**	**2150**	**4350**	**6540**	**557**	**567**
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	1.75 U	**21.8**	**3.94 J**	**12.7**	**3.72 J**	**10.9**	**4.66**	1.21 U	2.09 U	1.84 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	**1.89 J**	**28.3**	**4.89**	**7.6**	**2.59 J**	**7.43**	**6**	**1.46 J**	**1.42 J**	**1.36 J**
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	**3.01 J**	**55**	**6.75**	**13.1**	**4.83**	**9.56 J**	**7.8**	**2.54 J**	**2.53 J**	1.03 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	**27.2**	**282**	**32.4**	**22.3**	**16.3**	**26.1**	**31.7**	**7.33**	**6.54**	**4.83**
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	**5.7 J**	**88.3**	**12.9**	**11.1**	**5.93**	**10 J**	**11.9**	**3.02 J**	**1.81 J**	**2.33 J**
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	1.27 U	4.83 U	2.03 U	2.07 U	1.13 U	2.93 U	2.23 U	1.19 U	1.5 U	1.58 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	**10.2**	**151**	**19.7**	**15.1**	**8.49 J**	**17.1**	**18**	**5.56**	**4.74**	**3.02 J**
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	**271**	**4100**	**395**	**237**	**171**	**444**	**441**	**80.2**	**85.5**	**55.9**
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	**21.5**	**242**	**25**	**14.9**	**9.97**	**19.9**	**24.4**	**4.33 J**	**4.2 J**	**3.26 J**
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	**950**	**18800 J**	**1540**	**736**	**536**	**1410**	**1770**	**220**	**272**	**149**
Total Tetrachlorodibenzofuran (TCDF)	**5.51**	**480 J**	**86 J**	**300 J**	**89.9 J**	**273 J**	**112 J**	1.21 U	2.09 U	1.84 U
Total Pentachlorodibenzofuran (PeCDF)	**47.5 J**	**890 J**	**126 J**	**168 J**	**93.3 J**	**188 J**	**132 J**	**40 J**	**26 J**	**28.2 J**
Total Hexachlorodibenzofuran (HxCDF)	**394 J**	**5390**	**545 J**	**368**	**281 J**	**546 J**	**525 J**	**146**	**113 J**	**87.6 J**
Total Heptachlorodibenzofuran (HpCDF)	**1350 J**	**18300**	**1590**	**846 J**	**598**	**1620**	**1670**	**268 J**	**255 J**	**163 J**
Dioxin Furans (ng/kg)										
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 0)	**21.4947 J**	**412.479 J**	**50.9377 J**	**53.2838**	**21.2262 J**	**40.1959 J**	**52.201**	**21.9991 J**	**9.4452 J**	**5.4181 J**
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2)	**22.3207 J**	**412.7205 J**	**51.7292 J**	**53.3873**	**22.0577 J**	**41.5974 J**	**53.0925**	**23.0331 J**	**10.4147 J**	**7.2336 J**

Notes:

Bold: detected result

* Surface-weighted average concentration RAL (42 ng/kg TEQ)

cm: centimeter

J: estimated value

N: normal sample

ng/kg: nanograms per kilogram

RAL: Remedial Action Level

SCU: sediment cleanup unit

SE: sediment matrix

TEQ: toxicity equivalence

U: compound analyzed, but not detected above detection limit

Table A-8

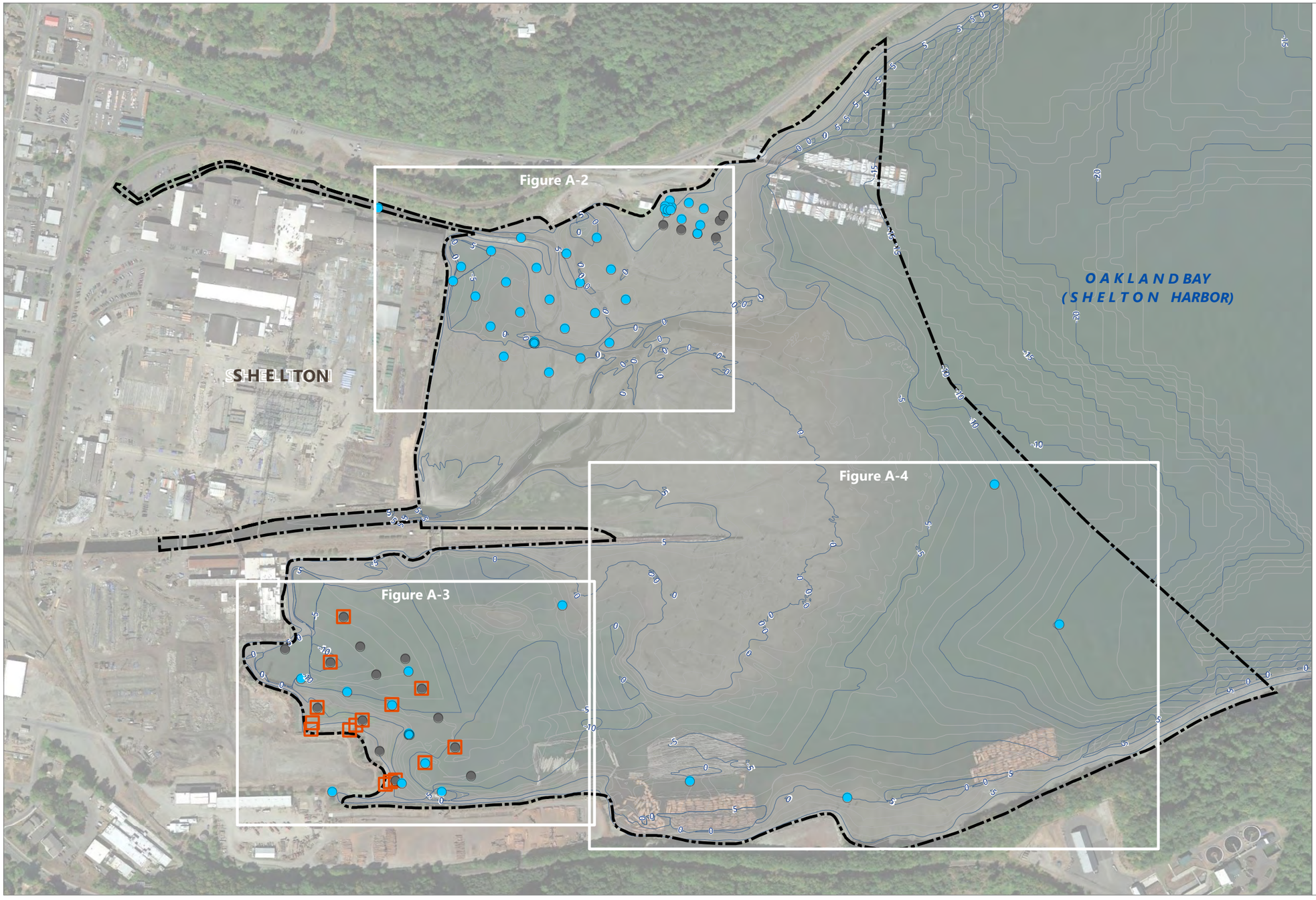
Summary of Initial and Retest Dioxin/Furan TEQ Results

Station	Dioxin/Furan TEQ Mammal (ng/kg dw)	
	2017 Initial Test Results	2018 Retest Results
SG-01	22.8	22.3
SH-03	287	413
SH-04	20.7	51.8
SH-13A	42.5	53.4
SH-14	13.7	22.1
SH-19	15.7	41.6
SH-21	15.6	53.1
SH-22	22.0	23.0
SH-24	21.4	10.4
SH-28	9.92	7.23

Notes:

ng/kg dw: nanograms per kilogram on a dry weight basis

Figures



Analyzed Location
DGT Location
Archived Location
Sediment Cleanup Unit Boundary

NOTE(S):
1. Bathymetry is combined from eTrac survey (2018), Bluegreen Lidar (2003), SPI sample elevations (2017), and PSDEM 2005, respectively.

0 740
Feet

Publish Date: 2018/08/29, 10:23 AM | User: ckiblinger
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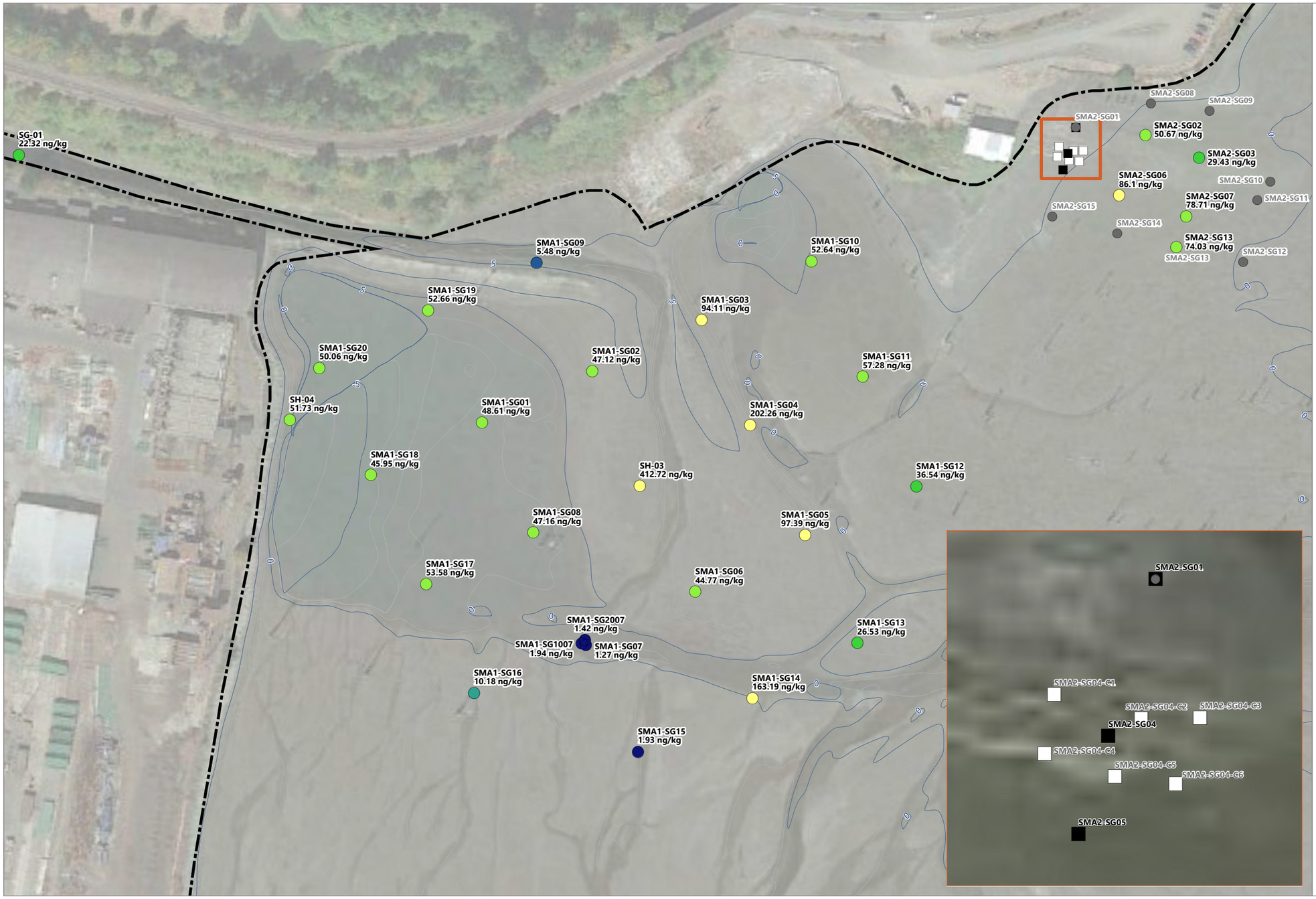
ANCHOR QEA

Figure A-1
Data Report Sample Locations
Appendix A: Pre-Remedial Design Investigation Data Report
Oakland Bay and Shelton Harbor Sediments Cleanup Site



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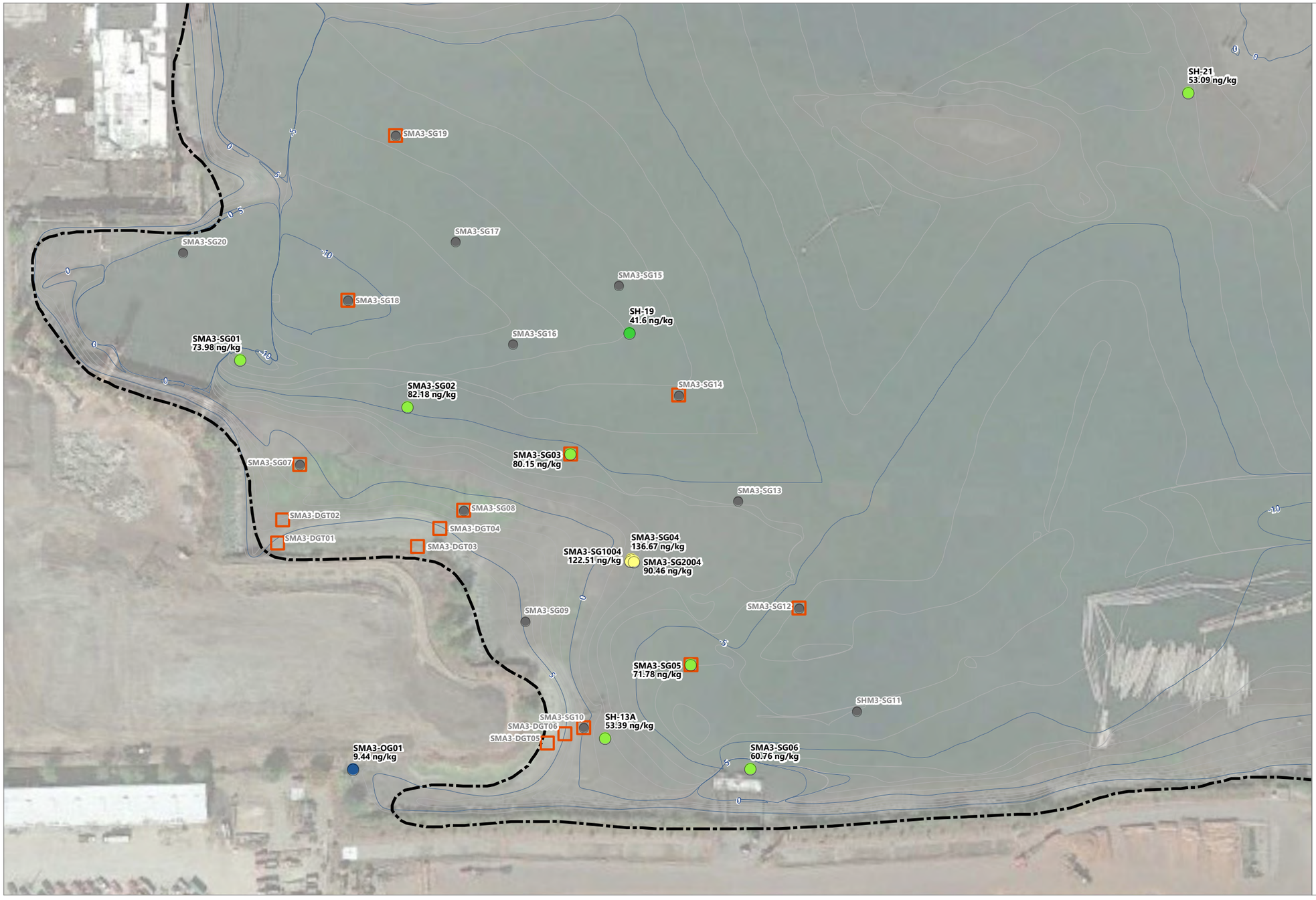
ANCHOR QEA

Figure A-2
North Harbor Chemistry Results
Appendix A: Pre-Remedial Design Investigation Data Report
Oakland Bay and Shelton Harbor Sediments Cleanup Site



Dioxin Furan TEQ

(2005 Mammalian, U=1/2, ng/kg)

- 1.3 - 5
- 5.1 - 10
- 10.1 - 19
- 19.1 - 42
- 42.1 - 84
- 84.1 - 412.7
- DGT Location
- Archived Location
- Sediment Cleanup Unit Boundary

NOTE(S):

1. Bathymetry is combined from eTrac survey (2018), Bluegreen Lidar (2003), SPI sample elevations (2017), and PSDEM 2005, respectively.

0 200

Feet

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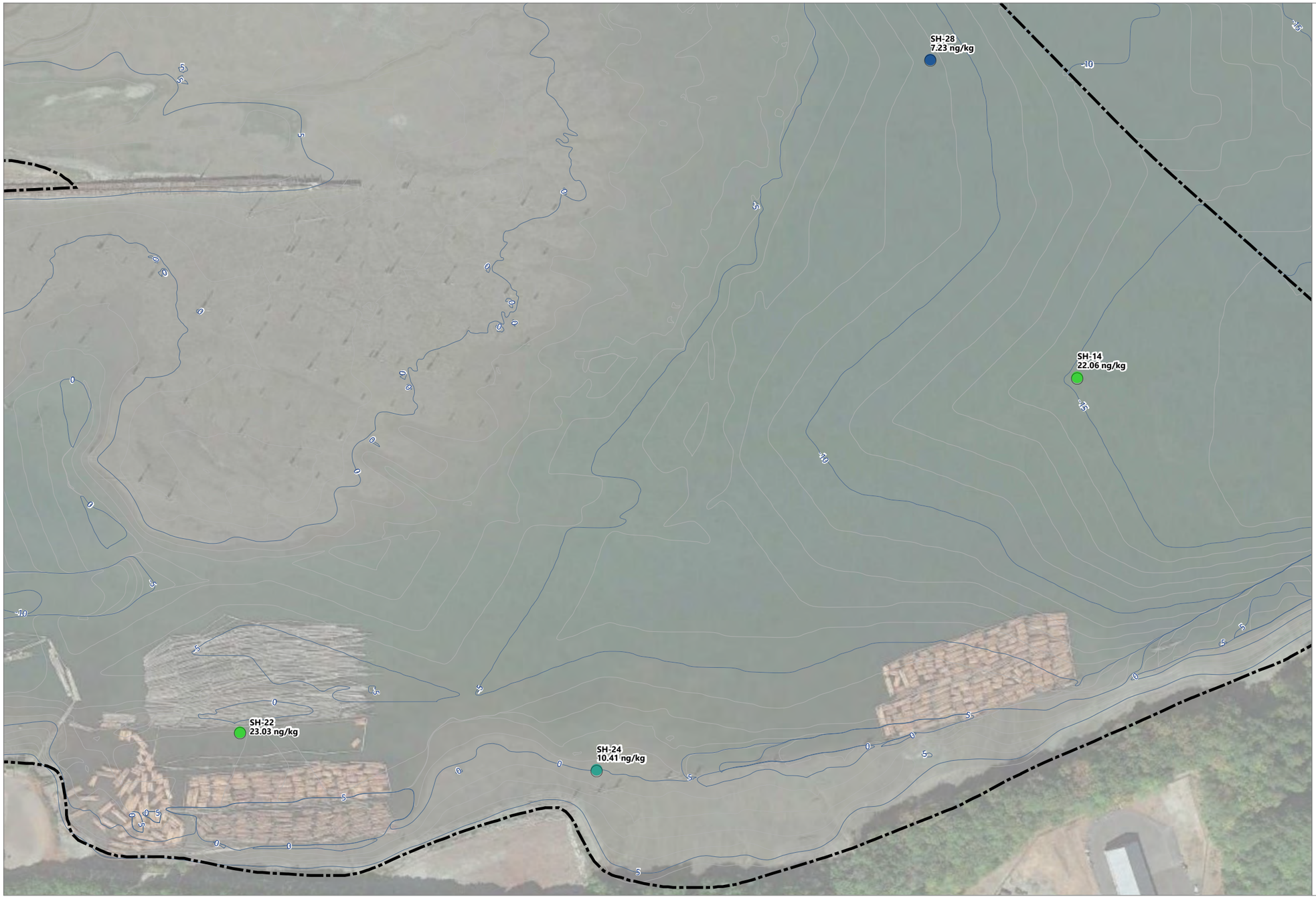
ANCHOR QEA

Figure A-3
South Harbor Chemistry Results
Appendix A: Pre-Remedial Design Investigation Data Report
Oakland Bay and Shelton Harbor Sediments Cleanup Site



Dioxin Furan TEQ

(2005 Mammalian, U=1/2, ng/kg)

- 1.3 - 5
- 5.1 - 10
- 10.1 - 19
- 19.1 - 42
- 42.1 - 84
- 84.1 - 412.7
- DGT Location
- Archived Location
- Sediment Cleanup Unit Boundary

NOTE(S):
1. Bathymetry is combined from eTrac survey (2018), Bluegreen Lidar (2003), SPI sample elevations (2017), and PSDEM 2005, respectively.

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Publish Date: 2018/08/08, 3:08 PM | User: ckiblinger
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ANCHOR QEA

Figure A-4
South Outer Harbor Chemistry Results
Appendix A: Pre-Remedial Design Investigation Data Report
Oakland Bay and Shelton Harbor Sediments Cleanup Site

Attachment A-1
Data Validation Reports

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Anchor Environmental, LLC
720 Olive Way, Suite 1900
Seattle, WA 98101
ATTN: Ms. Cindy Fields

July 20, 2018

SUBJECT: Shelton Harbor, Data Validation

Dear Ms. Fields,

Enclosed are the final validation reports for the fraction listed below. These SDGs were received on June 15, 2018. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #42441:

SDG #	**Fraction**
DPWG64001	Polychlorinated Dioxins/Dibenzofurans
DPWG64036	

The data validation was performed under Stage 4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- Sampling and Quality Assurance Project Plan for Shelton Harbor Sediment Cleanup Unit, Oakland Bay and Shelton Harbor Sediment Cleanup Site, Shelton Washington; July 2017
- USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review, April 2016

Please feel free to contact us if you have any questions.

Sincerely,

Christina Rink

Christina Rink
Project Manager/Senior Chemist

EDD / Stage 2B / Dioxins Stage 4 **LDC #42441 (Simpson Timber Company/Anchor Environmental - Seattle WA / Shelton Harbor)**

LDC	SDG#	DATE REC'D	(3) DATE DUE	Dioxins (1613B)																															
Matrix: Water/Sediment				W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	DPWG64001	06/15/18	07/09/18	0	21																														
B	DPWG64036	06/15/18	07/09/18	0	27																														
Total	J/CR			0	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48

Shaded cells indicate Stage 4 validation (all other cells are Stage 2B validation). These sample counts do not include MS, MSD, or DUP's.

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Shelton Harbor

LDC Report Date: July 20, 2018

Parameters: Polychlorinated Dioxins/Dibenzofurans

Validation Level: Stage 4

Laboratory: SGS AXYS Analytical Services, LTD

Sample Delivery Group (SDG): DPWG64001/WG63849

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
PDI-SMA1-SG15-180425	L29259-1	Sediment	04/25/18
PDI-SMA1-SG16-180425	L29259-2	Sediment	04/25/18
PDI-SMA1-SG17-180425	L29259-3	Sediment	04/25/18
PDI-SMA1-SG18-180425	L29259-4	Sediment	04/25/18
PDI-SMA1-SG19-180425	L29259-5	Sediment	04/25/18
PDI-SMA1-SG20-180425	L29259-6	Sediment	04/25/18
PDI-SMA1-SG1007-180425	L29259-7	Sediment	04/25/18
PDI-SMA1-SG2007-180425	L29259-8	Sediment	04/25/18
PDI-SMA1-SG111-180425	L29259-9	Sediment	04/25/18
PDI-SMA1-SG108-180425	L29259-10	Sediment	04/25/18
PDI-SMA1-SG01-180425	L29259-11	Sediment	04/25/18
PDI-SMA1-SG02-180425	L29259-12	Sediment	04/25/18
PDI-SMA1-SG03-180425	L29259-13	Sediment	04/25/18
PDI-SMA1-SG04-180425	L29259-14	Sediment	04/25/18
PDI-SMA1-SG04-180425DL	L29259-14DL	Sediment	04/25/18
PDI-SMA1-SG05-180425	L29259-15	Sediment	04/25/18
PDI-SMA1-SG06-180425	L29259-16	Sediment	04/25/18
PDI-SMA1-SG07-180425	L29259-17	Sediment	04/25/18
PDI-SMA1-SG08-180425	L29259-18	Sediment	04/25/18
PDI-SMA1-SG09-180425	L29259-19	Sediment	04/25/18
PDI-SMA1-SG10-180425	L29259-20	Sediment	04/25/18
PDI-SMA1-SG08-180425DUP	L29259-18DUP	Sediment	04/25/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Quality Assurance Project Plan for Shelton Harbor Sediment Cleanup Unit, Oakland Bay and Shelton Harbor Sediment Cleanup Site, Shelton, Washington (July 2017) and a modified outline of the USEPA National Functional Guidelines (NFG) for High Resolution Superfund Methods Data Review (April 2016). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Dioxins/Dibenzofurans by Environmental Protection Agency (EPA) Method 1613B

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required frequency.

Retention time windows were established for all homologues. The chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomer was less than or equal to 25%.

The static resolving power was at least 10,000 (10% valley definition).

III. Initial Calibration

A five point initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for unlabeled compounds and labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for unlabeled compounds and labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Extraction Date	Compound	Concentration	Associated Samples
WG63849-101	05/11/18	1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total TCDD Total PeCDD Total HxCDD Total HpCDD Total HpCDF	0.665 pg/g 1.55 pg/g 0.358 pg/g 0.286 pg/g 0.845 pg/g 0.273 pg/g 0.529 pg/g 0.665 pg/g 0.358 pg/g	All samples in SDG DPWG64001/WG63849

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates/Duplicate Sample Analysis

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Compound	RPD (Limits)	Flag	A or P
PDI-SMA1-SG08-180425DUP (PDI-SMA1-SG08-180425)	1,2,3,7,8,9-HxCDD	38.5 (≤35)	J (all detects)	A

VIII. Ongoing Precision Recovery

Ongoing precision recovery (OPR) samples were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples PDI-SMA1-SG1007-180425 and PDI-SMA1-SG2007-180425 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (pg/g)		RPD (Limits)
	PDI-SMA1-SG1007-180425	PDI-SMA1-SG2007-180425	
2,3,7,8-TCDD	0.317	0.309	3 (≤50)
1,2,3,7,8-PeCDD	0.441	0.333U	Not calculable
1,2,3,4,7,8-HxCDD	0.612	0.600	2 (≤50)
1,2,3,6,7,8-HxCDD	1.63	1.31	22 (≤50)
1,2,3,7,8,9-HxCDD	1.37	1.09	23 (≤50)
1,2,3,4,6,7,8-HpCDD	37.7	29.9	23 (≤50)
OCDD	321	274	16 (≤50)
2,3,7,8-TCDF	0.482	0.472	2 (≤50)
2,3,4,7,8-PeCDF	0.288	0.346U	Not calculable
1,2,3,4,7,8-HxCDF	0.782	0.741	5 (≤50)
1,2,3,6,7,8-HxCDF	0.356	0.419	16 (≤50)
1,2,3,4,6,7,8-HpCDF	15.2	9.82	43 (≤50)
1,2,3,4,7,8,9-HpCDF	0.677	0.804	17 (≤50)
OCDF	40.2	29.5	31 (≤50)
Total TCDD	9.90	13.8	33 (≤50)
Total PeCDD	14.5	11.9	20 (≤50)
Total HxCDD	32.6	25.8	23 (≤50)
Total HpCDD	89.6	74.1	19 (≤50)
Total TCDF	1.83	3.61	65 (≤50)

Compound	Concentration (pg/g)		RPD (Limits)
	PDI-SMA1-SG1007-180425	PDI-SMA1-SG2007-180425	
Total HxCDF	4.36	3.24	29 (≤50)
Total PeCDF	15.5	12.8	19 (≤50)
Total HpCDF	52.0	34.7	40 (≤50)

X. Internal Standards

All internal standard recoveries (%R) were within QC limits.

XI. Compound Quantitation

All compound quantitations met validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
All samples in SDG DPWG64001/WG63849	All compounds were reported as estimated maximum possible concentration (EMPC).	J (all detects)	A

Sample	Compound	Finding	Criteria	Flag	A or P
PDI-SMA1-SG04-180425	OCDD	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

XII. Target Compound Identifications

All target compound identifications met validation criteria.

XIII. System Performance

The system performance was acceptable.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed not reportable as follows:

Sample	Compound	Flag	A or P
PDI-SMA1-SG04-180425	OCDD	Not reportable	-
All samples in SDG DPWG64001/WG63849	2,3,7,8-TCDF 1,2,3,7,8,9-HxCDD	Not reportable	-

Due to DUP RPD and results reported by the laboratory as EMPCs, data were qualified as estimated in twenty-one samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

Shelton Harbor
Polychlorinated Dioxins/Dibenzofurans - Data Qualification Summary - SDG DPWG64001/WG63849

Sample	Compound	Flag	A or P	Reason
PDI-SMA1-SG15-180425 PDI-SMA1-SG16-180425 PDI-SMA1-SG17-180425 PDI-SMA1-SG18-180425 PDI-SMA1-SG19-180425 PDI-SMA1-SG20-180425 PDI-SMA1-SG1007-180425 PDI-SMA1-SG2007-180425 PDI-SMA1-SG111-180425 PDI-SMA1-SG108-180425 PDI-SMA1-SG01-180425 PDI-SMA1-SG02-180425 PDI-SMA1-SG03-180425 PDI-SMA1-SG04-180425 PDI-SMA1-SG04-180425DL PDI-SMA1-SG05-180425 PDI-SMA1-SG06-180425 PDI-SMA1-SG07-180425 PDI-SMA1-SG08-180425 PDI-SMA1-SG09-180425 PDI-SMA1-SG10-180425	All compounds were reported as estimated maximum possible concentration (EMPC).	J (all detects)	A	Compound quantitation (EMPC)
PDI-SMA1-SG08-180425	1,2,3,7,8,9-HxCDD	J (all detects)	A	Duplicate sample analysis (RPD)
PDI-SMA1-SG04-180425	OCDD	Not reportable	-	Overall assessment of data
PDI-SMA1-SG15-180425 PDI-SMA1-SG16-180425 PDI-SMA1-SG17-180425 PDI-SMA1-SG18-180425 PDI-SMA1-SG19-180425 PDI-SMA1-SG20-180425 PDI-SMA1-SG1007-180425 PDI-SMA1-SG2007-180425 PDI-SMA1-SG111-180425 PDI-SMA1-SG108-180425 PDI-SMA1-SG01-180425 PDI-SMA1-SG02-180425 PDI-SMA1-SG03-180425 PDI-SMA1-SG04-180425 PDI-SMA1-SG04-180425DL PDI-SMA1-SG05-180425 PDI-SMA1-SG06-180425 PDI-SMA1-SG07-180425 PDI-SMA1-SG08-180425 PDI-SMA1-SG09-180425 PDI-SMA1-SG10-180425	2,3,7,8-TCDF 1,2,3,7,8,9-HxCDD	Not reportable	-	Overall assessment of data

Shelton Harbor
Polychlorinated Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG DPWG64001/WG63849

No Sample Data Qualified in this SDG

LDC #: 42441A21 **VALIDATION COMPLETENESS WORKSHEET** Date: 6/27/18

SDG #: DPWG64001/WG63849 Stage 4 Page: 1 of 2

Laboratory: SGS AXYS Analytical Services, LTD Reviewer: FT

2nd Reviewer: CK

METHOD: HRGC/HRMS Polychlorinated Dioxins/Dibenzofurans (EPA Method 1613B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration/~~ICV~~	A / ~~A~~	% RSD ≤ 20 no ICV
IV.	Continuing calibration	A	ac limit
V.	Laboratory Blanks	SW	
VI.	Field blanks	N	
VII.	Matrix spike/Matrix spike duplicates /DUP	~~N~~ SW	CS
VIII.	Laboratory control samples	A	OPR
IX.	Field duplicates	SW	D = 7 + 8
X.	Internal standards	A	
XI.	Compound quantitation RL/LOQ/LODs	SW	
XII.	Target compound identification	A	
XIII.	System performance	A	
XIV.	Overall assessment of data	SW	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank

	Client ID	Lab ID	Matrix	Date
1	PDI-SMA-SG15-180425	L29259-1	Sediment	04/25/18
2	PDI-SMA-SG16-180425	L29259-2	Sediment	04/25/18
3	PDI-SMA-SG17-180425	L29259-3	Sediment	04/25/18
4	PDI-SMA-SG18-180425	L29259-4	Sediment	04/25/18
5	PDI-SMA-SG19-180425	L29259-5	Sediment	04/25/18
6	PDI-SMA-SG20-180425	L29259-6	Sediment	04/25/18
7	PDI-SMA-SG1007-180425	L29259-7	Sediment	04/25/18
8	PDI-SMA-SG2007-180425	L29259-8	Sediment	04/25/18
9	PDI-SMA-SG111-180425	L29259-9	Sediment	04/25/18
10	PDI-SMA-SG108-180425	L29259-10	Sediment	04/25/18
11	PDI-SMA-SG01-180425	L29259-11	Sediment	04/25/18
12	PDI-SMA-SG02-180425	L29259-12	Sediment	04/25/18
13	PDI-SMA-SG03-180425	L29259-13	Sediment	04/25/18
14	PDI-SMA-SG04-180425	L29259-14	Sediment	04/25/18

LDC #: 42441A21 **VALIDATION COMPLETENESS WORKSHEET** Date: 6/27/18

SDG #: DPWG64001 Stage 4 Page: 2 of 2

Laboratory: SGS AXYS Analytical Services, LTD Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Polychlorinated Dioxins/Dibenzofurans (EPA Method 1613B)

	Client ID	Lab ID	Matrix	Date
15	PDI-SMA-SG04-180425~~RE~~ DL	L29259-14~~RE~~ DL	Sediment	04/25/18
16	PDI-SMA-SG05-180425	L29259-15	Sediment	04/25/18
17	PDI-SMA-SG06-180425	L29259-16	Sediment	04/25/18
18	PDI-SMA-SG07-180425	L29259-17	Sediment	04/25/18
19	PDI-SMA-SG08-180425	L29259-18	Sediment	04/25/18
20	PDI-SMA-SG09-180425	L29259-19	Sediment	04/25/18
21	PDI-SMA-SG10-180425	L29259-20	Sediment	04/25/18
22	PDI-SMA-SG08-180425DUP	L29259-18DUP	Sediment	04/25/18
23				
24				
25				

Notes:

	WG63849-101						

LDC #: 42441A21

VALIDATION FINDINGS CHECKLIST

Reviewer: FT
2nd Reviewer: [signature]

Method: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS Instrument performance check				
Was PFK exact mass 380.9760 verified?	✓			
Were the retention time windows established for all homologues?	✓			
Was the chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomers ≤ 25% ?	✓			
Is the static resolving power at least 10,000 (10% valley definition)?	✓			
Was the mass resolution adequately check with PFK?	✓			
Was the presence of 1,2,8,9-TCDD and 1,3,4,6,8-PeCDF verified?	✓			
IIIa. Initial calibration				
Was the initial calibration performed at 5 concentration levels?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20% for all compounds?	✓			
Did all calibration standards meet the Ion Abundance Ratio criteria?	✓			
Was the signal to noise ratio for each target compound ≥ 2.5 and for each recovery and internal standard ≥ 10?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?			✓	
Were all concentrations for the unlabeled compounds ≤ 20% and for labeled compounds ≤ 30% ??			✓	
IV. Continuing calibration				
Was a continuing calibration performed at the beginning and end of each 12 hour period?	✓			
Were all concentrations for the unlabeled compounds and for labeled compounds within QC limits (Method 1613B, Table 6)?	✓			
Did all routine calibration standards meet the Ion Abundance Ratio criteria?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank performed for each matrix and whenever a sample extraction was performed?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet?	✓			
VI. Field blanks				
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	
VII. Matrix spike/Matrix spike duplicates				

LDC #: 42441A21

VALIDATION FINDINGS CHECKLIST

Reviewer: FT
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.			✓	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			OPR
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.	✓			
X. Internal standards				
Were internal standard recoveries within the ~~25-150%~~ QC criteria?	✓			
Was the minimum S/N ratio of all internal standard peaks ≥ 10?	✓			
XI. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. Target compound identification				
For 2,3,7,8 substituted congeners with associated labeled standards, were the retention times of the two quantitation peaks within -1 to 3 sec. of the RT of the labeled standard?	✓			
For 2,3,7,8 substituted congeners without associated labeled standards, were the relative retention times of the two quantitation peaks within 0.005 time units of the RRT measured in the routine calibration?	✓			
For non-2,3,7,8 substituted congeners, were the retention times of the two quantitation peaks within RT established in the performance check solution?	✓			
Did compound spectra contain all characteristic ions listed in the table attached?	✓			
Was the Ion Abundance Ratio for the two quantitation ions within criteria?	✓			
Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?	✓			
Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?	✓			
For PCDF identification, was any signal (S/N ≥ 2.5, at ± seconds RT) detected in the corresponding PCDPE channel?	✓			
Was an acceptable lock mass recorded and monitored?	✓			
XIII. System performance				
System performance was found to be acceptable.	✓			
XIV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:_____

_____

_____

LDC #: 42441A2/

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
Y N N/A Was the method blank contaminated?

Blank extraction date: 5/11/18 **Blank analysis date:** 5/16/18 **Associated samples:** All 75 X

Conc. units: pg/g

Compound	Blank ID	Sample Identification								
	WG63849-101									
F	0.665									
G	1.55									
O	0.358									
Q	0.286									
R	0.845									
S	0.273									
T	0.529									
U	0.665									
Y	0.358									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 42441A21

VALIDATION FINDINGS WORKSHEET
Laboratory Duplicates

Page: 1 of 1
Reviewer: FT
2nd reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

Y N N/A Were laboratory duplicate pairs identified in this SDG.
Y N N/A Were target compounds detected in the laboratory duplicate pairs?

Compound	Concentration (pg/g)		RPD (≤ 35 %)	QUAL
	19	22		
E	37.3	25.3	38.5	Jdet/A

LDC#: 42441A21

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: EJ
2nd Reviewer: [signature]

METHOD: 1613B

Compound	Concentration (pg/g)		(≤50) RPD
	7	8	
A	0.317	0.309	3
B	0.441	0.333U	NC
C	0.612	0.600	2
D	1.63	1.31	22
E	1.37	1.09	23
F	37.7	29.9	23
G	321	274	16
H	0.482	0.472	2
J	0.288	0.346U	NC
K	0.782	0.741	5
L	0.356	0.419	16
O	15.2	9.82	43
P	0.677	0.804	17
Q	40.2	29.5	31
R	9.90	13.8	33
S	14.5	11.9	20
T	32.6	25.8	23
U	89.6	74.1	19
V	1.83	3.61	65
W	4.36	3.24	29
X	15.5	12.8	19
Y	52.0	34.7	40

LDC #: 42441A21

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: BP
2nd Reviewer: [signature]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ions and relative response factors (RRF) used to quantitate the compound?
Y N N/A Compound quantitation and CRQLs were adjusted to reflect all sample dilutions and dry weight factors (if necessary).

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		All	all compounds reported as estimated maximum possible concentration (EMPC)		Jdet/A
		14	G exceeded cal Range		Jdet /A

Comments: See sample calculation verification worksheet for recalculations

LDC #: 42441A2/

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: FT
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.
Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		14	G exceeded cal Range		NR
		All	H, E from DB5 (report all results from DB225 for H + E)		N/R

Comments:

LDC #: 42441 A21

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: P2
2nd Reviewer: G

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
$\%RSD = 100 * (S/X)$

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported RRF (CS3 std)	Recalculated RRF (CS3 std)	Reported %RSD	Recalculated %RSD
1	ICAL	11/6/17	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	0.9466	0.9466	0.971	0.971	2.14	2.14
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.0166	1.0166	1.048	1.048	4.78	4.78
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	0.9904	0.9904	1.014	1.014	5.24	5.24
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	1.021	1.021	1.046	1.046	3.34	3.34
			OCDF (^{13}C-OCDD)	1.2524	1.2524	1.324	1.324	8.25	8.25
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42441A21

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: EB
2nd Reviewer: Q

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = $(A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported RRF (CS3 std)	Recalculated RRF (CS3 std)	Reported %RSD	Recalculated %RSD
1	ICAL	~~12/6/18~~ 2/6/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	0.88	0.88	0.91	0.91	8.10	8.10
	DB225		2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: #24411A21

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Reviewer: FT
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	CCV	5/16/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10.0	10.2	10.2		
	1458		2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10.0	10.2	10.2		
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50.0	49.2	49.2		
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50.0	50.2	50.2		
			OCDF (^{13}C-OCDD)	100.0	96.4	96.4		
2	CCV	5/17/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10.0	10.1	10.1		
	00:09		2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10.0	10.4	10.4		
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50.0	49.3	49.3		
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50.0	49.9	49.9		
			OCDF (^{13}C-OCDD)	100.0	99.0	99.0		
3	CCV	5/16/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10.0	10.2	10.2		
	DB225		2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)					
	20:34		1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)					
			OCDF (^{13}C-OCDD)					

Comments: Refer to Routine Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42441 A2 /

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Reviewer: F2
2nd Reviewer: Q

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	CCV	5/17/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10.0	10.6	10.6		
	PB225		2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)					
	0823		1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)					
			OCDF (^{13}C-OCDD)					
2	CCV	5/17/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10.0	10.1	10.1		
	1206		2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10.0	10.3	10.3		
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50.0	48.8	48.8		
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50.0	50.2	50.2		
			OCDF (^{13}C-OCDD)	100	95.8	95.8		
3	CCV	5/17/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10.0	9.83	9.83		
	2020		2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10.6	10.4	10.4		
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50.0	51.0	51.0		
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50.0	49.6	49.6		
			OCDF (^{13}C-OCDD)	100	101	P ~~100~~ 101		

Comments: Refer to Routine Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 4244/A21

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: FT
2nd Reviewer:

METHOD: GC/MS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration
SA = Spike added

RPD = | LCS - LCSD | * 2/(LCS + LCSD) LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: WG63849-102 LCS

Compound	Spike Added (ng/ml)		Spiked Sample Concentration (ng/ml)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalc
2,3,7,8-TCDD	10.0	NA	9.89	NA	98.9	98.9				
1,2,3,7,8-PeCDD	50.0	↓	49.9	↓	99.7	99.7				
1,2,3,4,7,8-HxCDD	50.0	↓	49.4	↓	98.7	98.7				
1,2,3,4,7,8,9-HpCDF	50.0	↓	49.3	↓	98.7	98.7				
OCDF	100	↓	92.0	↓	92.0	92.0	NA			

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42441 A2/

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: EA
2nd reviewer: C

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290A)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
RRF	=	Relative Response Factor (average) from the initial calibration
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. #1 , OCDF :

Conc. = $\frac{(4.47 \times 10^4)(4000)}{(2.35 \times 10^6)(1.2524)(2.03)}$

= 29.93 pg/g

#	Sample ID	Compound	Reported Concentration (pg/g)	Calculated Concentration (pg/g)	Qualification
	#1	OCDF	30.0	29.93	
	(#1) - 2,3,7,8-TCDF (DB225)	= $\frac{1.88 \times 10^4 (2000)}{8.13 \times 10^7 (0.88)(2.03)}$			
		= 0.2588 pg/g			
		lab Reported 0.258	pg/g		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Shelton Harbor

LDC Report Date: June 28, 2018

Parameters: Polychlorinated Dioxins/Dibenzofurans

Validation Level: Stage 4

Laboratory: SGS AXYS Analytical Services, LTD

Sample Delivery Group (SDG): DPWG64036/WG63850/WG64075

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
PDI-SMA1-SG11-180425	L29259-21	Sediment	04/25/18
PDI-SMA1-SG12-180425	L29259-22	Sediment	04/25/18
PDI-SMA1-SG13-180425	L29259-23	Sediment	04/25/18
PDI-SMA1-SG14-180425	L29259-24	Sediment	04/25/18
PDI-SMA1-SG14-180425DL	L29259-24 DL	Sediment	04/25/18
PDI-SMA3-SG05-180426	L29259-25	Sediment	04/26/18
PDI-SMA3-SG05-180426 DL	L29259-25 DL	Sediment	04/26/18
PDI-SMA3-SG06-180426	L29259-26	Sediment	04/26/18
PDI-SMA3-SG04-180426	L29259-27	Sediment	04/26/18
PDI-SMA3-SG04-180426 DL	L29259-27DL	Sediment	04/26/18
PDI-SMA3-SG02-180426	L29259-28	Sediment	04/26/18
PDI-SMA3-SG02-180426DL	L29259-28DL	Sediment	04/26/18
PDI-SMA3-SG1004-180426	L29259-29	Sediment	04/26/18
PDI-SMA3-SG1004-180426DL	L29259-29DL	Sediment	04/26/18
PDI-SMA3-SG01-180426	L29239-30	Sediment	04/26/18
PDI-SMA3-SG03-180426	L29259-31	Sediment	04/26/18
PDI-SMA3-SG2004-180426	L29259-32	Sediment	04/26/18
PDI-SMA3-SG2004-180426DL	L29259-32DL	Sediment	04/26/18
PDI-SMA3-SG101-180426	L29259-33	Sediment	04/26/18
PDI-SMA3-SG101-180426DL	L29259-33DL	Sediment	04/26/18
PDI-SMA2-SG106-180427	L29259-34	Sediment	04/27/18
PDI-SMA2-SG03-180427	L29259-35	Sediment	04/27/18
PDI-SMA2-SG06-180427	L29259-36	Sediment	04/27/18
PDI-SMA2-SG07-180430	L29259-1	Sediment	04/30/18
PDI-SMA2-SG13-180430	L29264-2	Sediment	04/30/18
PDI-SMA2-SG02-180430	L29264-6	Sediment	04/30/18

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
PDI-SMA3-OG01-180502	L29264-9	Sediment	05/02/18
PDI-SMA3-SG101-180426DUP	L29259-33DUP	Sediment	04/26/18
PDI-SMA3-SG101-180426DLDUP	L29259-33DLDUP	Sediment	04/26/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Quality Assurance Project Plan for Shelton Harbor Sediment Cleanup Unit, Oakland Bay and Shelton Harbor Sediment Cleanup Site, Shelton, Washington (July 2017) and a modified outline of the USEPA National Functional Guidelines (NFG) for High Resolution Superfund Methods Data Review (April 2016). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Dioxins/Dibenzofurans by Environmental Protection Agency (EPA) Method 1613B

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

The chain-of-custodies were reviewed for documentation of cooler temperatures. Cooler temperature for one of three coolers was reported 7.1°C upon receipt by the laboratory.

All technical holding time requirements were met.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required frequency.

Retention time windows were established for all homologues. The chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomer was less than or equal to 25%.

The static resolving power was at least 10,000 (10% valley definition).

III. Initial Calibration

A five point initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for unlabeled compounds and labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for unlabeled compounds and labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Extraction Date	Compound	Concentration	Associated Samples
WG64075-101	06/05/18	1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,7,8,9-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,4,6,7,8-HpCDF OCDF Total TCDD Total HxCDD Total HpCDD Total HxCDF Total HpCDF	0.079 pg/g 0.222 pg/g 0.059 pg/g 0.054 pg/g 0.078 pg/g 0.097 pg/g 0.055 pg/g 0.093 pg/g 0.079 pg/g 0.113 pg/g 0.078 pg/g	PDI-SMA3-OG01-180502
WG63850-101	05/11/18	1,2,3,6,7,8-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,7,8-PeCDF 1,2,3,4,7,8-HxCDF 1,2,3,4,6,7,8-HpCDF OCDF Total TCDD Total HxCDD Total HpCDD Total PeCDF Total HxCDF Total HpCDF	0.284 pg/g 1.41 pg/g 4.89 pg/g 0.278 pg/g 0.305 pg/g 0.614 pg/g 0.854 pg/g 1.73 pg/g 1.27 pg/g 2.28 pg/g 0.278 pg/g 0.305 pg/g 1.12 pg/g	PDI-SMA1-SG11-180425 PDI-SMA1-SG12-180425 PDI-SMA1-SG13-180425 PDI-SMA1-SG14-180425 PDI-SMA1-SG14-180425DL PDI-SMA3-SG05-180426 PDI-SMA3-SG05-180426 DL PDI-SMA3-SG06-180426 PDI-SMA3-SG04-180426 PDI-SMA3-SG04-180426 DL PDI-SMA3-SG02-180426 PDI-SMA3-SG02-180426DL PDI-SMA3-SG1004-180426 PDI-SMA3-SG1004-180426DL PDI-SMA3-SG01-180426 PDI-SMA3-SG03-180426 PDI-SMA3-SG2004-180426 PDI-SMA3-SG2004-180426DL PDI-SMA3-SG101-180426 PDI-SMA3-SG101-180426DL PDI-SMA2-SG106-180427 PDI-SMA2-SG03-180427 PDI-SMA2-SG06-180427 PDI-SMA2-SG07-180430 PDI-SMA2-SG13-180430 PDI-SMA2-SG02-180430

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
PDI-SMA3-OG01-180502	1,2,3,7,8,9-HxCDF	0.263 pg/g	0.263U pg/g

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates/Duplicate Sample Analysis

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Ongoing Precision Recovery

Ongoing precision recovery (OPR) samples were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples PDI-SMA3-SG1004-180426 and PDI-SMA3-SG2004-180426 and samples PDI-SMA3-SG1004-180426DL and PDI-SMA3-SG2004-180426DL were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (pg/g)		RPD (Limits)
	PDI-SMA3-SG1004-180426	PDI-SMA3-SG2004-180426	
2,3,7,8-TCDD	7.34	5.42	30 (≤50)
1,2,3,7,8-PeCDD	29.4	18.8	44 (≤50)
1,2,3,4,7,8-HxCDD	60.8	34.3	56 (≤50)
1,2,3,6,7,8-HxCDD	157	114	32 (≤50)
1,2,3,7,8,9-HxCDD	115	71.1	47 (≤50)
1,2,3,4,6,7,8-HpCDD	2150	1780	19 (≤50)
2,3,7,8-TCDF	72.2	55.7	26 (≤50)
1,2,3,7,8-PeCDF	18.1	14.5	22 (≤50)
2,3,4,7,8-PeCDF	26.2	20.0	27 (≤50)
1,2,3,4,7,8-HxCDF	63.3	56.9	11 (≤50)

Compound	Concentration (pg/g)		RPD (Limits)
	PDI-SMA3-SG1004-180426	PDI-SMA3-SG2004-180426	
1,2,3,6,7,8-HxCDF	27.2	23.3	15 (≤50)
1,2,3,7,8,9-HxCDF	2.52	2.04	21 (≤50)
2,3,4,6,7,8-HxCDF	21.0	16.4	25 (≤50)
1,2,3,4,6,7,8-HpCDF	637	652	2 (≤50)
1,2,3,4,7,8,9-HpCDF	38.7	34.3	12 (≤50)
OCDF	1370	1670	20 (≤50)
Total TCDD	3520	2240	44 (≤50)
Total PeCDD	2860	1780	47 (≤50)
Total HxCDD	4160	2420	53 (≤50)
Total HpCDD	5420	4780	13 (≤50)
Total TCDF	593	457	26 (≤50)
Total PeCDF	529	413	25 (≤50)
Total HxCDF	1020	949	7 (≤50)
Total HpCDF	2260	2730	19 (≤50)
1,2,3,7,8,9-HxCDD	89.2	43.6	69 (≤50)
2,3,7,8-TCDF	23.1	13.6	52 (≤50)

Compound	Concentration (pg/g)		RPD (Limits)
	PDI-SMA3-SG1004-180426DL	PDI-SMA3-SG2004-180426DL	
OCDD	14300	14100	1 (≤50)

X. Internal Standards

All internal standard recoveries (%R) were within QC limits.

XI. Compound Quantitation

All compound quantitations met validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
All samples in SDG DPWG64036/WG63850/WG64075	All compounds were reported as estimated maximum possible concentration (EMPC).	J (all detects)	A

Sample	Compound	Finding	Criteria	Flag	A or P
PDI-SMA1-SG14-180425	OCDD OCDF	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A
PDI-SMA3-SG05-180426 PDI-SMA3-SG04-180426 PDI-SMA3-SG02-180426 PDI-SMA3-SG1004-180426 PDI-SMA3-SG2004-180426 PDI-SMA3-SG101-180426	OCDD	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects)	A

XII. Target Compound Identifications

All target compound identifications met validation criteria.

XIII. System Performance

The system performance was acceptable.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed not reportable as follows:

Sample	Compound	Flag	A or P
PDI-SMA1-SG14-180425	OCDD OCDF	Not reportable	-
PDI-SMA3-SG05-180426 PDI-SMA3-SG04-180426 PDI-SMA3-SG02-180426 PDI-SMA3-SG1004-180426 PDI-SMA3-SG2004-180426 PDI-SMA3-SG101-180426	OCDD	Not reportable	-

Sample	Compound	Flag	A or P
All samples in SDG DPWG64036/WG63850/WG64075	2,3,7,8-TCDF 1,2,3,7,8,9-HxCDD	Not reportable	-

Due to results reported by the laboratory as EMPCs, data were qualified as estimated in twenty-seven samples.

Due to laboratory blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

Shelton Harbor
Polychlorinated Dioxins/Dibenzofurans - Data Qualification Summary - SDG DPWG64036/WG63850/WG64075

Sample	Compound	Flag	A or P	Reason
PDI-SMA1-SG11-180425 PDI-SMA1-SG12-180425 PDI-SMA1-SG13-180425 PDI-SMA1-SG14-180425 PDI-SMA1-SG14-180425DL PDI-SMA3-SG05-180426 PDI-SMA3-SG05-180426 DL PDI-SMA3-SG06-180426 PDI-SMA3-SG04-180426 PDI-SMA3-SG04-180426 DL PDI-SMA3-SG02-180426 PDI-SMA3-SG02-180426DL PDI-SMA3-SG1004-180426 PDI-SMA3-SG1004-180426DL PDI-SMA3-SG01-180426 PDI-SMA3-SG03-180426 PDI-SMA3-SG2004-180426 PDI-SMA3-SG2004-180426DL PDI-SMA3-SG101-180426 PDI-SMA3-SG101-180426DL PDI-SMA2-SG106-180427 PDI-SMA2-SG03-180427 PDI-SMA2-SG06-180427 PDI-SMA2-SG07-180430 PDI-SMA2-SG13-180430 PDI-SMA2-SG02-180430 PDI-SMA3-OG01-180502	All compounds were reported as estimated maximum possible concentration (EMPC).	J (all detects)	A	Compound quantitation (EMPC)
PDI-SMA1-SG14-180425	OCDD OCDF	Not reportable	-	Overall assessment of data
PDI-SMA3-SG05-180426 PDI-SMA3-SG04-180426 PDI-SMA3-SG02-180426 PDI-SMA3-SG1004-180426 PDI-SMA3-SG2004-180426 PDI-SMA3-SG101-180426	OCDD	Not reportable	-	Overall assessment of data

Sample	Compound	Flag	A or P	Reason
PDI-SMA1-SG11-180425 PDI-SMA1-SG12-180425 PDI-SMA1-SG13-180425 PDI-SMA1-SG14-180425 PDI-SMA1-SG14-180425DL PDI-SMA3-SG05-180426 PDI-SMA3-SG05-180426 DL PDI-SMA3-SG06-180426 PDI-SMA3-SG04-180426 PDI-SMA3-SG04-180426 DL PDI-SMA3-SG02-180426 PDI-SMA3-SG02-180426DL PDI-SMA3-SG1004-180426 PDI-SMA3-SG1004-180426DL PDI-SMA3-SG01-180426 PDI-SMA3-SG03-180426 PDI-SMA3-SG2004-180426 PDI-SMA3-SG2004-180426DL PDI-SMA3-SG101-180426 PDI-SMA3-SG101-180426DL PDI-SMA2-SG106-180427 PDI-SMA2-SG03-180427 PDI-SMA2-SG06-180427 PDI-SMA2-SG07-180430 PDI-SMA2-SG13-180430 PDI-SMA2-SG02-180430 PDI-SMA3-OG01-180502	2,3,7,8-TCDF 1,2,3,7,8,9-HxCDD	Not reportable	-	Overall assessment of data

Shelton Harbor
Polychlorinated Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG DPWG64036/WG63850/WG64075

Sample	Compound	Modified Final Concentration	A or P
PDI-SMA3-OG01-180502	1,2,3,7,8,9-HxCDF	0.263U pg/g	A

LDC #: 42441B21 **VALIDATION COMPLETENESS WORKSHEET** Date: 6/27/18
SDG #: DPWG64036/WG63850/WG64075 Stage 4 Page: 1 of 2
Laboratory: SGS AXYS Analytical Services, LTD Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Polychlorinated Dioxins/Dibenzofurans (EPA Method 1613B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

one of 3 coolers = 7.1°C

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration/ICV	A / N	% RSD ≤ 20
IV.	Continuing calibration	A	CCV ≤ QC limit
V.	Laboratory Blanks	SW	
VI.	Field blanks	N	
VII.	Matrix spike/Matrix spike duplicates (MS/MSD)	N/A	CS
VIII.	Laboratory control samples	A	OPR
IX.	Field duplicates	SW	D = 13, 17 14, 18
X.	Internal standards	A	
XI.	Compound quantitation RL/LOQ/LODs	SW	
XII.	Target compound identification	A	
XIII.	System performance	A	
XIV.	Overall assessment of data	SW	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	PDI-SMA1-SG11-180425	L29259-21	Sediment	04/25/18
2	PDI-SMA1-SG12-180425	L29259-22	Sediment	04/25/18
3	PDI-SMA1-SG13-180425	L29259-23	Sediment	04/25/18
4	PDI-SMA1-SG14-180425	L29259-24	Sediment	04/25/18
5	PDI-SMA1-SG14-180425~~RE~~ DL	L29259-24~~RE~~ DL	Sediment	04/25/18
6	PDI-SMA3-SG05-180426	L29259-25	Sediment	04/26/18
7	PDI-SMA3-SG05-180426~~RE~~ DL	L29259-25~~RE~~ DL	Sediment	04/26/18
8	PDI-SMA3-SG06-180426	L29259-26	Sediment	04/26/18
9	PDI-SMA3-SG04-180426	L29259-27	Sediment	04/26/18
10	PDI-SMA3-SG04-180426~~RE~~ DL	L29259-27~~RE~~ DL	Sediment	04/26/18
11	PDI-SMA3-SG02-180426	L29259-28	Sediment	04/26/18
12	PDI-SMA3-SG02-180426~~RE~~ DL	L29259-28~~RE~~ DL	Sediment	04/26/18
13	PDI-SMA3-SG1004-180426 D	L29259-29	Sediment	04/26/18
14	PDI-SMA3-SG1004-180426~~RE~~ DL D1	L29259-29~~RE~~ DL	Sediment	04/26/18

LDC #: 42441B21 **VALIDATION COMPLETENESS WORKSHEET** Date: 6/27/18
SDG #: DPWG64036 Stage 4 Page: 2 of 2
Laboratory: SGS AXYS Analytical Services, LTD Reviewer: EJ
2nd Reviewer:

METHOD: HRGC/HRMS Polychlorinated Dioxins/Dibenzofurans (EPA Method 1613B)

	Client ID	Lab ID	Matrix	Date
15	PDI-SMA3-SG01-180426	L29239-30	Sediment	04/26/18
16	PDI-SMA3-SG03-180426	L29259-31	Sediment	04/26/18
17	PDI-SMA3-SG2004-180426 D	L29259-32	Sediment	04/26/18
18	PDI-SMA3-SG2004-180426~~RE~~ D1 D1	L29259-32~~RE~~ D1	Sediment	04/26/18
19	PDI-SMA3-SG101-180426	L29259-33	Sediment	04/26/18
20	PDI-SMA3-SG101-180426~~RE~~ D1	L29259-33~~RE~~ D1	Sediment	04/26/18
21	PDI-SMA2-SG106-180427	L29259-34	Sediment	04/27/18
22	PDI-SMA2-SG03-180427	L29259-35	Sediment	04/27/18
23	PDI-SMA2-SG06-180427	L29259-36	Sediment	04/27/18
24	PDI-SMA2-SG07-180430	L29~~259~~64-1	Sediment	04/30/18
25	PDI-SMA2-SG13-180430	L29264-2	Sediment	04/30/18
26	PDI-SMA2-SG02-180430	L29264-6	Sediment	04/30/18
27	PDI-SMA3-OG01-180502	L29264-9	Sediment	05/02/18
28	PDI-SMA3-SG101-180426DUP	L29259-33DUP	Sediment	04/26/18
29	PDI-SMA3-SG101-180426~~RE~~DL DUP	L29259-33~~RE~~DL DUP	Sediment	04/26/18
30				
31				
32				

Notes:

1	WG638501-1						
2	WG640751-1						

LDC #: 42441B21

VALIDATION FINDINGS CHECKLIST

Reviewer: FT
2nd Reviewer:

Method: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS Instrument performance check				
Was PFK exact mass 380.9760 verified?	✓			
Were the retention time windows established for all homologues?	✓			
Was the chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomers ≤ 25% ?	✓			
Is the static resolving power at least 10,000 (10% valley definition)?	✓			
Was the mass resolution adequately check with PFK?	✓			
Was the presence of 1,2,8,9-TCDD and 1,3,4,6,8-PeCDF verified?	✓			
IIIa. Initial calibration				
Was the initial calibration performed at 5 concentration levels?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20% for all compounds?	✓			
Did all calibration standards meet the Ion Abundance Ratio criteria?	✓			
Was the signal to noise ratio for each target compound ≥ 2.5 and for each recovery and internal standard ≥ 10?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓		✓	
Were all concentrations for the unlabeled compounds ≤ 20% and for labeled compounds ≤ 30% ??	✓		✓	
IV. Continuing calibration				
Was a continuing calibration performed at the beginning and end of each 12 hour period?	✓			
Were all concentrations for the unlabeled compounds and for labeled compounds within QC limits (Method 1613B, Table 6)?	✓			
Did all routine calibration standards meet the Ion Abundance Ratio criteria?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank performed for each matrix and whenever a sample extraction was performed?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet?	✓			
VI. Field blanks				
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	
VII. Matrix spike/Matrix spike duplicates				

LDC #: 42441B21

VALIDATION FINDINGS CHECKLIST

Reviewer: FT
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.			✓	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.	✓			
X. Internal standards				
Were internal standard recoveries within the ~~25-150%~~ QC criteria?	✓			
Was the minimum S/N ratio of all internal standard peaks ≥ 10?	✓			
XI. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. Target compound identification				
For 2,3,7,8 substituted congeners with associated labeled standards, were the retention times of the two quantitation peaks within -1 to 3 sec. of the RT of the labeled standard?	✓			
For 2,3,7,8 substituted congeners without associated labeled standards, were the relative retention times of the two quantitation peaks within 0.005 time units of the RRT measured in the routine calibration?	✓			
For non-2,3,7,8 substituted congeners, were the retention times of the two quantitation peaks within RT established in the performance check solution?	✓			
Did compound spectra contain all characteristic ions listed in the table attached?	✓			
Was the Ion Abundance Ratio for the two quantitation ions within criteria?	✓			
Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?	✓			
Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?	✓			
For PCDF identification, was any signal (S/N ≥ 2.5, at ± seconds RT) detected in the corresponding PCDPE channel?	✓			
Was an acceptable lock mass recorded and monitored?	✓			
XIII. System performance				
System performance was found to be acceptable.	✓			
XIV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:_____

LDC #: 42441B21

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: FT
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
Y N N/A Was the method blank contaminated?

Blank extraction date: 6/5/18 **Blank analysis date:** 6/8/18 **Associated samples:** ~~9~~ 27

Conc. units: pg/g

Compound	Blank ID		Sample Identification					
	WG64075-101	5X	27					
F	0.079	0.395	-					
G	0.222	1.11	-					
N	0.059	0.295	0.263U					
M	0.054	0.27	-					
O	0.078	0.39	-					
Q	0.097	0.485	-					

Blank extraction date: ↓ **Blank analysis date:** ↓

Conc. units: pg/g Associated Samples: 27

Compound	Blank ID		Sample Identification					
	↓	5X ↓	27					
R	0.055	0.275	-					
T	0.093	0.465	-					
U	0.079	0.395	-					
X	0.113	0.565	-					
Y	0.078	0.39	-					

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 42441B21

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: FT
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
Y N N/A Was the method blank contaminated?

Blank extraction date: 5/11/18 **Blank analysis date:** 5/22/18 **Associated samples:** 1 → 26 75X
Conc. units: pg/g

Compound	Blank ID	Sample Identification						
	WG63850-101							
D	0.284							
F	1.41							
G	4.89							
I	0.278							
K	0.305							
O	0.614							
Q	0.854							

Blank extraction date: 5/11/18 **Blank analysis date:** 5/22/18
Conc. units: pg/g Associated Samples: 1 → 26 75X

Compound	Blank ID	Sample Identification						
	↓							
R	1.73							
T	1.27							
U	2.28							
W	0.278							
X	0.305							
Y	1.12							

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC#: 42441B21

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: EF
2nd Reviewer: [signature]

METHOD: 1613B

Compound	Concentration (pg/g)		(≤50) RPD
	13	17	
A	7.34	5.42	30
B	29.4	18.8	44
C	60.8	34.3	56
D	157	114	32
E	115	71.1	47
F	2150	1780	19
H	72.2	55.7	26
I	18.1	14.5	22
J	26.2	20.0	27
K	63.3	56.9	11
L	27.2	23.3	15
N	2.52	2.04	21
M	21.0	16.4	25
O	637	652	2
P	38.7	34.3	12
Q	1370	1670	20
R	3520	2240	44
S	2860	1780	47
T	4160	2420	53
U	5420	4780	13
V	593	457	26
W	529	413	25
X	1020	949	7
Y	2260	2730	19
E (DB225)	89.2	43.6	69
H (DB225)	23.1	13.6	52

LDC#: 42441B21

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: F2
2nd Reviewer: [illegible]

METHOD: GCMS PAH (EPA SW 846 Method 8270D-SIM)

Compound	Concentration (pg/g)		(≤50) RPD
	14	18	
G	14300	14100	1

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2018\42441B21.wpd

LDC #: 42441B21

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ions and relative response factors (RRF) used to quantitate the compound?
Y N N/A Compound quantitation and CRQLs were adjusted to reflect all sample dilutions and dry weight factors (if necessary).

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		All	all compounds reported as estimated maximum possible concentration (EMPC)		Jdet/A
		4	G, Q x'd cal Range		Jdet/A
		6, 9, 11, 13, 17, 19	G x'd cal Range		Jdet/A

Comments: See sample calculation verification worksheet for recalculations

LDC #: 42441B21

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: FT
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.
Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		4	G, Q x'd cal Range		N/R
		6, 9, 11, 13, 17, 19	G x'd cal Range		N/R
		All	H, E from DB5 (report all results from DB225 for H + E		N/R

Comments:

LDC #: 42441B21

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: RT
2nd Reviewer: Q

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
$\%RSD = 100 * (S/X)$

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported RRF (CS3 std)	Recalculated RRF (CS3 std)	Reported %RSD	Recalculated %RSD
1	ICAL	6/4/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	0.9110	0.9110	0.937	0.937	2.46	2.46
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.0829	1.0829	1.088	1.088	3.66	3.66
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	0.9433	0.9433	0.967	0.967	2.22	2.22
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	0.990	0.990	0.9898	0.9898	1.65	1.65
			OCDF (^{13}C-OCDD)	1.2492	1.2492	1.250	1.250	5.74	5.74
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42441B21

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: FD
2nd Reviewer: Q

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
$\%RSD = 100 * (S/X)$

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported RRF (CS3 std)	Recalculated RRF (CS3 std)	Reported %RSD	Recalculated %RSD
1	ICAL	11/6/17	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	0.9466	0.9466	0.971	0.971	2.14	2.14
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.0166	1.0166	1.048	1.048	4.78	4.78
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	0.9904	0.9904	1.014	1.014	5.24	5.24
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	1.021	1.021	1.046	1.046	3.34	3.34
			OCDF (^{13}C-OCDD)	1.2524	1.2524	1.324	1.324	8.25	8.25
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42441B21

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: PT
2nd Reviewer: Q

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = $(A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported RRF (CS3 std)	Recalculated RRF (CS3 std)	Reported %RSD	Recalculated %RSD
1	ICAL	~~12/6/18~~ 2/6/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	0.88	0.88	0.91	0.91	8.10	8.10
	DB225		2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42441B21

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	CCV	5/22/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10.0	10.5	10.5		
	1105		2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10.0	11.1	11.1		
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50.0	51.2	51.2		
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50.0	49.7	49.7		
			OCDF (^{13}C-OCDD)	100.0	99.6	99.6		
2	CCV	5/22/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)		10.8	10.8		
	2127		2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)		11.0	11.0		
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)		50.6	50.6		
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)		51.0	51.0		
			OCDF (^{13}C-OCDD)		96.4	96.4		
3	CCV	5/23/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)		10.6	10.6		
	0836		2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)		10.7	10.7		
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)		51.7	51.7		
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)		49.7	49.7		
			OCDF (^{13}C-OCDD)		95.1	95.1		

Comments: Refer to Routine Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: K244/B21

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Reviewer: FT
2nd Reviewer: Q

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	CCV	5/23/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10.0	10.0	10.0		
	DB225		2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)					
	0903		1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)					
			OCDF (^{13}C-OCDD)					
2	CCV	5/23/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10.0	10.6	10.6		
	DB225		2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)					
	2047		1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)					
			OCDF (^{13}C-OCDD)					
3	CCV	5/24/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10.0	F7 ~~10.4~~ 10.7	10.7		
	0623		2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10.0	11.4	11.4		
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50.0	49.8	49.8		
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50.0	51.8	51.8		
			OCDF (^{13}C-OCDD)	100.0	98.3	98.3		

Comments: Refer to Routine Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42441B21

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Page: 1 of 1
Reviewer: EF
2nd Reviewer: [signature]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	CCV	5/24/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10.0	10.9	10.9		
	DB225		2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)					
	0942		1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)					
			OCDF (^{13}C-OCDD)					
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)					
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)					
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)					
			OCDF (^{13}C-OCDD)					
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)					
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)					
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)					
			OCDF (^{13}C-OCDD)					

Comments: Refer to Routine Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42441B21

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: FT
2nd Reviewer:

METHOD: GC/MS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCS - LCSD I * 2/(LCS + LCSD) LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: WG63850-102 LCS

Compound	Spike Added (ng/mL)		Spiked Sample Concentration (ng/mL)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalc
2,3,7,8-TCDD	10.0	NA	10.6	NA	106	106				
1,2,3,7,8-PeCDD	50.0		52.1		104	104				
1,2,3,4,7,8-HxCDD	50.0		50.0		100	100				
1,2,3,4,7,8,9-HpCDF	50.0		51.2		103	103				
OCDF	100.0		94.5		94.5	94.5	NA			

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42441B21

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: FT
2nd reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

RRF = Relative Response Factor (average) from the initial calibration

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. #1, TCDD:

Conc. = $\frac{7.48 \times 10^3 \text{ (area)}}{2.92 \times 10^6 (1.0166)(2.05)}$

= 2.458 pg/g

#	Sample ID	Compound	Reported Concentration (pg/g)	Calculated Concentration (pg/g)	Qualification
	#1	TCDD	2.46	2.45B	
	#25 (3,3',7,8 TCDF DB225)				
	= $\frac{9.74 \times 10^5 \text{ (area)}}{9.52 \times 10^7 (0.88)(2.07)}$				
	= 11.23 pg/g				
	lab reported = 11.2 pg/g				

LDC #: 42441

EDD POPULATION COMPLETENESS WORKSHEET

Anchor

Date: 7/19/18

2nd Reviewer:

The LDC job number listed above was entered by BA.

Entered from Body or Summary

	EDD Process	Y/N	Initial	Comments/Action
I.	EDD Completeness	-		
Ia.	- All methods present?	Y	BA	
Ib.	- All samples present/match report?	Y		
Ic.	- All reported analytes present?	Y		
Id.	- 10% or 100% verification of EDD?	Y		
II.	EDD Preparation/Entry	-		
IIa.	- QC Level applied? (EPAStage2B or EPAStage4)	Y		
IIb.	- Laboratory EMPC qualified results qualified (J with reason code 23)?	Y		
III.	Reasonableness Checks	-		
IIIa.	- Do all qualified ND results have ND qualifier (e.g. UJ)?	Y		
IIIb.	- Do all qualified detect results have detect qualifier (e.g. J)?	Y		
IIIc.	- If reason codes are used, do all qualified results have reason code field populated, and vice versa?	Y		
IIId.	- Do blank concentrations in report match EDD, where data was qualified due to blank?	Y		
IIIe.	- Is the detect flag set to "N" for all "U" qualified blank results?	Y		
IIIf.	- Were there multiple results due to dilutions/reanalysis? If so, were results qualified appropriately?	Y/Y		
IIIg.	-Are all results marked reportable "Yes" unless rejected for overall assessment in the data validation report?	Y		For some results, only the dilution was reported. LDC made no changes and added validation qualifiers as necessary
IIIh.	-Are there any lab "R" qualified data? / Are the entry columns blank for these results?	N/A		
IIIi.	-Are there any discrepancies between the data packet and the EDD?	Any		See above

Notes: *see discrepancy sheet

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Anchor Environmental, LLC
720 Olive Way, Suite 1900
Seattle, WA 98101
ATTN: Ms. Cindy Fields

July 20, 2018

SUBJECT: Shelton Harbor, Data Validation

Dear Ms. Fields,

Enclosed is the final validation report for the fraction listed below. This SDG was received on June 18, 2018. Attachment 1 is a summary of the samples that were reviewed for analysis.

LDC Project #42449:

SDG #	**Fraction**
DPWG64183/WG636914	Polychlorinated Dioxins/Dibenzofurans

The data validation was performed under Stage 4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- Sampling and Quality Assurance Project Plan for Shelton Harbor Sediment Cleanup Unit, Oakland Bay and Shelton Harbor Sediment Cleanup Site, Shelton Washington; July 2017
- USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review, April 2016

Please feel free to contact us if you have any questions.

Sincerely,

Christina Rink

Christina Rink
Project Manager/Senior Chemist

EDD / Stage 2B / Dioxins Stage 4 **LDC #42449 (Simpson Timber Company/Anchor Environmental - Seattle WA / Shelton Harbor)**

LDC	SDG#	DATE REC'D	(3) DATE DUE	Dioxins (1613B)																															
Matrix: Water/Sediment				W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	DPWG64183 /WG63914	06/18/18	07/10/18	1	0																														
Total	T/CR			1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Shaded cells indicate Stage 4 validation (all other cells are Stage 2B validation). These sample counts do not include MS, MSD, or DUP's.

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Shelton Harbor

LDC Report Date: June 28, 2018

Parameters: Polychlorinated Dioxins/Dibenzofurans

Validation Level: Stage 4

Laboratory: SGS AXYS Analytical Services, LTD

Sample Delivery Group (SDG): DPWG64183/WG63914

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SH-RB-SG-180510	L29324-1	Water	05/10/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Quality Assurance Project Plan for Shelton Harbor Sediment Cleanup Unit, Oakland Bay and Shelton Harbor Sediment Cleanup Site, Shelton, Washington (July 2017) and a modified outline of the USEPA National Functional Guidelines (NFG) for High Resolution Superfund Methods Data Review (April 2016). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Dioxins/Dibenzofurans by Environmental Protection Agency (EPA) Method 1613B

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

The chain-of-custodies were reviewed for documentation of cooler temperatures. Cooler temperature was reported at 7.7°C upon receipt by the laboratory. No data was qualified based on cooler temperature.

All technical holding time requirements were met.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required frequency.

Retention time windows were established for all homologues. The chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomer was less than or equal to 25%.

The static resolving power was at least 10,000 (10% valley definition).

III. Initial Calibration

A five point initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for unlabeled compounds and labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for unlabeled compounds and labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Extraction Date	Compound	Concentration	Associated Samples
WG63914-101	05/24/18	1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,7,8-PeCDF Total HxCDD Total HpCDD Total PeCDF	0.707 pg/L 2.79 pg/L 0.591 pg/L 0.712 pg/L 1.40 pg/L 0.591 pg/L	All samples in SDG DPWG64183/WG63914

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
SH-RB-SG-180510	1,2,3,4,6,7,8-HpCDD Total HxCDD Total HpCDD Total PeCDF	2.08 pg/L 0.708 pg/L 4.12 pg/L 0.503 pg/L	2.08U pg/L 0.708J pg/L 4.12J pg/L 0.503J pg/L

VI. Field Blanks

Sample SH-RB-SG-180510 was identified as a rinsate blank. No contaminants were found with the following exceptions:

Blank ID	Compound	Concentration (pg/L)
SH-RB-SG-180510	1,2,3,4,6,7,8-HpCDD OCDD 2,3,4,7,8-PeCDF 1,2,3,4,6,7,8-HpCDF OCDF Total HxCDD Total HpCDD Total PeCDF Total HpCDF	2.08 15.3 0.503 0.538 1.22 0.708 4.12 0.503 1.19

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Ongoing Precision Recovery

Ongoing precision recovery (OPR) samples were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Internal Standards

All internal standard recoveries (%R) were within QC limits.

XI. Compound Quantitation

All compound quantitations met validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
All samples in SDG DPWG64183/WG63914	All compounds were reported as estimated maximum possible concentration (EMPC).	J (all detects)	A

XII. Target Compound Identifications

All target compound identifications met validation criteria.

XIII. System Performance

The system performance was acceptable.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to results reported by the laboratory as EMPCs, data were qualified as estimated in one sample.

Due to laboratory blank contamination, data were qualified as not detected or estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

Shelton Harbor
Polychlorinated Dioxins/Dibenzofurans - Data Qualification Summary - SDG DPWG64183/WG63914

Sample	Compound	Flag	A or P	Reason
SH-RB-SG-180510	All compounds were reported as estimated maximum possible concentration (EMPC).	J (all detects)	A	Compound quantitation (EMPC)

Shelton Harbor
Polychlorinated Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG DPWG64183/WG63914

Sample	Compound	Modified Final Concentration	A or P
SH-RB-SG-180510	1,2,3,4,6,7,8-HpCDD Total HxCDD Total HpCDD Total PeCDF	2.08U pg/L 0.708J pg/L 4.12J pg/L 0.503J pg/L	A

LDC #: 42449A21 **VALIDATION COMPLETENESS WORKSHEET** Date: 6/27/18
SDG #: DPWG64183/WG63914 Stage 4 Page: 1 of 1
Laboratory: SGS AXYS Analytical Services, LTD Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Polychlorinated Dioxins/Dibenzofurans (EPA Method 1613B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

cooler temp = 7.7°C

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration/~~ICV~~	A / N	% RSD ≤ 20
IV.	Continuing calibration	A	ccv = QC limits
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	RB = 1
VII.	Matrix spike/Matrix spike duplicates	N	QC sample
VIII.	Laboratory control samples	A	OPR
IX.	Field duplicates	N	
X.	Internal standards	A	
XI.	Compound quantitation RL/LOQ/LODs	SW	
XII.	Target compound identification	A	
XIII.	System performance	A	
XIV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	SH-RB-SG-180510	L29324-1	Water	05/10/18
2				
3				
4				
5				
6				
7				
8				
9				
10				

Notes:

	WG63914-101						

LDC #: 42449A21

VALIDATION FINDINGS CHECKLIST

Reviewer: FT
2nd Reviewer: A

Method: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS Instrument performance check				
Was PFK exact mass 380.9760 verified?	✓			
Were the retention time windows established for all homologues?	✓			
Was the chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomers ≤ 25% ?	✓			
Is the static resolving power at least 10,000 (10% valley definition)?	✓			
Was the mass resolution adequately check with PFK?	✓			
Was the presence of 1,2,8,9-TCDD and 1,3,4,6,8-PeCDF verified?	✓			
IIIa. Initial calibration				
Was the initial calibration performed at 5 concentration levels?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20% for all compounds?	✓			
Did all calibration standards meet the Ion Abundance Ratio criteria?	✓			
Was the signal to noise ratio for each target compound ≥ 2.5 and for each recovery and internal standard ≥ 10?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?			✓	
Were all concentrations for the unlabeled compounds ≤ 20% and for labeled compounds ≤ 30% ??			✓	
IV. Continuing calibration				
Was a continuing calibration performed at the beginning and end of each 12 hour period?	✓			
Were all concentrations for the unlabeled compounds and for labeled compounds within QC limits (Method 1613B, Table 6)?	✓			
Did all routine calibration standards meet the Ion Abundance Ratio criteria?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank performed for each matrix and whenever a sample extraction was performed?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet?	✓			
VI. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.	✓			
VII. Matrix spike/Matrix spike duplicates				

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.			✓	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
X. Internal standards				
Were internal standard recoveries within the 25-150% criteria?	✓			
Was the minimum S/N ratio of all internal standard peaks ≥ 10?	✓			
XI. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. Target compound identification				
For 2,3,7,8 substituted congeners with associated labeled standards, were the retention times of the two quantitation peaks within -1 to 3 sec. of the RT of the labeled standard?	✓			
For 2,3,7,8 substituted congeners without associated labeled standards, were the relative retention times of the two quantitation peaks within 0.005 time units of the RRT measured in the routine calibration?	✓			
For non-2,3,7,8 substituted congeners, were the retention times of the two quantitation peaks within RT established in the performance check solution?	✓			
Did compound spectra contain all characteristic ions listed in the table attached?	✓			
Was the Ion Abundance Ratio for the two quantitation ions within criteria?	✓			
Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?	✓			
Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?	✓			
For PCDF identification, was any signal (S/N ≥ 2.5, at ± seconds RT) detected in the corresponding PCDPE channel?	✓			
Was an acceptable lock mass recorded and monitored?	✓			
XIII. System performance				
System performance was found to be acceptable.	✓			
XIV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:_____

LDC #: 42449A21

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: FT
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
Y N N/A Was the method blank contaminated?

Blank extraction date: 5/24/18 **Blank analysis date:** 5/31/18 **Associated samples:** All
Conc. units: pg/L

Compound	Blank ID	Sample Identification						
	WG63914-10	1 5X		1				
F	0.707	3.535		2.084				
G	2.79	13.95						
I	0.591	2.955						
T	0.712	3.56		0.708 J				
U	1.40	7		4.12 J				
W	0.591	~~0.5~~ 2.955		0.503 J				

Blank extraction date:_____ **Blank analysis date:**_____
Conc. units:_____ Associated Samples:_____

Compound	Blank ID	Sample Identification						

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 42449A21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: FT
2nd reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

Sample: 1 (RB) Field Blank / Rinsate Blank/ Equipment Blank / Rinsate (circle one)

Compound	Concentration Units (pg/L)
F	2.08
G	15.3
J	0.503
O	0.538
Q	1.22
T	0.708
U	4.12
W	0.503
Y	1.19

Sample: _____ Field Blank / Rinsate Blank/ Equipment Blank / Rinsate (circle one)

Compound	Concentration Units (pg/L)

LDC #: 42449A21

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: FT
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N (N/A) Were the correct internal standard (IS), quantitation ions and relative response factors (RRF) used to quantitate the compound?
Y N (N/A) Compound quantitation and CRQLs were adjusted to reflect all sample dilutions and dry weight factors (if necessary).

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		All	all compounds reported as estimated maximum possible concentration (EMPC)		Jdet/A

Comments: See sample calculation verification worksheet for recalculations

LDC #: 42449A21

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: FD
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported RRF (CS3 std)	Recalculated RRF (CS3 std)	Reported %RSD	Recalculated %RSD
1	ICAL	11/6/17	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	0.9466	0.9466	0.971	0.971	2.14	2.14
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.0166	1.0166	1.048	1.048	4.78	4.78
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	0.9904	0.9904	1.014	1.014	5.24	5.24
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	1.021	1.021	1.046	1.046	3.34	3.34
			OCDF (^{13}C-OCDD)	1.2524	1.2524	1.324	1.324	8.25	8.25
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42449A21

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Reviewer: FT
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	CCV	5/31/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10.0	10.7	10.7		
	1439		2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10.0	10.7	10.7		
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50.0	51.4	51.4		
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50.0	51.7	51.7		
			OCDF (^{13}C-OCDD)	100.0	97.0	97.0		
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)					
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)					
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)					
			OCDF (^{13}C-OCDD)					
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)					
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)					
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)					
			OCDF (^{13}C-OCDD)					

Comments: Refer to Routine Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42449A21

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: FT
2nd Reviewer:

METHOD: GC/MS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration
SA = Spike added

RPD = | LCS - LCSD | * 2/(LCS + LCSD) LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: WG639/4-102 (OPR)

Compound	Spike Added (ng/ml)		Spiked Sample Concentration (ng/ml)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalc
2,3,7,8-TCDD	10.0	NA	9.60	NA	96.0	96.0				
1,2,3,7,8-PeCDD	50.0		46.3		92.6	92.6				
1,2,3,4,7,8-HxCDD	50.0		46.9		93.9	93.9				
1,2,3,4,7,8,9-HpCDF	50.0		46.8		93.7	93.7				
OCDF	100.0		87.0		87.0	87.0	NA			

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: #24491A2/

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: FT
2nd reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

RRF = Relative Response Factor (average) from the initial calibration

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. #1 . OCDD

Conc. = $\frac{9.68 \times 10^{3}(4000)}{2.30 \times 10^{6}(1.0368)(1.06}$

= 15.31 pg/L

#	Sample ID	Compound	Reported Concentration (pg/L)	Calculated Concentration (pg/L)	Qualification
	#1	OCDD	15.3	15.31	

LDC #: 42449

EDD POPULATION COMPLETENESS WORKSHEET

Anchor

Date: 7/19/18

2nd Reviewer: CG

The LDC job number listed above was entered by BA.

Entered from Body or Summary

	EDD Process	Y/N	Initial	Comments/Action
I.	EDD Completeness	-		
Ia.	- All methods present?	Y	BA	
Ib.	- All samples present/match report?	Y		
Ic.	- All reported analytes present?	Y		
Id.	- 10% or 100% verification of EDD?	Y		
II.	EDD Preparation/Entry	-		
IIa.	- QC Level applied? (EPAStage2B or EPAStage4)	Y		
IIb.	- Laboratory EMPC qualified results qualified (J with reason code 23)?	Y		
III.	Reasonableness Checks	-		
IIIa.	- Do all qualified ND results have ND qualifier (e.g. UJ)?	Y		
IIIb.	- Do all qualified detect results have detect qualifier (e.g. J)?	Y		
IIIc.	- If reason codes are used, do all qualified results have reason code field populated, and vice versa?	Y		
IIId.	- Do blank concentrations in report match EDD, where data was qualified due to blank?	Y		
IIIe.	- Is the detect flag set to "N" for all "U" qualified blank results?	Y		
IIIf.	- Were there multiple results due to dilutions/reanalysis? If so, were results qualified appropriately?	N/A		
IIIg.	-Are all results marked reportable "Yes" unless rejected for overall assessment in the data validation report?	Y		
IIIh.	-Are there any lab "R" qualified data? / Are the entry columns blank for these results?	N/A		
IIIi.	-Are there any discrepancies between the data packet and the EDD?	N		

Notes: *see discrepancy sheet

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Anchor Environmental, LLC
720 Olive Way, Suite 1900
Seattle, WA 98101
ATTN: Ms. Cindy Fields

July 31, 2018

SUBJECT: Shelton Harbor, Data Validation

Dear Ms. Fields,
Enclosed is the final validation report for the fraction listed below. This SDG was received on June 19, 2018. Attachment 1 is a summary of the samples that were reviewed for analysis.

LDC Project #42458:

SDG #	**Fraction**
B2290	Polychlorinated Dioxins/Dibenzofurans

The data validation was performed under Stage 4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- Sampling and Quality Assurance Project Plan for Shelton Harbor Sediment Cleanup Unit, Oakland Bay and Shelton Harbor Sediment Cleanup Site, Shelton Washington; July 2017
- USEPA National Functional Guidelines for High Resolution Superfund Methods Data Review, April 2016

Please feel free to contact us if you have any questions.

Sincerely,

Christina Rink

Christina Rink
Project Manager/Senior Chemist

Attachment 1

EDD / Stage 2B / Dioxins Stage 4 **LDC #42458 (Simpson Timber Company/Anchor Environmental - Seattle WA / Shelton Harbor)**

LDC	SDG#	DATE REC'D	(3) DATE DUE	Dioxins (1613B)																																	
Matrix:	Water/Sediment			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	B2290	06/19/18	07/11/18	0	10																																
Total	T/CR			0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10

Shaded cells indicate Stage 4 validation (all other cells are Stage 2B validation). These sample counts do not include MS, MSD, or DUP's.

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Shelton Harbor

LDC Report Date: July 9, 2018

Parameters: Polychlorinated Dioxins/Dibenzofurans

Validation Level: Stage 4

Laboratory: SGS North America, Inc.

Sample Delivery Group (SDG): B2290

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SG-01-SG-170713	B2290-001	Sediment	07/13/17
SH-03-SC-0-10-170809	B2290-002	Sediment	08/09/17
SH-04-SG-170713(Split)	B2290-003	Sediment	07/13/17
SH-13A-SG-170713	B2290-004	Sediment	07/13/17
SH-14-SG-170712	B2290-005	Sediment	07/12/17
SH-19-SG-170712(Split)	B2290-006	Sediment	07/12/17
SH-21-SG-170712(Split)	B2290-007	Sediment	07/12/17
SH-22-SG-170712	B2290-008	Sediment	07/12/17
SH-24-SG-170713	B2290-009	Sediment	07/13/17
SH-28-SG-170712	B2290-010	Sediment	07/12/17

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Sampling and Quality Assurance Project Plan for Shelton Harbor Sediment Cleanup Unit, Oakland Bay and Shelton Harbor Sediment Cleanup Site, Shelton, Washington (July 2017) and a modified outline of the USEPA National Functional Guidelines (NFG) for High Resolution Superfund Methods Data Review (April 2016). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Dioxins/Dibenzofurans by Environmental Protection Agency (EPA) Method 1613B

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required frequency.

Retention time windows were established for all homologues. The chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomer was less than or equal to 25%.

The static resolving power was at least 10,000 (10% valley definition).

III. Initial Calibration

A five point initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for unlabeled compounds and labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for unlabeled compounds and labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Ongoing Precision Recovery

Ongoing precision recovery (OPR) samples were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Internal Standards

All internal standard recoveries (%R) were within QC limits with the following exceptions:

Sample	Finding
SH-21-SG-170712(Split)	The cleanup standard 1,2,3,4,7-PeCDD was found to be outside the method control limits, since the associated labeled standard were within the QC limits, no qualification is necessary.

XI. Compound Quantitation

All compound quantitations met validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
All samples in SDG B2290	All compounds were reported as estimated maximum possible concentration (EMPC).	J (all detects)	A

Sample	Compound	Finding	Criteria	Flag	A or P
SH-03-SC-0-10-170809	1,2,3,4,6,7,8-HpCDD OCDD OCDF	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects)	P

XII. Target Compound Identifications

All target compound identifications met validation criteria.

XIII. System Performance

The system performance was acceptable.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to results reported by the laboratory as EMPCs and results exceeding calibration range, data were qualified as estimated in ten samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

Shelton Harbor
Polychlorinated Dioxins/Dibenzofurans - Data Qualification Summary - SDG B2290

Sample	Compound	Flag	A or P	Reason
SG-01-SG-170713 SH-03-SC-0-10-170809 SH-04-SG-170713(Split) SH-13A-SG-170713 SH-14-SG-170712 SH-19-SG-170712(Split) SH-21-SG-170712(Split) SH-22-SG-170712 SH-24-SG-170713 SH-28-SG-170712	All compounds were reported as estimated maximum possible concentration (EMPC).	J (all detects)	A	Compound quantitation (EMPC)
SH-03-SC-0-10-170809	1,2,3,4,6,7,8-HpCDD OCDD OCDF	J (all detects) J (all detects) J (all detects)	P	Compound quantitation (exceeded range)

Shelton Harbor
Polychlorinated Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG B2290

No Sample Data Qualified in this SDG

LDC #: 42458A21 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/9/18

SDG #: B2290 Stage 4 Page: 1 of 2

Laboratory: SGS North America, Inc. Reviewer: EJ

2nd Reviewer:

METHOD: HRGC/HRMS Polychlorinated Dioxins/Dibenzofurans (EPA Method 1613B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration/~~ICV~~	A / N	%D ≤ 20 no ICV
IV.	Continuing calibration	A	CCV = all samples
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Matrix spike/Matrix spike duplicates	N	
VIII.	Laboratory control samples	A	OPR
IX.	Field duplicates	N	
X.	Internal standards	SW	
XI.	Compound quantitation RL/LOQ/LODs	SW	
XII.	Target compound identification	A	
XIII.	System performance	A	
XIV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	SG-01-SG-170713	B2290-001	Sediment	07/13/17
2	SH-03-SC-0-10-170809	B2290-002	Sediment	08/09/17
3	SH-04-SG-170713(Split)	B2290-003	Sediment	07/13/17
4	SH-13A-SG-170713	B2290-004	Sediment	07/13/17
5	SH-14-SG-170712	B2290-005	Sediment	07/12/17
6	SH-19-SG-170712(Split)	B2290-006	Sediment	07/12/17
7	SH-21-SG-170712(Split)	B2290-007	Sediment	07/12/17
8	SH-22-SG-170712	B2290-008	Sediment	07/12/17
9	SH-24-SG-170713	B2290-009	Sediment	07/13/17
10	SH-28-SG-170712	B2290-010	Sediment	07/12/17
11				

Notes:

	B2290_15910 MB						

LDC #: 42458A21

VALIDATION FINDINGS CHECKLIST

Reviewer: FM
2nd Reviewer:

Method: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS Instrument performance check				
Was PFK exact mass 380.9760 verified?	✓			
Were the retention time windows established for all homologues?	✓			
Was the chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomers ≤ 25% ?	✓			
Is the static resolving power at least 10,000 (10% valley definition)?	✓			
Was the mass resolution adequately check with PFK?	✓			
Was the presence of 1,2,8,9-TCDD and 1,3,4,6,8-PeCDF verified?	✓			
IIIa. Initial calibration				
Was the initial calibration performed at 5 concentration levels?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20% for all compounds?	✓			
Did all calibration standards meet the Ion Abundance Ratio criteria?	✓			
Was the signal to noise ratio for each target compound ≥ 2.5 and for each recovery and internal standard ≥ 10?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓		✓	
Were all concentrations for the unlabeled compounds ≤ 20% and for labeled compounds ≤ 30% ??			✓	
IV. Continuing calibration				
Was a continuing calibration performed at the beginning and end of each 12 hour period?	✓			
Were all concentrations for the unlabeled compounds and for labeled compounds within QC limits (Method 1613B, Table 6)?	✓			
Did all routine calibration standards meet the Ion Abundance Ratio criteria?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank performed for each matrix and whenever a sample extraction was performed?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet?		✓		
VI. Field blanks				
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	
VII. Matrix spike/Matrix spike duplicates				

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.			✓	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	•	✓		
Target compounds were detected in the field duplicates.			✓	
X. Internal standards				
Were internal standard recoveries within QC criteria?	✓			
Was the minimum S/N ratio of all internal standard peaks ≥ 10?	✓			
XI. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. Target compound identification				
For 2,3,7,8 substituted congeners with associated labeled standards, were the retention times of the two quantitation peaks within -1 to 3 sec. of the RT of the labeled standard?	✓			
For 2,3,7,8 substituted congeners without associated labeled standards, were the relative retention times of the two quantitation peaks within 0.005 time units of the RRT measured in the routine calibration?	✓			
For non-2,3,7,8 substituted congeners, were the retention times of the two quantitation peaks within RT established in the performance check solution?	✓			
Did compound spectra contain all characteristic ions listed in the table attached?	✓			
Was the Ion Abundance Ratio for the two quantitation ions within criteria?	✓			
Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?	✓			
Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?	✓			
For PCDF identification, was any signal (S/N ≥ 2.5, at ± seconds RT) detected in the corresponding PCDPE channel?	✓			
Was an acceptable lock mass recorded and monitored?	✓			
XIII. System performance				
System performance was found to be acceptable.	✓			
XIV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:_____

LDC #: 42458A21

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: FT
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Are all internal standard recoveries were within the 40-135% criteria?
Y N N/A Was the S/N ratio all internal standard peaks ≥ 10?

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit: 40-135%)	Qualifications
		7	The clean up standard 12347-PeCDD was found to be outside the Method control limits, since the associated labeled standard were within the QC limits, no qualification is necessary	( )	text
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	Internal Standards	Associated compounds		Internal Standards	Associated compounds
A.	^{13}C-2,3,7,8-TCDF		I.	^{13}C-OCDD	
B.	^{13}C-2,3,7,8-TCDD		J.	^{13}C-1,2,3,4-TCDD	
C.	^{13}C-1,2,3,7,8-PeCDF		K.	^{13}C-1,2,3,7,8,9-HxCDD	
D.	^{13}C-1,2,3,7,8-PeCDD		L.	^{13}C-1,2,3,4,7,8-HxCDF	
E.	^{13}C-1,2,3,6,7,8-HxCDF				
F.	^{13}C-1,2,3,6,7,8-HxCDD				
G.	^{13}C-1,2,3,4,6,7,8-HpCDF				
H	^{13}C-1,2,3,4,6,7,8-HpCDD				

LDC #: 42458A21

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ions and relative response factors (RRF) used to quantitate the compound?
Y N N/A Compound quantitation and CRQLs were adjusted to reflect all sample dilutions and dry weight factors (if necessary).

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		All	all compounds reported as estimated maximum possible concentration (EMPC)		Jdet/A
		2	F, G, Q	x'd cal Range	Jdet/P

Comments: See sample calculation verification worksheet for recalculations

LDC #: 42458A21

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: KM
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported RRF (CS3 std)	Recalculated RRF (CS3 std)	Reported %RSD	Recalculated %RSD
1	ICAL	11/22/17	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	1.02	1.02	1.05	1.05	4.5	4.5
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.10	1.10	1.13	1.13	4.5	4.5
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	1.06	1.06	1.08	1.08	3.8	3.8
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	0.98	0.98	1.00	1.00	4.3	4.3
			OCDF (^{13}C-OCDD)	1.03	1.03	1.09	1.09	5.0	5.0
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 424582/

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	~~Average RRF~~ concentration (initial)	Reported ~~RRF~~ concentration (CC)	Recalculated ~~RRF~~ concentration (CC)	Reported %D	Recalculated %D
1	CCV	6/13/18	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10.0	10.9	10.9		
	1634		2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)		11.0	11.0		
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)		53.2	53.2		
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)		53.5	53.5		
			OCDF (^{13}C-OCDD)	100.0	108	108		
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)					
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)					
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)					
			OCDF (^{13}C-OCDD)					
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)					
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)					
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)					
			OCDF (^{13}C-OCDD)					

Comments: Refer to Routine Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: K2458A21

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC/MS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCS - LCSD I * 2/(LCS + LCSD) LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: OPR1 15910

Compound	Spike Added (ng/ml)		Spiked Sample Concentration (ng/ml)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalc
2,3,7,8-TCDD	10.0	NA	11.5	NA	NR	115				
1,2,3,7,8-PeCDD	50.0	↓	57.4	↓	↓	114.8				
1,2,3,4,7,8-HxCDD	50.0		60.2			120.4				
1,2,3,4,7,8,9-HpCDF	50.0		60.2			120.4				
OCDF	100.0	↓	118	↓	↓	118				

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42458421

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: FT
2nd reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 1613B)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

RRF = Relative Response Factor (average) from the initial calibration

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. #1, OCDF:

Conc. = $\frac{4.24 \times 10^7 \ (4000)}{2.26 \times 10^7 \ (1.03)(7.67)}$

= 950 pg/g

#	Sample ID	Compound	Reported Concentration (pg/g)	Calculated Concentration (pg/g)	Qualification
	#1	OCDF	950	950	

LDC #: 42458

EDD POPULATION COMPLETENESS WORKSHEET

Anchor

Date: 7/11/18

2nd Reviewer:

The LDC job number listed above was entered by BA.

Entered from Body or Summary

	EDD Process	Y/N	Initial	Comments/Action
I.	EDD Completeness	-		
Ia.	- All methods present?	Y	BA	
Ib.	- All samples present/match report?	Y		
Ic.	- All reported analytes present?	Y		
Id.	- 10% or 100% verification of EDD?	Y		
II.	EDD Preparation/Entry	-		
IIa.	- QC Level applied? (EPAStage2B or EPAStage4)	Y		
IIb.	- Laboratory EMPC qualified results qualified (J with reason code 23)?	Y		
III.	Reasonableness Checks	-		
IIIa.	- Do all qualified ND results have ND qualifier (e.g. UJ)?	N/A		
IIIb.	- Do all qualified detect results have detect qualifier (e.g. J)?	Y		
IIIc.	- If reason codes are used, do all qualified results have reason code field populated, and vice versa?	Y		
IIId.	- Do blank concentrations in report match EDD, where data was qualified due to blank?	N/A		
IIIe.	- Is the detect flag set to "N" for all "U" qualified blank results?			
IIIf.	- Were there multiple results due to dilutions/reanalysis? If so, were results qualified appropriately?			
IIIg.	-Are all results marked reportable "Yes" unless rejected for overall assessment in the data validation report?	Y		
IIIh.	-Are there any lab "R" qualified data? / Are the entry columns blank for these results?	N/A		
IIIi.	-Are there any discrepancies between the data packet and the EDD?	N		

Notes: *see discrepancy sheet

Attachment A-2
Field Collection Forms

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** **Station ID:** SMA1-SG01

Sampling Crew: BW/JA/CO
Sample Date: 4/25/18 Sampling Method: Sed Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunney
Station Coordinates: N / Lat. 47.212712 °N
E / Long. 123.090899 °W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA1-SG01-180425
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: — ft. ~10'
Tide Level: +8.99 ft.
Depth MLLW: — ft.
Grab Recovery: 24 cm Time: 1745
Sample Interval: — cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F Trace	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: Trace biota (fish/worms)
Trace organics - sticks/twigs

DGT Location? Yes / No	If yes	Temp:	pH:	Salinity:
Duplicate Station? Yes / No				

Processing Check-list

Processing Crew: BW/JA/CO **Time:** 1745
Date: 4/25/18

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1752 Homogenization End Time: 1753

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat.

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 160008-01.03 **Station ID:** SMA1-SG02

Sampling Crew: JA/BW/CO
Sample Date: 4/25/18 Sampling Method: Sed grab
Sampling Vessel: Peter R
Subcontractor(s): MES Weather: Cloudy
Station Coordinates: N / Lat. 47.212897°N
E / Long. 123.078361°W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA1-SG02-180425
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: — ft. ~9'
Tide Level: +10.38 ft.
Depth MLLW: — ft.
Grab Recovery: 21 cm Time: 1640
Sample Interval: — cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F ~10%	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: Trace organic - wood debris
Trace biota (shells)

DGT Location? **Yes / No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: BW/JA/CO **Time:** 1640
Date: 4/25/18

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1648 Homogenization End Time: 1649

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110808-01-03 **Station ID:** SMA1-SG03

Sampling Crew: BW/JA/CO
Sample Date: 4/25/18 Sampling Method: Sed Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Cloudy
Station Coordinates: N / Lat. 47.213082°W
E / Long. 123.089827°W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA1-SG03
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 3
Water Depth: ~ ft. ~8'
Tide Level: 10.78 ft.
Depth MLLW: ft.
Grab Recovery: 25 cm Time: 1600
Sample Interval: ~ cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F ~20%	black	mod dense/stiff	moderate	other:	slight	Moist
silt/clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: Abundant organic material - wood debris/leaves

DGT Location? **Yes / No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: JA/BW/CO **Time:** 1600
Date: 4/25/18

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1605 Homogenization End Time: 1606

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat.

Recorded by: Eli Porter

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 130008-01.03 **Station ID:** SMA1-SG04

Sampling Crew: BW/JA/CO
Sample Date: 4/25/18 Sampling Method: Sed Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Cloudy
Station Coordinates: N / Lat.
E / Long.
Datum: NAD 83 / WGS 84 zone:

Sample ID: DDT-SMA1-SG04-180425
Analysis: (Dioxins Furans / TBT / TOC / Cu / DGT) Other: Other:
(Circle Appropriate Analyses)

Accecpted Grab Number: 3
Water Depth: ft
Tide Level: ~~+0.85~~ ft. 10.87
Depth MLLW: ft.
Grab Recovery: >10 cm Time: 1540
Sample Interval: — cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand (C M F) ~20%	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: substantial woodwaste, trace biota

DGT Location? **Yes / No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: JA/BW/HO **Time:** 1540
Date: 4/25/18

Photograph of unhomogenized sample: [Y]
Homogenization Start Time: 1545 Homogenization End Time: 1546

Homogenize sample with paddle until consisyency and color are uniform: [Y]

Photograph of homogenized sample: [Y]

Comments:
Sample homogenized on boat

Recorded by:

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-0.03 **Station ID:** SMA1-SG05

Sampling Crew: JA/CO/BW
Sample Date: 4/25/18 Sampling Method: Sed grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: mostly cloudy
Station Coordinates: N / Lat. 47.212366° N
E / Long. 123.089279° W
Datum: NAD 83 / (WGS 84) zone:

Sample ID: PDI-SMA1-SG05-180425
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT (Circle Appropriate Analyses)
Other:
Other:

Accecpted Grab Number: 1
Water Depth: — ft. ~7'
Tide Level: +8.63 ft.
Depth MLLW: — ft.
Grab Recovery: 14 cm Time: 1350
Sample Interval: — cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:	Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none H2S	none	Dry
gravel	gray	soft/loose	slight Petroleum	trace	Damp
sand C M F >5%	black	mod dense/stiff	moderate other:	slight	Moist
silt clay	brown	dense/stiff	strong	moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming	heavy	

Comments: abundant wood debris

DGT Location? **Yes / No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: JA/BW/CO **Time:** 1350
Date: 4/25/18

Photograph of unhomogenized sample: ✓
Homogenization Start Time: 1356 Homogenization End Time: 1357

Homogenize sample with paddle until consisyency and color are uniform ✓

Photograph of homogenized sample: ✓

Comments:
Sample homogerized on boat.

Recorded by: Ali Britt

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA1-SED06

Sampling Crew: JA | BW | CO
Sample Date: 4/25/2018 Sampling Method: Sed Grab
Sampling Vessel: Peter R2
Subcontractor(s): MSS Weather: Partly Cloudy
Station Coordinates: N / Lat. 47.272164°N
E / Long. 123.089814°W
Datum: NAD 83 / (WGS 84) zone:

Sample ID: PDI-SMA1-SED06-180425
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT (Circle Appropriate Analyses) Other: Other:

Accecpted Grab Number: 1
Water Depth: ~ ft. ~7'
Tide Level: +9.21 ft.
Depth MLLW: ft.
Grab Recovery: >10 cm Time: 1405
Sample Interval: ~ cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	(soft/loose)	slight	Petroleum	trace	Damp
(sand) C M (F) ~15%	black	mod (dense/stiff)	moderate	other:	slight	Moist
(silt) clay	(brown)	dense/stiff	strong		moderate	(Wet)
(organic matter)	brown surface	very dense/stiff	overwhelming		heavy	

Comments: Trace organics - woody debris

DGT Location? Yes (No) If yes Temp: pH: Salinity:
Duplicate Station? Yes (No)

Processing Check-list

Processing Crew: JA | BW | CO **Time:** 1405 **Date:** 4/25/18

Photograph of unhomogenized sample: ✓
Homogenization Start Time: 1414 Homogenization End Time: 1415

Homogenize sample with paddle until consisyency and color are uniform: ✓

Photograph of homogenized sample: ✓

Comments:
Sample homogenized on boat.

Recorded by:

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMAI-SG07

Sampling Crew: BW / JA / CO
Sample Date: 4/25/18 Sampling Method: Sed Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunny - partly cloudy
Station Coordinates: N / Lat. 47.211971 °N
E / Long. 123.090346 °W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMAI-SG07-180425
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: ~ ft. Grab Recovery: 15 cm Time: 1105
Tide Level: +3.8 ft Sample Interval: ~ cm
Depth MLLW: ~ ft.

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: Trace organics + woody debris

DGT Location? Yes / No If yes Temp: pH: Salinity:
~~Duplicate~~ Triplicate Station? ~~Yes~~ / No

Processing Check-list

Processing Crew: JA / BW / CO **Time:** 1105
Date: 4/25/18

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1111 Homogenization End Time: 1113

Homogenize sample with paddle until consisyency and color are uniform: [ ] NO - see notes

Photograph of homogenized sample: [✓] NO-see notes

Comments:
- Sample too sandy - homogenized w/ spoon by hand
- took ~~fish~~ picture after collecting volume for analysis.

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110068 01.03 **Station ID:** SMA-SG1007

Sampling Crew: JA | CO | BW
Sample Date: 4/25/18 Sampling Method: Sed Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Mostly Sunny
Station Coordinates: N / Lat. 47.211976° N
E / Long. 123.090369° W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA1-SG1007-180425
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: ~ ft. Grab Recovery: 21 cm Time: 1120
Tide Level: ~~13.89~~ ND ft 3.92 Sample Interval: ~ cm
Depth MLLW: ~~4~~ ft.

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M-F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: Trace organics (shells), trace wood debris

DGT Location? Yes / No | If yes | Temp: | pH: | Salinity:
Triplicate ~~Duplicate~~ Station? Yes / No

Processing Check-list

Processing Crew: BW | CO | JA **Time:** 1120
Date: 4/25/18

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1125 Homogenization End Time: 1127

Homogenize sample with paddle until consisyency and color are uniform: [+ NO - see notes

Photograph of homogenized sample: [✓]

Comments: sample too sandy - homogenized w/ spoon by hand

Recorded by: RL. Pdtt

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA1-2007

Sampling Crew: BW/CO/JA
Sample Date: 4/25/18 Sampling Method: sed grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: mostly sunny
Station Coordinates: N / Lat. 47.211966 °N
E / Long. 123.040351 °W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA1-2007-180425
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: / ft. Grab Recovery: 23 cm Time: 1130
Tide Level: + 4.06 ft. Sample Interval: / cm
Depth MLLW: / ft.

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: Trace organics + wood debris

DGT Location? **Yes / No** If yes Temp: pH: Salinity:

triplicate Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: BW/CO/JA **Time:** 1130
Date: 4/25/18

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1136 Homogenization End Time: 1138

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments: sample too sandy - homogenized w/ spoon by hand

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA-SG08

Sampling Crew: JA / CO / BW
Sample Date: 4/25/18 Sampling Method: Sed Grab
Sampling Vessel: Peter K
Subcontractor(s): MSS Weather: Mostly Sunny
Station Coordinates: N / Lat. 47.212344 °N
E / Long. 123.090627 °W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA1-SG08-180425
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT (Circle Appropriate Analyses)
Other: Field duplicate
Other: PDI-SMA1-SG108-180425

Accecpted Grab Number: 1
Water Depth: ~ ft. ~7'
Tide Level: +4.79 ft.
Depth MLLW: ~ ft.
Grab Recovery: 26 cm Time: 1200
Sample Interval: ~ cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F <20%	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: Trace wood debris

DGT Location? **Yes / No**	If yes	Temp:	pH:	Salinity:
Duplicate Station? **Yes / No**				

Processing Check-list

Processing Crew: JA / BW / CO **Time:** 1200
Date: 4/25/18

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1210 Homogenization End Time: 1211

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments: Field Duplicate

Sample homogenized on boat.

Recorded by: Eli Patterson

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA-SG09

Sampling Crew: JA/BW/CO
Sample Date: 4/25/18 Sampling Method: Sed Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Cloudy
Station Coordinates: N / Lat. 47.213256°N
E / Long. 123.090653°W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA-SG09-180425
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: — ft. ~5'
Tide Level: +10.65 ft.
Depth MLLW: — ft.
Grab Recovery: 13 cm Time: 1620
Sample Interval: — cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel ~20%	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F 50%	black	mod dense/stiff	moderate	other:	slight	Moist
silt/clay 30%	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: 80% layer of gravel on surface
abundant biota (algae, shells, etc)

DGT Location? **Yes / No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: JA/BW/CO **Time:** 1620
Date: 4/25/18

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1628 Homogenization End Time: 1630

Homogenize sample with paddle until consisyency and color are uniform: [~~✓~~ NO]

Photograph of homogenized sample: [✓]

Comments: Sample too gravelly - homogenized w/spoon by hand

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-0.03 **Station ID:** SMA1-SG10

Sampling Crew: BW/CO/JA
Sample Date: 4/25/18 Sampling Method: Sed Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Partly Cloudy
Station Coordinates: N / Lat. 47.213292°N
E / Long. 123.089292°W
Datum: NAD 83 ~~WGS 84~~ zone:

Sample ID: PDI-SMA1-SG10-180425
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 2
Water Depth: / ft. ~7'
Tide Level: +6.62 ft.
Depth MLLW: / ft.
Grab Recovery: 22.5 cm Time: 1305
Sample Interval: / cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F <50%	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:

DGT Location? **Yes** / **No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes** / **No**

Processing Check-list

Processing Crew: JA/BW/CO **Time:** 1305
Date: 4/25/18

Photograph of unhomogenized sample: ✓
Homogenization Start Time: 1309 Homogenization End Time: 1310

Homogenize sample with paddle until consisyency and color are uniform: ✓

Photograph of homogenized sample: ✓

Comments:

Sample homogenized on board

Recorded by: Eli Pate

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 160008-01.03 **Station ID:** SMA1-11

Sampling Crew: BW/JA/CO
Sample Date: 4/25/18 Sampling Method: Sed Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: partly cloudy
Station Coordinates: N / Lat. 47.212908°N
E / Long. 123.089018°W
Datum: NAD 83 / ~~WGS 84~~ zone:

Sample ID: PDI-SMA1-SG11-180425DW
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT (Circle Appropriate Analyses)
Other: PDI-SMA1-SG11-180425
Other:

Accecpted Grab Number: 1
Water Depth: / ft. ~8'
Tide Level: +7.29 ft.
Depth MLLW: / ft.
Grab Recovery: 24 cm Time: 1315
Sample Interval: / cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F ~15%	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: Trace Organics - leaves/twigs

DGT Location? Yes / No	If yes	Temp:	pH:	Salinity:
Duplicate Station? Yes / No (DW)				

Processing Check-list

Processing Crew: JA/BW/CO **Time:** 1315
Date: 4/25/18

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1325 Homogenization End Time: 1326

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments: Field Duplicate

Sample Homogenized on Boat

Recorded by: Eli

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01-03 **Station ID:** SMA-SG12

Sampling Crew: BW/JA/CO
Sample Date: 4/25/18 Sampling Method: Sed Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Mostly Cloudy
Station Coordinates: N / Lat. 47.212544 °N
E / Long. 123.088735 °W
Datum: NAD 83 / ~~WGS 84~~ zone:

Sample ID: PDI-SMA1-SG12-180425
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: / ft. → 7'
Tide Level: +8.04 ft.
Depth MLLW: / ft.
Grab Recovery: 15 cm Time: 1335
Sample Interval: / cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F ~15%	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: Moderate organic matter - Woody debris

DGT Location? Yes / No	If yes	Temp:	pH:	Salinity:
Duplicate Station? Yes / No				

Processing Check-list

Processing Crew: JA/BW **Time:** 1335
Date: 4/25/18

Photograph of unhomogenized sample: ✓
Homogenization Start Time: 1340 Homogenization End Time:

Homogenize sample with paddle until consisyency and color are uniform: ✓

Photograph of homogenized sample: [ ]

Comments:
Sample homogenized on boat

Recorded by:

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA1-SG13

Sampling Crew: JA | BW | CO
Sample Date: 4/25/18
Sampling Vessel: Peter R
Subcontractor(s): Marine Sampling Systems
Station Coordinates: N / Lat. 47.212007 °N
E / Long. 123.089001 °W
Datum: NAD 83 / WGS 84 zone:

Sampling Method: Sed Grab
Weather: Sunny

Sample ID: PDI-SMA1-SG13
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT
(Circle Appropriate Analyses)
Other:
Other:

Accecpted Grab Number: 1
Water Depth: — ft.
Tide Level: +3.98 ft. ~3'
Depth MLLW: — ft.
Grab Recovery: 15 cm Time: 1025
Sample Interval: — cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight (S)	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: Abundant wood debris, biota (clams)

DGT Location? **Yes / No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: BW | JA | CO
Time:
Date: 4/25/18

Photograph of unhomogenized sample: ✓
Homogenization Start Time: 1035
Homogenization End Time: 1037

Homogenize sample with paddle until consisyency and color are uniform: ✓

Photograph of homogenized sample: ✓

Comments:
Sample homogenized on boat.

Recorded by: Eli D

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 160008-01.03 **Station ID:** SMA1-14

Sampling Crew: BW/CO/JA
Sample Date: 4/25/18 Sampling Method: Sed Grab
Sampling Vessel: Peter R
Subcontractor(s): Marine Sampling Systems Weather: Sunny/Partly Cloudy
Station Coordinates: N / Lat. ~~47 40~~ 47.216810°N
E / Long. 123.089513°W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA1-SG14-180425
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: — ft. ~2'
Tide Level: +3.85 ft.
Depth MLLW: — ft.
Grab Recovery: 22 cm Time: 1050
Sample Interval: — cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F <25%	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: 1 cm layer brown
abundant wood waste

DGT Location? **Yes / No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: JA/CO/BW **Time:** 1050
Date: 4/25/18

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1056 Homogenization End Time: 1057

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat

Recorded by: Eli Pate

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 180008 01.03 **Station ID:** SMA1-SG15

Sampling Crew: JA/CD/BW
Sample Date: 4/25/18 Sampling Method: Sed Grab
Sampling Vessel: ~~MSS~~ Peter P
Subcontractor(s): MSS Weather: partly cloudy
Station Coordinates: N / Lat. 47.211617 °N
E / Long. 123.090072 °W
Datum: NAD 83 / ~~WGS 84~~ zone:

Sample ID: RDI-SMA1-SG15-180425
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: ~ ft. ~8'
Tide Level: +9.84 ft.
Depth MLLW: ~ ft.
Grab Recovery: 14 cm Time: 1425
Sample Interval: ~ cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
(gravel) mill	gray	(soft/loose)	slight	Petroleum	trace	Damp
(sand) C M F	black	(mod dense/stiff)	moderate	other:	slight	Moist
(silt clay)	(brown)	dense/stiff	strong		moderate	(Wet)
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: Trace biota (worms) trace organics woody debris

DGT Location? **Yes / (No)** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / (No)**

Processing Check-list

Processing Crew: BW/JA/CD **Time:** 1425
Date: 4/25/18

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1432 Homogenization End Time: 1434

Homogenize sample with paddle until consisyency and color are uniform: [+] NO See notes

Photograph of homogenized sample: [✓]

Comments:
- Sample low sandy, homogenized w/ spoon by hand

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA1-SG16

Sampling Crew: BW/JA/CO
Sample Date: 4/25/18 Sampling Method: sed grab
Sampling Vessel: Peter K
Subcontractor(s): MSS Weather: mostly cloudy
Station Coordinates: N / Lat. 47. 211796 °N
E / Long. 123.090894 °W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA1-SG16-180425
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: / ft. ~10'
Tide Level: +10.23 ft.
Depth MLLW: / ft.
Grab Recovery: 21 cm Time: 1440
Sample Interval: / cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel - (some)	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: moderate organics - wood debris
trace biota (clams)

DGT Location? **Yes / No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: JA/BW/CO **Time:**
Date: 4/25/18

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1447 Homogenization End Time:

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat

Recorded by:

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA1-SG17

Sampling Crew: CO/BW/JA
Sample Date: 4/25/18 Sampling Method: Grd Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Mostly Sunny
Station Coordinates: N / Lat. 47.212165° N
E / Long. 123.051149° W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA1-SG17-180425
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: — ft. Grab Recovery: 710 cm Time: 1145
Tide Level: +4.29 ft. Sample Interval: — cm
Depth MLLW: — ft.

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: Trace wood debris

DGT Location? Yes / No If yes Temp: pH: Salinity:
Duplicate Station? Yes / No

Processing Check-list

Processing Crew: BW/CO/JA **Time:** 1145
Date: 4/25/18

Photograph of unhomogenized sample: ✓
Homogenization Start Time: 1152 Homogenization End Time: 1153

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA1-SG18

Sampling Crew: JA/BW/CO
Sample Date: 4/25/18 Sampling Method: Sed Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: cloudy (partly)
Station Coordinates: N / Lat. ~~47.21308°N~~ 47.212522°N
E / Long. 123.09440°W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA1-SG18-180425
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: ~ ft. ~15'
Tide Level: +9.36 ft.
Depth MLLW: ~ ft.
Grab Recovery: 24 cm Time: 1730
Sample Interval: ~ cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F Trace	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: Trace biota (crab/shrimp)
Trace organics - leaves + twigs

DGT Location? **Yes** / **No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes** / **No**

Processing Check-list

Processing Crew: BW/JA/CO **Time:** 1730
Date: 4/25/18

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1738 Homogenization End Time: 1739

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat.

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA1-SG19

Sampling Crew: JA | CO | BW
Sample Date: 4/25/18 Sampling Method: Sed Grab
Sampling Vessel: Peter K
Subcontractor(s): MSS Weather: Cloudy
Station Coordinates: N / Lat. 47.213083° N
E / Long. 123.091183° W
Datum: NAD 83 / (WGS 84) zone:

Sample ID: PDI-SMA1SG19-180425
Analysis: (Dioxins Furans / TBT / TOC / Cu / DGT) Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 2
Water Depth: — ft. ~13'
Tide Level: +9.98 ft.
Depth MLLW: — ft.
Grab Recovery: 23 cm Time: 1700
Sample Interval: — cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	soft/loose	slight	Petroleum	trace	Damp
(sand) C M F - Trace	black	mod dense/stiff	moderate	other:	slight	Moist
(silt) clay	(brown)	dense/stiff	strong		moderate	(Wet)
(organic matter)	brown surface	very dense/stiff	overwhelming		heavy	

Comments: Trace biota, Trace organic matter (leaf)

DGT Location? **Yes / No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: JA | BW | CO **Time:** 1700
Date: 4/25/18

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1708 Homogenization End Time: ~~19~~ 1709

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized as Grant.

Recorded by:

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA1-SG20

Sampling Crew: JA/BW/CO
Sample Date: 4/25/18 Sampling Method: Ted Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Cloudy
Station Coordinates: N / Lat. 47.213083° N
E / Long. 123.01714° W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA1-SG20-180425
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: — ft. ~11'
Tide Level: +9.76 ft.
Depth MLLW: — ft.
Grab Recovery: 25 cm Time: 1715
Sample Interval: — cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F - TRACE	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments: Trace organics - sticks + twigs & leaves
Trace biota (shrimp)

DGT Location? Yes / No If yes Temp: pH: Salinity:
Duplicate Station? Yes / No

Processing Check-list

Processing Crew: JA/CO/BW **Time:** 1715
Date: 4/25/18

Photograph of unhomogenized sample: ✓
Homogenization Start Time: 1723 Homogenization End Time 1724

Homogenize sample with paddle until consisyency and color are uniform: ✓

Photograph of homogenized sample: ✓

Comments:

Sample homogenized on boat.

Recorded by:

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA2-SG-01 ✓

Sampling Crew: EP/GB
Sample Date: 4/27/2018 Sampling Method: Hand Grab
Sampling Vessel: —
Subcontractor(s): — Weather: Cloudy 65°F
Station Coordinates: N / Lat.
E / Long.
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA2-SG01-180427
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: ft. Grab Recovery: 10 cm Time: 11:50
Tide Level: ft. Sample Interval: 10 cm
Depth MLLW: ft.

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
(gravel)	(gray)	soft/loose	slight	Petroleum	trace	Damp
(sand) C M F	black	(mod dense/stiff)	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	(Wet)
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:

DGT Location? **Yes / (No)** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / (No)**

Processing Check-list

Processing Crew: EP/GB **Time:** 1400
Date: 4/27/2018

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1400 Homogenization End Time: 1401

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:

Not paddle mixed, sample was a mixture of sand & gravel.
Did not mix with paddle

Recorded by: RL Rolfo

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01 03 **Station ID:** SMA2-SG-02

Sampling Crew: EP/BJ/SN
Sample Date: 4/30/2018 Sampling Method: Hydraulic Grab
Sampling Vessel: Peter R
Subcontractor(s): Marine Sampling Systems Weather:
Station Coordinates: N / Lat. 47.213755° N
E / Long. 123.087651° W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA2-SG02-180430
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 2
Water Depth: 6 ft. ~6'
Tide Level: ft.
Depth MLLW: ft.
Grab Recovery: 14 cm Time: 1001
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
abundant gravel
trace shell

DGT Location? Yes / No | If yes | Temp: | pH: | Salinity:
Duplicate Station? Yes / No

Processing Check-list

Processing Crew: EP/BJ/SN **Time:** 1011
Date: 4/30/2018

Photograph of unhomogenized sample: [✓] taken in grab
Homogenization Start Time: 1011 Homogenization End Time: 1017

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat.

Recorded by: Eli P

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA2-SG03 ✓

Sampling Crew: EP/GB
Sample Date: 4/27/2018 Sampling Method: Hand Grab
Sampling Vessel: —
Subcontractor(s): — Weather: Cloudy 65°F
Station Coordinates: N / Lat.
E / Long.
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA2-SG03-180427
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: — ft. Grab Recovery: 10 cm Time: 1120
Tide Level: — ft. Sample Interval: 10 cm
Depth MLLW: — ft.

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:

DGT Location? **Yes / No** | If yes | Temp: | pH: | Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: EP/GB **Time:** 1320
Date: 4/27/2018

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 13:20 Homogenization End Time: 13:20

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:

Paddle Mixed

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA2-SG04 ✓

Sampling Crew: EP/GB
Sample Date: 4/27/2018 Sampling Method: Hand Grab
Sampling Vessel: —
Subcontractor(s): — Weather:
Station Coordinates: N / Lat.
E / Long.
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA2-SG04-R0427
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: ~ ft. Grab Recovery: 10 cm Time: 11:00
Tide Level: ~ ft. Sample Interval: 10 cm
Depth MLLW: ~ ft.

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	(mod dense/stiff)	moderate	other:	slight	Moist
(silt clay)	brown	dense/stiff	strong		moderate	(Wet)
organic matter	(brown surface)	very dense/stiff	overwhelming		heavy	

Comments:
abundant gravel

DGT Location? **Yes** / **No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes** / **No**

Processing Check-list

Processing Crew: EP/GB **Time:** 1130
Date: 4/27/2018

Photograph of unhomogenized sample: [✓
Homogenization Start Time: 1130 Homogenization End Time: 1131

Homogenize sample with paddle until consisyency and color are uniform: [✓

Photograph of homogenized sample: [✓

Comments:

Sample was mixed with paddle

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA2-SG05

Sampling Crew: EP/BS/JT
Sample Date: 5/1/2018 Sampling Method: Hand Grab
Sampling Vessel: —
Subcontractor(s): — Weather:
Station Coordinates: N / Lat.
E / Long.
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA2-SG05-180501
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: — ft. Grab Recovery: 10 cm Time: 1621
Tide Level: — ft. Sample Interval: 10 cm
Depth MLLW: — ft.

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
Abundant large gravel

DGT Location? **Yes / No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: EP/BS/JT **Time:** 1621
Date: 5/1/2018

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: — Homogenization End Time: —

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Did not paddle mix, gravel too large to use paddle. Sample taken in dry

Recorded by:

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA2-SG06

Sampling Crew: EP/GB
Sample Date: 4/27/2018 Sampling Method: Hand Grab
Sampling Vessel: –
Subcontractor(s): – Weather: Cloudy 65°F
Station Coordinates: N / Lat.
E / Long.
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA2-SG06-180427
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: – ft. Grab Recovery: 10 cm Time: 1251
Tide Level: – ft. Sample Interval: 10 cm
Depth MLLW: – ft.

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:

DGT Location? Yes / No | If yes | Temp: | pH: | Salinity:
Duplicate Station? Yes / No

Processing Check-list

Processing Crew: EP/GB **Time:** 1401
Date: 4/27/2018

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1401 Homogenization End Time: 1402

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:

Paddle mix & dup dup time = 1351

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-0103 **Station ID:** SMA2-SG-07

Sampling Crew: EP/BJ/SN
Sample Date: 4/30/2018 Sampling Method: Hydraulic Grab
Sampling Vessel: Peter R
Subcontractor(s): Marine Sampling Systems Weather:
Station Coordinates: N / Lat. 47.213540°N
E / Long. 123.087755°W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA2-SG07-180430
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: 9 ft. ~9'
Tide Level: ft.
Depth MLLW: ft.
Grab Recovery: 21 cm Time: 0901
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:

DGT Location? **Yes / No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: EP/BJ/SN **Time:** 0911
Date: 4/30/2018

Photograph of unhomogenized sample: [✓] Taken in grab
Homogenization Start Time: 0911 Homogenization End Time: 0912

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:

EPA Split Sample taken

Recorded by:

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA2-SG08 ✓

Sampling Crew: EP/GB
Sample Date: 4/27/2018 Sampling Method: Hand Grab
Sampling Vessel: —
Subcontractor(s): — Weather: Cloudy 65°F
Station Coordinates: N / Lat.
E / Long.
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA2-SG08-180427
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: — ft. Grab Recovery: 10 cm Time: 11:33
Tide Level: — ft. Sample Interval: 10 cm
Depth MLLW: — ft.

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	(soft/loose)	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
(silt clay)	brown	dense/stiff	strong		moderate	(Wet)
organic matter	(brown surface)	very dense/stiff	overwhelming		heavy	

Comments:

DGT Location? **Yes / (No)** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / (No)**

Processing Check-list

Processing Crew: EP/GB **Time:** 1350
Date: 4/27/2018

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1350 Homogenization End Time: 1351

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
This sample was mixed with the paddle

Recorded by: Eli Patten

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110808-01.03 **Station ID:** SMA2-SG09

Sampling Crew: EP/GB
Sample Date: 4/27/2018 Sampling Method: Hand Grab
Sampling Vessel: —
Subcontractor(s): — Weather: Cloudy 65°F
Station Coordinates: N / Lat.
E / Long.
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA2-SG09-RD127
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT (Circle Appropriate Analyses)
Other:
Other:

Accecpted Grab Number: 1
Water Depth: — ft.
Tide Level: — ft.
Depth MLLW: — ft.
Grab Recovery: 10 cm Time: 1239
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	(Very soft/Loose)	(none)	H2S	(none)	Dry
gravel	(gray)	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
(silt clay)	brown	dense/stiff	strong		moderate	(Wet)
organic matter	(brown surface)	very dense/stiff	overwhelming		heavy	

Comments:
trace gravel

DGT Location? **Yes** / (**No**) If yes Temp: pH: Salinity:
Duplicate Station? **Yes** / (**No**)

Processing Check-list

Processing Crew: EP/GB **Time:** 1350
Date: 4/27/2018

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1350 Homogenization End Time: 1351

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
This sample was paddle mixed

Recorded by: Eli Patt

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-0103 **Station ID:** SMA2-SG-10

Sampling Crew: EP/BJ/SN
Sample Date: 4/30/2018 Sampling Method: Hydraulics E-Grab
Sampling Vessel: Pelagic R
Subcontractor(s): Marine Sampling Systems Weather:
Station Coordinates: N / Lat. 47.213611°
E / Long. 123.067036° W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA2-SG-10-180430
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT (Circle Appropriate Analyses) Other: Other:

Accecpted Grab Number: 1
Water Depth: ft. ~5'
Tide Level: ft.
Depth MLLW: ft.
Grab Recovery: 14 cm Time: 1039
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	soft/loose	slight	Petroleum	trace	Damp
(sand) C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	(dense/stiff)	strong		moderate	(Wet)
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
Abundant gravel

DGT Location? **Yes / (No)** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: EP/BJ/SN **Time:** 1049
Date: 4/30/2018

Photograph of unhomogenized sample: [✓] Taken in grab
Homogenization Start Time: 1049 Homogenization End Time: 1050

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat.

Recorded by: MG Bates

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-03.01 **Station ID:** SMA2-SG-11

Sampling Crew: EP/BJ/SN
Sample Date: 4/30/2018 Sampling Method: HYDRAULIC GRAB
Sampling Vessel: Peter R
Subcontractor(s): Marine Sampling Systems Weather:
Station Coordinates: N / Lat. 47.213548°N
E / Long. 123.087092°W
Datum: NAD 83 / (WGS 84) zone:

Sample ID: PDI-SMA2-SG-11-180430
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: 10 ft. ~10'
Tide Level: ft.
Depth MLLW: ft.
Grab Recovery: 21 cm Time: 0840
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	(soft/loose)	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
(silt clay)	brown	dense/stiff	strong		moderate	(Wet)
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
Trace gravel

DGT Location? **Yes / (No)** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: EP/BJ/SN **Time:** 0850
Date: 4/30/2018

Photograph of unhomogenized sample: [✓] Taken in grab
Homogenization Start Time: 0850 Homogenization End Time: 0851

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on board.

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA2-SG-12

Sampling Crew: EP/BJ/SN
Sample Date: 4/30/2018 Sampling Method: Hydraulic Grab
Sampling Vessel: Peter R
Subcontractor(s): Marine Sampling Systems Weather:
Station Coordinates: N / Lat. 47.213338° N
E / Long. 123.087152° W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA2-SG12-180430
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: 8 ft. ~8 Ft
Tide Level: — ft.
Depth MLLW: — ft.
Grab Recovery: 30 cm Time: 1020
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	(soft/loose)	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
(silt clay)	brown	dense/stiff	strong		moderate	(Wet)
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
Trace sand

DGT Location? Yes / (No) If yes Temp: pH: Salinity:
Duplicate Station? Yes / (No)

Processing Check-list

Processing Crew: EP/BJ/SN **Time:** 1030 **Date:** 4/30/2018

Photograph of unhomogenized sample: [✓] Taken in grab
Homogenization Start Time: 1030 Homogenization End Time: 1031

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat.

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA2-SG13

Sampling Crew: EP/BJ/SN
Sample Date: 4/30/2018 Sampling Method: HYD. GRAB
Sampling Vessel: PETER R
Subcontractor(s): MARINE SAMPLING SYSTEMS Weather:
Station Coordinates: N / Lat. 47.213380° W
E / Long. 123.087485° W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA2-SG13-180430
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 2
Water Depth: 13 ft. ~13'
Tide Level: ft.
Depth MLLW: ft.
Grab Recovery: 20.5 cm Time: 0820
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	(soft/loose)	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
(silt clay)	brown	dense/stiff	strong		moderate	(Wet)
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:

DGT Location? **Yes / (No)** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / (No)**

Processing Check-list

Processing Crew: EP/BJ/SN **Time:** 0830
Date: 4/30/2018

Photograph of unhomogenized sample: [✓] No picture
Homogenization Start Time: 0830 Homogenization End Time: 0831

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat. Unhomogenized photo taken ~~as~~ in grab sampler.

Recorded by:

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-0103 **Station ID:** SMA2-SG-14

Sampling Crew: EP/BJ/SN
Sample Date: 4/30/2018 Sampling Method: HYDRAULIC GRAB
Sampling Vessel: Peter R
Subcontractor(s): Marine Sampling Systems Weather:
Station Coordinates: N / Lat. 47.213420° N
E / Long. 123.087780° W
Datum: NAD 83 / (WGS 84) zone:

Sample ID: PDI-SMA2-SG14-180430
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: 8 ft. ~8'
Tide Level: — ft.
Depth MLLW: — ft.
Grab Recovery: 21 cm Time: 0928
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	(soft/loose)	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
(silt clay)	brown	dense/stiff	strong		moderate	(Wet)
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:

DGT Location? **Yes / (No)** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / (No)**

Processing Check-list

Processing Crew: EP/BJ/SN **Time:** 0938
Date: 4/30/2018

Photograph of unhomogenized sample: [✓] Taken mg/a6
Homogenization Start Time: 0938 Homogenization End Time: 0939

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat

Recorded by: Eli Potter

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA2-SG15

Sampling Crew: EP/GB
Sample Date: 4/27/2018 Sampling Method: Hand Grab
Sampling Vessel: —
Subcontractor(s): — Weather: Cloudy 65°F
Station Coordinates: N / Lat.
E / Long.
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA2-SG15-180427
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT
(Circle Appropriate Analyses)
Other:
Other:

Accecpted Grab Number: 1
Water Depth: — ft.
Tide Level: — ft.
Depth MLLW: — ft.
Grab Recovery: 10 cm Time: 1304
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
trace organics

DGT Location? **Yes** / **No** | If yes | Temp: | pH: | Salinity:
Duplicate Station? **Yes** / **No**

Processing Check-list

Processing Crew: EP/GB **Time:** 1420
Date: 4/27/2018

Photograph of unhomogenized sample: [Y]
Homogenization Start Time: 1420 Homogenization End Time: 1421

Homogenize sample with paddle until consisyency and color are uniform: [Y]

Photograph of homogenized sample: [Y]

Comments:
This sample was paddle mixed

Recorded by: Eli Petty

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-0103 **Station ID:** SMA3-OG-01

Sampling Crew: EP / JE
Sample Date: 5/2/2018 Sampling Method: Hand Grab
Sampling Vessel: —
Subcontractor(s): — Weather:
Station Coordinates: N / Lat.
E / Long.
Datum: NAD 83 / WGS 84 zone:

Sample ID: ~~PDI-OG-01-180502~~ PDI-SMA3-OG-01-180502
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: — ft.
Tide Level: — ft.
Depth MLLW: — ft.
Grab Recovery: — cm
Sample Interval: — cm
Time: 1600

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	~~mod dense/stiff~~	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
~~Odor~~ 5% silt, gravel to cobble abundant

DGT Location? **Yes / No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: EP/JE **Time:** 5/2/2018 1600
Date: —

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: Homogenization End Time:

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample taken in dry.

Recorded by:

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA3-SG01 ~~SMA3-SB10~~

Sampling Crew: EP/BW/JA
Sample Date: 4/26/2018 Sampling Method: Power Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunny
Station Coordinates: N / Lat. 47.207763°N
E / Long. 123.094347°W
Datum: NAD 83 / ~~WGS 84~~ zone:

Sample ID: PDI-SMA3-SG01-180426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: - ft. ~16'
Tide Level: - ft.
Depth MLLW: - ft.
Grab Recovery: 25 cm Time: 1400
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	~~Very soft/Loose~~	(none)	H2S	(none)	Dry
gravel	(gray)	(soft/loose)	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
(silt clay)	brown	dense/stiff	strong		moderate	(Wet)
organic matter	(brown surface)	very dense/stiff	overwhelming		heavy	

Comments:
Trace f sand

DGT Location? Yes / (No) If yes Temp: pH: Salinity:
Duplicate Station? (Yes) / No

Processing Check-list

Processing Crew: EP/BW/JA **Time:** 1410
Date: 4/26/2018

Photograph of unhomogenized sample: [✓] taken in grab
Homogenization Start Time: 1410 Homogenization End Time: 1411

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Paddle mixed. Sample homogenized on boat.

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01-03 **Station ID:** SMA3-SG02

Sampling Crew: EP/BW/JA
Sample Date: 4/26/2018 Sampling Method: Power grab
Sampling Vessel: PESETA IR
Subcontractor(s): MSS Weather: SUNNY
Station Coordinates: N / Lat. 47.207623° W
E / Long. 123.093510° W
Datum: NAD 83 / (WGS 84) zone:

Sample ID: PDI-SMA3-SG02-180426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: - ft. ~11'
Tide Level: - ft.
Depth MLLW: - ft.
Grab Recovery: 21 cm Time: ~~1347~~ 1350
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	(soft/loose)	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
(silt clay)	(brown)	dense/stiff	strong		moderate	(Wet)
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:

DGT Location? **Yes / (No)** If yes Temp: pH: Salinity:
Duplicate Station? ~~Yes~~ / (No)

Processing Check-list

Processing Crew: EP/BW/JA **Time:** 1400
Date: 4/26/2018

Photograph of unhomogenized sample: ✓ taken in grab
Homogenization Start Time: 1400 Homogenization End Time: 1401

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat.

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA3-SG03

Sampling Crew: EP/BW/JA
Sample Date: 4/26/2018 Sampling Method: Power grab
Sampling Vessel: Pete R
Subcontractor(s): MSS Weather:
Station Coordinates: N / Lat.
E / Long.
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA3-SG03-180426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: – ft.
Tide Level: – ft.
Depth MLLW: – ft.
Grab Recovery: 29 cm Time: 1200
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	(soft/loose)	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
(silt clay)	brown	dense/stiff	strong		moderate	(Wet)
organic matter	(brown surface)	very dense/stiff	overwhelming		heavy	

Comments:
Trace biota,

DGT Location? (Yes) / No | If yes | Temp: 12.0 | pH: 7.13 | Salinity: –
Duplicate Station? Yes / (No)

Processing Check-list

Processing Crew: EP/BW/JA **Time:** 1210
Date: 4/26/2018

Photograph of unhomogenized sample: [✓ taken with grab]
Homogenization Start Time: 1210 Homogenization End Time: 1211

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat.

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 160008-01.03 **Station ID:** SMA3-SG04

Sampling Crew: EP/BW/JA
Sample Date: 4/26/2016 Sampling Method: Power Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunny
Station Coordinates: N / Lat. 47.207136°N
E / Long. 123.092377°W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA3-SG04-K0426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT (Circle Appropriate Analyses)
Other:
Other:

Accecpted Grab Number: 1
Water Depth: - ft. ~8'
Tide Level: - ft.
Depth MLLW: - ft.
Grab Recovery: 23 cm Time: 0933
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
10% fine sand,

DGT Location? Yes / No If yes Temp: pH: Salinity:
Duplicate Station? Yes / No

Processing Check-list

Processing Crew: EP/BW/JA **Time:** 0939
Date:

Photograph of unhomogenized sample: [✓] taken in grab
Homogenization Start Time: 0939 Homogenization End Time: 0940

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Triplicate station; same classification for SG1004 & SG2004

1004
Recov: 27 Time: 0945 grab photo? ✓ homog photo? ✓

2004
Recov: 23 Time: 1000 grab photo? ✓ homog photo? ✓

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA3-SG05

Sampling Crew: EP/BW/JA
Sample Date: 04/26/2018 Sampling Method: Power Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunny
Station Coordinates: N / Lat. 47.206783°N
E / Long. 123.092064°W
Datum: NAD 83 / (WGS 84) zone:

Sample ID: PDI-SMA3-SG05
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: ~ ft. ~10'
Tide Level: ~ ft.
Depth MLLW: ~ ft.
Grab Recovery: 23 cm Time: 1040
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	(soft/loose)	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
(silt clay)	(brown)	dense/stiff	strong		moderate	(Wet)
(organic matter)	brown surface	very dense/stiff	overwhelming		heavy	

Comments:

DGT Location? (Yes) / No If yes Temp: 11.9 °C pH: 7.16 Salinity: —
Duplicate Station? Yes / (No)

Processing Check-list

Processing Crew: EP/BW/JA **Time:** 1050
Date: 4/26/2018

Photograph of unhomogenized sample: [X] taken in grab
Homogenization Start Time: 1050 Homogenization End Time: 1051

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat

Recorded by:

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA3-SG06

Sampling Crew: EP/BW/JA
Sample Date: 4/26/2018 Sampling Method: Power Grab
Sampling Vessel: PETER R
Subcontractor(s): MSS Weather: Sunny
Station Coordinates: N / Lat. 47.206439°N
E / Long. 123.091751°W
Datum: NAD 83 / ~~WGS 84~~ zone:

Sample ID: PDI-SMA3-SG06
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: – ft. ~17'
Tide Level: – ft.
Depth MLLW: ~ ft.
Grab Recovery: 22 cm Time: 1623
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
trace f-sand, trace organics (wood)

DGT Location? **Yes / No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: EP/BW/JA **Time:** 1633
Date: 4/26/2018

Photograph of unhomogenized sample: [✓ w/ grab
Homogenization Start Time: 1633 Homogenization End Time: 1634

Homogenize sample with paddle until consisyency and color are uniform: [✓

Photograph of homogenized sample: [✓

Comments:
Paddle-mixed. Sample homogenized on boat

EPA split

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA3-SG07

Sampling Crew: EP/BW/JA
Sample Date: 4/26/2018 Sampling Method: Power grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunny
Station Coordinates: N / Lat. 47.207417°N
E / Long. 123.094036°W
Datum: NAD 83 / (WGS 84) zone:

Sample ID: PDI-SMA3-SG07-180426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT (Circle Appropriate Analyses)
Other:
Other:

Accecpted Grab Number: 1
Water Depth: ~ ft. ~4'
Tide Level: ~ ft.
Depth MLLW: ~ ft.
Grab Recovery: 19 cm Time: 1255
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	(soft/loose)	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
(silt clay)	brown	dense/stiff	strong		moderate	(Wet)
organic matter	(brown surface)	very dense/stiff	overwhelming		heavy	

Comments:
10% f sand

DGT Location? (Yes) / No | If yes | Temp: 12.8°C | pH: 7.69 | Salinity: —

Duplicate Station? Yes / (No)

Processing Check-list

Processing Crew: EP/BW/JA **Time:** 1305
Date: 4/26/2018

Photograph of unhomogenized sample: ✓ taken in grab
Homogenization Start Time: 1305 Homogenization End Time: 1306

Homogenize sample with paddle until consisyency and color are uniform: ✓

Photograph of homogenized sample: ✓

Comments:
Paddle mixed. Sample homogenized on boat.

Recorded by: Eli Peter

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA3-SG08

Sampling Crew: EP/BW/JA
Sample Date: 4/26/2018 Sampling Method: Power Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunny
Station Coordinates: N / Lat.
E / Long.
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA3-SG08-180426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: – ft. Grab Recovery: 13 cm Time: 1315
Tide Level: – ft. Sample Interval: 10 cm
Depth MLLW: – ft.

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	soft/loose	slight	Petroleum	trace	Damp
~~sand~~ C M F	black	(mod dense/stiff)	moderate	other:	slight	Moist
(silt clay)	brown	dense/stiff	strong		moderate	(Wet)
organic matter	(brown surface)	very dense/stiff	overwhelming		heavy	

Comments:
20% sand f-c, trace biota

DGT Location? (Yes) / No | If yes | Temp: 13.6 °C | pH: 6.79 | Salinity: –
Duplicate Station? Yes / (No)

Processing Check-list

Processing Crew: EP/BW/JA **Time:**
Date: 4/26/2018

Photograph of unhomogenized sample: [X] taken with grab
Homogenization Start Time: Homogenization End Time:

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on board.

Recorded by:

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-09.03 **Station ID:** SMA3-SG09

Sampling Crew: EP/BW/JA
Sample Date: 4/26/2018 Sampling Method: Power Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunny
Station Coordinates: N / Lat. 47.206911°N
E / Long. 123.092893°W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA3-SG09-180426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 2
Water Depth: – ft. ~2'
Tide Level: – ft.
Depth MLLW: – ft.
Grab Recovery: 14 cm Time: 0910
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
Silty SAND w/ gravel, abundant gravel

DGT Location? **Yes / No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: EP/BW/JA **Time:** 0920
Date: 4/26/2018

Photograph of unhomogenized sample: [X] taken in grab
Homogenization Start Time: 0920 Homogenization End Time: 0921

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Paddle mixed. Sample homogenized on boat

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA3-SG10

Sampling Crew: EP/BW/JA
Sample Date: 4/26/2018 Sampling Method: Power Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunny
Station Coordinates: N / Lat. 47. 206559 °N
E / Long. 123 092566 °W
Datum: NAD 83 / WGS 84 zone:

Sample ID: POI-SMA3-SG10-180426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: ~ ft. ~7'
Tide Level: ~ ft.
Depth MLLW: ~ ft.
Grab Recovery: 22 cm Time: 1017
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
trace biota

DGT Location? Yes / No If yes Temp: 11.9 °C pH: 7.92 Salinity: —
Duplicate Station? Yes / No

Processing Check-list

Processing Crew: EP/BW/JA **Time:** 1027
Date: 4/26/2018

Photograph of unhomogenized sample: [X] taken in grab
Homogenization Start Time: 1027 Homogenization End Time: 1028

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat.

Recorded by: Eli Bates

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 180008-01.03 **Station ID:** SMA3-SG11

Sampling Crew: EP/BW/JA
Sample Date: 4/26/2018 Sampling Method: Power Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather:
Station Coordinates: N / Lat. 47.206645°N
E / Long. 123.091235°W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA3-SG11-180426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: — ft. ~16'
Tide Level: — ft. ~18'
Depth MLLW: — ft.
Grab Recovery: 22 cm Time: 1607
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	(soft/loose)	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
(silt clay)	brown	dense/stiff	strong		moderate	(Wet)
organic matter	(brown surface)	very dense/stiff	overwhelming		heavy	

Comments:
trace f-sand, trace wood fragments

DGT Location? **Yes / (No)** If yes Temp:. pH: Salinity:
Duplicate Station? **Yes / (No)**

Processing Check-list

Processing Crew: EP/BW/JA **Time:** 1617
Date: 4/26/2018

Photograph of unhomogenized sample: [✓] taken w/ grab
Homogenization Start Time: 1617 Homogenization End Time: 1618

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Paddle-mixed. Sample homogenized on boat

Recorded by:

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA3-SG-12

Sampling Crew: EP/BW/SA
Sample Date: 4/26/2018 Sampling Method: Power Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunny
Station Coordinates: N / Lat. 47.206987°N
E / Long. 123.091534°W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDJ-SMA3-SG12-180426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT (Circle Appropriate Analyses)
Other:
Other:

Accecpted Grab Number: 1
Water Depth: — ft. ~9'
Tide Level: — ft.
Depth MLLW: — ft.
Grab Recovery: 22 cm Time: 1100
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
(silt clay)	brown	dense/stiff	strong		moderate	(Wet)
organic matter	(brown surface)	very dense/stiff	overwhelming		heavy	

Comments:
10% F SAND, trace biota

DGT Location? (Yes) / No | If yes | Temp: 11.9°C | pH: 7.689 | Salinity: —
Duplicate Station? Yes / (No)

Processing Check-list

Processing Crew: EP/BW/SA **Time:** 1110
Date:

Photograph of unhomogenized sample: [X] taken in grab
Homogenization Start Time: 1110 Homogenization End Time: 1111

Homogenize sample with paddle until consisyency and color are uniform: [Y]

Photograph of homogenized sample: [Y]

Comments:
Sample homogenized on boat.

Recorded by:

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110068-01.03 **Station ID:** SMA3-SG13

Sampling Crew: EP/BW/JA
Sample Date: 4/26/2018 Sampling Method: Powe Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunny
Station Coordinates: N / Lat. 47.207342°N
E / Long. 123.091858°W
Datum: NAD 83 / ~~WGS 84~~ zone:

Sample ID: PDI-SMA3-SG13-180426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: — ft. ~16'
Tide Level: — ft.
Depth MLLW: — ft.
Grab Recovery: 20 cm Time: ~~1548~~ 1553
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	(soft/loose)	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
(silt clay)	brown	dense/stiff	strong		moderate	(Wet)
organic matter	(brown surface)	very dense/stiff	overwhelming		heavy	

Comments:
trace f-sand,

DGT Location? **Yes** / (**No**) If yes Temp: pH: Salinity:
Duplicate Station? **Yes** / (**NO**)

Processing Check-list

Processing Crew: EP/BW/JA **Time:**
Date:

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1603 Homogenization End Time: 1604

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat.

Recorded by: Eli Bell

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA3-SG14

Sampling Crew: EP/BW/JA
Sample Date: 4/26/2018 Sampling Method: Power Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunny
Station Coordinates: N / Lat. 47.207693°N
E / Long. 123.092170°W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA3-SG14-180426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: — ft. ~10'
Tide Level: — ft.
Depth MLLW: — ft.
Grab Recovery: 23 cm Time: 1117
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
Trace ~~FAINT~~ f sand, trace Biota

DGT Location? Yes / No If yes Temp: 11.9°C pH: 7.12 Salinity: —
Duplicate Station? Yes / No

Processing Check-list

Processing Crew: EP/BW/JA **Time:** 1127
Date: 4/26/2018

Photograph of unhomogenized sample: [X] taken in grab
Homogenization Start Time: 1127 Homogenization End Time: 1128

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01-03 **Station ID:** SMA3-SG15

Sampling Crew: EP/BW/JA
Sample Date: 4/26/2018 Sampling Method: Power Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunny
Station Coordinates: N / Lat. 47. 206056 °N
E / Long. 123. 042485
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA3-SG15-180426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: — ft. ~18'
Tide Level: — ft.
Depth MLLW: — ft.
Grab Recovery: 19 cm Time: 1523
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
trace organics (roots & sticks),

DGT Location? **Yes / No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: EP/BW/JA **Time:** 1533
Date: 4/26/2018

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1533 Homogenization End Time: 1534

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Paddle-mixed. Sample homogenized on boat

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110006-01-03 **Station ID:** SMA3-SG16

Sampling Crew: EP/BW/JA
Sample Date: 4/26/2018 Sampling Method: Power Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunny
Station Coordinates: N / Lat. 47.207847°N
E / Long. 123.~~090~~093000°W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA3-SG16-180426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: – ft. ~18'
Tide Level: – ft.
Depth MLLW: – ft.
Grab Recovery: 24 cm Time: 1538
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
trace f-sand, trace biota

DGT Location? **Yes / No** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / No**

Processing Check-list

Processing Crew: EP/BW/JA **Time:** 1546
Date: 4/26/2018

Photograph of unhomogenized sample: [✓]
Homogenization Start Time: 1548 Homogenization End Time: 1549
Homogenize sample with paddle until consisyency and color are uniform: [✓]
Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat.

Recorded by:

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01-03 **Station ID:** SMA3-SG17

Sampling Crew: EP/BW/SA
Sample Date: 4/26/2018 Sampling Method: Power Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunny
Station Coordinates: N / Lat. 47.208187°N
E / Long. 123.093302°W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA3-SG17-180426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: ~ ft. ~17'
Tide Level: ~ ft.
Depth MLLW: ~ ft.
Grab Recovery: 23 cm Time: 1505
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	(soft/loose)	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
(silt clay)	(brown)	dense/stiff	strong		moderate	(Wet)
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
trace sand, trace gravel,

DGT Location? **Yes / (No)** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / (No)**

Processing Check-list

Processing Crew: EP/BW/SA **Time:** 1515
Date: 4/26/2018

Photograph of unhomogenized sample: [✓ with grab
Homogenization Start Time: 1515 Homogenization End Time: 1516

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Paddle-mixed. Sample homogenized on boat

Recorded by:

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 180003-01.03 **Station ID:** SMA3-SG-18

Sampling Crew: EP/BW/JA
Sample Date: 4/26/2018 Sampling Method: Power Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunny
Station Coordinates: N / Lat. 47.207976° N
E / Long. 123.693826° W
Datum: NAD 83/ WGS 84 zone:

Sample ID: PDI-SMA3-SG-18-180426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: ~ ft. ~14'
Tide Level: ~ ft.
Depth MLLW: ~ ft.
Grab Recovery: >10 cm Time: 1237
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
10% f sand, trace biota, trace organics, woody debris

DGT Location? Yes / No | If yes | Temp: 12.0°C | pH: 6.97 | Salinity:
Duplicate Station? Yes / No

Processing Check-list

Processing Crew: EP/BW/JA **Time:** 1247
Date: 4/26/2018

Photograph of unhomogenized sample: [X] taken in grab
Homogenization Start Time: 1247 Homogenization End Time: 1248

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Paddle mixed. Sample homogenized on boat

Recorded by:

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA3-SG19

Sampling Crew: EP/BW/JA
Sample Date: 4/26/2018 Sampling Method: Power Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunny
Station Coordinates: N / Lat. 47.208539°N
E / Long. 123.093615°W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA3-SG19-180426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: — ft. ~10'
Tide Level: — ft.
Depth MLLW: — ft.
Grab Recovery: 19 cm Time: 1220
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	none	H2S	none	Dry
gravel	gray	soft/loose	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
silt clay	brown	dense/stiff	strong		moderate	Wet
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
10% f sand

DGT Location? Yes / No | If yes | Temp: 12.1°C | pH: 7.14 | Salinity: —
Duplicate Station? Yes / No

Processing Check-list

Processing Crew: EP/BW/JA **Time:** 1230
Date: 4/26/2018

Photograph of unhomogenized sample: [X] taken in grab
Homogenization Start Time: 1230 Homogenization End Time: 1231

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Paddle mixed. Sample homogenized on Grant

Recorded by: [signature]

ANCHOR QEA

Shelton Harbor Surface Sediment Collection and Processing Form

Project Name: Shelton Harbor **Project No:** 110008-01.03 **Station ID:** SMA3-SG-20

Sampling Crew: EP/BW/JA
Sample Date: 4/26/2018 Sampling Method: Power Grab
Sampling Vessel: Peter R
Subcontractor(s): MSS Weather: Sunny
Station Coordinates: N / Lat. 47.208121°N
E / Long. 123.094649°W
Datum: NAD 83 / WGS 84 zone:

Sample ID: PDI-SMA3-SG20-180426
Analysis: Dioxins Furans / TBT / TOC / Cu / DGT Other:
(Circle Appropriate Analyses) Other:

Accecpted Grab Number: 1
Water Depth: ~ ft. ~13'
Tide Level: ~ ft.
Depth MLLW: ~ ft.
Grab Recovery: 25 cm Time: 1420
Sample Interval: 10 cm

Sediment Type:	Sediment Color:	Density:	Sediment Odor:		Sheen:	Moisture:
cobble	D.O.	Very soft/Loose	(none)	H2S	(none)	Dry
gravel	(gray)	(soft/loose)	slight	Petroleum	trace	Damp
sand C M F	black	mod dense/stiff	moderate	other:	slight	Moist
(silt clay)	(brown)	dense/stiff	strong		moderate	(Wet)
organic matter	brown surface	very dense/stiff	overwhelming		heavy	

Comments:
trace fine sand, trace gravel

DGT Location? **Yes / (No)** If yes Temp: pH: Salinity:
Duplicate Station? **Yes / (No)**

Processing Check-list

Processing Crew: EP/BW/JA **Time:** 1430
Date: 4/26/2018

Photograph of unhomogenized sample: [✓] taken in grab
Homogenization Start Time: 1430 Homogenization End Time: 1431

Homogenize sample with paddle until consisyency and color are uniform: [✓]

Photograph of homogenized sample: [✓]

Comments:
Sample homogenized on boat

Recorded by: [signature]