TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

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TestAmerica Job ID: 580-78854-1
Client Project/Site: Portland Harbor Pre-Remedial Design
Revision: 1

For:
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*Authorized for release by:*
*11/13/2018 1:38:21 PM*

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## Job ID: 580-78854-1

**Laboratory: TestAmerica Seattle**

**Narrative**

# CASE NARRATIVE
# Client: AECOM
# Project: Portland Harbor Pre-Remedial Design
# Report Number: 580-78854-1

**REVISION 1: NOVEMBER 13, 2018**
This revision was required because the report was missing QC data for 8270D BEHP. Please note that the method blank batch was corrected in the SVOC section below..

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues.

It should be noted that samples with elevated Reporting Limits (RLs) resulting from a dilution may not be able to satisfy customer reporting limits in some cases. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes within the calibration range of the instrument or that reduces the interferences thereby enabling the quantification of target analytes.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

**RECEIPT**
Two samples were received on 7/16/2018 12:50 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.1° C.

Sample PDI-SG-B483 (580-78854-1) was activated for all on hold analyses by the client on 8/16/2018.

A container for each of the following samples PDI-SG-B483 (580-78854-1) and PDI-SG-S266 (580-78854-2) was shipped 9/10/18 from TestAmerica Sacramento's freezer and arrived and placed in the freezer on 9/11/18 in the TestAmerica Seattle location.

A sample container was provided to be archived frozen at the TestAmerica Sacramento laboratory pending potential additional analyses.

This report contains results of all analyses performed by TestAmerica Seattle.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

**SEMIVOLATILE ORGANIC COMPOUNDS (GC-MS)**
**Sample PDI-SG-B483 (580-78854-1) was analyzed for semivolatile organic compounds (GC-MS) in accordance with 8270D.** The sample was prepared on 09/07/2018 and analyzed on 09/10/2018.

Bis(2-ethylhexyl) phthalate was detected in method blank MB 580-**284577/1-A** at a level that was greater than the reporting limit (RL), but less than the method detection limit (MDL). If the associated sample reported a result above the MDL and/or RL, the result has been flagged. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples were not performed.

The following sample was frozen by the laboratory in hold, thawed, and extracted before the holding time expired: PDI-SG-B483 (580-78854-1). The sample was removed from the freezer on 9/7/18.

## Job ID: 580-78854-1 (Continued)

### Laboratory: TestAmerica Seattle (Continued)

Sample PDI-SG-B483 (580-78854-1) required dilution prior to analysis due to the nature of the sample matrix. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

**SEMIVOLATILE ORGANIC COMPOUNDS - SELECTED ION MODE (SIM)**

**Sample PDI-SG-B483 (580-78854-1) was analyzed for semivolatile organic compounds - Selected Ion Mode (SIM) in accordance with SW846 8270D_SIM.** The sample was prepared on 10/09/2018 and analyzed on 10/11/2018.

Fluoranthene was detected in method blank MB 580-286035/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples were not performed.

The following sample was frozen by the laboratory in hold, thawed, and extracted before the holding time expired: PDI-SG-B483 (580-78854-1). The sample was removed from the freezer on 10/9/18.

Sample PDI-SG-B483 (580-78854-1)[25X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

**ORGANOTINS BY GC/MS**

**Sample PDI-SG-B483 (580-78854-1) was analyzed for Organotins by GC/MS in accordance with the Krone Method.** The sample was prepared on 09/21/2018 and analyzed on 10/11/2018.

The following sample was frozen within holding time, thawed and extracted within 1 day: PDI-SG-B483 (580-78854-1). The sample was removed from the freezer on 09/20/18.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

**DIESEL AND EXTENDED RANGE ORGANICS**

**Sample PDI-SG-B483 (580-78854-1) was analyzed for diesel and extended range organics in accordance with Method NWTPH-Dx.** The sample was prepared on 09/21/2018 and analyzed on 09/27/2018.

The following sample contained a hydrocarbon pattern in the diesel range; however, the elution pattern was later than the typical diesel fuel pattern used by the laboratory for quantitative purposes: PDI-SG-B483 (580-78854-1).

The following sample was received by the laboratory and frozen within holding time: : PDI-SG-B483 (580-78854-1). The sample was thawed and extracted before the holding time expired. The sample was removed from the freezer on 9/20/18.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

**TOTAL MERCURY**

**Sample PDI-SG-B483 (580-78854-1) was analyzed for total mercury in accordance with EPA SW-846 Method 7471A.** The sample was prepared and analyzed on 08/23/2018.

The following sample was prepared outside of preparation holding time due to client requesting analysis after holding time expired: PDI-SG-B483 (580-78854-1).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Definitions/Glossary

Client: AECOM
Project/Site: Portland Harbor Pre-Remedial Design

TestAmerica Job ID: 580-78854-1

## Qualifiers

### GC/MS Semi VOA

| Qualifier | Qualifier Description |
|---|---|
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |
| B | Compound was found in the blank and sample. |

### GC Semi VOA

| Qualifier | Qualifier Description |
|---|---|
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |

### Metals

| Qualifier | Qualifier Description |
|---|---|
| H | Sample was prepped or analyzed beyond the specified holding time |

## Glossary

| Abbreviation | These commonly used abbreviations may or may not be present in this report. |
|---|---|
| ¤ | Listed under the "D" column to designate that the result is reported on a dry weight basis |
| %R | Percent Recovery |
| CFL | Contains Free Liquid |
| CNF | Contains No Free Liquid |
| DER | Duplicate Error Ratio (normalized absolute difference) |
| Dil Fac | Dilution Factor |
| DL | Detection Limit (DoD/DOE) |
| DL, RA, RE, IN | Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample |
| DLC | Decision Level Concentration (Radiochemistry) |
| EDL | Estimated Detection Limit (Dioxin) |
| LOD | Limit of Detection (DoD/DOE) |
| LOQ | Limit of Quantitation (DoD/DOE) |
| MDA | Minimum Detectable Activity (Radiochemistry) |
| MDC | Minimum Detectable Concentration (Radiochemistry) |
| MDL | Method Detection Limit |
| ML | Minimum Level (Dioxin) |
| NC | Not Calculated |
| ND | Not Detected at the reporting limit (or MDL or EDL if shown) |
| PQL | Practical Quantitation Limit |
| QC | Quality Control |
| RER | Relative Error Ratio (Radiochemistry) |
| RL | Reporting Limit or Requested Limit (Radiochemistry) |
| RPD | Relative Percent Difference, a measure of the relative difference between two points |
| TEF | Toxicity Equivalent Factor (Dioxin) |
| TEQ | Toxicity Equivalent Quotient (Dioxin) |

## Client Sample ID: PDI-SG-B483

**Date Collected: 07/13/18 14:50**
**Date Received: 07/16/18 12:50**

## Lab Sample ID: 580-78854-1

**Matrix: Solid**
**Percent Solids: 59.2**

### Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **2-Methylnaphthalene** | **5.4** | **J** | 40 | 3.6 | ug/Kg | ☼ | 10/09/18 16:09 | 10/11/18 13:05 | 25 |
| Acenaphthene | ND | | 40 | 4.8 | ug/Kg | ☼ | 10/09/18 16:09 | 10/11/18 13:05 | 25 |
| **Acenaphthylene** | **8.9** | **J** | 40 | 4.0 | ug/Kg | ☼ | 10/09/18 16:09 | 10/11/18 13:05 | 25 |
| **Anthracene** | **6.3** | **J** | 40 | 4.8 | ug/Kg | ☼ | 10/09/18 16:09 | 10/11/18 13:05 | 25 |
| **Benzo[a]anthracene** | **9.6** | **J** | 40 | 6.1 | ug/Kg | ☼ | 10/09/18 16:09 | 10/11/18 13:05 | 25 |
| Benzo[a]pyrene | ND | | 40 | 3.2 | ug/Kg | ☼ | 10/09/18 16:09 | 10/11/18 13:05 | 25 |
| **Benzo[b]fluoranthene** | **15** | **J** | 40 | 4.8 | ug/Kg | ☼ | 10/09/18 16:09 | 10/11/18 13:05 | 25 |
| Benzo[g,h,i]perylene | ND | | 40 | 4.0 | ug/Kg | ☼ | 10/09/18 16:09 | 10/11/18 13:05 | 25 |
| Benzo[k]fluoranthene | ND | | 40 | 4.8 | ug/Kg | ☼ | 10/09/18 16:09 | 10/11/18 13:05 | 25 |
| Chrysene | ND | | 40 | 12 | ug/Kg | ☼ | 10/09/18 16:09 | 10/11/18 13:05 | 25 |
| Dibenz(a,h)anthracene | ND | | 40 | 5.8 | ug/Kg | ☼ | 10/09/18 16:09 | 10/11/18 13:05 | 25 |
| **Fluoranthene** | **27** | **J B** | 40 | 11 | ug/Kg | ☼ | 10/09/18 16:09 | 10/11/18 13:05 | 25 |
| **Fluorene** | **7.3** | **J** | 40 | 4.0 | ug/Kg | ☼ | 10/09/18 16:09 | 10/11/18 13:05 | 25 |
| Indeno[1,2,3-cd]pyrene | ND | | 40 | 4.8 | ug/Kg | ☼ | 10/09/18 16:09 | 10/11/18 13:05 | 25 |
| **Naphthalene** | **33** | **J** | 40 | 6.5 | ug/Kg | ☼ | 10/09/18 16:09 | 10/11/18 13:05 | 25 |
| **Phenanthrene** | **21** | **J** | 40 | 5.6 | ug/Kg | ☼ | 10/09/18 16:09 | 10/11/18 13:05 | 25 |
| **Pyrene** | **26** | **J** | 40 | 7.8 | ug/Kg | ☼ | 10/09/18 16:09 | 10/11/18 13:05 | 25 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *Terphenyl-d14* | *89* | | *57 - 120* | *10/09/18 16:09* | *10/11/18 13:05* | *25* |

### Method: 8270D - Semivolatile Organic Compounds (GC/MS)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Bis(2-ethylhexyl) phthalate | ND | | 1300 | 150 | ug/Kg | ☼ | 09/21/18 12:45 | 10/18/18 13:55 | 25 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *Terphenyl-d14 (Surr)* | *58* | | *58 - 120* | *09/21/18 12:45* | *10/18/18 13:55* | *25* |

### Method: Organotins - Organotins, PSEP (GC/MS)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Tributyltin | ND | | 62 | 16 | ug/Kg | ☼ | 09/21/18 18:00 | 10/11/18 00:18 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *Tripentyltin* | *27* | | *10 - 113* | *09/21/18 18:00* | *10/11/18 00:18* | *1* |

### Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **#2 Diesel (C10-C24)** | **75** | **J** | 76 | 19 | mg/Kg | ☼ | 09/21/18 11:01 | 09/27/18 17:43 | 1 |
| **Motor Oil (>C24-C36)** | **330** | | 76 | 26 | mg/Kg | ☼ | 09/21/18 11:01 | 09/27/18 17:43 | 1 |

| *Surrogate* | *%Recovery* | *Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *o-Terphenyl* | *95* | | *50 - 150* | *09/21/18 11:01* | *09/27/18 17:43* | *1* |

### Method: 7471A - Mercury (CVAA)

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Mercury** | **0.053** | **H** | 0.035 | 0.011 | mg/Kg | ☼ | 08/23/18 13:53 | 08/23/18 17:46 | 1 |

## Method: 8270D - Semivolatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 580-284577/1-A**
**Matrix: Solid**
**Analysis Batch: 284702**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 284577**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Bis(2-ethylhexyl) phthalate | 6.46 | J | 30 | 3.6 | ug/Kg | | 09/21/18 12:45 | 09/23/18 11:43 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *Terphenyl-d14 (Surr)* | *91* | | *58 - 120* | *09/21/18 12:45* | *09/23/18 11:43* | *1* |

**Lab Sample ID: LCS 580-284577/2-A**
**Matrix: Solid**
**Analysis Batch: 284702**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 284577**

| Analyte | | | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Bis(2-ethylhexyl) phthalate | | | 50.0 | 44.5 | | ug/Kg | | 89 | 59 - 123 | | |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *Terphenyl-d14 (Surr)* | *95* | | *58 - 120* |

## Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

**Lab Sample ID: MB 580-286035/1-A**
**Matrix: Solid**
**Analysis Batch: 286213**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 286035**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| 2-Methylnaphthalene | ND | | 1.0 | 0.090 | ug/Kg | | 10/09/18 16:09 | 10/11/18 12:14 | 1 |
| Acenaphthene | ND | | 1.0 | 0.12 | ug/Kg | | 10/09/18 16:09 | 10/11/18 12:14 | 1 |
| Acenaphthylene | ND | | 1.0 | 0.10 | ug/Kg | | 10/09/18 16:09 | 10/11/18 12:14 | 1 |
| Anthracene | ND | | 1.0 | 0.12 | ug/Kg | | 10/09/18 16:09 | 10/11/18 12:14 | 1 |
| Benzo[a]anthracene | ND | | 1.0 | 0.15 | ug/Kg | | 10/09/18 16:09 | 10/11/18 12:14 | 1 |
| Benzo[a]pyrene | ND | | 1.0 | 0.080 | ug/Kg | | 10/09/18 16:09 | 10/11/18 12:14 | 1 |
| Benzo[b]fluoranthene | ND | | 1.0 | 0.12 | ug/Kg | | 10/09/18 16:09 | 10/11/18 12:14 | 1 |
| Benzo[g,h,i]perylene | ND | | 1.0 | 0.10 | ug/Kg | | 10/09/18 16:09 | 10/11/18 12:14 | 1 |
| Benzo[k]fluoranthene | ND | | 1.0 | 0.12 | ug/Kg | | 10/09/18 16:09 | 10/11/18 12:14 | 1 |
| Chrysene | ND | | 1.0 | 0.30 | ug/Kg | | 10/09/18 16:09 | 10/11/18 12:14 | 1 |
| Dibenz(a,h)anthracene | ND | | 1.0 | 0.14 | ug/Kg | | 10/09/18 16:09 | 10/11/18 12:14 | 1 |
| Fluoranthene | 0.386 | J | 1.0 | 0.28 | ug/Kg | | 10/09/18 16:09 | 10/11/18 12:14 | 1 |
| Fluorene | ND | | 1.0 | 0.10 | ug/Kg | | 10/09/18 16:09 | 10/11/18 12:14 | 1 |
| Indeno[1,2,3-cd]pyrene | ND | | 1.0 | 0.12 | ug/Kg | | 10/09/18 16:09 | 10/11/18 12:14 | 1 |
| Naphthalene | ND | | 1.0 | 0.16 | ug/Kg | | 10/09/18 16:09 | 10/11/18 12:14 | 1 |
| Phenanthrene | ND | | 1.0 | 0.14 | ug/Kg | | 10/09/18 16:09 | 10/11/18 12:14 | 1 |
| Pyrene | ND | | 1.0 | 0.19 | ug/Kg | | 10/09/18 16:09 | 10/11/18 12:14 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *Terphenyl-d14* | *101* | | *57 - 120* | *10/09/18 16:09* | *10/11/18 12:14* | *1* |

## Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

**Lab Sample ID: LCS 580-286035/2-A**
**Matrix: Solid**
**Analysis Batch: 286213**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 286035**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| 2-Methylnaphthalene | 200 | 166 | | ug/Kg | | 83 | 68 - 120 |
| Acenaphthene | 200 | 160 | | ug/Kg | | 80 | 68 - 120 |
| Acenaphthylene | 200 | 157 | | ug/Kg | | 79 | 68 - 120 |
| Anthracene | 200 | 199 | | ug/Kg | | 100 | 73 - 125 |
| Benzo[a]anthracene | 200 | 211 | | ug/Kg | | 106 | 66 - 120 |
| Benzo[a]pyrene | 200 | 204 | | ug/Kg | | 102 | 72 - 124 |
| Benzo[b]fluoranthene | 200 | 202 | | ug/Kg | | 101 | 63 - 121 |
| Benzo[g,h,i]perylene | 200 | 189 | | ug/Kg | | 95 | 63 - 120 |
| Benzo[k]fluoranthene | 200 | 194 | | ug/Kg | | 97 | 63 - 123 |
| Chrysene | 200 | 189 | | ug/Kg | | 95 | 69 - 120 |
| Dibenz(a,h)anthracene | 200 | 211 | | ug/Kg | | 105 | 70 - 125 |
| Fluoranthene | 200 | 202 | | ug/Kg | | 101 | 74 - 125 |
| Fluorene | 200 | 172 | | ug/Kg | | 86 | 73 - 120 |
| Indeno[1,2,3-cd]pyrene | 200 | 223 | | ug/Kg | | 112 | 65 - 121 |
| Naphthalene | 200 | 157 | | ug/Kg | | 78 | 70 - 120 |
| Phenanthrene | 200 | 181 | | ug/Kg | | 91 | 73 - 120 |
| Pyrene | 200 | 193 | | ug/Kg | | 97 | 70 - 120 |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *Terphenyl-d14* | *91* | | *57 - 120* |

## Method: Organotins - Organotins, PSEP (GC/MS)

**Lab Sample ID: MB 580-284643/1-A**
**Matrix: Solid**
**Analysis Batch: 286082**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 284643**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Tributyltin | ND | | 38 | 9.8 | ug/Kg | | 09/21/18 18:00 | 10/10/18 15:20 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *Tripentyltin* | *30* | | *10 - 113* | *09/21/18 18:00* | *10/10/18 15:20* | *1* |

**Lab Sample ID: LCS 580-284643/2-A**
**Matrix: Solid**
**Analysis Batch: 286082**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 284643**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|
| Tributyltin | 71.8 | 18.0 | J | ug/Kg | | 25 | 14 - 150 |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *Tripentyltin* | *31* | | *10 - 113* |

## Method: Organotins - Organotins, PSEP (GC/MS) (Continued)

**Lab Sample ID: LCSD 580-284643/3-A**
**Matrix: Solid**
**Analysis Batch: 286082**

**Client Sample ID: Lab Control Sample Dup**
**Prep Type: Total/NA**
**Prep Batch: 284643**

| Analyte | | | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tributyltin | | | 71.8 | 17.6 | J | ug/Kg | | 24 | 14 - 150 | 3 | 20 |

| *Surrogate* | *LCSD %Recovery* | *LCSD Qualifier* | *Limits* |
|---|---|---|---|
| *Tripentyltin* | *28* | | *10 - 113* |

## Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

**Lab Sample ID: MB 580-284561/1-A**
**Matrix: Solid**
**Analysis Batch: 285059**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 284561**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| #2 Diesel (C10-C24) | ND | | 50 | 12 | mg/Kg | | 09/21/18 11:01 | 09/27/18 15:09 | 1 |
| Motor Oil (>C24-C36) | ND | | 50 | 18 | mg/Kg | | 09/21/18 11:01 | 09/27/18 15:09 | 1 |

| *Surrogate* | *MB %Recovery* | *MB Qualifier* | *Limits* | *Prepared* | *Analyzed* | *Dil Fac* |
|---|---|---|---|---|---|---|
| *o-Terphenyl* | *99* | | *50 - 150* | *09/21/18 11:01* | *09/27/18 15:09* | *1* |

**Lab Sample ID: LCS 580-284561/2-A**
**Matrix: Solid**
**Analysis Batch: 285059**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 284561**

| Analyte | | | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|---|---|---|---|---|---|---|---|---|---|
| #2 Diesel (C10-C24) | | | 500 | 534 | | mg/Kg | | 107 | 70 - 125 |
| Motor Oil (>C24-C36) | | | 500 | 550 | | mg/Kg | | 110 | 70 - 129 |

| *Surrogate* | *LCS %Recovery* | *LCS Qualifier* | *Limits* |
|---|---|---|---|
| *o-Terphenyl* | *124* | | *50 - 150* |

**Lab Sample ID: LCSD 580-284561/3-A**
**Matrix: Solid**
**Analysis Batch: 285059**

**Client Sample ID: Lab Control Sample Dup**
**Prep Type: Total/NA**
**Prep Batch: 284561**

| Analyte | | | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #2 Diesel (C10-C24) | | | 500 | 527 | | mg/Kg | | 105 | 70 - 125 | 1 | 16 |
| Motor Oil (>C24-C36) | | | 500 | 550 | | mg/Kg | | 110 | 70 - 129 | 0 | 16 |

| *Surrogate* | *LCSD %Recovery* | *LCSD Qualifier* | *Limits* |
|---|---|---|---|
| *o-Terphenyl* | *123* | | *50 - 150* |

## Method: 7471A - Mercury (CVAA)

**Lab Sample ID: MB 580-282304/16-A**
**Matrix: Solid**
**Analysis Batch: 282350**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 282304**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Mercury | ND | | 0.030 | 0.0090 | mg/Kg | | 08/23/18 13:53 | 08/23/18 17:25 | 1 |

**Lab Sample ID: LCS 580-282304/17-A**
**Matrix: Solid**
**Analysis Batch: 282350**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 282304**

| Analyte | | | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | | | 0.167 | 0.160 | | mg/Kg | | 96 | 80 - 120 | | |

**Lab Sample ID: LCSD 580-282304/18-A**
**Matrix: Solid**
**Analysis Batch: 282350**

**Client Sample ID: Lab Control Sample Dup**
**Prep Type: Total/NA**
**Prep Batch: 282304**

| Analyte | | | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | | | 0.167 | 0.153 | | mg/Kg | | 92 | 80 - 120 | 5 | 20 |

# Lab Chronicle

Client: AECOM
Project/Site: Portland Harbor Pre-Remedial Design

TestAmerica Job ID: 580-78854-1

**Client Sample ID: PDI-SG-B483**
**Date Collected: 07/13/18 14:50**
**Date Received: 07/16/18 12:50**

**Lab Sample ID: 580-78854-1**
**Matrix: Solid**
**Percent Solids: 59.2**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Prepared or Analyzed | Analyst | Lab |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3550B | | | 284577 | 09/21/18 12:45 | A1K | TAL SEA |
| Total/NA | Analysis | 8270D | | 25 | 286811 | 10/18/18 13:55 | ERZ | TAL SEA |
| Total/NA | Prep | 3546 | | | 286035 | 10/09/18 16:09 | BAH | TAL SEA |
| Total/NA | Analysis | 8270D SIM | | 25 | 286213 | 10/11/18 13:05 | ADB | TAL SEA |
| Total/NA | Prep | Organotin Prep | | | 284643 | 09/21/18 18:00 | KMS | TAL SEA |
| Total/NA | Analysis | Organotins | | 1 | 286082 | 10/11/18 00:18 | KFS | TAL SEA |
| Total/NA | Prep | 3546 | | | 284561 | 09/21/18 11:01 | A1K | TAL SEA |
| Total/NA | Analysis | NWTPH-Dx | | 1 | 285059 | 09/27/18 17:43 | W1T | TAL SEA |
| Total/NA | Prep | 7471A | | | 282304 | 08/23/18 13:53 | T1H | TAL SEA |
| Total/NA | Analysis | 7471A | | 1 | 282350 | 08/23/18 17:46 | FCW | TAL SEA |

**Laboratory References:**

TAL SEA = TestAmerica Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

# Accreditation/Certification Summary

Client: AECOM
TestAmerica Job ID: 580-78854-1
Project/Site: Portland Harbor Pre-Remedial Design

## Laboratory: TestAmerica Seattle

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

| Authority | Program | EPA Region | Identification Number | Expiration Date |
|---|---|---|---|---|
| Alaska (UST) | State Program | 10 | 17-024 | 01-19-19 |
| ANAB | DoD ELAP | | L2236 | 01-19-19 |
| ANAB | ISO/IEC 17025 | | L2236 | 01-19-19 |
| California | State Program | 9 | 2901 | 11-05-18 |
| Montana (UST) | State Program | 8 | N/A | 04-30-20 |
| Nevada | State Program | 9 | WA000502019-1 | 07-31-19 |
| Oregon | NELAP | 10 | WA100007 | 11-05-19 |
| US Fish & Wildlife | Federal | | LE058448-0 | 07-31-19 |
| USDA | Federal | | P330-14-00126 | 02-10-20 |
| Washington | State Program | 10 | C553 | 02-17-19 |

# Sample Summary

Client: AECOM
Project/Site: Portland Harbor Pre-Remedial Design

TestAmerica Job ID: 580-78854-1

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---|---|---|---|---|
| 580-78854-1 | PDI-SG-B483 | Solid | 07/13/18 14:50 | 07/16/18 12:50 |

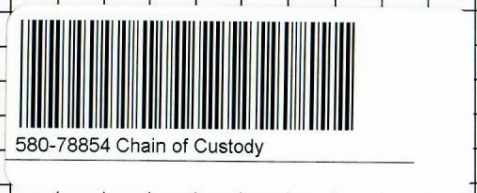
# SURFACE SEDIMENT CHAIN OF CUSTODY

| | | | |
|---|---|---|---|
| **TestAmerica-Seattle**<br>5755-8th-Street-East<br>Tacoma, WA 98424-1317<br>**Ph: 253-922-2310 Fax: 253-922-5047** | **Project Contact: Amy Dahl / Chelsey Cook**<br>**Tel: (206) 438-2261 / (206) 438-2010**<br>**Analysis Turnaround Time**<br>Calendar ( C ) or Work Days (W) _____<br>☐ 21 days<br>☒ Other _ASAP_____ | **Site Contact: Jennifer Ray**<br>**Laboratory Contact: Elaine-Walker** | **7/16/2018** COC No: 1<br>**Carrier: Courier** ____1___ of __1____ pages |

**Client Contact**
AECOM
1111 3rd Ave Suite 1600
Seattle, WA 98101
Phone: (206) 438-2700 Fax: 1+(866) 495-5288
Project Name: Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling
Portland, OR
Project #: 60566335 Study: Surface Sediment
Sample Type: D/U

| Sample Identification | Sample Date | Sample Time | Matrix | QC Sample | Sampler's Initials | Total No. of Cont. | Fraction | PCB Congeners 1668A | PCDD/Fs 1613B | TPH Diesel, Metals, Mercury NWTPH-Dx, 6020B, 7471A | Grain size ASTM D7928/D6913 | Total organic carbon, Total solids 9060 (104C & 70C) | Archive Archive -20 C | PAHs, BEHP, Tributyltin, 8270-SIM, 8270-LL, Kron/Unger | Atterberg Limits ASTM D4318 | WQ - PCB Congeners 1668A | WQ - PCDD/Fs 1613B | TPH Diesel, Metals, Mercury NWTPH-Dx, 6020B, 7471A | WQ - Total Organic Carbon SM5310B | WQ - PAHs 8270-SIM | WQ - BEHP EPA 8270D-LL | WQ - Tributyltin Krone/Unger | Sample Specific Notes: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PDI-SG-B483 | 7/13/2018 | 14:50 | SS | | LS | 8 | | H | H | x* | x* | x* | H | H | H | | | | | | | | |
| PDI-SG-~~B487~~ WP-B487 | 7/13/2018 | 12:10 | SS | | LS | ~~8~~ 7 | | H | H | x* | x* | x* | H | H | ~~H~~ | | | | | | | | |

*Container Type: WMG=Wide Mouth Glass Jar, P=HDPE, PP=Polypropylene, AG=amber glass, G=glass, RC=Resin Column*
*Preservative: HCl = Hydrochloric Acid, H3PO4 = Phosphoric Acid, HNO3 = Nitric Acid*
*Fraction: D = Dissolved, PRT = Particulate, T = Total (unfiltered)*




***Sample Disposal***
☐ *Return To Client* ☒ *Disposal By Lab* ☒ *Archive For* **12** *Months*

**Special Instructions/QC Requirements & Comments:**
**Separate reports for each lab.**
**x*- Analyze for grain size, metals (6020B analytes only), Mn, and TOC (9060 @ 104C & 70C) ASAP.**
**H - Hold analyses pending further instruction.**

1.5

| | | | | | |
|---|---|---|---|---|---|
| Relinquished by: | Company: AECOM | Date/Time: 7/16/18 1210 | Received by: | Company: M.E. | Date/Time: 7/16/18 1210 |
| Relinquished by: | Company: M.E. | Date/Time: 7/16/18 1250 | Received by: | Company: TAKR | Date/Time: 7/16/18 1250 |
| Relinquished by: | Company: | Date/Time: | Received by: | Company: | Date/Time: |

# SURFACE SEDIMENT
# CHAIN OF CUSTODY

| | | | |
|---|---|---|---|
| **TestAmerica-Seattle**<br>5755-8th-Street-East<br>Tacoma, WA 98424-1317<br>**Ph: 253-922-2310 Fax: 253-922-5047** | **Project Contact: Amy Dahl / Chelsey Cook**<br>**Tel: (206) 438-2261 / (206) 438-2010** | **Site Contact: Jennifer Ray**<br>**Laboratory Contact: Elaine-Walker** | **7/16/2018** COC No: 1<br>**Carrier: Courier** 1 of 1 pages |
| **Client Contact**<br>AECOM<br>1111 3rd Ave Suite 1600<br>Seattle, WA 98101<br>Phone: (206) 438-2700 Fax: 1+(866) 495-5288<br>Project Name: Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling<br>Portland, OR<br>Project #: 60566335 Study: **Surface Sediment**<br>Sample Type: D/U | **Analysis Turnaround Time**<br>Calendar ( C ) or Work Days (W) _____<br>☐ 21 days<br>☒ Other _ASAP_____ | | |

| Sample Identification | Sample Date | Sample Time | Matrix | QC Sample | Sampler's Initials | Total No. of Cont. | Fraction | PCB Congeners 1668A | PCDD/Fs 1613B | TPH Diesel, Metals, Mercury NWTPH-Dx, 6020B, 7471A | Grain size ASTM D7928/D6913 | Total organic carbon, Total solids 9060 (104C & 70C) | Archive Archive -20 C | PAHs, BEHP, Tributyltin, 8270-SIM, 8270-LL, Kron/Unger | Atterberg Limits ASTM D4318 | WQ - PCB Congeners 1668A | WQ - PCDD/Fs 1613B | TPH Diesel, Metals, Mercury NWTPH-Dx, 6020B, 7471A | WQ - Total Organic Carbon SM5310B | WQ - PAHs 8270-SIM | WQ - BEHP EPA 8270D-LL | WQ - Tributyltin Krone/Unger | Sample Specific Notes: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PDI-SG-B483 | 7/13/2018 | 14:50 | SS | | LS | 8 | | H | H | x* | x* | x* | H | H | H | | | | | | | | |
| PDI-SG-~~B487~~ W2-B487 | 7/13/2018 | 12:10 | SS | | LS | ~~7~~ | | H | H | x* | x* | x* | H | H | ~~H~~ | | | | | | | | |

580-78854 Chain of Custody

*Container Type: WMG=Wide Mouth Glass Jar, P=HDPE, PP=Polypropylene, AG=amber glass, G=glass, RC=Resin Column*

*Preservative: HCl = Hydrochloric Acid, H3PO4 = Phosphoric Acid, HNO3 = Nitric Acid*

*Fraction: D = Dissolved, PRT = Particulate, T = Total (unfiltered)*

***Sample Disposal***
☐ Return To Client ☒ Disposal By Lab ☒ Archive For **12** Months

**Special Instructions/QC Requirements & Comments:**

**Separate reports for each lab.**

**x*- Analyze for grain size, metals (6020B analytes only), Mn, and TOC (9060 @ 104C & 70C) ASAP.**

**H - Hold analyses pending further instruction.**

1 of 5

| | | | | | |
|---|---|---|---|---|---|
| Relinquished by: | Company: AECOM | Date/Time: 7/16/18 1210 | Received by: | Company: M.E. | Date/Time: 7/16/18 1210 |
| Relinquished by: | Company: M.E. | Date/Time: 7/16/18 1250 | Received by: | Company: TARR | Date/Time: 7/16/18 1250 |
| Relinquished by: | Company: TARR | Date/Time: 7/16/18 1700 | Received by: | Company: SEA TR | Date/Time: 7/17/18 0930 |

FRS = 0.710.7 w/C.S.

**TestAmerica Sacramento**
880 Riverside Parkway
West Sacramento, CA 95605
Phone (916) 373-5600 Fax (916) 372-1059

# Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

| Client Information (Sub Contract Lab) | Sampler: | Lab PM: Walker, Elaine M | Carrier Tracking No(s): | COC No: 320-128759.1 |
|---|---|---|---|---|
| Client Contact: Shipping/Receiving | Phone: | E-Mail: elaine.walker@testamericainc.com | State of Origin: Oregon | Page: Page 1 of 1 |
| Company: TestAmerica Laboratories, Inc. | | Accreditations Required (See note): | | Job #: 580-78854-6 |
| Address: 5755 8th Street East, , | Due Date Requested: 7/19/2018 | | | |
| City: Tacoma | TAT Requested (days): | | | |
| State, Zip: WA, 98424 | | | | |
| Phone: 253-922-2310(Tel) 253-922-5047(Fax) | PO #: | | | |
| Email: | WO #: | | | |
| Project Name: Portland Harbor Pre-Remedial Design | Project #: 58012120 | | | |
| Site: | SSOW#: | | | |

**Analysis Requested**

**Preservation Codes:**

A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)

Other:

| Sample Identification - Client ID | Sample Date | Sample Time | Sample Type (C=comp, G=grab) | Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air) | Field Filtered Sample (Yes or No) | Perform MS/MSD (Yes or No) | Transfer of frozen archive from SAC to Seattle | Total Number of containers | Special Instructions/Note: |
|---|---|---|---|---|---|---|---|---|---|
| | | | Preservation Code | | | | | | |
| PDI-SG-B483 | 7/13/18 | 14:50 Pacific | | Solid | | | X | 1 | , Total Solids performed at 104C, Total Solids performed at 70C for TOC |
| PDI-SG-S266 | 7/13/18 | 12:10 Pacific | | Solid | | | X | 1 | , Total Solids performed at 104C |

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

| ***Possible Hazard Identification*** *Unconfirmed* | ***Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)*** ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months* |
|---|---|
| Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2 | Special Instructions/QC Requirements: |

| Empty Kit Relinquished by: | Date: | Time: | Method of Shipment: |
|---|---|---|---|

| Relinquished by: See Sample Control | Date/Time: 9/13/18 1500 | Company: SEA | Received by: K Fresh | Date/Time: 9/14/18 0930 | Company: SEA |
|---|---|---|---|---|---|
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |

| Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: |
|---|---|---|

Ver: 09/20/2016

# Login Sample Receipt Checklist

Client: AECOM

Job Number: 580-78854-1

**Login Number: 78854**
**List Number: 1**
**Creator: O'Connell, Jason I**

**List Source: TestAmerica Seattle**

| Question | Answer | Comment |
|---|---|---|
| Radioactivity wasn't checked or is </= background as measured by a survey meter. | True | |
| The cooler's custody seal, if present, is intact. | True | |
| Sample custody seals, if present, are intact. | True | |
| The cooler or samples do not appear to have been compromised or tampered with. | True | |
| Samples were received on ice. | True | |
| Cooler Temperature is acceptable. | True | |
| Cooler Temperature is recorded. | True | |
| COC is present. | True | |
| COC is filled out in ink and legible. | True | |
| COC is filled out with all pertinent information. | True | |
| Is the Field Sampler's name present on COC? | True | |
| There are no discrepancies between the containers received and the COC. | True | |
| Samples are received within Holding Time (excluding tests with immediate HTs) | True | |
| Sample containers have legible labels. | True | |
| Containers are not broken or leaking. | True | |
| Sample collection date/times are provided. | True | |
| Appropriate sample containers are used. | True | |
| Sample bottles are completely filled. | True | |
| Sample Preservation Verified. | True | |
| There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs | True | |
| Containers requiring zero headspace have no headspace or bubble is <6mm (1/4"). | True | |
| Multiphasic samples are not present. | True | |
| Samples do not require splitting or compositing. | True | |
| Residual Chlorine Checked. | N/A | |