

THE LEADER IN ENVIRONMENTAL TESTING

# **ANALYTICAL REPORT**

TestAmerica Laboratories, Inc.

TestAmerica Seattle 5755 8th Street East Tacoma, WA 98424 Tel: (253)922-2310

TestAmerica Job ID: 580-80213-7

Client Project/Site: Portland Harbor Pre-Remedial Design

For:

AECOM 1111 Third Ave Suite 1600 Seattle, Washington 98101

Attn: Amy Dahl

# M. Elains Walker

Authorized for release by: 9/26/2018 5:05:06 PM

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

TestAmerica Job ID: 580-80213-7

# **Table of Contents**

| Cover Page              | 1  |
|-------------------------|----|
| Table of Contents       | 2  |
| Case Narrative          | 3  |
| Definitions             | 4  |
| Client Sample Results   |    |
| QC Sample Results       |    |
| Chronicle               | 9  |
| Certification Summary   | 10 |
| Sample Summary          | 11 |
| Chain of Custody        | 12 |
| Receipt Checklists      | 15 |
| sotope Dilution Summary | 16 |

3

4

e

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9

#### **Case Narrative**

Client: AECOM TestAmerica Job ID: 580-80213-7

Project/Site: Portland Harbor Pre-Remedial Design

Job ID: 580-80213-7

**Laboratory: TestAmerica Seattle** 

**Narrative** 

#### CASE NARRATIVE Client: AECOM

Project: Portland Harbor Pre-Remedial Design Report Number: 580-80213-7

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**

Three samples were received on 9/10/2018 12:40 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.3° C.

This report only contains results for the Rinse Blank water sample.

This report contains results for 1613B Dioxins / Furans, performed by TestAmerica Sacramento.

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.

#### **DIOXIN/ FURAN**

Sample PDI-RB-VV-090718 (580-80213-3) was analyzed for Dioxin/ Furan in accordance with 1613B. The sample was prepared on 09/13/2018 and analyzed on 09/22/2018.

Several analytes were detected in method blank MB 320-245399/1-A at levels that were above the method detection limit but below the reporting limit. The values should be considered estimates, and have been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

EPA Method 1613B specifies a +/- 15 second retention time difference between the recovery standard in the initial calibration (ICAL) and the continuing calibration verification (CCV). The 13C-1,2,3,4-TCDD and/or 13C-1,2,3,7,8,9-HxCDD associated with the following samples run on instrument 10D5 exceeded this criteria: PDI-RB-VV-090718 (580-80213-3), (CCV 320-247160/16), (LCS 320-245399/2-A), (LCSD 320-245399/3-A) and (MB 320-245399/1-A). This retention time shift is due to normal and reasonable column maintenance and does not affect the instrument chromatography resolution, sensitivity, or identification of target analytes. System retention times have been updated for proper analyte identification.

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

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7

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10

# **Definitions/Glossary**

Client: AECOM TestAmerica Job ID: 580-80213-7

Project/Site: Portland Harbor Pre-Remedial Design

#### **Qualifiers**

#### **Dioxin**

| Qualifier | Qualifier Description   |
|-----------|---|
| В         | Compound was found in the blank and sample.   |
| J         | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.  |
| q         | The reported result is the estimated maximum possible concentration of this analyte, quantitated using the theoretical ion ratio. The measured ion ratio does not meet qualitative identification criteria and indicates a possible interference. |

### **Glossary**

NC

ND

PQL

QC

RER

RLRPD

| 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)  |

TEF Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin) **TEQ** 

Not Calculated

**Quality Control** 

**Practical Quantitation Limit** 

Relative Error Ratio (Radiochemistry)

Not Detected at the reporting limit (or MDL or EDL if shown)

Relative Percent Difference, a measure of the relative difference between two points

Reporting Limit or Requested Limit (Radiochemistry)

TestAmerica Seattle

# **Client Sample Results**

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

Lab Sample ID: 580-80213-3

TestAmerica Job ID: 580-80213-7

**Matrix: Water** 

| <b>Client Sample</b> | ID: PDI-RB-VV-090718 |
|----------------------|----------------------|
|                      |                      |

Date Collected: 09/07/18 14:50 Date Received: 09/10/18 12:40

| Analyte                 | Result       | Qualifier | RL       | EDL   | Unit | D | Prepared       | Analyzed       | Dil Fac |
|-------------------------|--------------|-----------|----------|-------|------|---|----------------|----------------|---------|
| 1,2,3,4,6,7,8-HpCDD     | 53           | В         | 48       | 0.77  | pg/L |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 1,2,3,4,6,7,8-HpCDF     | 5.7          | JB        | 48       | 0.17  | pg/L |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 1,2,3,4,7,8,9-HpCDF     | 2.7          | JqB       | 48       | 0.23  | pg/L |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 1,2,3,4,7,8-HxCDD       | 1.5          | JB        | 48       | 0.095 | pg/L |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 1,2,3,4,7,8-HxCDF       | 1.0          | JB        | 48       | 0.21  | pg/L |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 1,2,3,6,7,8-HxCDD       | 0.85         | JB        | 48       | 0.091 | pg/L |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 1,2,3,6,7,8-HxCDF       | 0.83         | JB        | 48       | 0.20  | pg/L |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 1,2,3,7,8,9-HxCDD       | 0.73         | JqB       | 48       | 0.085 | pg/L |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 1,2,3,7,8,9-HxCDF       | 9.4          | JB        | 48       | 0.15  | pg/L |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 1,2,3,7,8-PeCDD         | 0.41         | JB        | 48       | 0.11  | pg/L |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 1,2,3,7,8-PeCDF         | 2.6          | JB        | 48       | 0.13  | pg/L |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 2,3,4,6,7,8-HxCDF       | 0.34         | JqB       | 48       | 0.16  | pg/L |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 2,3,4,7,8-PeCDF         | 0.87         | JqB       | 48       | 0.14  | pg/L |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 2,3,7,8-TCDD            | ND           | •         | 9.6      |       | pg/L |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 2,3,7,8-TCDF            | 2.7          | JqB       | 9.6      | 0.073 | pg/L |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| OCDD                    | 2300         |           | 96       | 1.3   | pg/L |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| OCDF                    | 71           | JB        | 96       |       | pg/L |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| Isotope Dilution        | %Recovery    | Qualifier | Limits   |       |      |   | Prepared       | Analyzed       | Dil Fac |
| 13C-1,2,3,4,6,7,8-HpCDD | 103          |           | 23 - 140 |       |      |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 13C-1,2,3,4,6,7,8-HpCDF | 90           |           | 28 - 143 |       |      |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 13C-1,2,3,4,7,8,9-HpCDF | 91           |           | 26 - 138 |       |      |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 13C-1,2,3,4,7,8-HxCDD   | 81           |           | 32 - 141 |       |      |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 13C-1,2,3,4,7,8-HxCDF   | 84           |           | 26 - 152 |       |      |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 13C-1,2,3,6,7,8-HxCDD   | 85           |           | 28 - 130 |       |      |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 13C-1,2,3,6,7,8-HxCDF   | 86           |           | 26 - 123 |       |      |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 13C-1,2,3,7,8,9-HxCDF   | 84           |           | 29 - 147 |       |      |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 13C-1,2,3,7,8-PeCDD     | 76           |           | 25 - 181 |       |      |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 13C-1,2,3,7,8-PeCDF     | 71           |           | 24 - 185 |       |      |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 13C-2,3,4,6,7,8-HxCDF   | 85           |           | 28 - 136 |       |      |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 13C-2,3,4,7,8-PeCDF     | 70           |           | 21 - 178 |       |      |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 13C-2,3,7,8-TCDD        | 84           |           | 25 - 164 |       |      |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 13C-2,3,7,8-TCDF        | 75           |           | 24 - 169 |       |      |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| 13C-OCDD                | 88           |           | 17 - 157 |       |      |   | 09/13/18 07:53 | 09/22/18 11:03 | 1       |
| Surrogate               | %Recovery    | Qualifier | Limits   |       |      |   | Prepared       | Analyzed       | Dil Fac |
| Surrogate               | 7011CCCVC1 y | Quanner   | Lilling  |       |      |   | rreparea       | Analyzea       |         |

TestAmerica Job ID: 580-80213-7

Project/Site: Portland Harbor Pre-Remedial Design

Method: 1613B - Dioxins and Furans (HRGC/HRMS)

| Lab Sample ID: | MB 320-245399/1-A |
|----------------|-------------------|
| Matrix: Water  |                   |

**Analysis Batch: 247160** 

Client: AECOM

**Client Sample ID: Method Blank** Prep Type: Total/NA **Prep Batch: 245399** 

|                     | MB     | MB             |     |       |      |   |                |                |   |
|---------------------|--------|----------------|-----|-------|------|---|----------------|----------------|---|
| Analyte             | Result | Qualifier      | RL  | EDL   | Unit | D | Prepared       | Analyzed       | Dil Fac                                 |
| 1,2,3,4,6,7,8-HpCDD | 2.06   | <del>J</del> – | 50  | 0.13  | pg/L |   | 09/13/18 07:53 | 09/22/18 13:21 |   |
| 1,2,3,4,6,7,8-HpCDF | 1.91   | J              | 50  | 0.17  | pg/L |   | 09/13/18 07:53 | 09/22/18 13:21 | •                                       |
| 1,2,3,4,7,8,9-HpCDF | 3.49   | J              | 50  | 0.21  | pg/L |   | 09/13/18 07:53 | 09/22/18 13:21 | •                                       |
| 1,2,3,4,7,8-HxCDD   | 2.03   | J              | 50  | 0.15  | pg/L |   | 09/13/18 07:53 | 09/22/18 13:21 | • |
| 1,2,3,4,7,8-HxCDF   | 1.26   | J              | 50  | 0.23  | pg/L |   | 09/13/18 07:53 | 09/22/18 13:21 | •                                       |
| 1,2,3,6,7,8-HxCDD   | 0.799  | J q            | 50  | 0.14  | pg/L |   | 09/13/18 07:53 | 09/22/18 13:21 | •                                       |
| 1,2,3,6,7,8-HxCDF   | 1.11   | Jq             | 50  | 0.23  | pg/L |   | 09/13/18 07:53 | 09/22/18 13:21 |   |
| 1,2,3,7,8,9-HxCDD   | 1.15   | J              | 50  | 0.13  | pg/L |   | 09/13/18 07:53 | 09/22/18 13:21 | •                                       |
| 1,2,3,7,8,9-HxCDF   | 10.3   | J              | 50  | 0.17  | pg/L |   | 09/13/18 07:53 | 09/22/18 13:21 | •                                       |
| 1,2,3,7,8-PeCDD     | 0.639  | J              | 50  | 0.15  | pg/L |   | 09/13/18 07:53 | 09/22/18 13:21 | •                                       |
| 1,2,3,7,8-PeCDF     | 2.97   | J              | 50  | 0.20  | pg/L |   | 09/13/18 07:53 | 09/22/18 13:21 | •                                       |
| 2,3,4,6,7,8-HxCDF   | 0.846  | J              | 50  | 0.17  | pg/L |   | 09/13/18 07:53 | 09/22/18 13:21 | •                                       |
| 2,3,4,7,8-PeCDF     | 1.38   | J              | 50  | 0.21  | pg/L |   | 09/13/18 07:53 | 09/22/18 13:21 | •                                       |
| 2,3,7,8-TCDD        | ND     |                | 10  | 0.15  | pg/L |   | 09/13/18 07:53 | 09/22/18 13:21 | •                                       |
| 2,3,7,8-TCDF        | 3.01   | J              | 10  | 0.095 | pg/L |   | 09/13/18 07:53 | 09/22/18 13:21 | •                                       |
| OCDD                | 10.1   | J              | 100 | 0.18  | pg/L |   | 09/13/18 07:53 | 09/22/18 13:21 | •                                       |
| OCDF                | 4.71   | J              | 100 | 0.20  | pg/L |   | 09/13/18 07:53 | 09/22/18 13:21 | 1                                       |
|                     | 440    | MD             |     |       |      |   |                |                |   |

|                         |           |           |          | 1.0 |                |                |         |  |  |
|-------------------------|-----------|-----------|----------|-----|----------------|----------------|---------|--|--|
|                         | MB        | MB        |          |     |                |                |         |  |  |
| Isotope Dilution        | %Recovery | Qualifier | Limits   |     | Prepared       | Analyzed       | Dil Fac |  |  |
| 13C-1,2,3,4,6,7,8-HpCDD | 88        |           | 23 - 140 |     | 09/13/18 07:53 | 09/22/18 13:21 | 1       |  |  |
| 13C-1,2,3,4,6,7,8-HpCDF | 77        |           | 28 - 143 |     | 09/13/18 07:53 | 09/22/18 13:21 | 1       |  |  |
| 13C-1,2,3,4,7,8,9-HpCDF | 80        |           | 26 - 138 |     | 09/13/18 07:53 | 09/22/18 13:21 | 1       |  |  |
| 13C-1,2,3,4,7,8-HxCDD   | 71        |           | 32 - 141 |     | 09/13/18 07:53 | 09/22/18 13:21 | 1       |  |  |
| 13C-1,2,3,4,7,8-HxCDF   | 74        |           | 26 - 152 |     | 09/13/18 07:53 | 09/22/18 13:21 | 1       |  |  |
| 13C-1,2,3,6,7,8-HxCDD   | 71        |           | 28 - 130 |     | 09/13/18 07:53 | 09/22/18 13:21 | 1       |  |  |
| 13C-1,2,3,6,7,8-HxCDF   | 73        |           | 26 - 123 |     | 09/13/18 07:53 | 09/22/18 13:21 | 1       |  |  |
| 13C-1 2 3 7 8 0-HyCDE   | 74        |           | 20 147   |     | 00/13/18 07:53 | 00/22/18 13:21 | 1       |  |  |

13C-1,2,3,7,8,9-HxCDF 09/13/18 07:53 09/22/18 13:21 13C-1,2,3,7,8-PeCDD 72 25 - 181 09/13/18 07:53 09/22/18 13:21 13C-1,2,3,7,8-PeCDF 66 24 - 185 09/13/18 07:53 09/22/18 13:21 74 09/13/18 07:53 09/22/18 13:21 13C-2,3,4,6,7,8-HxCDF 28 - 136 13C-2,3,4,7,8-PeCDF 66 21 - 178 09/13/18 07:53 09/22/18 13:21 13C-2,3,7,8-TCDD 80 25 - 164 09/13/18 07:53 09/22/18 13:21 13C-2,3,7,8-TCDF 72 24 - 169 09/13/18 07:53 09/22/18 13:21 13C-OCDD 76 17 - 157 09/13/18 07:53 09/22/18 13:21

MB MB Limits Surrogate %Recovery Qualifier Prepared Analyzed 37CI4-2,3,7,8-TCDD 73 35 - 197 09/13/18 07:53 09/22/18 13:21

Lab Sample ID: LCS 320-245399/2-A

**Matrix: Water** 

Analysis Batch: 247160

**Client Sample ID: Lab Control Sample** Prep Type: Total/NA Prep Batch: 245399

| 7 maryolo Batolii 247 100 | Spike | LCS    | LCS       |      |   |      | %Rec.               |
|---------------------------|-------|--------|-----------|------|---|------|---------------------|
| Analyte                   | Added | Result | Qualifier | Unit | D | %Rec | Limits              |
| 1,2,3,4,6,7,8-HpCDD       | 1000  | 975    |           | pg/L |   | 98   | 70 - 140            |
| 1,2,3,4,6,7,8-HpCDF       | 1000  | 1030   |           | pg/L |   | 103  | 82 - 122            |
| 1,2,3,4,7,8,9-HpCDF       | 1000  | 1070   |           | pg/L |   | 107  | 78 <sub>-</sub> 138 |
| 1,2,3,4,7,8-HxCDD         | 1000  | 1060   |           | pg/L |   | 106  | 70 - 164            |
| 1,2,3,4,7,8-HxCDF         | 1000  | 1040   |           | pg/L |   | 104  | 72 - 134            |

TestAmerica Seattle

Page 6 of 17 9/26/2018

# **QC Sample Results**

Client: AECOM TestAmerica Job ID: 580-80213-7

Project/Site: Portland Harbor Pre-Remedial Design

Lab Sample ID: LCS 320-245399/2-A

#### Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

**Matrix: Water Prep Type: Total/NA Analysis Batch: 247160 Prep Batch: 245399** LCS LCS Spike %Rec. Added Result Qualifier Analyte Unit D %Rec Limits 1,2,3,6,7,8-HxCDD 1000 1070 pg/L 107 76 - 134 1,2,3,6,7,8-HxCDF 1000 1070 pg/L 107 84 - 130 1000 1130 1,2,3,7,8,9-HxCDD pg/L 113 64 - 1621,2,3,7,8,9-HxCDF 1000 1070 pg/L 107 78 - 130 1,2,3,7,8-PeCDD 1000 1010 pg/L 101 70 - 142 1,2,3,7,8-PeCDF 1000 1050 pg/L 105 80 - 134 2,3,4,6,7,8-HxCDF 1000 1060 106 70 - 156 pg/L 2,3,4,7,8-PeCDF 1000 104 1040 pg/L 68 - 160pg/L 2,3,7,8-TCDD 200 183 92 67 - 1582,3,7,8-TCDF 200 108 75 - 158 216 pg/L OCDD 78 - 144 2000 1980 pg/L 99 2170 109 63 - 170 pg/L

| OCDF                    |           |           | 2000     |
|-------------------------|-----------|-----------|----------|
|                         | LCS       | LCS       |          |
| Isotope Dilution        | %Recovery | Qualifier | Limits   |
| 13C-1,2,3,4,6,7,8-HpCDD | 88        |           | 26 - 166 |
| 13C-1,2,3,4,6,7,8-HpCDF | 78        |           | 21 - 158 |
| 13C-1,2,3,4,7,8,9-HpCDF | 80        |           | 20 - 186 |
| 13C-1,2,3,4,7,8-HxCDD   | 70        |           | 21 - 193 |
| 13C-1,2,3,4,7,8-HxCDF   | 74        |           | 19 - 202 |
| 13C-1,2,3,6,7,8-HxCDD   | 74        |           | 25 - 163 |
| 13C-1,2,3,6,7,8-HxCDF   | 73        |           | 21 - 159 |
| 13C-1,2,3,7,8,9-HxCDF   | 74        |           | 17 - 205 |
| 13C-1,2,3,7,8-PeCDD     | 70        |           | 21 - 227 |
| 13C-1,2,3,7,8-PeCDF     | 64        |           | 21 - 192 |
| 13C-2,3,4,6,7,8-HxCDF   | 75        |           | 22 - 176 |
| 13C-2,3,4,7,8-PeCDF     | 64        |           | 13 - 328 |
| 13C-2,3,7,8-TCDD        | 75        |           | 20 - 175 |
| 13C-2,3,7,8-TCDF        | 68        |           | 22 - 152 |
| 13C-OCDD                | 76        |           | 13 - 199 |

LCS LCS

%Recovery Qualifier

| Lab Sample ID: LCSD 320-245399/3-A |  |
|------------------------------------|--|
| Matrix: Water                      |  |

Surrogate

37CI4-2,3,7,8-TCDD

| Analysis Batch: 247160 |       |        |           |      |   |      | Prep Ba  | itch: 24 | <del>15</del> 399 |
|------------------------|-------|--------|-----------|------|---|------|----------|----------|-------------------|
|                        | Spike | LCSD   | LCSD      |      |   |      | %Rec.    |          | RPD               |
| Analyte                | Added | Result | Qualifier | Unit | D | %Rec | Limits   | RPD      | Limit             |
| 1,2,3,4,6,7,8-HpCDD    | 1000  | 927    |           | pg/L |   | 93   | 70 - 140 | 5        | 50                |
| 1,2,3,4,6,7,8-HpCDF    | 1000  | 981    |           | pg/L |   | 98   | 82 - 122 | 5        | 50                |
| 1,2,3,4,7,8,9-HpCDF    | 1000  | 1000   |           | pg/L |   | 100  | 78 - 138 | 6        | 50                |
| 1,2,3,4,7,8-HxCDD      | 1000  | 995    |           | pg/L |   | 100  | 70 - 164 | 7        | 50                |
| 1,2,3,4,7,8-HxCDF      | 1000  | 1000   |           | pg/L |   | 100  | 72 - 134 | 4        | 50                |
| 1,2,3,6,7,8-HxCDD      | 1000  | 1020   |           | pg/L |   | 102  | 76 - 134 | 5        | 50                |
| 1,2,3,6,7,8-HxCDF      | 1000  | 1000   |           | pg/L |   | 100  | 84 - 130 | 7        | 50                |
| 1,2,3,7,8,9-HxCDD      | 1000  | 1090   |           | pg/L |   | 109  | 64 - 162 | 4        | 50                |
| 1,2,3,7,8,9-HxCDF      | 1000  | 1020   |           | pg/L |   | 102  | 78 - 130 | 5        | 50                |
| 1,2,3,7,8-PeCDD        | 1000  | 955    |           | pg/L |   | 95   | 70 - 142 | 6        | 50                |

Limits

31 - 191

TestAmerica Seattle

Prep Type: Total/NA

**Client Sample ID: Lab Control Sample Dup** 

**Client Sample ID: Lab Control Sample** 

9/26/2018

# **QC Sample Results**

Client: AECOM TestAmerica Job ID: 580-80213-7

Project/Site: Portland Harbor Pre-Remedial Design

## Method: 1613B - Dioxins and Furans (HRGC/HRMS) (Continued)

| Lab | Sample | ID: L | CSD | 320-245 | 5399/3-A |
|-----|--------|-------|-----|---------|----------|
|     |        |       |     |         |          |

Matrix: Water

Surrogate

37CI4-2,3,7,8-TCDD

Analysis Batch: 247160

Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 245399

| _                 | Spike    | LCSD   | LCSD      |      |   |      | %Rec.    |     | RPD   |
|-------------------|----------|--------|-----------|------|---|------|----------|-----|-------|
| Analyte           | Added    | Result | Qualifier | Unit | D | %Rec | Limits   | RPD | Limit |
| 1,2,3,7,8-PeCDF   | 1000     | 988    |           | pg/L |   | 99   | 80 - 134 | 6   | 50    |
| 2,3,4,6,7,8-HxCDF | 1000     | 1000   |           | pg/L |   | 100  | 70 - 156 | 6   | 50    |
| 2,3,4,7,8-PeCDF   | 1000     | 999    |           | pg/L |   | 100  | 68 - 160 | 4   | 50    |
| 2,3,7,8-TCDD      | 200      | 172    |           | pg/L |   | 86   | 67 - 158 | 6   | 50    |
| 2,3,7,8-TCDF      | 200      | 203    |           | pg/L |   | 101  | 75 - 158 | 6   | 50    |
| OCDD              | 2000     | 1900   |           | pg/L |   | 95   | 78 - 144 | 4   | 50    |
| OCDF              | 2000     | 2080   |           | pg/L |   | 104  | 63 - 170 | 4   | 50    |
|                   | 00 / 000 |        |           |      |   |      |          |     |       |

|                         | LCSD      | LCSD      |          |
|-------------------------|-----------|-----------|----------|
| Isotope Dilution        | %Recovery | Qualifier | Limits   |
| 13C-1,2,3,4,6,7,8-HpCDD | 82        |           | 26 - 166 |
| 13C-1,2,3,4,6,7,8-HpCDF | 73        |           | 21 - 158 |
| 13C-1,2,3,4,7,8,9-HpCDF | 77        |           | 20 - 186 |
| 13C-1,2,3,4,7,8-HxCDD   | 67        |           | 21 - 193 |
| 13C-1,2,3,4,7,8-HxCDF   | 70        |           | 19 - 202 |
| 13C-1,2,3,6,7,8-HxCDD   | 69        |           | 25 - 163 |
| 13C-1,2,3,6,7,8-HxCDF   | 71        |           | 21 - 159 |
| 13C-1,2,3,7,8,9-HxCDF   | 72        |           | 17 - 205 |
| 13C-1,2,3,7,8-PeCDD     | 68        |           | 21 - 227 |
| 13C-1,2,3,7,8-PeCDF     | 64        |           | 21 - 192 |
| 13C-2,3,4,6,7,8-HxCDF   | 72        |           | 22 - 176 |
| 13C-2,3,4,7,8-PeCDF     | 62        |           | 13 - 328 |
| 13C-2,3,7,8-TCDD        | 74        |           | 20 - 175 |
| 13C-2,3,7,8-TCDF        | 68        |           | 22 - 152 |
| 13C-OCDD                | 70        |           | 13 - 199 |
|                         |           |           |          |

LCSD LCSD

Limits

31 - 191

%Recovery Qualifier

72

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TestAmerica Seattle

#### **Lab Chronicle**

Client: AECOM TestAmerica Job ID: 580-80213-7

Project/Site: Portland Harbor Pre-Remedial Design

Client Sample ID: PDI-RB-VV-090718 Lab Sample ID: 580-80213-3

Date Collected: 09/07/18 14:50 Matrix: Water

Date Received: 09/10/18 12:40

|           | Batch    | Batch  |     | Dilution | Batch  | Prepared       |         |         |
|-----------|----------|--------|-----|----------|--------|----------------|---------|---------|
| Prep Type | Туре     | Method | Run | Factor   | Number | or Analyzed    | Analyst | Lab     |
| Total/NA  | Prep     | 1613B  |     |          | 245399 | 09/13/18 07:53 | ITH     | TAL SAC |
| Total/NA  | Analysis | 1613B  |     | 1        | 247160 | 09/22/18 11:03 | AS      | TAL SAC |

#### **Laboratory References:**

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

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# **Accreditation/Certification Summary**

Client: AECOM TestAmerica Job ID: 580-80213-7

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 | <b>Identification Number</b> | <b>Expiration Date</b> |
|--------------------|---------------|------------|------------------------------|------------------------|
| 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                     | 11-05-18               |
| 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               |

# **Laboratory: TestAmerica Sacramento**

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         | 17-020                | 01-20-21        |
| ANAB               | DoD ELAP      |            | L2468                 | 01-20-21        |
| Arizona            | State Program | 9          | AZ0708                | 08-11-19        |
| Arkansas DEQ       | State Program | 6          | 88-0691               | 06-17-19        |
| California         | State Program | 9          | 2897                  | 01-31-19        |
| Colorado           | State Program | 8          | CA00044               | 08-31-19        |
| Connecticut        | State Program | 1          | PH-0691               | 06-30-19        |
| Florida            | NELAP         | 4          | E87570                | 06-30-19        |
| Georgia            | State Program | 4          | N/A                   | 01-28-19        |
| Hawaii             | State Program | 9          | N/A                   | 01-29-19        |
| Illinois           | NELAP         | 5          | 200060                | 03-17-19        |
| Kansas             | NELAP         | 7          | E-10375               | 10-31-18        |
| Louisiana          | NELAP         | 6          | 30612                 | 06-30-19        |
| Maine              | State Program | 1          | CA0004                | 04-14-20        |
| Michigan           | State Program | 5          | 9947                  | 01-31-20        |
| Nevada             | State Program | 9          | CA00044               | 07-31-19        |
| New Hampshire      | NELAP         | 1          | 2997                  | 04-18-19        |
| New Jersey         | NELAP         | 2          | CA005                 | 06-30-19        |
| New York           | NELAP         | 2          | 11666                 | 03-31-19        |
| Oregon             | NELAP         | 10         | 4040                  | 01-29-19        |
| Pennsylvania       | NELAP         | 3          | 68-01272              | 03-31-19        |
| Texas              | NELAP         | 6          | T104704399            | 05-31-19        |
| US Fish & Wildlife | Federal       |            | LE148388-0            | 07-31-19        |
| USDA               | Federal       |            | P330-18-00239         | 01-17-21        |
| USEPA UCMR         | Federal       | 1          | CA00044               | 11-06-18        |
| Utah               | NELAP         | 8          | CA00044               | 02-28-19        |
| Vermont            | State Program | 1          | VT-4040               | 04-30-19        |
| Virginia           | NELAP         | 3          | 460278                | 03-14-19        |
| Washington         | State Program | 10         | C581                  | 05-05-19        |
| West Virginia (DW) | State Program | 3          | 9930C                 | 12-31-18        |
| Wyoming            | State Program | 8          | 8TMS-L                | 01-28-19        |

# **Sample Summary**

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

TestAmerica Job ID: 580-80213-7

| Lab Sample ID | Client Sample ID | Matrix | Collected      | Received       |
|---------------|------------------|--------|----------------|----------------|
| 580-80213-3   | PDI-RB-VV-090718 | Water  | 09/07/18 14:50 | 09/10/18 12:40 |

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|                            |  | 1 of 1 pages                       |                                      |                          |                                 |   |  |                     |  |                 | Sample Specific Notes: |                       | *           |             |                    |              |   |   |   |   |   |   |   |   |  |  |   | 57   | -  | 9/10/18 1204    | Date/Time:   | Date/Time:               |
|----------------------------|--|------------------------------------|--------------------------------------|--------------------------|---------------------------------|---|--|---------------------|--|-----------------|------------------------|-----------------------|-------------|-------------|--------------------|--------------|---|---|---|---|---|---|---|---|--|--|---|--|--|-----------------|--|--------------------------|
|                            | T  | 9/10/2018                          |                                      |                          |                                 | ger   | iun/əud  | tin Kr              | Kınqi  | 'nΤ -           | δM                     |                       |             |             |                    | -            | - |   | 1 | _ |   | - | + | - | -  |  |   |  |  |                 |  |                          |
|                            |  | 1/6                                |                                      |                          |                                 |   | OD-FF  | L78 V d             | нь Е   | - ве            | δM                     |                       |             | ,           | 1                  | +            | - | + |   | + |   | - | + | + | -  |  |   |  |  |                 |  |                          |
| ópo                        |  |                                    | -                                    | +                        |                                 |   |  | 16991 s             | _  | _               |                        |                       |             | -           | x -                | +            | - | 1 | - |   |   | - | + | + | +  |  | sth   |  |  | in              |  |                          |
| Custe                      |  |                                    | -                                    | +                        |                                 |   |  | WIS-0L              | -  |                 | -                      |                       |             | +           | ×                  | +            | + |   |   |   |   |   | + | + | +  |  | 12 Mor  |  |  | -               | ıy:  | .yr                      |
| lain of                    |  |                                    | F                                    | -                        |                                 |   | 9020B  | _                   | -  | -               |                        |                       | +           | +           | ×                  | +            |   |   |   |   |   |   |   | 1 | +  |  | re For  |  |  | Compan          | Company  | Company                  |
| 13 Ch                      |  |                                    | Courier                              | +                        | 02                              | 10//01/0                                    | TPH-D  |                     | +  | -               |                        |                       | +           | +           | ×                  | 1            |   |   |   |   |   |   |   |   | 1  |  | X Archive For 12 Months   |  |  |                 |  |                          |
| 580-80213 Chain of Custody |  |                                    | Carrier: Courier                     |                          |                                 |   |  | 8£191               |  |                 |                        |                       | -           | +           | ×                  | 1            |   |   |   |   |   |   |   |   |  | 1  |   |  |  |                 |  |                          |
| 28 <u>8</u>                |  |                                    | Ü                                    | +                        |                                 |   |  | Seners              |  |                 | +                      |                       |             |             | х.                 |              |   |   |   |   |   |   |   |   |  |  | Lab   |  |  |                 |  |                          |
|                            |  |                                    | t                                    | -0/.7                    | 8 'W                            | IS-0/                                       | 728 ,nii   | ributyl             | T, qH  | ron/            | LL, K                  | :                     | =           | H           | -                  |              |   |   |   |   |   |   |   |   |  |  | X isposal By Lab  |  | -  | 2               |  |                          |
|                            | 7  |                                    | 1                                    | 020                      |                                 |   |  | O 07-               |  |                 |                        |                       | E           | H           |                    |              |   |   |   |   |   |   |   |   |  |  | X ispo  |  | -  | 7               |  |                          |
| SURFACE SEDIMENT           | CHAIN OF CUSTODY   |                                    | lker                                 |                          | 0906                            | spil  | los Isto   | L ,noda             | nic can<br>(D(   | organ<br>& 70   | Total o                |                       | H           | H           |                    |              |   |   |   |   |   |   |   |   |  |  |   |  |  | 1               |  |                          |
| MI O                       | ST   | ķ                                  | ine-Wa                               |                          |                                 | ε   | 169 <b>0</b> /8  | 1 D465              | NLSV   | əzis            | nisva                  |                       | x           | ×           |                    |              |   |   |   |   |   |   |   |   |  |  | Slient  |  |  | AAS             |  |                          |
| SE                         | C  | ifer R                             | ct: Ela                              |                          | ,xa                             | -H4J  | LMN Å  | "Mercu              | Metals   | (1289)<br>1471/ | . 63020°               | 9<br>L                | н           | H           |                    |              |   |   |   |   |   |   |   |   |  | sposal   | m To C  |  |  | 7 4             | 1  | 3.                       |
| CE                         | 5  | t: Jen                             | Conta                                |                          |                                 |   |  |                     | aeı  | 191 %           | CDD/I                  | d                     | н           | H           |                    |              |   |   |   |   |   | - |   |   |  | Sample Disposal  | Return To Client  |  |  | Received by     | Received by  | Received by              |
| RFA                        | A  | Site Contact: Jennifer Ray         | Laboratory Contact: Elaine-Walker    |                          |                                 |   |  | V85                 | 991 saa  | usgu            | CB Cº                  | d                     | H           | H           |                    |              |   |   |   |   |   |   |   |   |  | Sam  |   |  |  | Rece            | Rec  | Rec                      |
|                            | E  | Site                               | Lab                                  |                          |                                 |   |  |                     |  | u               | raction                |                       | +           | -           |                    |              |   | - | - | + | - |   |   |   | um   |  |   |  |  | 2               |  |                          |
|                            |  |                                    |                                      |                          |                                 |   |  |                     |  |                 | Total No.              | 100                   | 7           | 7           | 14                 |              |   |   |   |   |   |   |   |   | =Resin Column  |  |   |  |  | 2               | 3 =  | 24.5                     |
|                            |  |                                    |                                      |                          | 1                               |   |  |                     |  | t               |                        | , 5                   | C.Z.        | 13          | 1                  |              |   |   |   |   |   |   |   |   | C=Res  |  |   |  | ,  | +               | +  |                          |
|                            |  | Con Con                            | Tel: (206) 438-2261 / (206) 438-2010 | 91                       |                                 |   |  |                     |  |                 | 1                      |                       | ¥           | M           | H                  |              |   |   |   |   | 1 |   |   |   | ass, R   |  |   |  |  | Date/Time:      |  | 04   0   8<br>Date/Time: |
|                            |  | 1/Cha                              | Tel: (206) 438-2261 / (206) 438-2010 | Analysis Turnaround Time | (W)                             | -   | -  | 02                  |  |                 |                        | QC Sample             |             |             |                    |              |   |   |   |   |   |   |   |   | s, G=gl  |  |   | uction.  |  | te/Time         | Date/Time:   | Date/Time                |
|                            |  | -                                  | 2261 / C                             | urnaro                   | Calendar ( C ) or Work Days (W) |   | 21 days   Worker   | Other ASAP (63 enly |  | -               |                        |                       |             |             |                    |              | + | + | - | + | + | + | + | - | er glas:   |  |   | er instr   |  | Da              | Da   | O G                      |
|                            |  |                                    | 11act: A                             | I sish                   | ) or Wc                         |   | 3  | (60                 |  |                 |                        | Matrix                | SS          | SS          | W                  |              |   |   |   |   |   |   |   |   | =amp   | ic Acid  |   | furthe   |  | <               |  |                          |
|                            |  | 9                                  | ect Con                              | Ans                      | dar (C                          |   | 21 day   | ASAP                | 1  | ł               | +                      | +                     | 80          | 8           | 05                 |              |   |   | + | + |   |   |   |   | ne, AG   | = Nitri  |   | ending   |  |                 | 1  | Ü                        |
|                            |  |                                    | Proj                                 |                          | Calen                           |   |  | Other               |  |                 | Sample                 | Time                  | 12:08       | 85:6        | 14:50              |              |   |   |   |   |   |   |   |   | ropyle   | HN03   |   | yses p   |  |                 |  |                          |
|                            |  |                                    |                                      |                          |                                 |   | M  | S.                  |  |                 | Sample                 | Date                  | 9/7/2018    | 9/7/2018    | 9/7/2018           |              |   |   |   |   |   |   |   |   | =Polvp   | Acid,  |   | g anal   | ,  | Company         | Company  | Company:                 |
| _                          |  | -                                  | +                                    | +                        |                                 |   |  | ×                   | +  |                 | Sa                     |                       | 6           | 6           | 0                  | -            | + | + | + | - | + | + | + | + | PP.  | sphoric  | (tered)   | mainir   |  | 3               | <u> </u>   | 3                        |
| set America-Scattle        | 1estamerica-sentic<br>5755-8th-Street-East<br>Tacoma WA 98424-1317 | Ph: 253-922-2310 Fax: 253-922-5047 | Client Contact                       | AECOM                    | Seartle WA 98101                | Phone: (206) 438-2700 Fax: 1+(866) 495-5288 | Project Name: Portland Harbor Pre-Remedial Design Project Name: Portland Baseline Sampling | Portland, OR        | Project #: 60566335 Study: Sufface assert Science Committee Turner | D/U             |                        | Sample Identification | PDI-SG-B431 | PDI-SG-B479 | 812000 IXV add IXI | FDING-V-0010 |   |   |   |   |   |   |   |   | Section March Glass (ar P=HDPE PP=Polypropylene, AG=amber glass, G=glass, RC | Preservative: HCI = Hydrochloric Acid, H3PO4 = Phosphoric Acid, HNO3 = Nitric Acid | ion: $D = Dissolved$ , $PRT = Particulate$ , $T = Total$ (unfill. | Special Instructions/QC Requirements & Comments: | Analyze samples for gram size now, increasing the Separate reports for each lab. | Reimonished by: | The second secon | Relinquished by:         |

Page 12 of 17

9/26/2018

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| TestAmerica-Seattle 5755-8th-Street-East                                  | •   |                    | SU                                     | RF.                           | ACI                   | E SE                                    | DI                | MEN       | T             |   |             | 580-  | 80213           | IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII                     | in of (   | Milliani<br>Custo                       | dy<br>dy                 | <b>ia fa</b> (111) k             | Ш                                 |                    |                          |                          |                        |   |  |
|---|---|--------------------|--|-------------------------------|-----------------------|---|-------------------|-----------|---------------|---|-------------|---|-----------------|--|---|---|--------------------------|----------------------------------|-----------------------------------|--------------------|--------------------------|--------------------------|------------------------|---|--|
| Tacoma, WA 98424-1317   | ]   |                    |  |                               |                       |   | CI                | TAT       | NΩ            | FC  | TTC         | rod   | v               |  | _   | • |                          |                                  |                                   |                    |                          |                          |                        | <del></del>                             |  |
| Ph: 253-922-2310 Fax: 253-922-5047  | <del> </del>                              |                    |  | F1 1 1 1 7 1                  |                       |   |                   |           |               |   |             | IVD   | , 1             |  |   |   |                          |                                  |                                   |                    |                          |                          |                        |   |  |
| Client Contact AECOM  |   |                    |  | ny Dahl / Ch                  |                       | *******                                 | _                 |           |               | nnifer l                                    |             |   |                 |  |   | 9/10/2018 COC No: 1                     |                          |                                  |                                   |                    |                          |                          |                        |   |  |
| 1111 3rd Ave Suite 1600   |   | 1 el;              |  | 261 / (206) 43<br>rnaround Ti |                       |   | La                | oralor    | y Cont        | tact: E                                     | laine-V     | Valker  |                 |  | <del>,                                     </del> | Carrier: Courier 1 of 1                 |                          |                                  |                                   |                    |                          |                          | loflpages              |   |  |
| Seattle, WA 98101   | <del> </del>                              | Calanda            |  |                               | me                    | *************************************** |                   |           | 1             |   |             | İ   |                 | 922  |   | 1                                       |                          |                                  |                                   |                    |                          |                          |                        |   |  |
| Phone. (206) 438-2700 Fax; 1+(866) 495-5288                               | Calendar ( C ) or Work Days (W)           |                    |  |                               |                       |   |                   | 14        |               | 9960  | 1           | 8,  |                 |  |   | ļ                                       | 8                        |                                  | 1                                 |                    |                          |                          |                        |   |  |
| Project Name: Portland Harbor Pre-Remedial Design                         | 170                                       |                    |  | 1 2)                          |                       |   |                   |           |               | Ē   |             | ds 9  |                 | ŝ  | ļ   |   |                          | 476                              | 2                                 | Į                  |                          |                          |                        |   |  |
| Investigation and Baseline Sampling                                       |   | 21                 | days (NX<br>AP_(63                     | yes /                         |                       |   |                   |           |               | NWTPH-Dx.                                   | D7928/D6913 | l soli  |                 | 8270   | 48  |   | ĕ                        | 98,                              | <b>5</b>                          | Ì                  | l                        |                          | ığıı                   |   |  |
| Portland, OR AA   | K A                                       | Other _AS          | AP 165                                 | only !                        |                       |   |                   | 1         |               | Certy                                       | 28/1        | Tog.  | ١.              | i i  | <u>\$</u>   |   | 141                      | 602                              | 4                                 |                    |                          | <u>ĕ</u>                 | le/C                   |   |  |
| Project #: 60566335 Study: Surface Matter Spice of                        |   |                    |  | 0                             |                       |   |                   | 1668.4    |               | Σ.  | D 25        | pon,  | -20 C           | jig.   | ners  | 138                                     | ž                        | Curo                             | ¥                                 | S X                | 1699                     | 827                      | X<br>r                 |   |  |
| Sample Type: D/U  |   |                    |  |                               |                       |   |                   | Ę         | 1613B         | f. Metals                                   | e ASTM      | anic car<br>70C)                                | rchive -        | HP, Tr   | В Солде   | DD/Fs f                                 | H Diesel                 | als, Me                          | al Organ                          | Hs 8270.           | Pesticides 1669M         | HP EPA                   | Fributykin Krone/Unger |   |  |
| Sample Identification   | Sample<br>Date                            | Sample<br>Time     | Matrix                                 | QC Sample                     | Sampler's<br>Initials | Total No.<br>of Cont.                   | Fraction          | PCB Conge | PCDD/Fs 1613B | TPH Diesel, Metaks, Mercury<br>6820B, 7471A | Grain size  | Total organic carbon, Total solids (104C & 70C) | Archive Archive | PAHs. BEHP, Tributyltin, 8270-SIM, 8270-<br>LL, Kron/Unger | WQ - PCB Congeners 1668A                          | WQ - PCDD/Fs 1613B                      | WQ - TPH Diesel NWTPH-Ds | WQ - Metals, Mercury 6020B, 7470 | WQ - Total Organic Carbon SMS310B | WQ - PAHs 8270-SIM | WQ - Pest                | WQ - BEHP EPA 8270D-L.L. | WQ - Trit              | Sample Specific Notes:                  |  |
| PDI-SG-B431   | 9/7/2018                                  | 12.08              | SS                                     |                               | MT-TH                 | 7                                       |                   | В         | H             | 13  | x           | H   | н               | Н  |   |   | T                        |                                  |                                   |                    |                          |                          |                        |   |  |
| PDI-SG-B479   | 9/7/2018                                  | 9-58               | SS                                     |                               | MIN                   | 7                                       | T                 | И         | н             | Н   | x           | 13  | H               | Н  |   |   |                          |                                  |                                   |                    |                          |                          |                        |   |  |
| PDI-RB-VV-090718  | 9/7/2018                                  | 14:50              | W                                      |                               | JH                    | 14                                      | T                 |           |               |   |             |   |                 | 1  | · ·   |   | \ x                      | ,                                | х                                 | x                  |                          | x                        | x                      |   |  |
|   |   |                    |  |                               |                       |   | T                 |           |               | 1   |             |   |                 |  |   |   | 1                        | <u> </u>                         | _                                 |                    |                          | <u> </u>                 |                        |   |  |
|   |   |                    |  |                               |                       |   | ╅                 |           |               | 1   |             |   |                 |  |   |   |                          |                                  |                                   |                    |                          |                          | <del>  </del>          |   |  |
|   |   |                    |  |                               |                       |   | T                 |           |               |   |             |   |                 |  |   |   |                          |                                  |                                   |                    |                          |                          | <b></b>                |   |  |
|   |   |                    |  |                               |                       |   | t                 |           |               |   |             |   |                 |  |   |   |                          |                                  |                                   |                    |                          |                          | $\vdash \vdash \vdash$ |   |  |
|   |   |                    |  |                               |                       |   | 1                 |           |               |   |             |   |                 |  |   |   |                          |                                  |                                   |                    |                          | -                        | <del>  </del>          |   |  |
|   | N-10-10-10-10-10-10-10-10-10-10-10-10-10- |                    |  |                               |                       |   | $\vdash$          |           |               |   |             |   |                 |  |   |   |                          |                                  |                                   |                    |                          | =                        | $\overline{}$          |   |  |
|   |   |                    |  |                               |                       |   |                   |           |               |   |             |   |                 |  |   |   | -                        |                                  |                                   | -                  |                          |                          | $\sqcap$               |   |  |
|   |   |                    |  |                               |                       |   | $\vdash$          |           |               |   |             |   |                 |  |   |   |                          |                                  |                                   |                    |                          |                          |                        |   |  |
|   |   |                    |  |                               |                       | ······                                  | П                 |           |               |   |             |   |                 |  |   |   |                          |                                  |                                   |                    |                          |                          |                        | *************************************** |  |
| Container Type: WMG=Wide Mouth Glass Jar, P=HDPE, i                       | PP=Polypro                                | opviene. A         | G≍amber o                              | lass. G≃ola:                  | ss. RC=Res            | in Column                               | _                 |           |               |   |             |   |                 |  |   |   |                          |                                  |                                   |                    |                          |                          | $\rightarrow$          |   |  |
| Preservative: HCl = Hydrochloric Acid, H3PO4 = Phosphe                    |   |                    |  |                               | 00,110 1100           |   |                   |           |               |   |             |   |                 |  |   |   |                          |                                  |                                   |                    |                          | $\rightarrow$            |                        |   |  |
| Fraction: $D = Dissolved$ , $PRT = Particulate$ , $T = Total$ (unfiltered | i)  |                    | ······································ |                               |                       |   |                   | Samp      | e Disp        | osal  |             |   |                 |  |   |   |                          |                                  |                                   | ئــــــا           | £                        |                          |                        |   |  |
|   |   |                    |  |                               |                       |   |                   |           | Return        | To Cli                                      | ent         | X   | ispo            | sal By i   | Lab   |   | rchi                     | ive For                          | 12 M                              | onths              |                          |                          |                        |   |  |
| Special Instructions/QC Requirements & Comments:                          |   |                    |  |                               |                       |   |                   |           |               |   |             |   |                 |  |   |   |                          |                                  |                                   |                    |                          |                          | ,                      |   |  |
| Analyze samples for grain size ASAP, Hold (H) remai                       | ning analys                               | es penain          | g turther in                           | struction.                    |                       |   |                   |           |               |   |             |   |                 |  |   |   |                          |                                  |                                   |                    |                          |                          | 1                      | 3                                       |  |
| Separate reports for each lab.  |   |                    |  |                               |                       |   |                   |           |               |   |             |   |                 |  |   |   |                          |                                  |                                   |                    |                          |                          | Į,                     | /                                       |  |
| A A COLOR   |   |                    |  |                               | <u>i</u>              |   |                   |           |               |   |             |   | 1               |  |   |   |                          |                                  |                                   |                    |                          |                          |                        |   |  |
| Relinquished by   | Company                                   | EEN                | 1                                      | Date Time:                    | 18/1                  | 204                                     |                   | Receive   | ed by:        | AA.   | AT an       | أمير  | 1               | Λ.   |   |   | ľ                        | Compa<br>A                       | ny:                               |                    |                          |                          | I                      | Pate Time: 910 18 1204                  |  |
| Relinquished by:  | Company . E . Date fine   1240            |                    |  |                               |                       |   | Received by Tim R |           |               |   |             |   |                 |  |   |   |                          |                                  |                                   |                    | Date/Time: 9/11/18 0957) |                          |                        |   |  |
| Relinquished by   | Company:                                  | \(\lambda \cdot \) |  | Date/Time:                    | <u> </u>              | 100                                     |                   | Receive   |               |   | <u> </u>    |   | Ą               | 1  |   |   |                          | Compa                            |                                   | JULA               |                          |                          | I                      | 9/1//8 095 () Date/Time:                |  |
| Museum  | 14120                                     | 012                |  | गाणाड                         |                       | 100                                     |                   |           |               |   |             |   |                 | <del></del>  |   |   |                          |                                  |                                   |                    |                          |                          |                        |   |  |

1R5 1.6/1.6

|  | Chain  | Chain of Custody Record  | Record  |  |  |                        | TELEADER IN ENVIRONMENTAL TISTING                                   |   |
|--|--|--|---|--|--|------------------------|---|---|
| Client Information (Sub Contract Lab)  | Sampler  |  | Lab PM:<br>Walker, Elaine M   |  | Camer Tracking No(s)   | COC No:<br>580-59098.1 | 18.1  | _ |
| nach<br>g/Receiving  | Phone:   |  | E-Mail:<br>elaine.walker@te:  | E-Maik<br>elaine.walker@testamericainc.com   | State of Origin:<br>Oregon   | Page:<br>Page: 1 of 1  | 1   |   |
| Company:<br>TestAmerica Laboratories, Inc.   |  |  | Accredigions R  | Accrediblions Required (See note):   |  | Job #;                 | 4   |   |
| Address:<br>880 Riverside Parkway,   | Doe Date Requested:<br>9/26/2018   |  |   | Analysis Requested   | duested  | Preserval              | Preservation Codes:   |   |
| Crist<br>West Secramento   | TAT Requested (days):  |  |   | 81   |  | 8 - NSOH               |   | - |
| Siale, Zpr<br>CA, 95605  |  |  |   |  |  | D-Milric A             | cid P-Na204S  |   |
| Phone 918-373-5600(Tel) 916-372-1059(Fax)  | PO#:   |  | T olw   | Č)   |  | F - MeOH               | 1   |   |
| mass:  | WO#:   |  | isl) jir  |  |  |                        | þ   |   |
| s Name:<br>land Harbor Pre-Remedial Design   | Project #:<br>58012120   |  | 4 (00)  | om) a  |  |                        |   |   |
|  | SSOW#.   |  | w) d w  |  |  | anco te<br>C<br>E<br>E |   |   |
| Sample Identification - Clent ID II at ID  | Sample<br>Samula Dete  | Sample Matrix Type (Wesser, C-comp, C- | S SWAINBELS   | os acranacia   |  | ofat Murabar c         |   |   |
|  |  | Preservation Code:   | X   |  | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1  |                        | Special Instructions/Note:  |   |
| PDI-SG-B431 (580-80213-1)  | 9/7/18 12:08<br>Pacific  | Solid  | ×   | ×  |  | 2                      |   |   |
| PDI-SG-B479 (580-80213-2)  | 9/7/18 09:58<br>Pacific  | Solid  | ×   | , x  |  | N                      |   |   |
| PDI-RB-VV-090718 (560-80213-3)   | 9/7/18 14:50<br>Pacific  | Water  |   | ×  |  | 2                      |   |   |
|  |  |  |   |  |  |                        |   |   |
|  |  |  |   |  |  |                        |   |   |
|  |  |  |   |  |  |                        |   |   |
|  |  |  |   |  |  |                        |   |   |
|  |  |  |   |  |  | , , , , t              |   |   |
| Note: Since aboration are subject to change. Test/market Laborations, fire, places the ownership of method, analyte a socieditation contributed by contributions and subject to change a face for any places the ownership of method, analyte a socieditation for the State of Origin lested above for any places structured by maintain accessful to the State of Origin lested above for any places that was a subject to a subject | Indes, inc. places the ownership of in<br>strashic being analyzed, the sample<br>to date, return the signed Chain of | ethod, analyte & accredit<br>s must be shipped back to<br>Custody attesting to said  | ation compliance upo<br>the TestAmerica let<br>complicance to TestA | m out subcontract laboratories.<br>soratory or other instructions will<br>wherica Laboratories, Inc. | This sample shipment is forwards<br>be provided. Any changes to acu                  | d under chain-of-cu    | stody. If the laboratory does not<br>suid be brought to TestAmerica |   |
| Possible Hazard Idenlification   |  |  | Sample  | Disposal ( A fee may be  | Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) | retained lonoer        | than 1 month  |   |
| Uncontimed   |  |  |   | Return To Client   | Disposel By Leb  | Archive For            | Months  |   |
| Deliverable Requested: 1, 11, 111, IV, Other (specify)   | Primary Deliverable Rank: 2  |  | Special In  | Special Instructions/QC Requirements:  | nts:   |                        |   |   |
| inquished by:  | Date:  |  | Time:   | ) //   | Mathod of Shipment:  |                        | ī   |   |
| Mulm   | 118  | 700 Company  | 2012 Received by  | ed by Much   | 1 02 A   | 906 81                 | S Campar Sac  |   |
| 10   | Ontertime  | Company  | Received by   | ed by:   | Date/Time:   |                        | Company   |   |
| - 1  | Date/Time:   | Company  | Received by:  | ed by:   | Date/Time:   |                        | Company   |   |
| Custody Seals Inflact: Custody Seal No.: 49228   | 5  |  | Cooler  | Coder Temperature(s) *C and Other Remarks:   | O.O  |                        |   |   |
|  |  |  |   |  |  | :                      | Ver: 09:20:2016   | - |

Client: AECOM Job Number: 580-80213-7

Login Number: 80213 List Source: TestAmerica Seattle

List Number: 1

Creator: Antonson, Angeline D

| oreator. Antonson, Angeline b  |        |         |
|--|--------|---------|
| Question   | Answer | Comment |
| Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>True</td> <td></td> | 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    |         |
|  |        |         |

Client: AECOM

TestAmerica Job ID: 580-80213-7 Project/Site: Portland Harbor Pre-Remedial Design

### Method: 1613B - Dioxins and Furans (HRGC/HRMS)

**Matrix: Water** Prep Type: Total/NA

|                   |                  | Percent Isotope Dilution Recovery (Acceptance Limits) |          |          |          |          |          |          |          |  |
|-------------------|------------------|---|----------|----------|----------|----------|----------|----------|----------|--|
|                   |                  | HpCDD   | HpCDF    | HpCDF2   | HxCDD    | HxCDF    | HxDD     | HxDF     | HxCF     |  |
| Lab Sample ID     | Client Sample ID | (23-140)  | (28-143) | (26-138) | (32-141) | (26-152) | (28-130) | (26-123) | (29-147) |  |
| 580-80213-3       | PDI-RB-VV-090718 | 103   | 90       | 91       | 81       | 84       | 85       | 86       | 84       |  |
| MB 320-245399/1-A | Method Blank     | 88  | 77       | 80       | 71       | 74       | 71       | 73       | 74       |  |
|                   |                  | Percent Isotope Dilution Recovery (Acceptance Limits) |          |          |          |          |          |          |          |  |
|                   |                  | PeCDD   | PeCDF    | 13CHxCF  | PeCF     | TCDD     | TCDF     | OCDD     |          |  |
| Lab Sample ID     | Client Sample ID | (25-181)  | (24-185) | (28-136) | (21-178) | (25-164) | (24-169) | (17-157) |          |  |
| 580-80213-3       | PDI-RB-VV-090718 | 76  | 71       | 85       | 70       | 84       | 75       | 88       |          |  |
| MB 320-245399/1-A | Method Blank     | 72  | 66       | 74       | 66       | 80       | 72       | 76       |          |  |

#### **Surrogate Legend**

HpCDD = 13C-1,2,3,4,6,7,8-HpCDD

HpCDF = 13C-1,2,3,4,6,7,8-HpCDF

HpCDF2 = 13C-1,2,3,4,7,8,9-HpCDF

HxCDD = 13C-1,2,3,4,7,8-HxCDD

HxCDF = 13C-1,2,3,4,7,8-HxCDF

HxDD = 13C-1,2,3,6,7,8-HxCDD

HxDF = 13C-1,2,3,6,7,8-HxCDF

HxCF = 13C-1,2,3,7,8,9-HxCDF

PeCDD = 13C-1,2,3,7,8-PeCDD

PeCDF = 13C-1,2,3,7,8-PeCDF

13CHxCF = 13C-2,3,4,6,7,8-HxCDF

PeCF = 13C-2,3,4,7,8-PeCDF

TCDD = 13C-2,3,7,8-TCDD

TCDF = 13C-2,3,7,8-TCDF

OCDD = 13C-OCDD

## Method: 1613B - Dioxins and Furans (HRGC/HRMS)

**Matrix: Water** Prep Type: Total/NA

|                     |                        | Perc  | Percent Isotope Dilution Recovery (Acceptance Limits) |          |          |          |          |          |          |
|---------------------|------------------------|---|---|----------|----------|----------|----------|----------|----------|
|                     |                        | HpCDD   | HpCDF   | HpCDF2   | HxCDD    | HxCDF    | HxDD     | HxDF     | HxCF     |
| Lab Sample ID       | Client Sample ID       | (26-166)  | (21-158)  | (20-186) | (21-193) | (19-202) | (25-163) | (21-159) | (17-205) |
| LCS 320-245399/2-A  | Lab Control Sample     | 88  | 78  | 80       | 70       | 74       | 74       | 73       | 74       |
| LCSD 320-245399/3-A | Lab Control Sample Dup | 82  | 73  | 77       | 67       | 70       | 69       | 71       | 72       |
|                     |                        | Percent Isotope Dilution Recovery (Acceptance Limits) |   |          |          |          |          |          |          |
|                     |                        | PeCDD   | PeCDF   | 13CHxCF  | PeCF     | TCDD     | TCDF     | OCDD     |          |
| Lab Sample ID       | Client Sample ID       | (21-227)  | (21-192)  | (22-176) | (13-328) | (20-175) | (22-152) | (13-199) |          |
| LCS 320-245399/2-A  | Lab Control Sample     | 70  | 64  | 75       | 64       | 75       | 68       | 76       |          |
| LCSD 320-245399/3-A | Lab Control Sample Dup | 68  | 64  | 72       | 62       | 74       | 68       | 70       |          |

#### Surrogate Legend

HpCDD = 13C-1,2,3,4,6,7,8-HpCDD

HpCDF = 13C-1,2,3,4,6,7,8-HpCDF

HpCDF2 = 13C-1,2,3,4,7,8,9-HpCDF

HxCDD = 13C-1,2,3,4,7,8-HxCDD

HxCDF = 13C-1,2,3,4,7,8-HxCDF

HxDD = 13C-1,2,3,6,7,8-HxCDD

HxDF = 13C-1,2,3,6,7,8-HxCDF

HxCF = 13C-1,2,3,7,8,9-HxCDF

PeCDD = 13C-1,2,3,7,8-PeCDD

TestAmerica Seattle

Page 16 of 17

9/26/2018

# **Isotope Dilution Summary**

Client: AECOM

Project/Site: Portland Harbor Pre-Remedial Design

PeCDF = 13C-1,2,3,7,8-PeCDF 13CHxCF = 13C-2,3,4,6,7,8-HxCDF PeCF = 13C-2,3,4,7,8-PeCDF TCDD = 13C-2,3,7,8-TCDD TCDF = 13C-2,3,7,8-TCDFOCDD = 13C-OCDD

TestAmerica Job ID: 580-80213-7