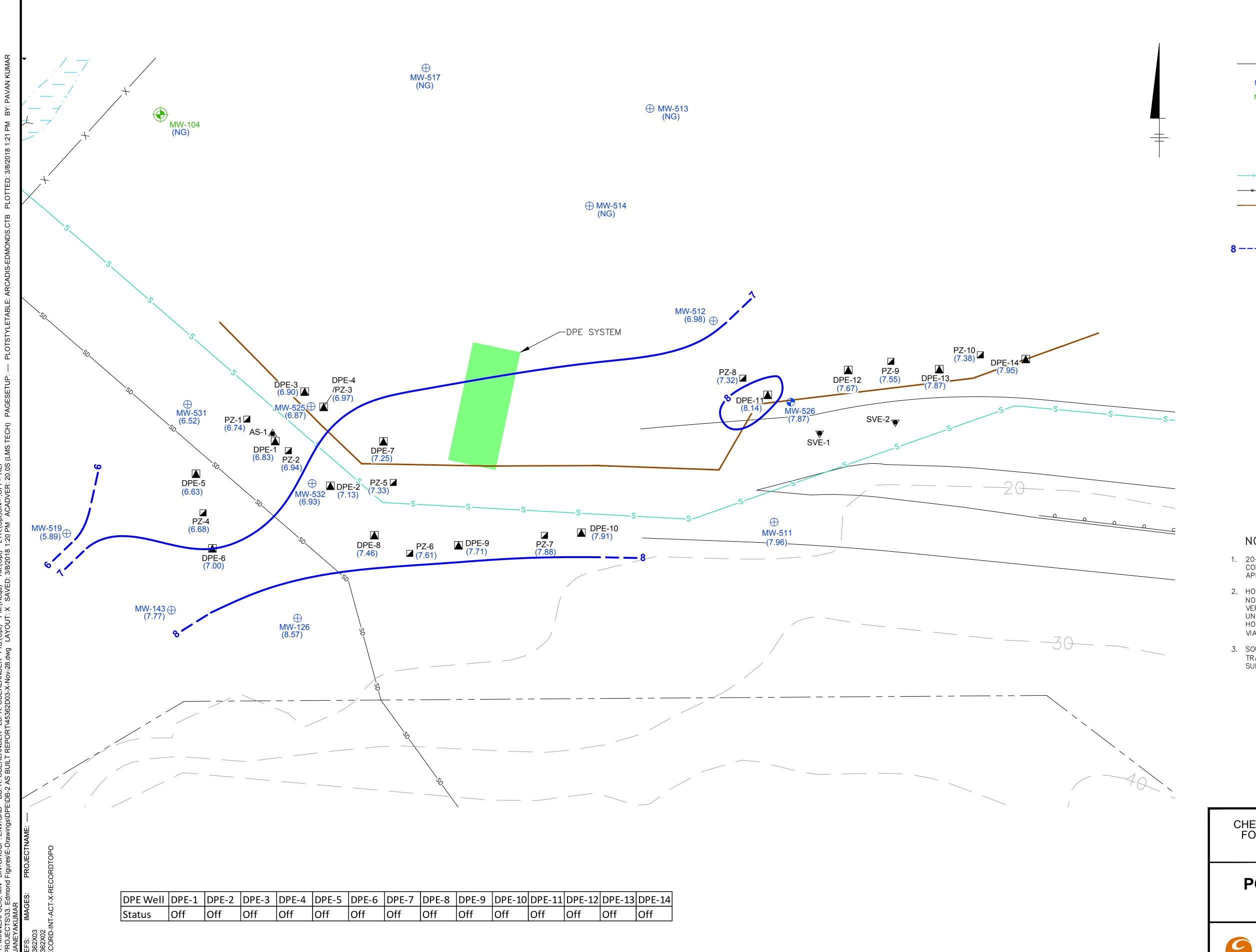
#### **APPENDIX G**

Potentiometric Surface Maps – November 28, 2017 to November 13, 2018



LEGEND:

FORMER UNOCAL EDMONDS BULK FUEL TERMINAL PROPERTY BOUNDARY

MW-515 # INTERIOR MONITORING WELL LOCATION

MW-518 PERIMETER MONITORING WELL LOCATION

PZ-1 ✓ PIEZOMETER LOCATION

AS-1 A AIR SPARGE WELL LOCATION

DPE-10 DUAL PHASE EXTRACTION (DPE)

WELL LOCATION

SVE-1 T SOIL VAPOR EXTRACTION (SVE) WELL LOCATION

WSDOT STORMWATER LINE

20-MIL POLYETHYLENE SHEETING

DPE DUAL-PHASE EXTRACTION

(8.57) GROUNDWATER ELEVATION IN FEET ABOVE NAVD88

8 --- POTENTIOMETRIC CONTOUR (DASHED WHERE INFERRED)

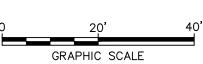
(NG) NOT GAUGED

NAVD88 NATIONAL AMERICAN VERTICAL DATUM OF 1988

WSDOT WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

#### NOTES:

- 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
- 2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98).
  VERTICAL DATUM: N.A.V.D. 88
  UNITS: U.S. SURVEY FEET
  HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS
  VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
- 3. SOUTHEAST PORTION OF WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) STORMWATER LINE HAS NOT BEEN

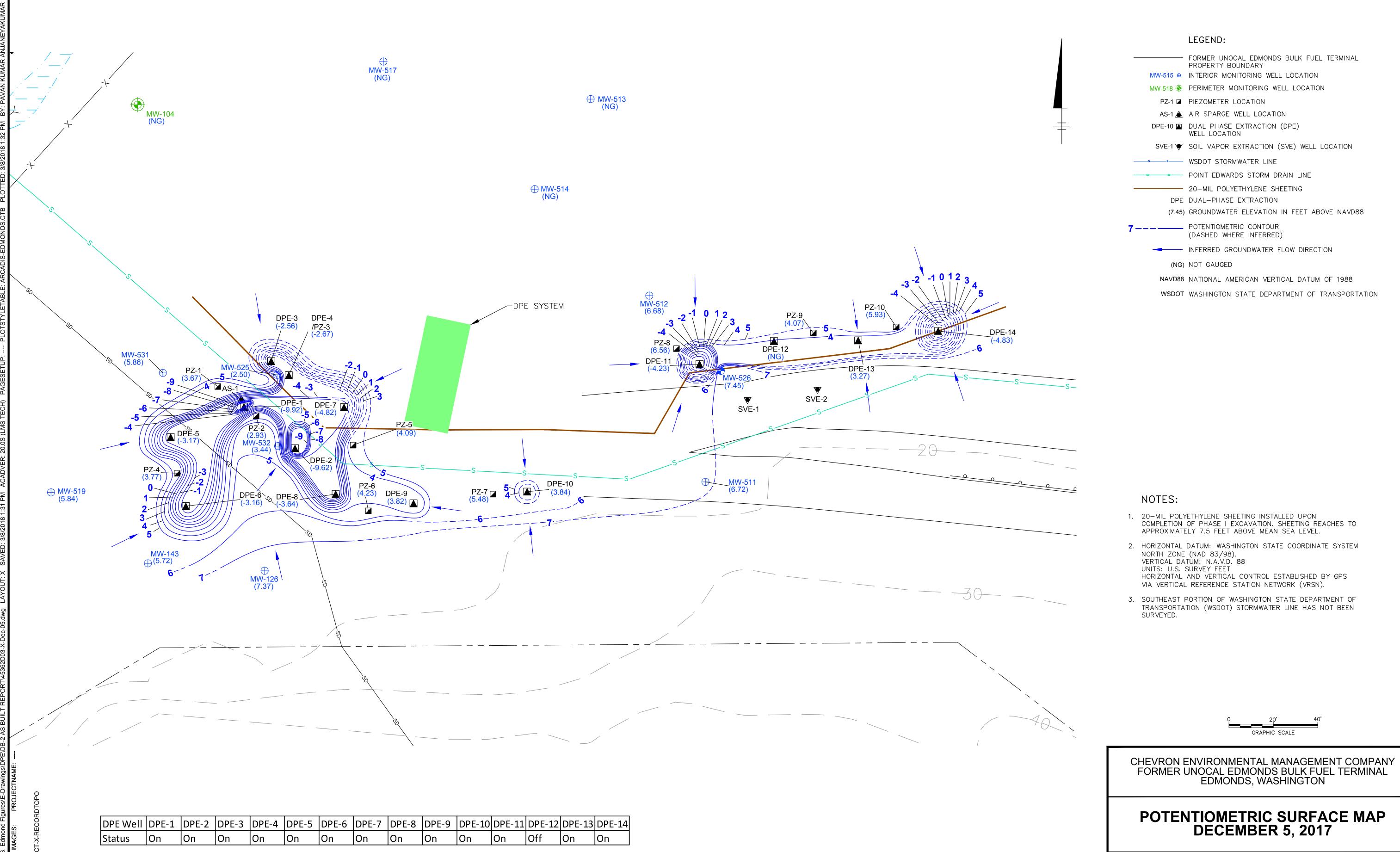


CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY FORMER UNOCAL EDMONDS BULK FUEL TERMINAL EDMONDS, WASHINGTON

POTENTIOMETRIC SURFACE MAP NOVEMBER 28, 2017



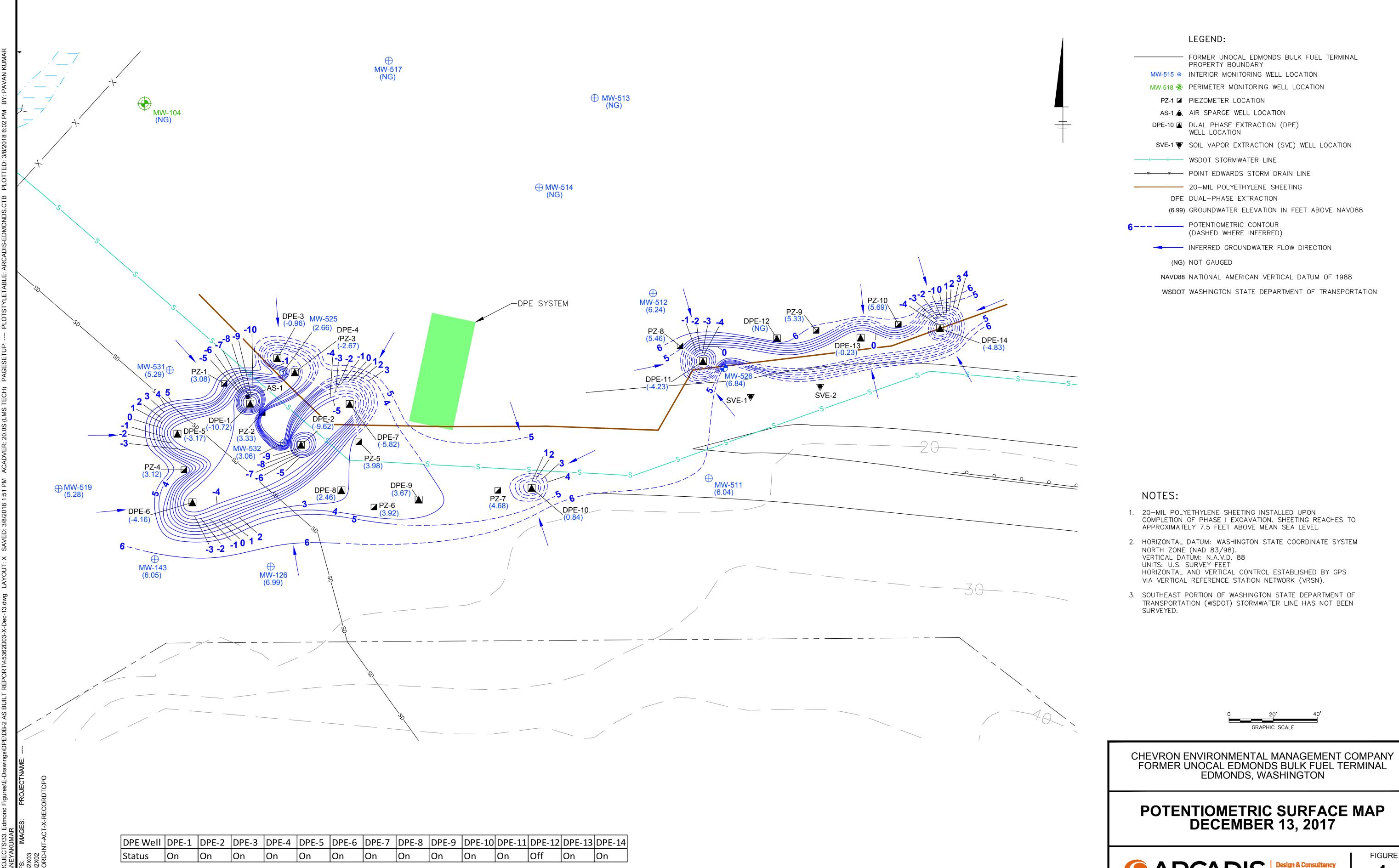
FIGURE



FIGURE

ARCADIS

Design & Consultancy for natural and built assets



- FORMER UNOCAL EDMONDS BULK FUEL TERMINAL

NAVD88 NATIONAL AMERICAN VERTICAL DATUM OF 1988

- NORTH ZONE (NAD 83/98).

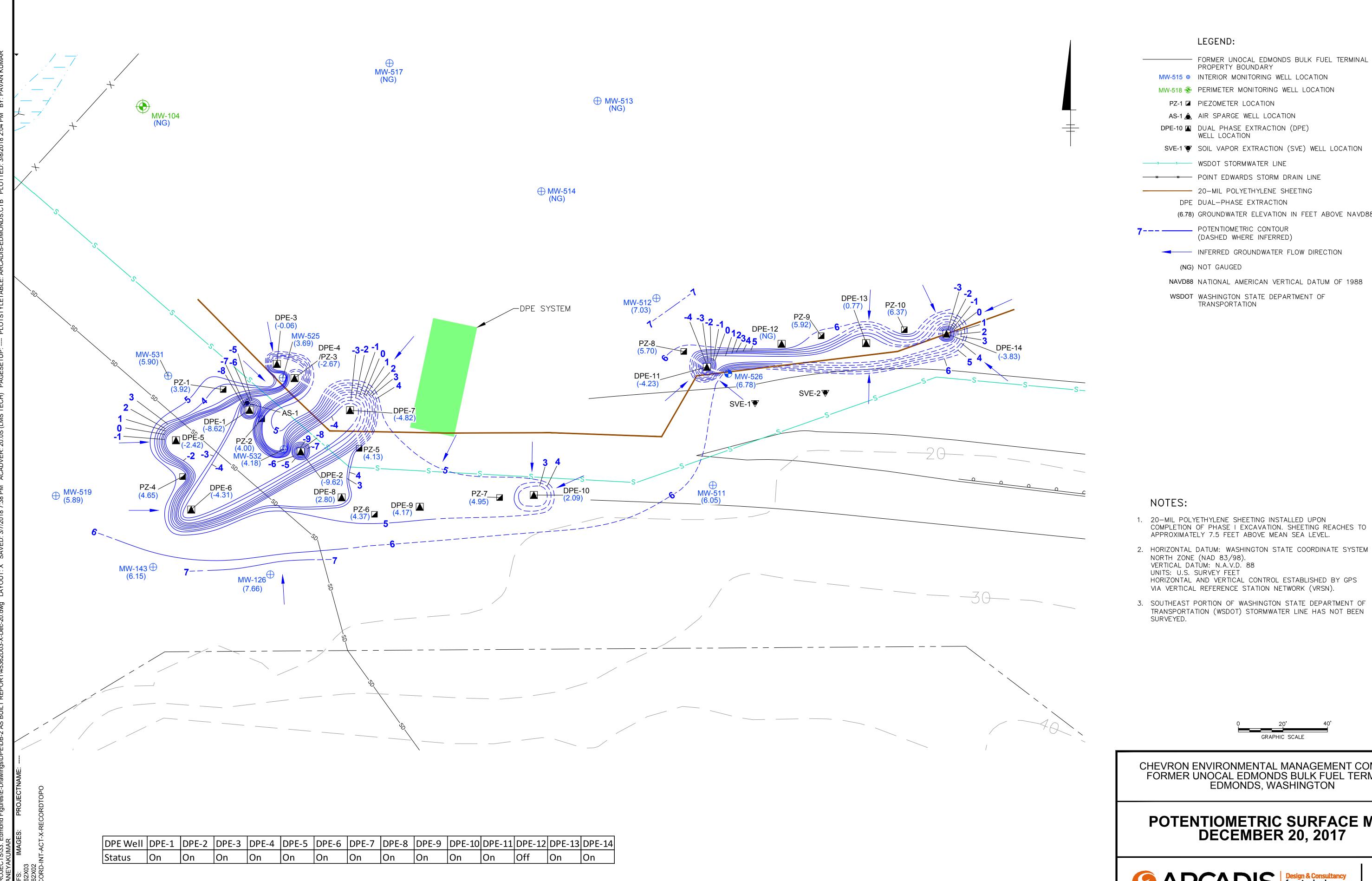
  VERTICAL DATUM: N.A.V.D. 88

  UNITS: U.S. SURVEY FEET

  HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS
- 3. SOUTHEAST PORTION OF WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) STORMWATER LINE HAS NOT BEEN

POTENTIOMETRIC SURFACE MAP DECEMBER 13, 2017





- FORMER UNOCAL EDMONDS BULK FUEL TERMINAL

MW-518 PERIMETER MONITORING WELL LOCATION

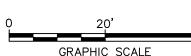
(6.78) GROUNDWATER ELEVATION IN FEET ABOVE NAVD88

INFERRED GROUNDWATER FLOW DIRECTION

NAVD88 NATIONAL AMERICAN VERTICAL DATUM OF 1988

WSDOT WASHINGTON STATE DEPARTMENT OF

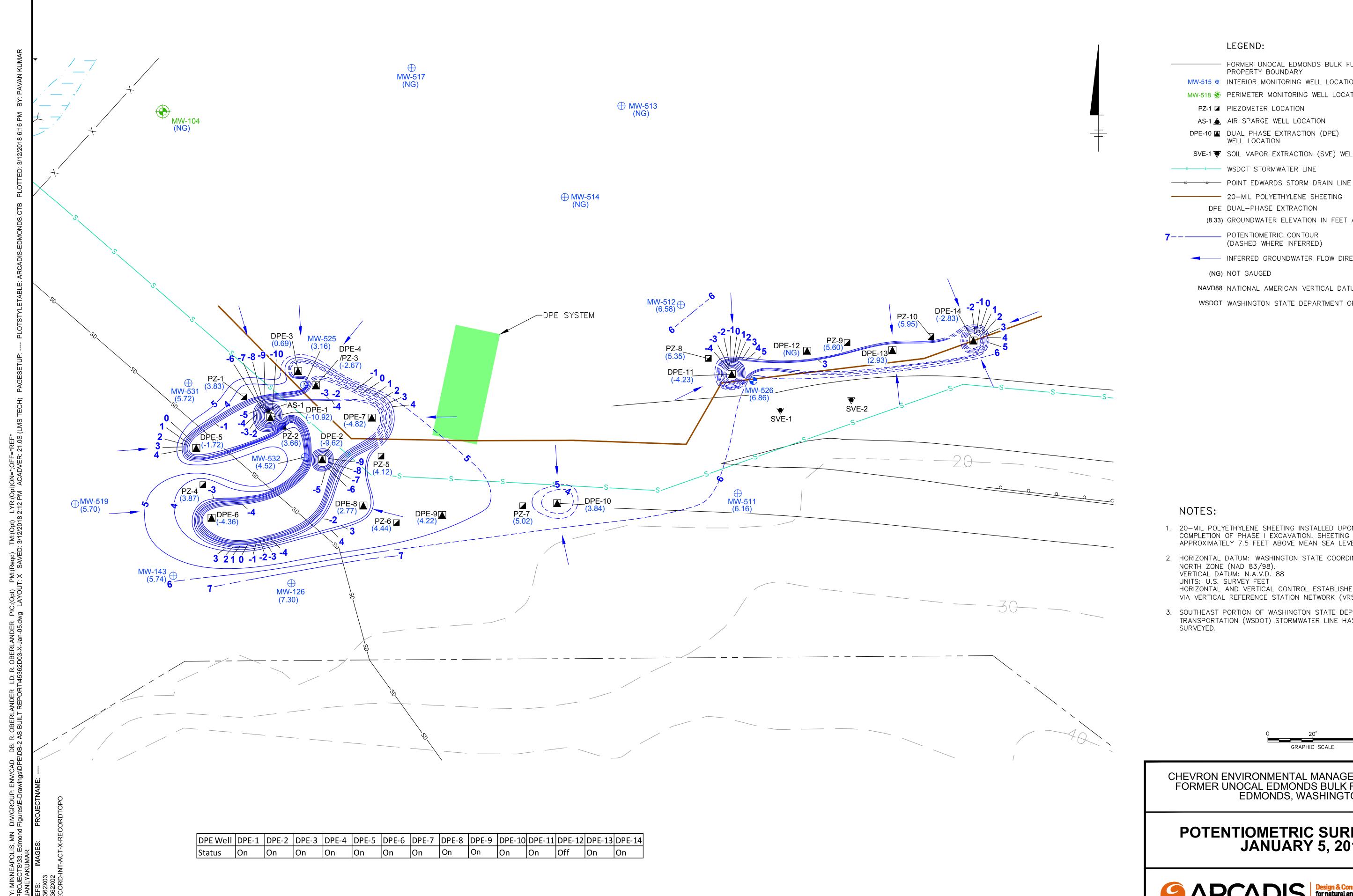
- COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
- NORTH ZONE (NAD 83/98).
  VERTICAL DATUM: N.A.V.D. 88
  UNITS: U.S. SURVEY FEET
  HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS
- 3. SOUTHEAST PORTION OF WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) STORMWATER LINE HAS NOT BEEN



CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY FORMER UNOCAL EDMONDS BULK FUEL TERMINAL EDMONDS, WASHINGTON

POTENTIOMETRIC SURFACE MAP DECEMBER 20, 2017





LEGEND:

- FORMER UNOCAL EDMONDS BULK FUEL TERMINAL PROPERTY BOUNDARY

MW-515 ⊕ INTERIOR MONITORING WELL LOCATION

MW-518 PERIMETER MONITORING WELL LOCATION

PZ-1 ✓ PIEZOMETER LOCATION

AS-1 A AIR SPARGE WELL LOCATION

DPE-10 DUAL PHASE EXTRACTION (DPE) WELL LOCATION

SVE-1 VAPOR EXTRACTION (SVE) WELL LOCATION

20-MIL POLYETHYLENE SHEETING

DPE DUAL-PHASE EXTRACTION

(8.33) GROUNDWATER ELEVATION IN FEET ABOVE NAVD88

7-- POTENTIOMETRIC CONTOUR (DASHED WHERE INFERRED)

INFERRED GROUNDWATER FLOW DIRECTION

(NG) NOT GAUGED

NAVD88 NATIONAL AMERICAN VERTICAL DATUM OF 1988

WSDOT WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

#### NOTES:

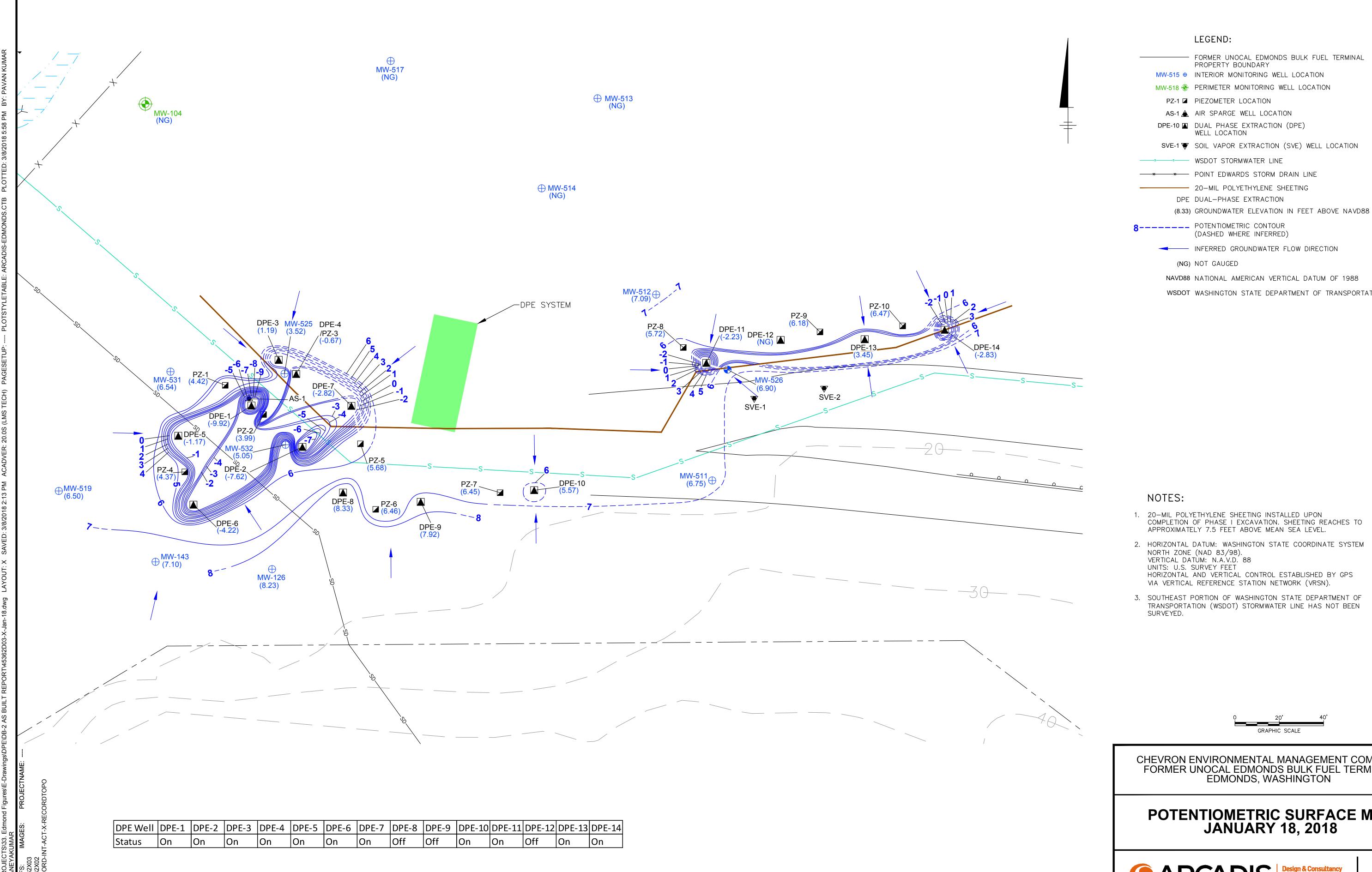
- 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
- 2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98).
  VERTICAL DATUM: N.A.V.D. 88
  UNITS: U.S. SURVEY FEET
  HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS
  VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
- 3. SOUTHEAST PORTION OF WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) STORMWATER LINE HAS NOT BEEN



CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY FORMER UNOCAL EDMONDS BULK FUEL TERMINAL EDMONDS, WASHINGTON

POTENTIOMETRIC SURFACE MAP JANUARY 5, 2018





- FORMER UNOCAL EDMONDS BULK FUEL TERMINAL

MW-518 PERIMETER MONITORING WELL LOCATION

(DASHED WHERE INFERRED)

INFERRED GROUNDWATER FLOW DIRECTION

NAVD88 NATIONAL AMERICAN VERTICAL DATUM OF 1988

WSDOT WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

- COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
- NORTH ZONE (NAD 83/98).

  VERTICAL DATUM: N.A.V.D. 88

  UNITS: U.S. SURVEY FEET

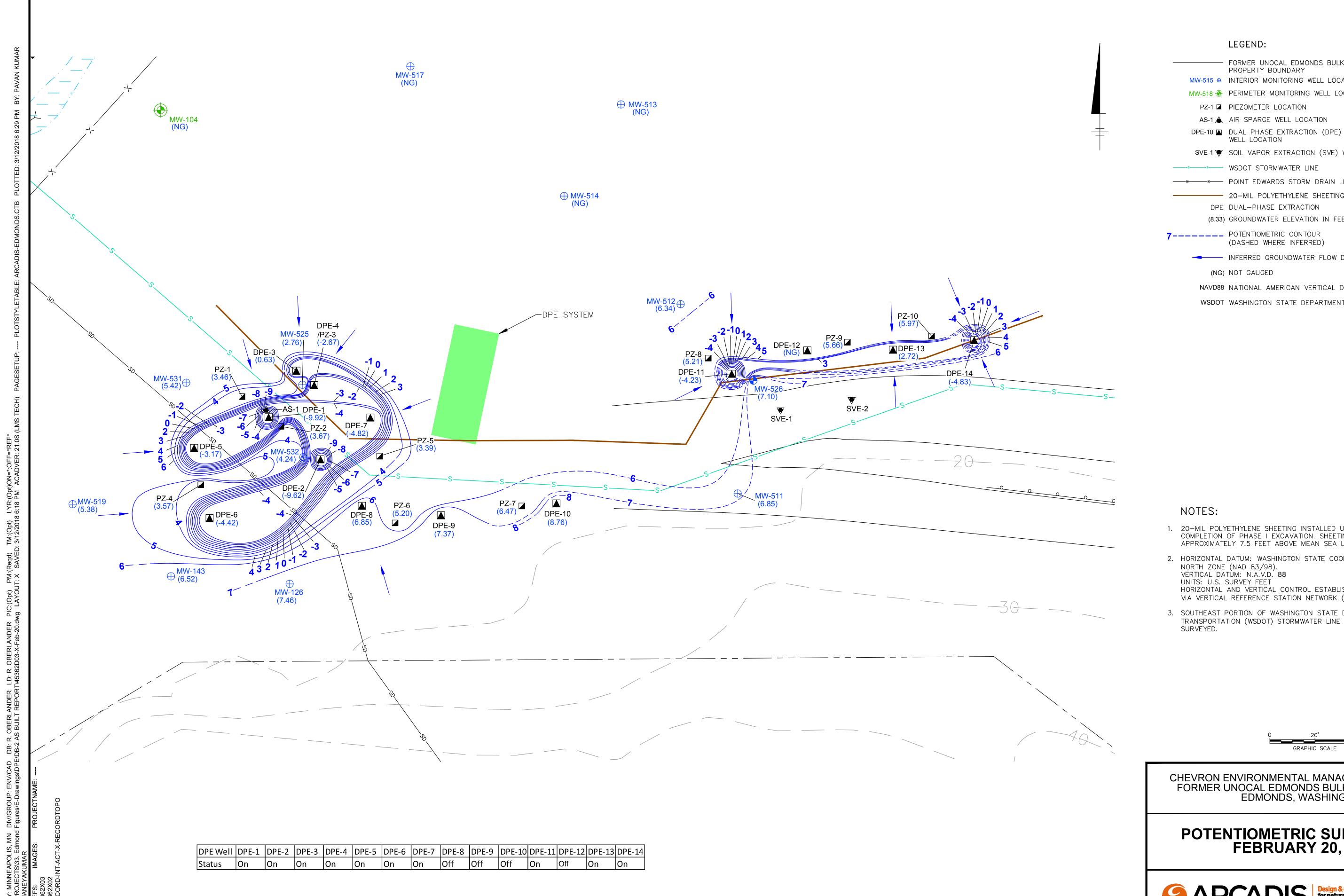
  HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS
- 3. SOUTHEAST PORTION OF WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) STORMWATER LINE HAS NOT BEEN



CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY FORMER UNOCAL EDMONDS BULK FUEL TERMINAL EDMONDS, WASHINGTON

POTENTIOMETRIC SURFACE MAP JANUARY 18, 2018





- FORMER UNOCAL EDMONDS BULK FUEL TERMINAL

MW-515 ⊕ INTERIOR MONITORING WELL LOCATION

MW-518 PERIMETER MONITORING WELL LOCATION

PZ-1 ✓ PIEZOMETER LOCATION

AS-1 A AIR SPARGE WELL LOCATION

SVE-1 VAPOR EXTRACTION (SVE) WELL LOCATION

20-MIL POLYETHYLENE SHEETING

DPE DUAL-PHASE EXTRACTION

(8.33) GROUNDWATER ELEVATION IN FEET ABOVE NAVD88

(DASHED WHERE INFERRED)

INFERRED GROUNDWATER FLOW DIRECTION

NAVD88 NATIONAL AMERICAN VERTICAL DATUM OF 1988

WSDOT WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

- COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
- 2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98).

  VERTICAL DATUM: N.A.V.D. 88

  UNITS: U.S. SURVEY FEET

  HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
- 3. SOUTHEAST PORTION OF WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) STORMWATER LINE HAS NOT BEEN

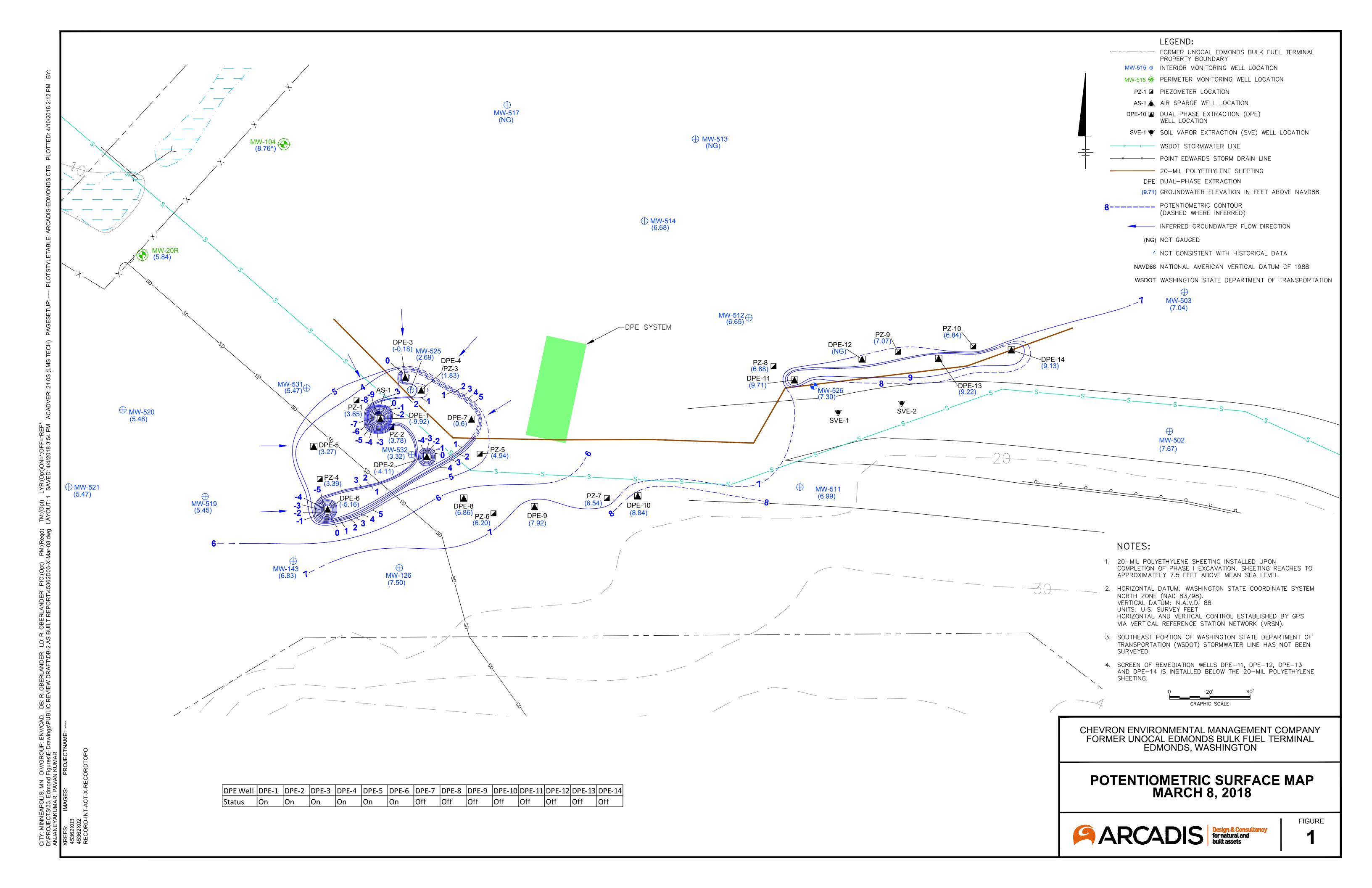


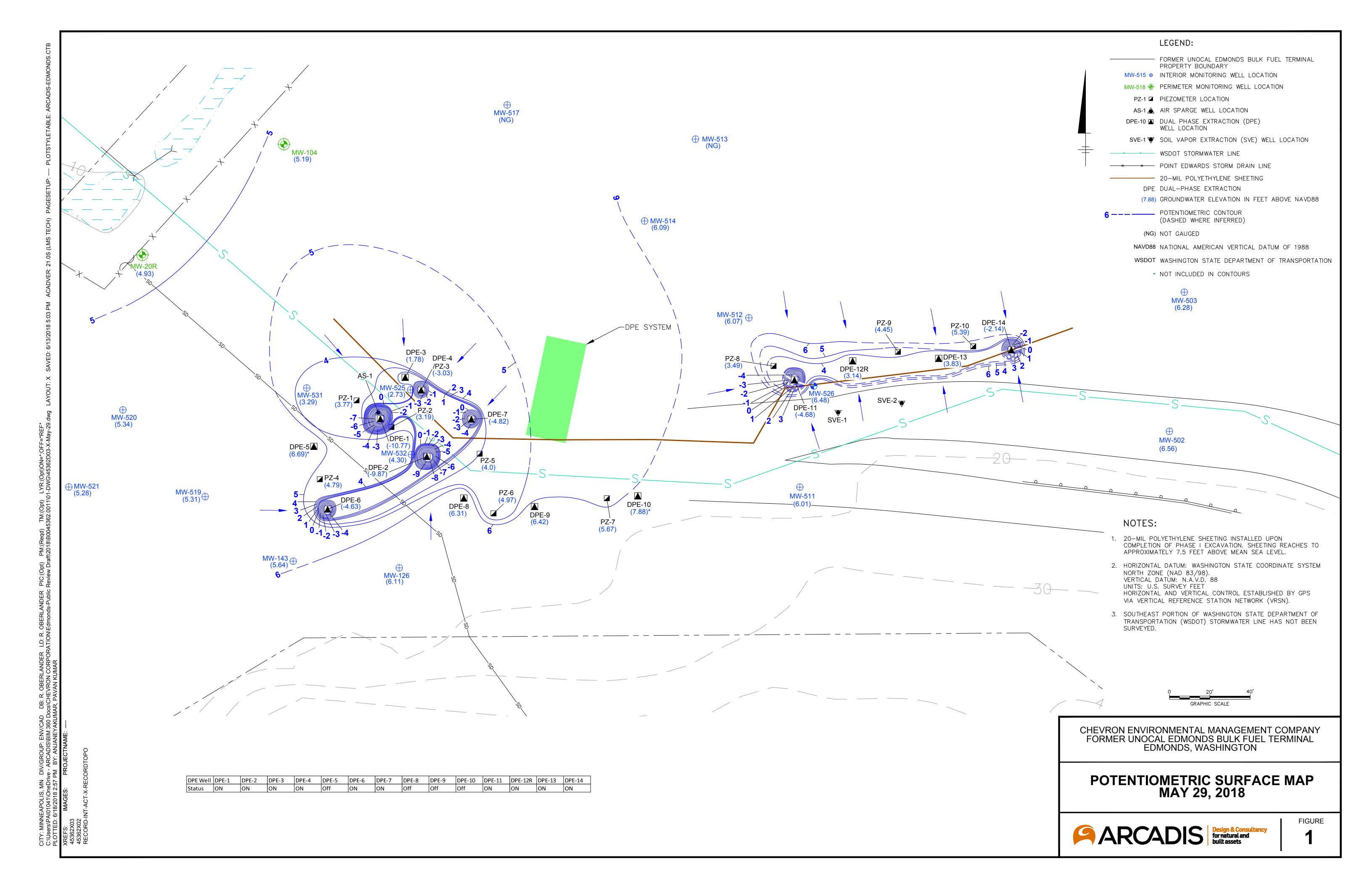
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY FORMER UNOCAL EDMONDS BULK FUEL TERMINAL EDMONDS, WASHINGTON

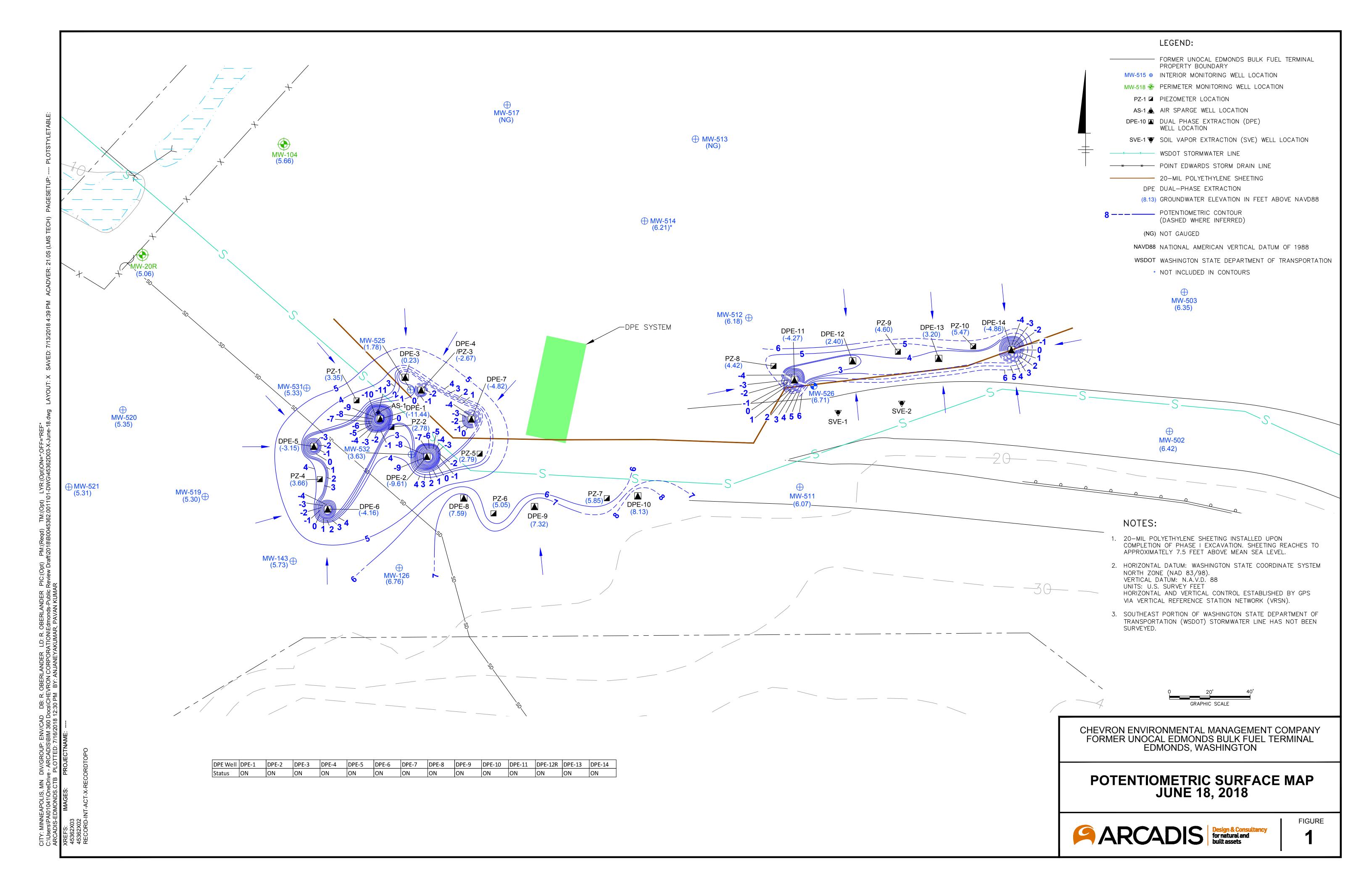
### POTENTIOMETRIC SURFACE MAP FEBRUARY 20, 2018

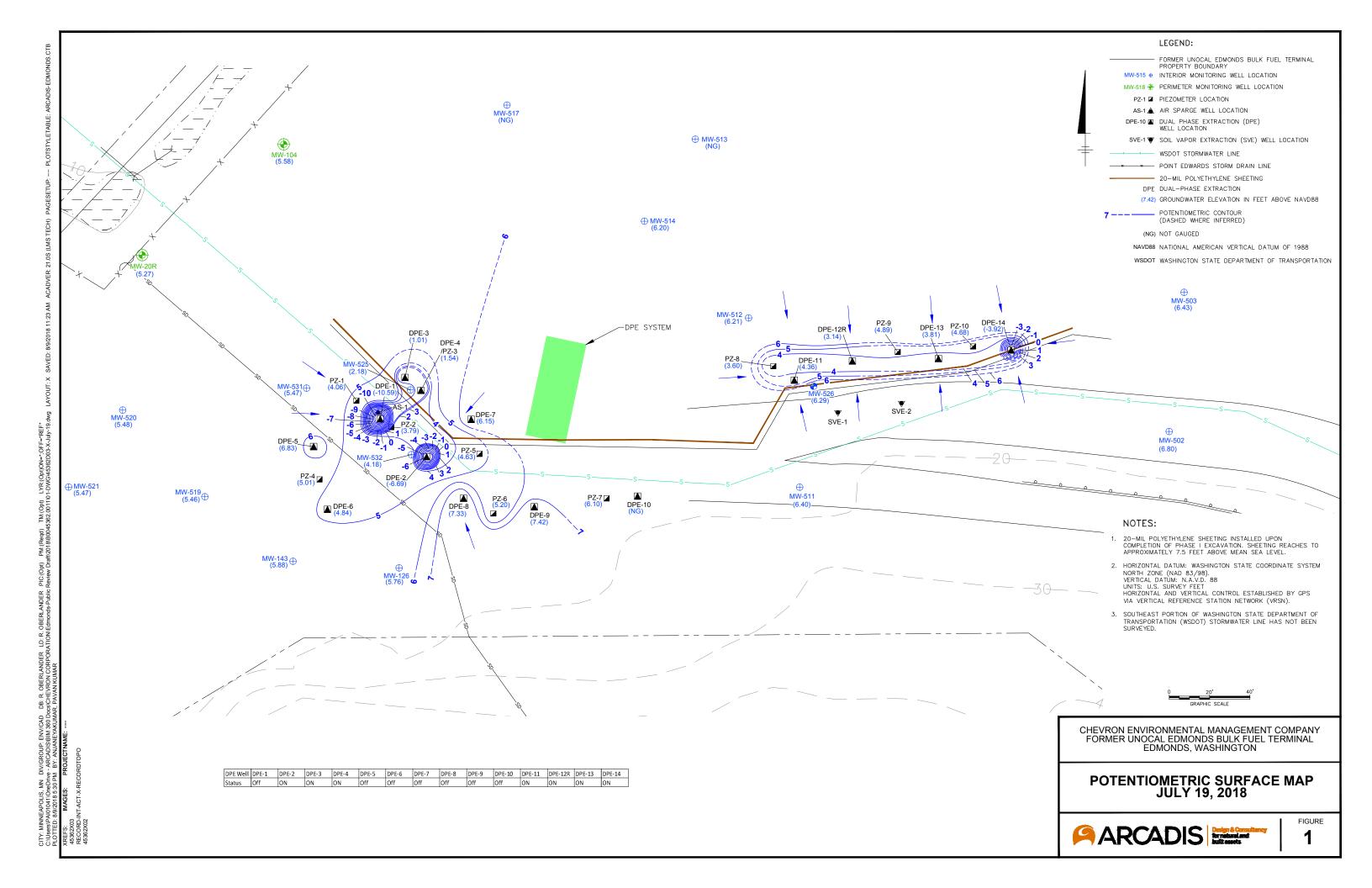


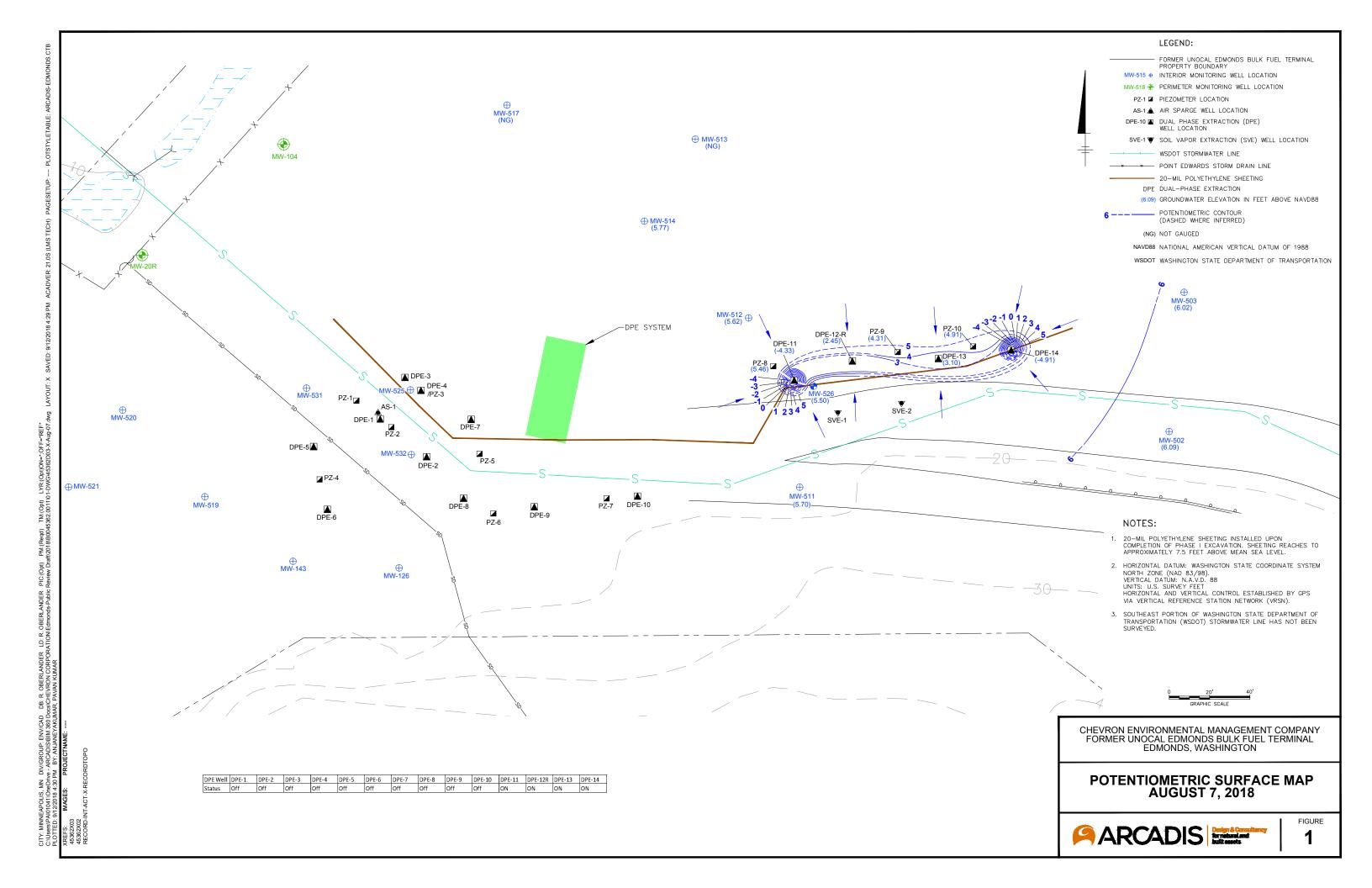
**FIGURE** 

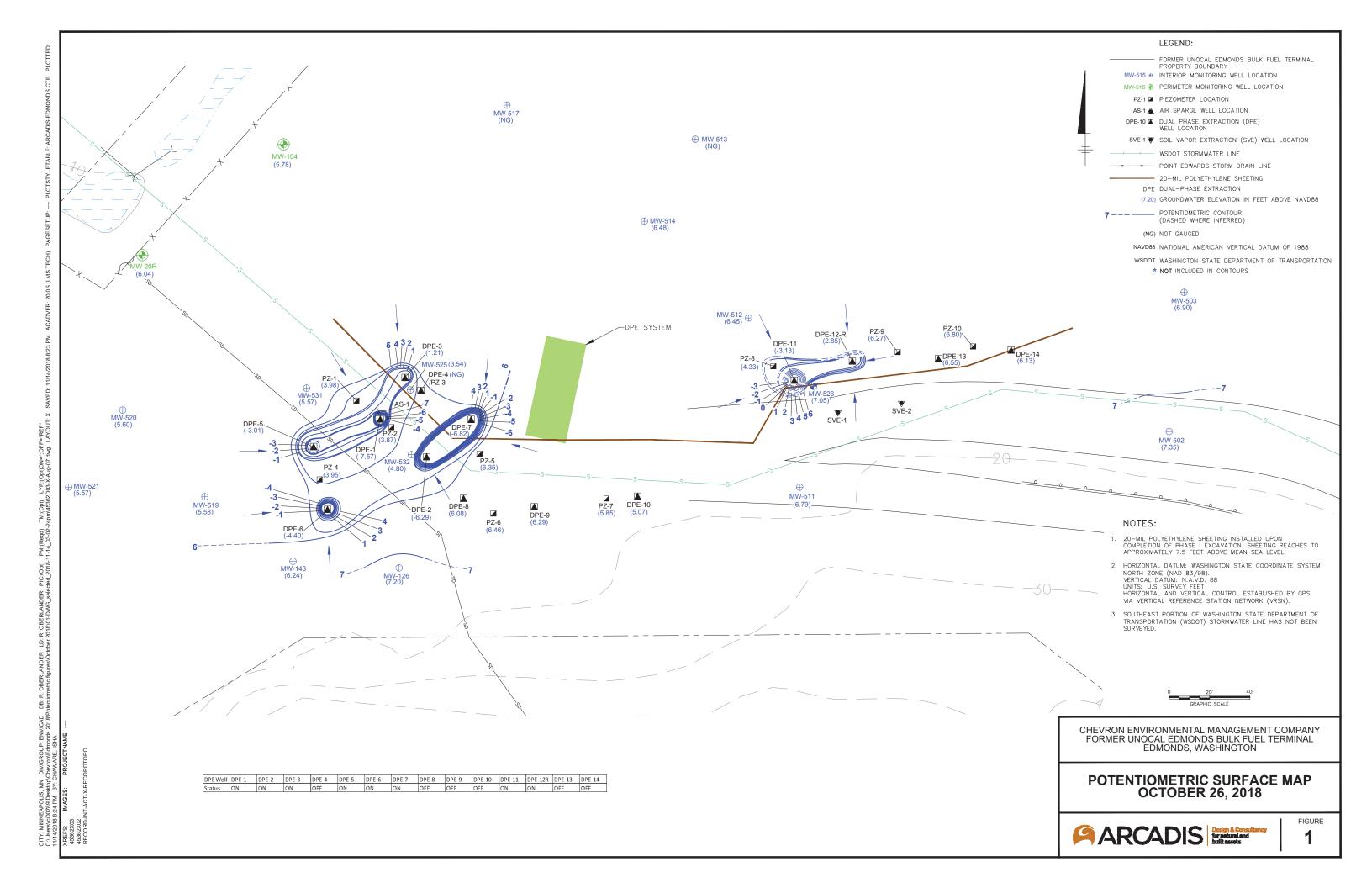


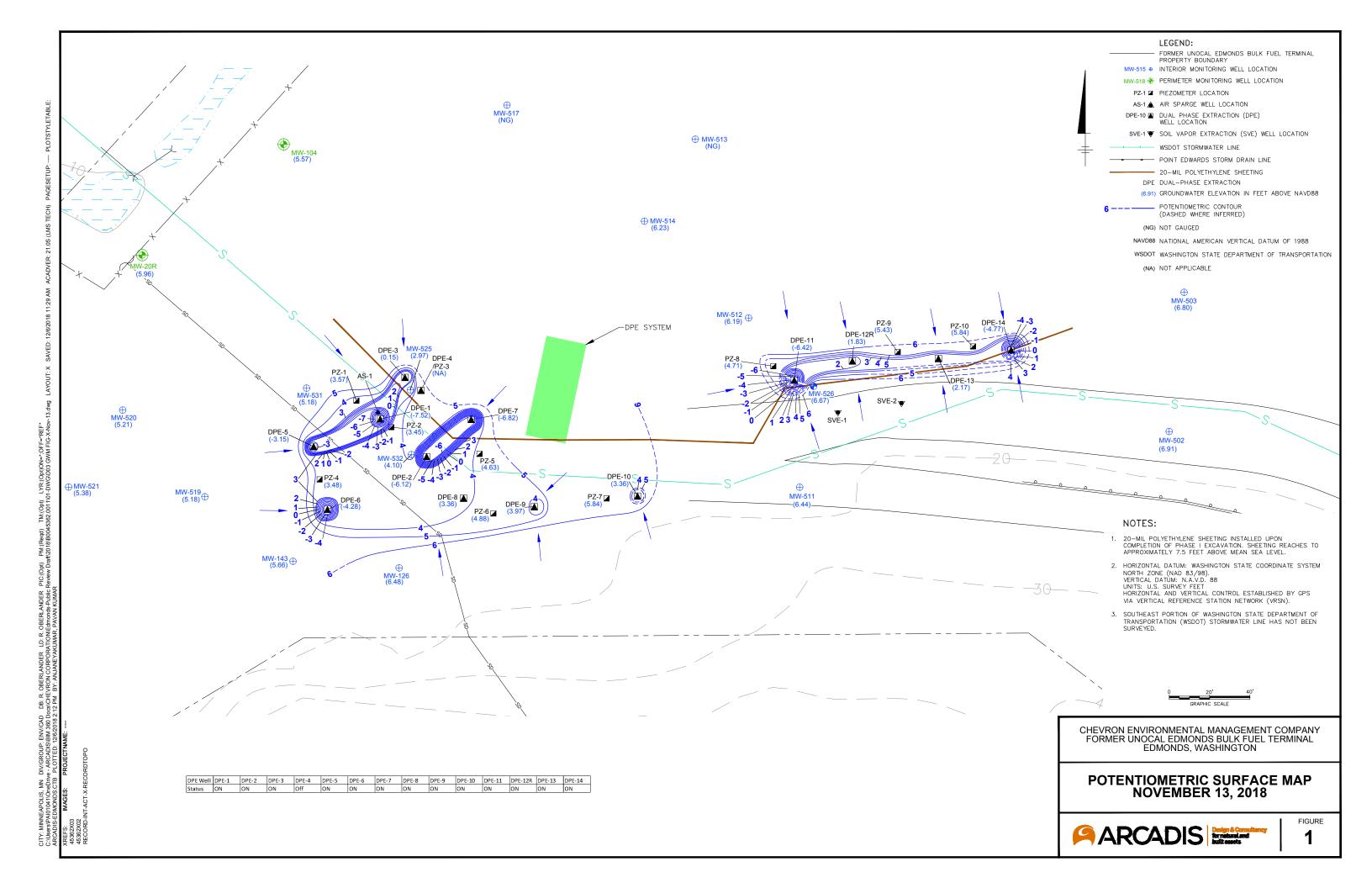












# **APPENDIX H DPE 12 Decommissioning Log and DPE 12-R Boring Log**

#### (SUBMIT ONE WELL REPORT PER WELL INSTALLED) Notice of Intent No. AE47095, RE15476 Construction/Decommission Type of Well Construction X Resource Protection X Decommission ORIGINAL INSTALLATION Notice Geotechnical Soil Boring of Intent Number Property Owner Chevron Site Address 11720 Unoco Road Consulting Firm Arcadis City Edmonds County Snohomish Unique Ecology Well ID Location 1/4 NW 1/4 NE Sec 26 TWN 27N R 3E or Tag No. WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for Lat/Long (s,t,r Lat Deg \_\_\_\_\_n/a \_\_\_ Lat Min/Sec \_\_\_\_ construction of this well, and its compliance with all Washington well construction standards still Required) Long Deg \_\_\_\_n/a Long Min/Sec n/a Materials used and the information reported above are true to my best knowledge and belief Tax Parcel No. 27032600102400 X Driller Traince Name (Print) Driller/Trainee Signature Driller/Trainee License No. 3-10-18 Work/Decommision Start Date If trainee, licensed drillers' Signature and License No. Work/Decommision Completed Date 3-27-18 Construction/Design Well Data 103-WARR Formation Description CONCRETE SURFACE SEAL Didn't Logsoll BACKFILL FT Banton b Chips REQUIRED INFORMATION (Must get one or both if available) **DEPT OF ECOLOGY WELL TAG#:** CLIENT WELL ID#: DPE-12

Page \_\_\_\_\_ of \_\_

ECY 050-12 (Rec=v 2/01)

**CURRENT** 

RESOURCE PROTECTION WELL REPORT

Scale 1" =

Date Start-Finish: 3/22/18-3/22/18

Drilling Company: Cascade Drilling

Driller's Name: Curtis Askew

Drilling Method: Hollow-stem Auger

Auger Size: 10 1/4" Rig Type: NA

Sampling Method: Hand Auger

Northing : NA Easting: NA

Casing Elevation: NA
Borehole Depth: 24.0 ft bgs.
Surface Elevation: NA

Descriptions By: Eric Krueger

Well/Boring ID: DPE-12R Client: Chevron EMC

Location: 11720 Unoco Rd, Edmonds, WA.

Former Unocal Edmonds Bulk Fuel Terminal.

Weather Conditions: 40° F Rain

Sampii					, ··						
DEPTH (ft.)	Sample Run Number	Sample/Int/Type	Recovery (")	Blow Counts	N-Value	PID (ppm)	Anatyical Sample	USGS Class	Geologic Column	Stratigraphic Description	Well/Boring Construction
-0 -1 -2 -3 -45 -678101112131415161718191919201921222324	НА	5.5-6	6	NA NA	NA NA	0.0	NA	SP		SAND, poorly graded, fine grained; soft; moist; brown.  At 4.5' bgs. Change to GRAVEL, small to medium sized; surounded.  At 5.0' bgs. Black linner encountered.  SAND and GRAVEL, poorly graded, fine grained sand; smato medium sized, subrounded gravel; soft; moist; brown; HCLO.  Boring cleared to 8.0 ft bgs via air knife and vacuum techniques.  No samples taken from 8.0-24.0' bgs- Wood plug inserted into lead auger to combat heaving sands.	Hydrated Bentonite
25										End of Boring at 24.0 ft bgs.	



°F=Degrees Fahrenheit HA=Hand Auger HCLO=Hydrocarbon like odor PVC=Polyvinyl Chloride PID=Photoionization detector

Data File: DPE-12.dat

## **APPENDIX I** Outfall #002 Laboratory Analytical Results and Chain of Custody Documentation



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: 580-73288-2

Client Project/Site: Edmonds Terminal

Revision: 3

#### For:

ARCADIS U.S. Inc 194 Seven Farms Drive Suite F Charleston, South Carolina 29492

Attn: Peter Campbell

Kim hesler

Authorized for release by: 3/29/2018 3:06:16 PM

Kim Presley, Project Management Assistant I (253)922-2310

kim.presley@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

.....LINKS .....

Review your project results through

Total Access

**Have a Question?** 



Visit us at:

www.testamericainc.com

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.

TestAmerica Job ID: 580-73288-2

#### **Table of Contents**

Cover Page	1
Table of Contents	2
Case Narrative	3
Definitions	
Client Sample Results	6
QC Sample Results	9
Chronicle	15
Certification Summary	16
Sample Summary	17
Chain of Custody	18
Receipt Checklists	19

#### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73288-2

Job ID: 580-73288-2

Laboratory: TestAmerica Seattle

Narrative

CASE NARRATIVE
Client: ARCADIS U.S. Inc
Project: Edmonds Terminal
Report Number: 580-73288-2

#### REVISION 3: March 29, 2018

revised to include MB/LCS/LCSD for all methods.

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 12/1/2017 1:00 PM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.9° C and 4.7° C.

The chain of custody lists the time 1210 for the matrix spike/matrix spike duplicate entry for sample Outfall 002 but time 1200 for parent. Logging in with parent's time. Outfall 002 (580-73288-7[MS]) and Outfall 002 (580-73288-7[MSD]).

The chain of custody requests a 24 hour turn-around-time (TAT) for the following sample but as requested by the project manager, all samples are logged in on a 5 day TAT due to capacity in the laboratory. Outfall 002 (580-73288-7), Outfall 002 (580-73288-7[MS]) and Outfall 002 (580-73288-7[MSD]).

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.

#### **VOLATILE ORGANIC COMPOUNDS (GC-MS)**

Sample Outfall 002 (580-73288-7), DUP-1 (580-73288-8) and Trip Blank (580-73288-9) were analyzed for volatile organic compounds (GC-MS) in accordance with EPA Method 624. The samples were analyzed on 12/04/2017.

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

#### POLYCYCLIC AROMATIC HYDROCARBONS (PAHS)

Samples Outfall 002 (580-73288-7) and DUP-1 (580-73288-8) were analyzed for polycyclic aromatic hydrocarbons (PAHs) in accordance with EPA SW-846 Method 8270C SIM. The samples were prepared on 12/04/2017 and analyzed on 12/07/2017.

Benzo[a]anthracene was detected in method blank MB 580-262722/1-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.

Benzo[a]anthracene and Benzo[a]pyrene failed the recovery criteria low for the MSD of sample Outfall 002MSD (580-73288-7) in batch

TestAmerica Seattle 3/29/2018 (Rev. 3)

#### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73288-2

3

Job ID: 580-73288-2 (Continued)

#### Laboratory: TestAmerica Seattle (Continued)

580-262954. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

The following samples were diluted due to dark extract color, typically indicative of matrix interference: Outfall 002 (580-73288-7), Outfall 002 (580-73288-7[MSD]) and Outfall 002 (580-73288-7[MSD]). Elevated reporting limits (RL) are provided.

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

#### **GASOLINE RANGE ORGANICS (GRO)**

Sample Outfall 002 (580-73288-7), DUP-1 (580-73288-8) and Trip Blank (580-73288-9) were analyzed for gasoline range organics (GRO) in accordance with Method NWTPH-Gx. The samples were analyzed on 12/05/2017.

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

#### **DIESEL AND MOTOR OIL RANGE ORGANICS**

Sample Outfall 002 (580-73288-7) and DUP-1 (580-73288-8) were analyzed for diesel and motor oil range organics in accordance with Method NWTPH-Dx. The samples were prepared on 12/04/2017 and analyzed on 12/05/2017.

Motor Oil (>C24-C36) exceeded the RPD limit for the MSD of sample Outfall 002MSD (580-73288-7) in batch 580-262795. The percent recoveries met acceptance limit and the LCS/LCSD was in control.

The following sample contained a hydrocarbon pattern in the diesel range; however, the elution pattern was earlier than the typical diesel fuel pattern used by the laboratory for quantitative purposes: GWSP-101 (580-73288-1).

Continuing calibration verification (CCV) standard associated with batch 580-262795 recovered outside %Drift acceptance criteria for o-Terphenyl surrogate. The %Recovery is within acceptance criteria for the surrogate in the CCV and associated samples; therefore, the data are qualified and reported. Outfall 002 (580-73288-7), Outfall 002 (580-73288-7[MS]), Outfall 002 (580-73288-7[MSD]), DUP-1 (580-73288-8), (CCV 580-262795/23), (CCVRT 580-262795/4), (LCS 580-262751/2-B), (LCSD 580-262751/3-B) and (MB 580-262751/1-B).

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

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#### **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73288-2

#### **Qualifiers**

#### **GC/MS Semi VOA**

Quaimer	Qualifier Description
В	Compound was found in the blank and sample.
F1	MS and/or MSD Recovery is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

#### **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.
F2	MS/MSD RPD exceeds control limits

#### 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)

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

FUL FIACIICAI QUAITITATION LIN	PQL	Practical Quantitation Li	mit
--------------------------------	-----	---------------------------	-----

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)

TestAmerica Seattle

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Client Sample ID: Outfall 002

Date Collected: 12/01/17 12:00 Date Received: 12/01/17 13:00 Lab Sample ID: 580-73288-7

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/04/17 20:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123			•		12/04/17 20:03	1
Toluene-d8 (Surr)	97		79 - 122					12/04/17 20:03	1
4-Bromofluorobenzene (Surr)	91		78 - 119					12/04/17 20:03	1
Dibromofluoromethane (Surr)	104		70 - 120					12/04/17 20:03	1
1,2-Dichloroethane-d4 (Surr)	114		70 - 120					12/04/17 20:03	1

Method: 8270C SIM - Ser	nivolatile Organi	c Compou	ınds (GC/MS	SIM)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0067	JBF1	0.020	0.0020	ug/L		12/04/17 09:07	12/07/17 03:23	1
Chrysene	ND		0.020	0.0060	ug/L		12/04/17 09:07	12/07/17 03:23	1
Benzo[b]fluoranthene	ND		0.020	0.0081	ug/L		12/04/17 09:07	12/07/17 03:23	1
Benzo[k]fluoranthene	ND		0.030	0.0091	ug/L		12/04/17 09:07	12/07/17 03:23	1
Benzo[a]pyrene	ND	F1	0.020	0.0030	ug/L		12/04/17 09:07	12/07/17 03:23	1
Indeno[1,2,3-cd]pyrene	ND		0.020	0.0071	ug/L		12/04/17 09:07	12/07/17 03:23	1
Dibenz(a,h)anthracene	ND		0.020	0.0020	ug/L		12/04/17 09:07	12/07/17 03:23	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	70		53 - 112				12/04/17 09:07	12/07/17 03:23	1

Method: NWTPH-Gx - Northw Analyte Gasoline		Qualifier	m Products ( RL 0.25	GC) MDL 0.050	 <u>D</u>	Prepared	Analyzed 12/05/17 19:52	Dil Fac
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		58 - 133		,		12/05/17 19:52	1
Trifluorotoluene (Surr)	108		77 - 128				12/05/17 19:52	1

Method. NWTPH-DX - Northwe	est - Seiiii-v	Claule Peu	oleulli Prou	นษเร (ษา	(د				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.024	J	0.10	0.019	mg/L		12/04/17 14:02	12/05/17 18:44	1
Motor Oil (>C24-C36)	ND	F2	0.25	0.078	mg/L		12/04/17 14:02	12/05/17 18:44	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	63		50 - 150				12/04/17 14:02	12/05/17 18:44	1

#### **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73288-2

**Client Sample ID: DUP-1** Date Collected: 12/01/17 00:01

Date Received: 12/01/17 13:00

Lab Sample ID: 580-73288-8

Matrix: Water

Method: 624 - Volatile Orga	nic Compoun	ds (GC/MS	5)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/04/17 21:17	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	97		74 - 123			-		12/04/17 21:17	1
Toluene-d8 (Surr)	98		79 - 122					12/04/17 21:17	1
4-Bromofluorobenzene (Surr)	83		78 - 119					12/04/17 21:17	1
Dibromofluoromethane (Surr)	104		70 - 120					12/04/17 21:17	1
1,2-Dichloroethane-d4 (Surr)	114		70 - 120					12/04/17 21:17	1

Method: 8270C SIM - Sen Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0086	JB	0.020	0.0020	ug/L		12/04/17 09:07	12/07/17 04:29	1
Chrysene	ND		0.020	0.0061	ug/L		12/04/17 09:07	12/07/17 04:29	1
Benzo[b]fluoranthene	ND		0.020	0.0081	ug/L		12/04/17 09:07	12/07/17 04:29	1
Benzo[k]fluoranthene	ND		0.030	0.0091	ug/L		12/04/17 09:07	12/07/17 04:29	1
Benzo[a]pyrene	0.0058	J	0.020	0.0030	ug/L		12/04/17 09:07	12/07/17 04:29	1
Indeno[1,2,3-cd]pyrene	ND		0.020	0.0071	ug/L		12/04/17 09:07	12/07/17 04:29	1
Dibenz(a,h)anthracene	0.0055	J	0.020	0.0020	ug/L		12/04/17 09:07	12/07/17 04:29	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	61		53 - 112				12/04/17 09:07	12/07/17 04:29	1

Method: NWTPH-Gx - Northw	vest - Volatile	Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			12/05/17 22:31	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		58 - 133					12/05/17 22:31	1

Method. NWTPH-DX - Northw	est - Seiiii-v	Olathe Peti	oleulli Prou	นษเร (ษา	(د				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.027	J	0.10	0.019	mg/L		12/04/17 14:02	12/05/17 20:12	1
Motor Oil (>C24-C36)	ND		0.25	0.078	mg/L		12/04/17 14:02	12/05/17 20:12	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	72		50 - 150				12/04/17 14:02	12/05/17 20:12	

#### **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73288-2

Lab Sample ID: 580-73288-9

Matrix: Water

Client Sample ID: Trip Blank Date Collected: 12/01/17 00:01 Date Received: 12/01/17 13:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/04/17 16:19	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	99		74 - 123					12/04/17 16:19	1
Toluene-d8 (Surr)	98		79 - 122					12/04/17 16:19	1
4-Bromofluorobenzene (Surr)	89		78 - 119					12/04/17 16:19	1
Dibromofluoromethane (Surr)	104		70 - 120					12/04/17 16:19	1
1,2-Dichloroethane-d4 (Surr)	112		70 - 120					12/04/17 16:19	1

Method: NWTPH-Gx - Nortl	hwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			12/05/17 16:40	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		58 - 133			-		12/05/17 16:40	1

TestAmerica Job ID: 580-73288-2

**Client Sample ID: Lab Control Sample** 

**Prep Type: Total/NA** 

Method: 624 - Volatile Organic Compounds (GC/MS)

MD MD

Lab Sample ID: MB 580-262747/5

Matrix: Water

Client Sample ID: Method Blank
Prep Type: Total/NA

Analysis Batch: 262747

	INID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/04/17 15:05	1
	МВ	МВ							

Surrogate	%Recovery Qualifier	Limits	Prepared Ana	alyzed	Dil Fac
Trifluorotoluene (Surr)	95	74 - 123	12/04/	17 15:05	1
Toluene-d8 (Surr)	96	79 - 122	12/04/	17 15:05	1
4-Bromofluorobenzene (Surr)	107	78 - 119	12/04/	17 15:05	1
Dibromofluoromethane (Surr)	105	70 - 120	12/04/	17 15:05	1
1,2-Dichloroethane-d4 (Surr)	109	70 - 120	12/04/	17 15:05	1

Lab Sample ID: LCS 580-262747/6

**Matrix: Water** 

Analysis Batch: 262747

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzene	10.0	11.8		ug/L		118	37 - 151	

LCS	LCS	
%Recovery	Qualifier	Limits
96		74 - 123
94		79 - 122
94		78 - 119
102		70 - 120
109		70 - 120
	%Recovery 96 94 94 102	94 94 102

Lab Sample ID: 580-73288-7 MS

Matrix: Water

Client Sample ID: Outfall 002

Prep Type: Total/NA

**Analysis Batch: 262747** 

	Sample	Sample	Spike	MS	MS				%Rec.	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzene	ND		10.0	12.1		ug/L		121	37 - 151	

	MS	MS	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	99		74 - 123
Toluene-d8 (Surr)	97		79 - 122
4-Bromofluorobenzene (Surr)	93		78 - 119
Dibromofluoromethane (Surr)	104		70 - 120
1,2-Dichloroethane-d4 (Surr)	111		70 - 120

Lab Sample ID: 580-73288-7 MSD

Matrix: Water

Client Sample ID: Outfall 002

Prep Type: Total/NA

Analysis Batch: 262747

RPD Sample Sample Spike MSD MSD %Rec. Result Qualifier Unit Analyte Result Qualifier Added Limits D %Rec RPD Limit 37 - 151 10.0 121 Benzene ND 12.1 ug/L 0

	MSD	MSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	98		74 - 123
Toluene-d8 (Surr)	96		79 - 122

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#### Method: 624 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 580-73288-7 MSD

**Matrix: Water** 

**Analysis Batch: 262747** 

Client Sample ID: Outfall 002 **Prep Type: Total/NA** 

MSD MSD

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	92		78 - 119
Dibromofluoromethane (Surr)	104		70 - 120
1,2-Dichloroethane-d4 (Surr)	109		70 - 120

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

Lab Sample ID: MB 580-262722/1-A

**Matrix: Water** 

**Analysis Batch: 262767** 

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 262722

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.00551	J	0.020	0.0020	ug/L		12/04/17 09:07	12/04/17 15:21	1
Chrysene	ND		0.020	0.0060	ug/L		12/04/17 09:07	12/04/17 15:21	1
Benzo[b]fluoranthene	ND		0.020	0.0080	ug/L		12/04/17 09:07	12/04/17 15:21	1
Benzo[k]fluoranthene	ND		0.030	0.0090	ug/L		12/04/17 09:07	12/04/17 15:21	1
Benzo[a]pyrene	ND		0.020	0.0030	ug/L		12/04/17 09:07	12/04/17 15:21	1
Indeno[1,2,3-cd]pyrene	ND		0.020	0.0070	ug/L		12/04/17 09:07	12/04/17 15:21	1
Dibenz(a,h)anthracene	ND		0.020	0.0020	ug/L		12/04/17 09:07	12/04/17 15:21	1

MB MB

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	71		53 - 112	12/04/17 09:07	12/04/17 15:21	<del></del> 1

Lab Sample ID: LCS 580-262722/2-A

**Matrix: Water** 

**Analysis Batch: 262767** 

**Client Sample ID: Lab Control Sample** Prep Type: Total/NA Prep Batch: 262722

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits 4.00 3.20 71 - 120 Benzo[a]anthracene ug/L 80 Chrysene 4.00 3.37 ug/L 84 64 - 120 Benzo[b]fluoranthene 4.00 3.46 ug/L 87 66 - 120 Benzo[k]fluoranthene 4.00 3.45 ug/L 86 68 - 120 4.00 Benzo[a]pyrene 3.57 ug/L 89 76 - 120 Indeno[1,2,3-cd]pyrene 4.00 3.43 ug/L 86 63 - 120 Dibenz(a,h)anthracene 4.00 3.55 ug/L 60 - 125

LCS LCS

Surrogate	%Recovery Qualifier	Limits
Terphenyl-d14	69	53 - 112

Lab Sample ID: LCSD 580-262722/3-A

**Matrix: Water** 

Analysis Batch: 262767

Client Sample ID: Lab Control Sample Dup

**Prep Type: Total/NA** Prep Batch: 262722

•	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	3.35		ug/L		84	71 - 120	4	16
Chrysene	4.00	3.57		ug/L		89	64 - 120	6	16
Benzo[b]fluoranthene	4.00	3.54		ug/L		89	66 - 120	2	20
Benzo[k]fluoranthene	4.00	3.70		ug/L		92	68 - 120	7	20

Client: ARCADIS U.S. Inc

TestAmerica Job ID: 580-73288-2

Project/Site: Edmonds Terminal

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

Lab Sample ID: LCSD 580-262722/3-A

**Matrix: Water** 

**Matrix: Water** 

**Analysis Batch: 262767** 

Lab Sample ID: 580-73288-7 MS

Analysis Batch: 262954

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

**Prep Batch: 262722** 

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]pyrene	4.00	3.68		ug/L		92	76 - 120	3	17
Indeno[1,2,3-cd]pyrene	4.00	3.62		ug/L		91	63 - 120	5	15
Dibenz(a,h)anthracene	4.00	3.80		ug/L		95	60 - 125	7	15

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 70 53 - 112

Client Sample ID: Outfall 002

**Prep Type: Total/NA** 

Prep Batch: 262722

,, c.c	Sample	Sample	Spike	MS	MS				%Rec.
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits
Benzo[a]anthracene	0.0067	JBF1	4.04	2.96		ug/L		73	71 - 120
Chrysene	ND		4.04	3.16		ug/L		78	64 - 120
Benzo[b]fluoranthene	ND		4.04	2.99		ug/L		74	66 - 120
Benzo[k]fluoranthene	ND		4.04	3.13		ug/L		77	68 - 120
Benzo[a]pyrene	ND	F1	4.04	3.21		ug/L		80	76 - 120
Indeno[1,2,3-cd]pyrene	ND		4.04	2.98		ug/L		74	63 - 120
Dibenz(a,h)anthracene	ND		4.04	3.12		ug/L		77	60 - 125

MS MS

Sample Sample

Result Qualifier

Surrogate %Recovery Qualifier Limits 53 - 112 Terphenyl-d14 64

Lab Sample ID: 580-73288-7 MSD

**Matrix: Water** 

Analyte

**Analysis Batch: 262954** 

Client Sample ID: Outfall 002

Prep Type: Total/NA Prep Batch: 262722

%Rec. **RPD** D %Rec Limits RPD Limit 71 \_ 120 16 64 - 120 6 16

Benzo[a]anthracene 0.0067 JBF1 4.02 2.75 F1 ug/L 68 Chrysene ND 4.02 2.99 ug/L 74 ND 4.02 2.69 67 66 - 120 Benzo[b]fluoranthene ug/L 11 20 Benzo[k]fluoranthene ND 4.02 2.85 ug/L 71 68 - 120 9 20 4.02 72 ND F1 2.88 F1 ug/L 76 - 120 17 Benzo[a]pyrene 11 ND 4.02 67 63 - 120 10 15 Indeno[1,2,3-cd]pyrene 2.71 ug/L 71 Dibenz(a,h)anthracene ND 4.02 2.85 ug/L 60 - 125 15

Spike

Added

MSD MSD

Result Qualifier

Unit

MSD MSD

Surrogate %Recovery Qualifier Limits 53 - 112 Terphenyl-d14 61

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-262841/5

**Matrix: Water** 

**Analysis Batch: 262841** 

Client Sample ID: Method Blank Prep Type: Total/NA

MR MR

Result Qualifier RL **MDL** Unit Analyte Prepared Analyzed Dil Fac Gasoline  $\overline{\mathsf{ND}}$ 0.25 0.050 mg/L 12/05/17 15:05

TestAmerica Job ID: 580-73288-2

Dil Fac

#### Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC) (Continued)

Lab Sample ID: MB 580-262841/5

Lab Sample ID: LCS 580-262841/6

Lab Sample ID: LCSD 580-262841/7

**Matrix: Water** 

**Analysis Batch: 262841** 

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

MR MR

Surrogate	%Recovery	Qualifier	Limits	Prepar	ed Analyzed	d
4-Bromofluorobenzene (Surr)	91		58 - 133		12/05/17 15	5:05
Trifluorotoluene (Surr)	97		77 - 128		12/05/17 15	5:05

**Client Sample ID: Lab Control Sample** 

**Prep Type: Total/NA** 

**Matrix: Water** Analysis Batch: 262841

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Gasoline	1.00	0.908		mg/L		91	79 - 110	

LCS LCS

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	100		58 - 133
Trifluorotoluene (Surr)	97		77 - 128

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

**Matrix: Water** 

Analysis Batch: 262841

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Gasoline	 1.00	0.968		ma/L		97	79 <sub>-</sub> 110	6	10

LCSD LCSD

Surrogate	%Recovery Qualifier	Limits
4-Bromofluorobenzene (Surr)	99	58 - 133
Trifluorotoluene (Surr)	105	77 - 128

Lab Sample ID: 580-73288-7 MS Client Sample ID: Outfall 002 **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 262841

rinaly old Datom 2020 : .	Sample	Sample	Spike	MS	MS				%Rec.	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Gasoline	ND		1 00	0.885		ma/l		89	79 - 110	

MS MS

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	98		58 - 133
Trifluorotoluene (Surr)	108		77 - 128

Lab Sample ID: 580-73288-7 MSD Client Sample ID: Outfall 002 Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 262841

7 <b>,</b> 0.0 _ 20.0 0_0	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Gasoline	ND		1.00	0.952		ma/L		95	79 - 110	7	10

MSD MSD

Surrogate	%Recovery Qualifier	Limits
4-Bromofluorobenzene (Surr)	100	58 - 133
Trifluorotoluene (Surr)	107	77 - 128

TestAmerica Job ID: 580-73288-2

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

Lab Sample ID: MB 580-262751/1-B

**Matrix: Water** 

**Analysis Batch: 262795** 

Client Sample ID: Method Blank Prep Type: Total/NA

**Prep Batch: 262751** 

MB MB Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac 0.10 #2 Diesel (C10-C24)  $\overline{\mathsf{ND}}$ 0.019 mg/L 12/04/17 14:02 12/05/17 15:27 Motor Oil (>C24-C36) ND 0.25 0.077 mg/L 12/04/17 14:02 12/05/17 15:27

MB MB

Qualifier Limits Surrogate %Recovery Prepared Analyzed Dil Fac o-Terphenyl 83 50 - 150 12/04/17 14:02 12/05/17 15:27

**Client Sample ID: Lab Control Sample** 

Lab Sample ID: LCS 580-262751/2-B

**Matrix: Water** 

**Analysis Batch: 262795** 

Prep Type: Total/NA

**Prep Batch: 262751** 

LCS LCS Spike %Rec. Result Qualifier Limits **Analyte** Added Unit D %Rec #2 Diesel (C10-C24) 2.00 1.78 89 59 - 112 mg/L Motor Oil (>C24-C36) 2.00 2.14 107 64 - 120 mg/L

LCS LCS

Surrogate %Recovery Qualifier Limits o-Terphenyl 50 - 150 82

Lab Sample ID: LCSD 580-262751/3-B

**Matrix: Water** 

**Analysis Batch: 262795** 

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

Prep Type: Total/NA

**Prep Batch: 262751** %Rec. **RPD** 

LCSD LCSD Spike Analyte Added Result Qualifier Unit D %Rec Limits **RPD** Limit #2 Diesel (C10-C24) 2.00 1.71 mg/L 86 59 - 112 4 16 2.00 Motor Oil (>C24-C36) 2.08 mg/L 104 64 - 12017 3

MS MS

LCSD LCSD

Surrogate %Recovery Qualifier Limits o-Terphenyl 82 50 - 150

Lab Sample ID: 580-73288-7 MS

**Matrix: Water** 

**Analysis Batch: 262795** 

Client Sample ID: Outfall 002

Prep Type: Total/NA

**Prep Batch: 262751** 

%Rec.

Analyte Result Qualifier Added Result Qualifier Unit %Rec Limits #2 Diesel (C10-C24) 0.024 J 2.03 1.45 70 59 - 112 mg/L Motor Oil (>C24-C36) ND F2 2.03 1.85 mg/L 91 64 - 120

Spike

MS MS

Sample Sample

%Recovery Qualifier Limits Surrogate 50 - 150 o-Terphenyl 66

Lab Sample ID: 580-73288-7 MSD

**Matrix: Water** 

**Analysis Batch: 262795** 

Client Sample ID: Outfall 002 Prep Type: Total/NA

**Prep Batch: 262751** 

•	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
#2 Diesel (C10-C24)	0.024	J	2.02	1.24		mg/L		60	59 - 112	16	16
Motor Oil (>C24-C36)	ND	F2	2.02	1.50	F2	mg/L		74	64 - 120	21	17

#### **QC Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73288-2

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

Lab Sample ID: 580-73288-7 MSD

**Matrix: Water** 

**Analysis Batch: 262795** 

Client Sample ID: Outfall 002 Prep Type: Total/NA

Prep Batch: 262751

MSD MSD

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Lab Sample ID: 580-73288-7

**Matrix: Water** 

Client Sample ID: Outfall 002 Date Collected: 12/01/17 12:00

Date Received: 12/01/17 13:00

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			262747	12/04/17 20:03	P1P	TAL SEA
Total/NA	Prep	3510C			262722	12/04/17 09:07	NDB	TAL SEA
Total/NA	Analysis	8270C SIM		1	262954	12/07/17 03:23	ERB	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	262841	12/05/17 19:52	JCV	TAL SEA
Total/NA	Prep	3510C			262751	12/04/17 14:02	NDB	TAL SEA
Total/NA	Cleanup	3630C			262781	12/04/17 18:07	NDB	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	262795	12/05/17 18:44	ADB	TAL SEA

Lab Sample ID: 580-73288-8 **Client Sample ID: DUP-1** 

Date Collected: 12/01/17 00:01 Date Received: 12/01/17 13:00 **Matrix: Water** 

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			262747	12/04/17 21:17	P1P	TAL SEA
Total/NA	Prep	3510C			262722	12/04/17 09:07	NDB	TAL SEA
Total/NA	Analysis	8270C SIM		1	262954	12/07/17 04:29	ERB	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	262841	12/05/17 22:31	JCV	TAL SEA
Total/NA	Prep	3510C			262751	12/04/17 14:02	NDB	TAL SEA
Total/NA	Cleanup	3630C			262781	12/04/17 18:07	NDB	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	262795	12/05/17 20:12	ADB	TAL SEA

Lab Sample ID: 580-73288-9 **Client Sample ID: Trip Blank** Date Collected: 12/01/17 00:01

Date Received: 12/01/17 13:00

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	262747	12/04/17 16:19	P1P	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	262841	12/05/17 16:40	JCV	TAL SEA

#### **Laboratory References:**

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

TestAmerica Seattle

**Matrix: Water** 

#### **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-73288-2

Project/Site: Edmonds Terminal

#### **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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

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#### **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73288-2

Lab Sample ID	Client Sample ID	Matrix	Collected Received
580-73288-7	Outfall 002	Water	<u>12/01/17 12:00</u> <u>12/01/17 13:00</u>
580-73288-8	DUP-1	Water	12/01/17 00:01 12/01/17 13:00
580-73288-9	Trip Blank	Water	12/01/17 00:01 12/01/17 13:00

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THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Short	Hold	

Rush

Chain of Custody Record

Client		Client Conta		1 - 11			Date	Chain of Custody Number
Aviadis		1 Pct	er cam	poell			12/1/17	311/1
		1	umber (Area Code)				Lab Number チ3288	- 1 . 1
1100 olive way, Suite 800	o Code	Sampler	0.910.02	Lab Contact		T		Page of
Seattle WA	98101		Lrueger		aradre.	more	ysis (Attach list if space is needed)	
Project Name and Location (State)	יטוטו	Billing Conta		Licute	WAIRCO	5 5		
Edmonds Terminal, 11720 unoco Contract/Purchase Order/Quote No.	Dd. Edmands W	4				× 2%		Special Instructions/
Contract/Purchase Order/Quote Nd.			Matrix		ainers &	1 5 3		Conditions of Receipt
					ervatives	にまる表		10
Sample I.D. and Location/Description (Containers for each sample may be combined on one line)	Date	Time ₹	Aqueous Sed. Soil	Unpres. H2SO4 HNO3	HCI NaOH ZnAc/ NaOH	NWTPH-CH NWTPH-DX 624 BENZE CPANS by 82	Therm. II	DA2 Cor 1.9 Unc 2.6
GWSP-101	12/1/17 0	9830	X		8	XXXX	Wet/Pack	sc 48/08 @Lab 1620 ss Packing 906
GWSP-102A	1 0	900					LabCo	Custody Seal: Yes No
3 GWSP-102B	C	2930				XXXX		
<u>GWSP - 103A</u>	i	000				XXXX		
GWSP- 103B	l l	025				XXXX		
GWSP- 104.		045				XXXX		
* outfail ooz	) It.	200		and the state of t		XXXX		24 hr TAT
outfall DOZ MS/MSD		210				XXXX		***************************************
DUP-1	<b>∀</b> -	<u> </u>			7	XXXX		
Trip blank			<b>₽</b>	t (	6	$X \mid X \mid$		
•								1
							Therm. I	D A2 Cor 4.7 Unc 5.4
	azard Identification				,			sc. <u>le @Lab 1620</u>
☐ Yes ☐ No Cooler Temp: ☐ Non-Ha Turn Around Time Required (business days)	azard 🗌 Flamma	ible LI Skii	n Irritant 🔲 P		Unknown	eturn To Client 🔲 A	Archive ForWet/Pack	Custody Seal: Yes No
☐ 24 Hours ☐ 48 Hours 🔀 5 Days ☐ 10 Da	vs 🗆 15 Days	☐ Other		ис пецин	ететь (эреспу)			Custody Sear; 1 es No
1. Relinguished By, Sign/Print	,, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Date	Time	1. Receive	ed By Signt+Print	<del>//</del>	/ .	, Date / / , Time
Buk / Prichrueger		12/1/1	7 1300		m	my	) / Blankinshi	12/1/17 1300
2. Relinquished by Sign/Print		Date'	Time	2. Receive	d By Sign/Print	/ ()		Date Time
3. Relinquished By Sign/Print		Date	Time	3. Receive	ed By Sign/Print			, Date , Time
Comments								
الملاحد المالات	AT							
DISTRIBUTION: WHITE - Stays with the Samples; CANARY	– Returned to Client v	vith Report; PIN	IK – Field Copy	ne 18 of 10	a		F90 73399 Ob-	
			га	go io oi is			580-73288 Chain of 0	Justoay Jizaizo IO (INEV. 3

Job Number: 580-73288-2

Login Number: 73288 List Source: TestAmerica Seattle

List Number: 1

Creator: Blankinship, Tom X

Clouder Blankmonip, Tom A		
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	The COC lists time 1210 for the MS/D but 1200 for parent.
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	

**TestAmerica Seattle** 



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# **ANALYTICAL REPORT**

TestAmerica Laboratories, Inc.

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

TestAmerica Job ID: 580-73407-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 12/13/2017 5:48:04 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

·····LINKS ·······

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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.

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73407-1

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### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73407-1

Job ID: 580-73407-1

**Laboratory: TestAmerica Seattle** 

Narrative

CASE NARRATIVE
Client: ARCADIS U.S. Inc

Project: Chevron Edmonds Terminal Report Number: 580-73407-1

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 12/6/2017 11:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.1° C.

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.

#### **VOLATILE ORGANIC COMPOUNDS (GC-MS)**

Samples Outfall-120517 (580-73407-1) and Trip Blank (580-73407-2) were analyzed for volatile organic compounds (GC-MS) in accordance with EPA Method 624. The samples were analyzed on 12/09/2017.

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

### POLYCYCLIC AROMATIC HYDROCARBONS (PAHS)

Sample Outfall-120517 (580-73407-1) was analyzed for polycyclic aromatic hydrocarbons (PAHs) in accordance with EPA SW-846 Method 8270C SIM. The samples were prepared on 12/11/2017 and analyzed on 12/13/2017.

Several analytes were detected in method blank MB 580-263163/1-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. The target analyte concentrations were less than half the reporting limit (1/2RL); therefore, re-extraction and/or re-analysis of samples was not performed.

Benzo[a]pyrene failed the recovery criteria high for LCSD 580-263163/3-A. The analyte was biased high in the LCSD and was not detected in the associated samples; therefore, the data have been reported.

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

### **GASOLINE RANGE ORGANICS (GRO)**

Samples Outfall-120517 (580-73407-1) and Trip Blank (580-73407-2) were analyzed for gasoline range organics (GRO) in accordance with Method NWTPH-Gx. The samples were analyzed on 12/09/2017 and 12/12/2017.

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

TestAmerica Seattle 12/13/2017

### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73407-1

Job ID: 580-73407-1 (Continued)

Laboratory: TestAmerica Seattle (Continued)

### **DIESEL AND MOTOR OIL RANGE ORGANICS**

Sample Outfall-120517 (580-73407-1) was analyzed for diesel and motor oil range organics in accordance with Method NWTPH-Dx. The samples were prepared on 12/07/2017 and analyzed on 12/09/2017.

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

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# **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73407-1

## **Qualifiers**

### **GC/MS Semi VOA**

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.
*	LCS or LCSD is outside acceptance limits.

### **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.

# 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)

TestAmerica Seattle

12/13/2017

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# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Client Sample ID: Outfall-120517

TestAmerica Job ID: 580-73407-1

Lab Sample ID: 580-73407-1

12/11/17 09:32 12/13/17 11:58

Analyzed

Prepared

**Matrix: Water** 

Date Collected: 12/05/17 15:30 Date Received: 12/06/17 11:10

Dibenz(a,h)anthracene

Surrogate

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/09/17 21:37	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123					12/09/17 21:37	1
Toluene-d8 (Surr)	104		79 - 122					12/09/17 21:37	1
4-Bromofluorobenzene (Surr)	102		78 - 119					12/09/17 21:37	1
Dibromofluoromethane (Surr)	102		70 - 120					12/09/17 21:37	1
1,2-Dichloroethane-d4 (Surr)	98		70 - 120					12/09/17 21:37	1
Method: 8270C SIM - Semi	volatile Organi	c Compou	nds (GC/MS	SIM)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0090	JB	0.020	0.0020	ug/L		12/11/17 09:32	12/13/17 11:58	1
Chrysene	0.0079	JB	0.020	0.0061	ug/L		12/11/17 09:32	12/13/17 11:58	1
Benzo[b]fluoranthene	0.0098	J	0.020	0.0081	ug/L		12/11/17 09:32	12/13/17 11:58	1
Benzo[k]fluoranthene	ND		0.031	0.0092	ug/L		12/11/17 09:32	12/13/17 11:58	1
Benzo[a]pyrene	0.0089	J * B	0.020	0.0031	ug/L		12/11/17 09:32	12/13/17 11:58	1
Indeno[1,2,3-cd]pyrene	0.0078	IR	0.020	0.0071	ua/l		12/11/17 09:32	12/13/17 11:58	1

Terphenyl-d14	60		53 - 112				12/11/17 09:32	12/13/17 11:58	1
Method: NWTPH-Gx - Northw	est - Volatile	e Petroleur	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			12/09/17 03:04	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		58 - 133					12/09/17 03:04	1
Trifluorotoluene (Surr)	118		77 - 128					12/09/17 03:04	1

0.020

Limits

0.0020 ug/L

0.0083 JB

%Recovery Qualifier

Method: NWTPH-Dx - North Analyte		olatile Pet Qualifier	roleum Prod RL	ucts (GC	•	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.024	J	0.10	0.019	mg/L		12/07/17 09:33	12/09/17 03:11	1
Motor Oil (>C24-C36)	ND		0.25	0.078	mg/L		12/07/17 09:33	12/09/17 03:11	1
Surrogate o-Terphenyl	<b>%Recovery</b> 73	Qualifier	Limits 50 - 150				Prepared 12/07/17 09:33	Analyzed 12/09/17 03:11	Dil Fac

Dil Fac

12/13/2017

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73407-1

Lab Sample ID: 580-73407-2

Matrix: Water

Client Sample ID: Trip Blank Date Collected: 12/05/17 15:30

Date Received: 12/06/17 11:10

Method: 624 - Volatile Organic Compounds (GC/MS)									
Analyte	Result Qu	ualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/09/17 15:54	1
Surrogate	%Recovery Qu	ualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123					12/09/17 15:54	1
Toluene-d8 (Surr)	103		79 - 122					12/09/17 15:54	1
4-Bromofluorobenzene (Surr)	100		78 - 119					12/09/17 15:54	1
Dibromofluoromethane (Surr)	102		70 - 120					12/09/17 15:54	1
1,2-Dichloroethane-d4 (Surr)	98		70 - 120					12/09/17 15:54	1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)										
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
Gasoline	ND		0.25	0.050	mg/L			12/12/17 13:48	1	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac	
4-Bromofluorobenzene (Surr)	93	-	58 - 133			-		12/12/17 13:48	1	
Trifluorotoluene (Surr)	97		77 - 128					12/12/17 13:48		

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Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73407-1

# Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-263136/5 **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA

Analysis Ratch: 263136

Analysis balch: 203130									
	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/09/17 13:27	1
	MB	MB							
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123					12/09/17 13:27	1
Toluene-d8 (Surr)	107		79 - 122					12/09/17 13:27	1
4-Bromofluorobenzene (Surr)	102		78 - 119					12/09/17 13:27	1
Dibromofluoromethane (Surr)	101		70 - 120					12/09/17 13:27	1
1,2-Dichloroethane-d4 (Surr)	99		70 - 120					12/09/17 13:27	1

**Client Sample ID: Lab Control Sample** Lab Sample ID: LCS 580-263136/6 **Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 263136** 

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzene 10.0 8.16 ug/L 82 37 - 151

LCS LCS Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 100 74 - 123 Toluene-d8 (Surr) 108 79 - 122 4-Bromofluorobenzene (Surr) 106 78 - 119 Dibromofluoromethane (Surr) 102 70 - 120 1,2-Dichloroethane-d4 (Surr) 97 70 - 120

Lab Sample ID: LCSD 580-263136/7 **Client Sample ID: Lab Control Sample Dup Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 263136** 

	Spike	LCSD	LCSD			%Rec.		RPD
Analyte	Added	Result	Qualifier U	Unit D	%Rec	Limits	RPD	Limit
Benzene	10.0	8.18		ug/L	82	37 - 151		30

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	103		74 - 123
Toluene-d8 (Surr)	103		79 - 122
4-Bromofluorobenzene (Surr)	102		78 - 119
Dibromofluoromethane (Surr)	101		70 - 120
1,2-Dichloroethane-d4 (Surr)	97		70 - 120

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

Lab Sample ID: MB 580-263163/1-A **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA **Analysis Batch: 263327 Prep Batch: 263163** 

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.00660	J	0.020	0.0020	ug/L		12/11/17 09:32	12/13/17 10:45	1
Chrysene	0.00715	J	0.020	0.0060	ug/L		12/11/17 09:32	12/13/17 10:45	1
Benzo[b]fluoranthene	ND		0.020	0.0080	ug/L		12/11/17 09:32	12/13/17 10:45	1

TestAmerica Seattle

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Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-73407-1 Project/Site: Chevron Edmonds Terminal

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

Lab Sample ID: MB 580-263163/1-A

**Matrix: Water** 

**Analysis Batch: 263327** 

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

**Prep Batch: 263163** 

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	0.00920	J	0.030	0.0090	ug/L		12/11/17 09:32	12/13/17 10:45	1
Benzo[a]pyrene	0.00606	J	0.020	0.0030	ug/L		12/11/17 09:32	12/13/17 10:45	1
Indeno[1,2,3-cd]pyrene	0.00833	J	0.020	0.0070	ug/L		12/11/17 09:32	12/13/17 10:45	1
Dibenz(a,h)anthracene	0.00783	J	0.020	0.0020	ug/L		12/11/17 09:32	12/13/17 10:45	1

MB MB

%Recovery Qualifier Limits Surrogate Prepared Analyzed Dil Fac 53 - 112 12/11/17 09:32 12/13/17 10:45 Terphenyl-d14 79

Lab Sample ID: LCS 580-263163/2-A

**Matrix: Water** 

**Analysis Batch: 263327** 

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

**Prep Batch: 263163** 

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzo[a]anthracene 4.00 3.65 ug/L 91 71 - 120 Chrysene 4.00 3.24 ug/L 81 64 - 120 4.00 4.35 Benzo[b]fluoranthene ug/L 109 66 - 120 Benzo[k]fluoranthene 4.00 4.43 68 - 120 ug/L 111 4.00 Benzo[a]pyrene 4.65 ug/L 116 76 - 120 Indeno[1,2,3-cd]pyrene 4.00 4.43 ug/L 111 63 - 120Dibenz(a,h)anthracene 4.00 4.54 ug/L 114 60 - 125

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 68 53 - 112

Lab Sample ID: LCSD 580-263163/3-A

**Matrix: Water** 

**Analysis Batch: 263327** 

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA **Prep Batch: 263163** 

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	3.97		ug/L		99	71 - 120	9	16
Chrysene	4.00	3.54		ug/L		89	64 - 120	9	16
Benzo[b]fluoranthene	4.00	4.64		ug/L		116	66 - 120	6	20
Benzo[k]fluoranthene	4.00	4.78		ug/L		120	68 - 120	8	20
Benzo[a]pyrene	4.00	4.92	*	ug/L		123	76 - 120	6	17
Indeno[1,2,3-cd]pyrene	4.00	4.77		ug/L		119	63 - 120	7	15
Dibenz(a,h)anthracene	4.00	5.00		ug/L		125	60 - 125	10	15

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 71 53 - 112

TestAmerica Seattle

12/13/2017

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73407-1

Client Sample ID: Method Blank

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

Lab Sample ID: MB 580-263121/6

**Matrix: Water** 

Analyte

Gasoline

**Analysis Batch: 263121** 

MB MB

Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 0.25  $\overline{\mathsf{ND}}$ 0.050 mg/L 12/08/17 22:30

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac 4-Bromofluorobenzene (Surr) 92 58 - 133 12/08/17 22:30 Trifluorotoluene (Surr) 109 77 - 128 12/08/17 22:30

Lab Sample ID: LCS 580-263121/7

**Matrix: Water** 

**Analysis Batch: 263121** 

**Client Sample ID: Lab Control Sample** 

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

Prep Type: Total/NA

Prep Type: Total/NA

LCS LCS Spike %Rec. **Analyte** Added Result Qualifier Unit Limits D %Rec 79 - 110 Gasoline 1.00 0.864 86 mg/L

LCS LCS

Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 58 - 133 92 103 77 - 128 Trifluorotoluene (Surr)

Lab Sample ID: LCSD 580-263121/8

**Matrix: Water** 

**Analysis Batch: 263121** 

LCSD LCSD RPD Spike Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Gasoline 1.00 0.900 mg/L

LCSD LCSD

%Recovery Qualifier Surrogate Limits 4-Bromofluorobenzene (Surr) 93 58 - 133 Trifluorotoluene (Surr) 108 77 - 128

Lab Sample ID: MB 580-263254/5

**Matrix: Water** 

**Analysis Batch: 263254** 

MB MB

Analyte RL **MDL** Unit Result Qualifier Prepared Dil Fac 0.25 Gasoline ND 0.050 mg/L 12/12/17 12:12

MB MB

Surrogate Qualifier Limits %Recovery Prepared Analyzed Dil Fac 4-Bromofluorobenzene (Surr) 93 58 - 133 12/12/17 12:12 Trifluorotoluene (Surr) 98 77 - 128

Lab Sample ID: LCS 580-263254/6

**Matrix: Water** 

Analysis Batch: 263254

- man <b>y</b>	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Gasoline	1.00	0.934		mg/L		93	79 - 110	 _

TestAmerica Seattle

Prep Type: Total/NA

%Rec.

79 - 110

Client Sample ID: Method Blank Prep Type: Total/NA

Analyzed

Prep Type: Total/NA

**Client Sample ID: Lab Control Sample** 

Project/Site: Chevron Edmonds Terminal

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC) (Continued)

Lab Sample ID: LCS 580-263254/6

**Matrix: Water** 

**Analysis Batch: 263254** 

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

LCS LCS

Surrogate	%Recovery Qualifie	r Limits
4-Bromofluorobenzene (Surr)	99	58 - 133
Trifluorotoluene (Surr)	99	77 - 128

Lab Sample ID: LCSD 580-263254/7 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 263254

Spike LCSD LCSD %Rec. RPD Analyte Added Result Qualifier Unit %Rec Limits RPD Limit 1.00 Gasoline 0.919 mg/L 92 79 - 110 2

LCSD LCSD

%Recovery Qualifier Surrogate Limits 4-Bromofluorobenzene (Surr) 100 58 - 133 Trifluorotoluene (Surr) 96 77 - 128

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

MB MB

Lab Sample ID: MB 580-262980/1-B

**Matrix: Water** 

**Analysis Batch: 263112** 

Prep Type: Total/NA

Prep Batch: 262980

Client Sample ID: Method Blank

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.10	0.019	mg/L		12/07/17 09:33	12/09/17 02:07	1
Motor Oil (>C24-C36)	ND		0.25	0.077	mg/L		12/07/17 09:33	12/09/17 02:07	1
	MB	МВ							

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac o-Terphenyl 82 50 - 150 12/07/17 09:33 12/09/17 02:07

Lab Sample ID: LCS 580-262980/2-B

**Matrix: Water** 

**Client Sample ID: Lab Control Sample** Prep Type: Total/NA **Analysis Batch: 263112** Prep Batch: 262980 Spike LCS LCS %Rec.

**Analyte** Added Result Qualifier %Rec Limits Unit D #2 Diesel (C10-C24) 2.00 1.79 90 59 - 112 mg/L Motor Oil (>C24-C36) 2.00 2.22 64 - 120 mg/L 111

LCS LCS

%Recovery Qualifier Limits Surrogate o-Terphenyl 50 - 150

Lab Sample ID: LCSD 580-262980/3-B

**Matrix: Water** 

Prep Type: Total/NA **Analysis Batch: 263112** Prep Batch: 262980 Spike LCSD LCSD %Rec. **RPD** Added Result Qualifier Unit %Rec Limits **RPD** 

Analyte Limit #2 Diesel (C10-C24) 2.00 1.80 90 16 ma/L 59 - 112 Motor Oil (>C24-C36) 2.00 2 19 mg/L 110 64 - 12017

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

# **QC Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73407-1

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

Lab Sample ID: LCSD 580-262980/3-B

**Matrix: Water** 

**Analysis Batch: 263112** 

LCSD LCSD

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

Prep Batch: 262980

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# **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Client Sample ID: Outfall-120517

TestAmerica Job ID: 580-73407-1

Lab Sample ID: 580-73407-1

Matrix: Water

Matrix: Water

Date Collected: 12/05/17 15:30 Date Received: 12/06/17 11:10

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1 -	263136	12/09/17 21:37	W1T	TAL SEA
Total/NA	Prep	3510C			263163	12/11/17 09:32	NDB	TAL SEA
Total/NA	Analysis	8270C SIM		1	263327	12/13/17 11:58	ERZ	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	263121	12/09/17 03:04	RSB	TAL SEA
Total/NA	Prep	3510C			262980	12/07/17 09:33	NDB	TAL SEA
Total/NA	Cleanup	3630C			263027	12/07/17 15:02	NDB	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	263112	12/09/17 03:11	ADB	TAL SEA

Client Sample ID: Trip Blank Lab Sample ID: 580-73407-2

Date Collected: 12/05/17 15:30 Matrix: Water

Date Received: 12/06/17 11:10

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	263136	12/09/17 15:54	W1T	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	263254	12/12/17 13:48	JCV	TAL SEA

### **Laboratory References:**

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

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TestAmerica Seattle

# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-73407-1

Project/Site: Chevron Edmonds Terminal

# **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	UST-022	03-02-18
ANAB	DoD ELAP		L2236	01-19-19
ANAB	ISO/IEC 17025		L2236	01-19-19
California	State Program	9	2901	01-31-18
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-18

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# **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73407-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-73407-1	Outfall-120517	Water	12/05/17 15:30	12/06/17 11:10
580-73407-2	Trip Blank	Water	12/05/17 15:30	12/06/17 11:10

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Short Hold

Chain o Custod

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Sample I.D. and Location/Description (Containers for each sample may be combined on one line)	Date	Time	Air	Sed.	Soil		Unpres.	HZS04	COMIL	NaOH	ZnAc/	Walch	2	38	280	0	5												
Outfall - 120517	12/05/17 1	530	λ	C			$\chi$		χ				X	Y		X	1			_	L			Ī					
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☐ Yes ☐ No Cooler Temp: ☐ Non-H.	lazard Identification azard □ Flamma	bie 🗆	Skin	Irritani	t [	□ Pa	ison E	3		Unkno	own	Samµ □ R		,					isal Bj ve Foi			//	Month					ed if san an 1 mo	
Turn Around Time Required (business days) □ 24 Hours □ 48 Hours 🗷 5 Days □ 10 Da	ys 🗌 15 Days	☐ Other					(	QC Re	quire	ments	s (Spe	cify)															<u> </u>	·	
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Comments												·								<del></del>		***************************************	***************************************						

Job Number: 580-73407-1

Login Number: 73407 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

Creator: Hobbs, Kenneth F		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



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: 580-73617-2

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

Kim hesley

Authorized for release by: 1/22/2018 4:34:30 PM

Kim Presley, Project Management Assistant I

(253)922-2310

kim.presley@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

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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.

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-2

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### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-2

Job ID: 580-73617-2

**Laboratory: TestAmerica Seattle** 

Narrative

CASE NARRATIVE
Client: ARCADIS U.S. Inc
Project: Chevron Edmonds Terminal

Report Number: 580-73617-1

Revision 1: January 22, 2018

Per Client email 1/22/2018, the Outfall #2 sample date has been reported seperately.

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 12/14/2017 3:40 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.2° C.

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.

#### **VOLATILE ORGANIC COMPOUNDS (GC-MS)**

Samples Outfall #002 (580-73617-1) and Trip Blank - 2 (580-73617-2) were analyzed for volatile organic compounds (GC-MS) in accordance with EPA Method 624. The samples were analyzed on 12/15/2017.

No 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 Outfall #002 (580-73617-1) was analyzed for semivolatile organic compounds - Selected Ion Mode (SIM) in accordance with EPA SW-846 Method 8270D SIM. The samples were prepared and analyzed on 12/18/2017.

Dibenz(a,h)anthracene and Indeno[1,2,3-cd]pyrene were detected in method blank MB 580-263608/1-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. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples were not performed.

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

### **GASOLINE RANGE ORGANICS (GRO)**

Samples Outfall #002 (580-73617-1) and Trip Blank - 2 (580-73617-2) were analyzed for gasoline range organics (GRO) in accordance with Method NWTPH-Gx. The samples were analyzed on 12/15/2017.

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

TestAmerica Seattle 1/22/2018

## **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-2

Job ID: 580-73617-2 (Continued)

**Laboratory: TestAmerica Seattle (Continued)** 

### **DIESEL AND MOTOR OIL RANGE ORGANICS**

Sample Outfall #002 (580-73617-1) was analyzed for diesel and motor oil range organics in accordance with Method NWTPH-Dx. The samples were prepared and analyzed on 12/19/2017.

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# **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-2

## **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	<b>Qualifier Description</b>
-----------	------------------------------

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

### **Glossary**

Abbreviation	These commonly used abbreviations may or may not be present in this report.								
n	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)

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TestAmerica Job ID: 580-73617-2

Client Sample ID: Outfall #002

Date Collected: 12/14/17 09:00 Date Received: 12/14/17 15:40 Lab Sample ID: 580-73617-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/15/17 19:37	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	103		74 - 123					12/15/17 19:37	1
Toluene-d8 (Surr)	97		79 - 122					12/15/17 19:37	1
4-Bromofluorobenzene (Surr)	103		78 - 119					12/15/17 19:37	1
Dibromofluoromethane (Surr)	103		70 - 120					12/15/17 19:37	1
1,2-Dichloroethane-d4 (Surr)	102		70 - 120					12/15/17 19:37	1

Method: 8270D SIM - Sem	ivolatile Organi	c Compou	inds (GC/MS	S SIM)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0039	J	0.021	0.0021	ug/L		12/18/17 09:31	12/18/17 15:32	1
Benzo[a]pyrene	0.0062	J	0.021	0.0031	ug/L		12/18/17 09:31	12/18/17 15:32	1
Benzo[b]fluoranthene	ND		0.021	0.0083	ug/L		12/18/17 09:31	12/18/17 15:32	1
Benzo[k]fluoranthene	ND		0.031	0.0093	ug/L		12/18/17 09:31	12/18/17 15:32	1
Chrysene	ND		0.021	0.0062	ug/L		12/18/17 09:31	12/18/17 15:32	1
Dibenz(a,h)anthracene	0.0078	JB	0.021	0.0021	ug/L		12/18/17 09:31	12/18/17 15:32	1
Indeno[1,2,3-cd]pyrene	0.0080	JB	0.021	0.0072	ug/L		12/18/17 09:31	12/18/17 15:32	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	74		53 - 112				12/18/17 09:31	12/18/17 15:32	1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)										
ı	Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Gasoline	ND		0.25	0.050	mg/L			12/15/17 17:51	1
	Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
	4-Bromofluorobenzene (Surr)	96		58 - 133					12/15/17 17:51	1
	Trifluorotoluene (Surr)	107		77 - 128					12/15/17 17:51	1

Analyte	Result C	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.028 J	J	0.10	0.020	mg/L		12/19/17 14:12	12/19/17 22:27	1
Motor Oil (>C24-C36)	ND		0.26	0.081	mg/L		12/19/17 14:12	12/19/17 22:27	1
Surrogate	%Recovery G	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	75	_	50 - 150				12/19/17 14:12	12/19/17 22:27	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Client Sample ID: Trip Blank - 2

Date Collected: 12/14/17 00:01

TestAmerica Job ID: 580-73617-2

Lab Sample ID: 580-73617-2

**Matrix: Water** 

Date Received: 12/14/17 15:40

Method: 624 - Volatile Orga	anic Compoun	ds (GC/MS	5)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/15/17 19:12	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	99		74 - 123			-		12/15/17 19:12	1
Toluene-d8 (Surr)	97		79 - 122					12/15/17 19:12	1
4-Bromofluorobenzene (Surr)	101		78 - 119					12/15/17 19:12	1
Dibromofluoromethane (Surr)	104		70 - 120					12/15/17 19:12	1
1.2-Dichloroethane-d4 (Surr)	102		70 - 120					12/15/17 19:12	1

Method: NWTPH-Gx - Northwe	est - Volatile	Petroleui	m Products	(GC)			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared
Casalina	ND		0.25	0.050			

 Analyte Gasoline	Result	Qualifier	RL 0.25	<b>MDL</b> 0.050	D	Prepared	Analyzed 12/15/17 17:19	Dil Fac
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		58 - 133		-		12/15/17 17:19	1
Trifluorotoluene (Surr)	100		77 - 128				12/15/17 17:19	1

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-2

## Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-263561/5

**Matrix: Water** 

Analyte

Benzene

Analysis Batch: 263561

Client Sample ID: Method Blank Prep Type: Total/NA

**Client Sample ID: Lab Control Sample** 

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

Prep Type: Total/NA

Prep Type: Total/NA

MB MB Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 1.0 0.42 ug/L 12/15/17 16:18 ND

MB MB Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Trifluorotoluene (Surr) 106 74 - 123 12/15/17 16:18 Toluene-d8 (Surr) 109 79 - 122 12/15/17 16:18 4-Bromofluorobenzene (Surr) 100 78 - 119 12/15/17 16:18 106 70 - 120 Dibromofluoromethane (Surr) 12/15/17 16:18 70 - 120 1,2-Dichloroethane-d4 (Surr) 102 12/15/17 16:18

Lab Sample ID: LCS 580-263561/6

**Matrix: Water** 

**Analysis Batch: 263561** 

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit %Rec Limits Benzene 10.0 10.5 ug/L 105 37 - 151

LCS LCS Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 118 74 - 123 94 79 - 122 Toluene-d8 (Surr) 4-Bromofluorobenzene (Surr) 101 78 - 119 105 70 - 120 Dibromofluoromethane (Surr) 1,2-Dichloroethane-d4 (Surr) 107 70 - 120

Lab Sample ID: LCSD 580-263561/7

**Matrix: Water** 

**Analysis Batch: 263561** 

LCSD LCSD RPD Spike %Rec. D %Rec **Analyte** Added Result Qualifier Unit Limits **RPD** Limit Benzene 10.0 11.0 ug/L 110 37 - 151

LCSD LCSD Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 100 74 - 123 Toluene-d8 (Surr) 96 79 - 122 4-Bromofluorobenzene (Surr) 104 78 - 119 Dibromofluoromethane (Surr) 101 70 - 120 99 70 - 120 1,2-Dichloroethane-d4 (Surr)

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

Lab Sample ID: MB 580-263608/1-A

**Matrix: Water** 

**Analysis Batch: 263640** 

Client Sample ID: Method Blank Prep Type: Total/NA **Prep Batch: 263608** MB MB

Result Qualifier RL **MDL** Unit Analyte Prepared Analyzed Dil Fac Benzo[a]anthracene ND 0.020 0.0020 ug/L 12/18/17 09:31 12/18/17 14:20 Benzo[a]pyrene ND 0.020 0.0030 ug/L 12/18/17 09:31 12/18/17 14:20 Benzo[b]fluoranthene ND 12/18/17 09:31 12/18/17 14:20 0.020 0.0080 ug/L

TestAmerica Seattle

Page 8 of 16 1/22/2018

TestAmerica Job ID: 580-73617-2

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

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

Lab Sample ID: MB 580-263608/1-A **Matrix: Water** 

**Analysis Batch: 263640** 

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

**Prep Batch: 263608** 

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.030	0.0090	ug/L		12/18/17 09:31	12/18/17 14:20	1
Chrysene	ND		0.020	0.0060	ug/L		12/18/17 09:31	12/18/17 14:20	1
Dibenz(a,h)anthracene	0.00486	J	0.020	0.0020	ug/L		12/18/17 09:31	12/18/17 14:20	1
Indeno[1,2,3-cd]pyrene	0.00727	J	0.020	0.0070	ug/L		12/18/17 09:31	12/18/17 14:20	1

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Terphenyl-d14 53 - 112 12/18/17 09:31 12/18/17 14:20 82

Lab Sample ID: LCS 580-263608/2-A **Matrix: Water** 

Analysis Batch: 263640

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

Prep Batch: 263608

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	3.62		ug/L		91	71 - 120	
Benzo[a]pyrene	4.00	4.58		ug/L		115	76 - 120	
Benzo[b]fluoranthene	4.00	4.43		ug/L		111	66 - 120	
Benzo[k]fluoranthene	4.00	4.49		ug/L		112	68 - 120	
Chrysene	4.00	3.12		ug/L		78	64 - 120	
Dibenz(a,h)anthracene	4.00	4.45		ug/L		111	60 - 125	
Indeno[1,2,3-cd]pyrene	4.00	4.08		ug/L		102	63 - 120	

LCS LCS

Surrogate %Recovery Qualifier Limits 53 - 112 Terphenyl-d14

Lab Sample ID: LCSD 580-263608/3-A

**Matrix: Water** 

Analysis Batch: 263640

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

**Prep Type: Total/NA Prep Batch: 263608** 

7									
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	3.62		ug/L		90	71 - 120	0	16
Benzo[a]pyrene	4.00	4.61		ug/L		115	76 - 120	1	17
Benzo[b]fluoranthene	4.00	4.43		ug/L		111	66 - 120	0	20
Benzo[k]fluoranthene	4.00	4.51		ug/L		113	68 - 120	0	20
Chrysene	4.00	3.15		ug/L		79	64 - 120	1	16
Dibenz(a,h)anthracene	4.00	4.50		ug/L		113	60 - 125	1	15
Indeno[1,2,3-cd]pyrene	4.00	4.38		ug/L		110	63 - 120	7	15

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 75 53 - 112

TestAmerica Seattle

TestAmerica Job ID: 580-73617-2

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-263564/5 Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 263564** 

MB MB Analyte Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 0.25 Gasoline  $\overline{\mathsf{ND}}$ 0.050 mg/L 12/15/17 15:44

MB MB %Recovery Surrogate Qualifier Limits Prepared Analyzed Dil Fac 4-Bromofluorobenzene (Surr) 95 58 - 133 12/15/17 15:44 Trifluorotoluene (Surr) 100 77 - 128 12/15/17 15:44

Lab Sample ID: LCS 580-263564/6

**Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

Analysis Batch: 263564

LCS LCS Spike %Rec. **Analyte** Added Result Qualifier %Rec Limits Unit D Gasoline 1.00 0.990 99 79 - 110 mg/L

LCS LCS Surrogate %Recovery Qualifier Limits 58 - 133 4-Bromofluorobenzene (Surr) 103 103 77 - 128 Trifluorotoluene (Surr)

Lab Sample ID: LCSD 580-263564/7 **Client Sample ID: Lab Control Sample Dup** Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 263564** 

RPD Spike LCSD LCSD %Rec. Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Gasoline 1.00 0.960 mg/L 79 - 110

LCSD LCSD %Recovery Qualifier Surrogate I imits 4-Bromofluorobenzene (Surr) 103 58 - 133 Trifluorotoluene (Surr) 97 77 - 128

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

75

Lab Sample ID: MB 580-263751/1-B Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 263776 Prep Batch: 263751** 

MB MB

Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac #2 Diesel (C10-C24) ND 0.10 12/19/17 14:12 12/19/17 21:21 0.019 mg/L Motor Oil (>C24-C36) ND 0.25 12/19/17 14:12 12/19/17 21:21 0.077 mg/L MB MB Qualifier Limits Dil Fac Surrogate %Recovery Prepared Analyzed

12/19/17 14:12 12/19/17 21:21 50 - 150 o-Terphenyl Lab Sample ID: LCS 580-263751/2-B **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 263776 Prep Batch: 263751** Spike LCS LCS %Rec. Added Analyte Result Qualifier Unit D %Rec Limits #2 Diesel (C10-C24) 2.00 1.83 mg/L 92 59 - 112

TestAmerica Seattle

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# **QC Sample Results**

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

Client: ARCADIS U.S. Inc

**Analysis Batch: 263776** 

**Analysis Batch: 263776** 

**Matrix: Water** 

Motor Oil (>C24-C36)

**Matrix: Water** 

Analyte

Project/Site: Chevron Edmonds Terminal

Lab Sample ID: LCS 580-263751/2-B

Lab Sample ID: LCSD 580-263751/3-B

TestAmerica Job ID: 580-73617-2

**Client Sample ID: Lab Control Sample** 

**Prep Type: Total/NA** 

**Prep Batch: 263751** 

Spike LCS LCS Result Qualifier Limits Unit D %Rec

%Rec.

Added 2.00 2.13 mg/L 106 64 - 120

LCS LCS

Surrogate %Recovery Qualifier Limits o-Terphenyl 84 50 - 150

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

**Prep Type: Total/NA Prep Batch: 263751** 

%Rec. **RPD** RPD Limits Limit

LCSD LCSD Spike Analyte Added Result Qualifier Unit D %Rec 2.00 1.83 mg/L 16 #2 Diesel (C10-C24) 91 59 - 112 0 2.00 Motor Oil (>C24-C36) 2.17 mg/L 109 64 - 120 2 17

LCSD LCSD

Surrogate %Recovery Qualifier Limits 50 - 150 o-Terphenyl 91

# **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-2

Lab Sample ID: 580-73617-1

Matrix: Water

Client Sample ID: Outfall #002 Date Collected: 12/14/17 09:00

Date Received: 12/14/17 15:40

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	263561	12/15/17 19:37	P1P	TAL SEA
Total/NA	Prep	3510C			263608	12/18/17 09:31	NDB	TAL SEA
Total/NA	Analysis	8270D SIM		1	263640	12/18/17 15:32	TL1	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	263564	12/15/17 17:51	JCV	TAL SEA
Total/NA	Prep	3510C			263751	12/19/17 14:12	NDB	TAL SEA
Total/NA	Cleanup	3630C			263772	12/19/17 16:39	NDB	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	263776	12/19/17 22:27	ADB	TAL SEA

Client Sample ID: Trip Blank - 2 Lab Sample ID: 580-73617-2

Date Collected: 12/14/17 00:01 Matrix: Water

Date Collected: 12/14/17 00:01 Matrix: Water Date Received: 12/14/17 15:40

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	263561	12/15/17 19:12	P1P	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	263564	12/15/17 17:19	JCV	TAL SEA

### **Laboratory References:**

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

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# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-73617-2

Project/Site: Chevron Edmonds Terminal

# **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	UST-022	03-02-18
ANAB	DoD ELAP		L2236	01-19-19
ANAB	ISO/IEC 17025		L2236	01-19-19
California	State Program	9	2901	01-31-18
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-18

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# **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-73617-1	Outfall #002	Water	12/14/17 09:00	12/14/17 15:40
580-73617-2	Trip Blank - 2	Water	12/14/17 00:01	12/14/17 15:40

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### TestAmerica Seattle

5755 8th Street East Tacoma, WA 98424

# **Chain of Custody Record**



THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Evi C					ker, Elaine M						Carrier Tracking No(s):					580-	COC No: 580-27035-8908.1		
Client Contact: Jason Little	Phone: 7 2 C 1 T 1/12				ail: ine.walker@testamericainc.com													Page: Page 1 of 1		
Company: ARCADIS U.S. Inc		· · · · · · · · · · · · · · · · · · ·									Rea	ueste	d				Job#		73617	
Address:	Due Date Request	ed:							1	,			T				Pres	ervation C	<del></del>	
1100 Olive Way Suite 800	TAT Paguestad (d																A - H B - N		M - Hexane	
Dity: Seattle	- Fivedays	TAT Requested (days):															C - Z	n Acelate	N - None O - AsNaO2	
State, Zip: WA, 98101	FILEDAY.	,									0						E - N	itric Acid aHSO4	P - Na2O4S Q - Na2SO3	
Phone:	PO #:			<del></del>	11			2	-	. (5	7	l					F-M G-A	eOH mchlor	R - Na2S2O3 S - H2SO4	
206-726-4720(Tel) Email:	B0045362.0010 W0#:	B0045362.0010			2		စ္က	1.7	4	10	2						H - A	scorbic Acid	T - TSP Dodecal U - Acetone	hydra
Jason,Little@arcadis.com	0015254061				<u>`</u>		NO/R	100	5	4	1 1						J - DI K - EI	Water DTA	V - MCAA W - pH 4-5	
Project Name: Chevron Edmonds Terminal	Project #: 58011413					t. Dr		2 -	. 1	1						L-E		Z - other (specify	/)	
Site:	SSOW#:				Sample (Yes or No SD (Yes or NO)	4s	hwes	ŏ, >	10		1 1						Other	:		
Washington		1	T	I	18 E	сРАН	Nort		1 -	024	Has					3		***************************************		
			Sample Type	Matrix (wewater		SIM	ă,	M. NWTP!	×		2					1				
		Sample	(C=comp,	S=solid, O=waste/oil,		8270C_	NWTPH_Dx - Northwest - DRO/RRO	624_Smi, NWTPH_GX	BTEX	TPH	Fixed						ē			
Sample Identification	Sample Date	Time	the state of the s	BT=Tissue, A=Air ation Code:		2 (SS 2 (SS C)	为型双级	\$100 EST	, 12	ļ	12							Special	Instructions/No	te:
			,		<del>M</del>	N V	$\diamondsuit$	$\star$	+							/-	D.	- 0	n.7	AND COURSE
Outfail # 002	12/14/17	0900	5	Water	₩.	X,	$\Delta$	X/X	+		$\vdash$	$\perp$	-	$\vdash$			144	\= 8.	02	
Trop blank	-		<u> </u>	Water	Ц			$\Delta \lambda$	$\searrow$											
				Water																
USP 801	12/14/17	0935	6	Air	П				X	X	X.						р	D =	301.5 PA	)W
V5780Z	12/14/17	1 -	1	Air					$\nabla$	X	X						Ρi	n = (	O. I ppm	
437, 00 =		0.7.15	<u> </u>	7.					<del>-/-`</del>	7			1		$\dashv$			<b></b>	<del></del>	
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Possible Hazard Identification					\$a					may					s are				1 month)	
Non-Hazard Flammable Skin Irritant Pe	oison B Unkr	nown	Radiologica	1	- e -	Re	eturn	To Cli	ent	oquire	Di:	sposal	By La	b	٠	Arc	chive Fo	)r	Months	
Deliverable Requested: I, II, III, IV, Other (specify)							115110	CUO/15	QC I	equire	JANCI K									
Empty Kit Relinquished by:		Date:			Time:			1				Ме	hod of		ent:	,			10	
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Relinquished by:	Date/Time:	121		Company		Recei	ved by		····		<u> </u>	<del>)                                    </del>		Date/T					Company	·
Control Control						Cont	, Ta	0.504	(c) °C -	and Oak	or Dan	arke:		<u> </u>						
Custody Seals Intact: Custody Seal No.:						Coole	riemp	erature	(s) Ca	na Oth	er Rem	arks:								

Job Number: 580-73617-2

Login Number: 73617 List Source: TestAmerica Seattle

List Number: 1

Creator: Blankinship, Tom X

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	The air samples may exceed hold time by the time they're analyzed.
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	



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: 580-73804-2

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

Kim hesley

Authorized for release by: 1/23/2018 10:37:37 AM Kim Presley, Project Management Assistant I (253)922-2310 kim.presley@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

----- LINKS -----

Review your project results through

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**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-2

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## **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-2

Job ID: 580-73804-2

**Laboratory: TestAmerica Seattle** 

**Narrative** 

Job Narrative 580-73804-1

#### Revision 1: January 23, 2018

Per client email 1/22/18, the outfall #2 sample data has been reported seperately.

#### Receipt

Two samples were received on 12/21/2017 1:55 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.2° C.

#### **GC/MS VOA**

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

#### GC/MS Semi VOA

Method(s) 8270C SIM, 8270D SIM: The method blank for preparation batch 580-263972 and 580-263972 and analytical batch 580-264077 contained Benzo[a]anthracene, Benzo[a]pyrene, and Dibenz(a,h)anthracene above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

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

#### GC Semi VOA

Method(s) NWTPH-Dx: The method blank for preparation batch 580-264046 and 580-264100 and analytical batch 580-264112 contained #2 Diesel (C10-C24) above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

Method(s) NWTPH-Dx: 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: Outfall #002 (580-73804-1).

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

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## **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-2

### **Qualifiers**

### GC/MS Semi VOA

Qualifier	Qualifier Description
В	Compound was found in the blank and sample.

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

#### **GC Semi VOA**

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.

## **Glossary**

MDA

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)

Minimum Detectable Activity (Radiochemistry) MDC Minimum Detectable Concentration (Radiochemistry) MDL Method Detection Limit

Minimum Level (Dioxin) ML NC Not Calculated

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

**PQL Practical Quantitation Limit** 

**Quality Control** QC

**RER** Relative Error Ratio (Radiochemistry)

Reporting Limit or Requested Limit (Radiochemistry) RL

**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 Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-2

Lab Sample ID: 580-73804-1

**Matrix: Water** 

Client Sample ID: Outfall #002 Date Collected: 12/20/17 16:00 Date Received: 12/21/17 13:55

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND ND		1.0	0.42	ug/L			12/27/17 23:44	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123					12/27/17 23:44	1
Toluene-d8 (Surr)	101		79 - 122					12/27/17 23:44	1
4-Bromofluorobenzene (Surr)	96		78 - 119					12/27/17 23:44	1
Dibromofluoromethane (Surr)	100		70 - 120					12/27/17 23:44	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 120					12/27/17 23:44	1
- Method: 8270C SIM - Semi	volatile Organi	c Compou	nds (GC/MS	SIM)					
Analyte	_	Qualifier	` RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0038	J B	0.021	0.0021	ug/L		12/21/17 14:55	12/26/17 13:42	1
Chrysene	ND		0.021	0.0063	ua/l		12/21/17 14:55	12/26/17 12:42	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0038	JB	0.021	0.0021	ug/L		12/21/17 14:55	12/26/17 13:42	1
Chrysene	ND		0.021	0.0063	ug/L		12/21/17 14:55	12/26/17 13:42	1
Benzo[b]fluoranthene	ND		0.021	0.0084	ug/L		12/21/17 14:55	12/26/17 13:42	1
Benzo[k]fluoranthene	ND		0.032	0.0095	ug/L		12/21/17 14:55	12/26/17 13:42	1
Benzo[a]pyrene	ND		0.021	0.0032	ug/L		12/21/17 14:55	12/26/17 13:42	1
Indeno[1,2,3-cd]pyrene	ND		0.021	0.0074	ug/L		12/21/17 14:55	12/26/17 13:42	1
Dibenz(a,h)anthracene	ND		0.021	0.0021	ug/L		12/21/17 14:55	12/26/17 13:42	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	78		53 - 112				12/21/17 14:55	12/26/17 13:42	1

Method: NWTPH-Gx - Northw Analyte Gasoline		Qualifier	m Products ( RL 0.25	GC) MDL 0.050	 <u>D</u>	Prepared	Analyzed 12/23/17 18:24	Dil Fac
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		58 - 133				12/23/17 18:24	1
Trifluorotoluene (Surr)	109		77 - 128				12/23/17 18:24	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.081	JB	0.10	0.019	mg/L		12/22/17 13:07	12/26/17 21:54	1
Motor Oil (>C24-C36)	ND		0.26	0.079	mg/L		12/22/17 13:07	12/26/17 21:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	81		50 - 150				12/22/17 13:07	12/26/17 21:54	1
n-Decanoic Acid (Surr)							12/22/17 13:07	12/26/17 21:54	1

1/23/2018

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-2

Lab Sample ID: 580-73804-2

Matrix: Water

Client Sample ID: Trip Blank Date Collected: 12/20/17 00:01

Date Received: 12/21/17 13:55

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/27/17 23:15	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	98		74 - 123					12/27/17 23:15	1
Toluene-d8 (Surr)	101		79 - 122					12/27/17 23:15	1
4-Bromofluorobenzene (Surr)	100		78 - 119					12/27/17 23:15	1
Dibromofluoromethane (Surr)	99		70 - 120					12/27/17 23:15	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 120					12/27/17 23:15	1

Method: NWTPH-Gx - North	nwest - Volatile	Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			12/23/17 16:49	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		58 - 133			=		12/23/17 16:49	1
Trifluorotoluene (Surr)	97		77 - 128					12/23/17 16:49	

1/23/2018

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Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-2

Client Sample ID: Lab Control Sample

## Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-264164/13

**Matrix: Water** 

Analyte

Benzene

Analysis Batch: 264164

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 1.0 0.42 ug/L 12/27/17 17:04 ND

MB MB Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Trifluorotoluene (Surr) 100 74 - 123 12/27/17 17:04 Toluene-d8 (Surr) 101 79 - 122 12/27/17 17:04 4-Bromofluorobenzene (Surr) 104 78 - 119 12/27/17 17:04 100 70 - 120 Dibromofluoromethane (Surr) 12/27/17 17:04 70 - 120 1,2-Dichloroethane-d4 (Surr) 102 12/27/17 17:04

Lab Sample ID: LCS 580-264164/14

**Matrix: Water** 

**Analysis Batch: 264164** 

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzene 10.0 9.51 ug/L 95 37 - 151

LCS LCS Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 100 74 - 123 104 79 - 122 Toluene-d8 (Surr) 4-Bromofluorobenzene (Surr) 103 78 - 119 99 70 - 120 Dibromofluoromethane (Surr) 1,2-Dichloroethane-d4 (Surr) 101 70 - 120

Lab Sample ID: LCSD 580-264164/15

**Matrix: Water** 

**Analysis Batch: 264164** 

LCSD LCSD RPD Spike %Rec. D %Rec **Analyte** Added Result Qualifier Unit Limits **RPD** Benzene 10.0 10.4 ug/L 104 37 - 151

LCSD LCSD Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 99 74 - 123 Toluene-d8 (Surr) 106 79 - 122 105 78 - 119 4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr) 102 70 - 120 102 70 - 120 1,2-Dichloroethane-d4 (Surr)

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

**Matrix: Water** 

Lab Sample ID: MB 580-263972/1-A Client Sample ID: Method Blank Prep Type: Total/NA **Analysis Batch: 264077 Prep Batch: 263972** MD MD

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.00697	J	0.020	0.0020	ug/L		12/21/17 14:17	12/22/17 20:52	1
Chrysene	ND		0.020	0.0060	ug/L		12/21/17 14:17	12/22/17 20:52	1
Benzo[b]fluoranthene	ND		0.020	0.0080	ug/L		12/21/17 14:17	12/22/17 20:52	1

TestAmerica Seattle

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

Prep Type: Total/NA

Prep Type: Total/NA

Project/Site: Chevron Edmonds Terminal

Client: ARCADIS U.S. Inc

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

Lab Sample ID: MB 580-263972/1-A Client Sample ID: Method Blank **Matrix: Water Prep Type: Total/NA Prep Batch: 263972 Analysis Batch: 264077** 

	МВ	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.030	0.0090	ug/L		12/21/17 14:17	12/22/17 20:52	1
Benzo[a]pyrene	0.00499	J	0.020	0.0030	ug/L		12/21/17 14:17	12/22/17 20:52	1
ndeno[1,2,3-cd]pyrene	ND		0.020	0.0070	ug/L		12/21/17 14:17	12/22/17 20:52	1
Dibenz(a,h)anthracene	0.00462	J	0.020	0.0020	ug/L		12/21/17 14:17	12/22/17 20:52	1
	Analyte Benzo[k]fluoranthene Benzo[a]pyrene ndeno[1,2,3-cd]pyrene Dibenz(a,h)anthracene	Analyte         Result           Benzo[k]fluoranthene         ND           Benzo[a]pyrene         0.00499           ndeno[1,2,3-cd]pyrene         ND	Benzo[k]fluoranthene         ND           Benzo[a]pyrene         0.00499 J           ndeno[1,2,3-cd]pyrene         ND	Analyte         Result ND         Qualifier Qualifier         RL Qualifier           Benzo[k]fluoranthene         ND         0.030           Benzo[a]pyrene         0.00499         J         0.020           Indeno[1,2,3-cd]pyrene         ND         0.020	Analyte         Result Benzo[k]fluoranthene         Qualifier         RL ND         MDL 0.030         0.0090           Benzo[a]pyrene         0.00499         J 0.020         0.0030           ndeno[1,2,3-cd]pyrene         ND 0.020         0.0070	Analyte         Result Benzo[k]fluoranthene         Qualifier         RL ND         MDL Unit Unit Unit Unit Unit Unit Unit Unit	Analyte         Result Benzo[k]fluoranthene         Qualifier         RL ND         MDL Unit Unit Unit Unit Unit Unit Unit Unit	Analyte         Result Benzo[k]fluoranthene         Qualifier         RL ND         MDL Unit Unit Unit Unit Unit Unit Unit Unit	Analyte         Result Benzo[k]fluoranthene         ND         Unit Unit Unit Unit Unit Unit Unit Unit

MB MB %Recovery Qualifier Limits Surrogate Prepared Analyzed Dil Fac 12/21/17 14:17 12/22/17 20:52 53 - 112 Terphenyl-d14 81

Lab Sample ID: LCS 580-263972/2-A

**Analysis Batch: 264077** 

**Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA **Prep Batch: 263972** Spike LCS LCS %Rec.

							,	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	3.35		ug/L		84	71 - 120	
Chrysene	4.00	3.32		ug/L		83	64 - 120	
Benzo[b]fluoranthene	4.00	3.38		ug/L		84	66 - 120	
Benzo[k]fluoranthene	4.00	3.39		ug/L		85	68 - 120	
Benzo[a]pyrene	4.00	3.54		ug/L		88	76 - 120	
Indeno[1,2,3-cd]pyrene	4.00	3.30		ug/L		83	63 - 120	
Dibenz(a,h)anthracene	4.00	3.28		ug/L		82	60 - 125	

LCS LCS Surrogate %Recovery Qualifier Limits Terphenyl-d14 66 53 - 112

Lab Sample ID: LCSD 580-263972/3-A

**Analysis Batch: 264077** 

**Matrix: Water** 

Spike LCSD LCSD %Rec. **RPD** Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Benzo[a]anthracene 4.00 3.92 ug/L 98 71 - 120 16 16 Chrysene 4.00 3.90 64 - 120 ug/L 98 16 16 Benzo[b]fluoranthene 4.00 3.90 ug/L 97 66 - 120 14 20 4.00 ug/L Benzo[k]fluoranthene 3.97 99 68 - 120 16 20 4.00 4.15 104 76 - 120 17 Benzo[a]pyrene ug/L Indeno[1,2,3-cd]pyrene 4.00 3.80 ug/L 95 63 - 12014 15 Dibenz(a,h)anthracene 4.00 3.82 ug/L 96 60 - 125 15 15

LCSD LCSD Surrogate %Recovery Qualifier Limits 53 - 112 Terphenyl-d14 77

TestAmerica Seattle

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

Prep Batch: 263972

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

MD MD

Lab Sample ID: MB 580-264086/5 Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 264086** 

	IVID	IAID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			12/23/17 15:14	1
	МВ	MB							

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac 58 - 133 4-Bromofluorobenzene (Surr) 90 12/23/17 15:14 97 Trifluorotoluene (Surr) 77 - 128 12/23/17 15:14

Lab Sample ID: LCS 580-264086/6

**Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA Analysis Batch: 264086

		Spike	LCS	LCS				%Rec.	
Analyte		Added	Result	Qualifier	Unit	D	%Rec	Limits	
Gasoline	 	1.00	1.01		mg/L		101	79 - 110	

LCS LCS Limits Surrogate %Recovery Qualifier 4-Bromofluorobenzene (Surr) 58 - 133 99 Trifluorotoluene (Surr) 105 77 - 128

Lab Sample ID: LCSD 580-264086/7 **Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA** 

**Matrix: Water** 

**Analysis Batch: 264086** 

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Gasoline	1.00	0.929		ma/L	_	93	79 - 110	9	10

LCSD LCSD %Recovery Qualifier Surrogate I imits 4-Bromofluorobenzene (Surr) 100 58 - 133 Trifluorotoluene (Surr) 94 77 - 128

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

Lab Sample ID: MB 580-264046/1-B Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 264112** Prep Batch: 264046

MB MB Analyte Result Qualifier RL **MDL** Unit **Prepared** Analyzed Dil Fac #2 Diesel (C10-C24) 0.0426 0.10 12/22/17 13:07 12/26/17 20:55 J 0.019 mg/L Motor Oil (>C24-C36) ND 0.25 12/22/17 13:07 12/26/17 20:55 0.077 mg/L MB MB

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	84		50 - 150	12/22/17 13:07	12/26/17 20:55	1
n-Decanoic Acid (Surr)				12/22/17 13:07	12/26/17 20:55	1

TestAmerica Seattle

1/23/2018

# **QC Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-2

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

Lab Sample ID: LCS 580-2 Matrix: Water Analysis Batch: 264112	264046/2-B					Clie	nt Sa	mple ID	Prep Type: Total/NA Prep Batch: 264046
			Spike	LCS	LCS				%Rec.
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits
#2 Diesel (C10-C24)			2.00	1.82		mg/L		91	59 - 112
Motor Oil (>C24-C36)			2.00	2.09		mg/L		105	64 - 120
	LCS	LCS							
Surrogate	%Recovery	Qualifier	Limits						
o-Terphenyl	89		50 - 150						

Lab Sample ID: LCSD 580-264046/3-B Matrix: Water Analysis Batch: 264112			(	Client Sa	ample	ID: Lat	Control   Prep Ty   Prep Ba	pe: Tot	al/NA
_	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
#2 Diesel (C10-C24)	2.00	1.80		mg/L		90	59 - 112	1	16
Motor Oil (>C24-C36)	2.00	1.97		mg/L		98	64 - 120	6	17

LCSD LCSD Surrogate %Recovery Qualifier Limits o-Terphenyl 85 50 - 150

1/23/2018

## **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-2

Lab Sample ID: 580-73804-1

Matrix: Water

Client Sample ID: Outfall #002 Date Collected: 12/20/17 16:00

Date Received: 12/21/17 13:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	264164	12/27/17 23:44	HDK	TAL SEA
Total/NA	Prep	3510C			263972	12/21/17 14:55	APR	TAL SEA
Total/NA	Analysis	8270C SIM		1	264105	12/26/17 13:42	TL1	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	264086	12/23/17 18:24	JCV	TAL SEA
Total/NA	Prep	3510C			264046	12/22/17 13:07	REY	TAL SEA
Total/NA	Cleanup	3630C			264100	12/26/17 09:03	REY	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	264112	12/26/17 21:54	T1W	TAL SEA

Client Sample ID: Trip Blank Lab Sample ID: 580-73804-2

Date Collected: 12/20/17 00:01 Matrix: Water

Date Received: 12/21/17 13:55

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624	· ·	1	264164	12/27/17 23:15	HDK	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	264086	12/23/17 16:49	JCV	TAL SEA

**Laboratory References:** 

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

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# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-73804-2

Project/Site: Chevron Edmonds Terminal

# **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	<b>Expiration Date</b>
Alaska (UST)	State Program	10	UST-022	03-02-18
ANAB	DoD ELAP		L2236	01-19-19
ANAB	ISO/IEC 17025		L2236	01-19-19
California	State Program	9	2901	01-31-18
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-18

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# **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-73804-1	Outfall #002	Water	12/20/17 16:00	12/21/17 13:55
580-73804-2	Trip Blank	Water	12/20/17 00:01	12/21/17 13:55

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**TestAmerica Seattle** 

5755 8th Street East

Loc: 580 73804

## **Chain of Custody Record**

<u>TestAmerica</u>

Tacoma, WA 98424 Phone (253) 922-2310 Fax (253) 922-5047				Slody R	ecor	a								50/20/C/()			NTAL TESTING
Client Information	Sampler: Bric Phone: 303 -	Kruc	ejer	Lab P Walk	Рм: lker, Elain	ne M	_			ľ	Carrier Trac	cking No(s):		COC No: 580-270	035-890	J8.1	
Client Contact: Jason Little	Phone: 303 -	-519-7	1192	E-Mail elain	ail: ne.walker	r@test	ameri	icainc.	.com					Page: Page 1			
Company: ARCADIS U.S. Inc										s Req	uested	******		Job #:		***************************************	
Address: 1100 Olive Way Suite 800	Due Date Request	ted:				$\Box$	T		1	<del></del>					ation Co	des:	<del>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</del>
City: Seattle State, Zip: WA, 98101		days): lays						-	-15)	1 7 1				A - HCL B - NaOH C - Zn Ad D - Nitric E - NaHS	cetate : Acid SO4	M - Hexani N - None O - AsNaC P - Na2O4 O - Na2SC	02 4S 03
Phone: 206-726-4720(Tel)	PO#: B0045362.0010	0			3			429	7/2	1 ;	.			F - MeOh G - Amch H - Ascor	hlor	R - Na2S2 S - H2SO4 T - TSP Do	
<sup>Email:</sup> Jason.Little@arcadis.com	WO#: 0015254061				<b>2</b>	- DRO/RRO		EA.	1 - to	Mc+16.				i-lce J-DIWa	ater	U - Aceton V - MCAA	ne
Project Name: Chevron Edmonds Terminal	Project #: 58011413		***************************************		N.	t- DR(	.   '	<u>"</u>	× 5	- I 🔍 J				K - EDTA	•	W - pH 4-5 Z - other (s	
Site: Washington	SSOW#:					.Hs rthwes	ğ	1 0 1	スピンして	200				Other:			
Sample Identification	Sample Date	Sample Time		(W≔water, S=solid, O≃waste/oil, BT=Yissue, A≃Air)	Tald Firered S	8270C_SIM - cPAHs NWTPH_Dx - Northwest	624_5ml, NWTPH_Gx	Benzen	87万× ( 1Pr 4が)	D NX I				Foral Number o	pecial Ir	nstructions	s/Note:
Ourfall #1002	12/20/17	200		ation Code:     Water	<b>PY</b>	H	$\biguplus$	<del>[//</del>	4	+	+	11	42	X PFI	.,,0	~	
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568-45N	12/20/17	1645	6	·	H	+	+	<del> </del>	<del></del>	<del> </del> *+	++			4.GA3			12.7
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Non-Hazard Flammable Skin Irritant Poise Deliverable Requested: I, II, III, IV, Other (specify)	on B ' Unkn	own F	Radiological	<u>/</u>		<sup>J</sup> <i>Return</i> ial Instr			Requir	Dis ements	posal By	Lab	Arc	chive For_		Months	S
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<del>----1/23</del>/2018

Client: ARCADIS U.S. Inc

Job Number: 580-73804-2

Login Number: 73804 List Source: TestAmerica Seattle

List Number: 1

Creator: Gall, Brandon A

Creator. Gail, Braildon A		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td>Lab does not accept radioactive samples.</td>	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	N/A	Not present
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	



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: 580-73946-2 Client Project/Site: Edmonds Terminal

#### For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

Kim hesley

Authorized for release by: 1/23/2018 11:13:26 AM Kim Presley, Project Management Assistant I (253)922-2310 kim.presley@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

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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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73946-2

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### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73946-2

Job ID: 580-73946-2

**Laboratory: TestAmerica Seattle** 

Narrative

Job Narrative 580-73946-1

#### Revision 1: January 23, 2018

Per client email 1/22/18, the outfall #2 sample data has been reported separately.

#### Receipt

Two samples were received on 12/28/2017 2:55 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was -0.4° C.

#### GC/MS VOA

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

#### GC/MS Semi VOA

Method(s) 8270C SIM, 8270D SIM: The method blank for preparation batch 580-264392 and analytical batch 580-264418 contained Benzo[a]anthracene above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

Method(s) 8270C SIM: The following sample was diluted due to the nature of the sample matrix: Outfall #002 (580-73946-1). Elevated reporting limits (RLs) are provided.

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

#### GC Semi VOA

Method(s) NWTPH-Dx: The method blank for preparation batch 580-264464 and 580-264557 and analytical batch 580-264663 contained DRO (C10-C24) above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

Method(s) NWTPH-Dx: 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: Outfall #002 (580-73946-1).

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

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

#### Organic Prep

Method(s) 3510C: The following sample formed emulsions during the extraction procedure: Outfall #002 (580-73946-1) extracting for 8270\_SIM using 3510C\_LVI. The emulsions required additional sodium sulfate in the funnel filter and additional DCM rinses.

Method(s) 3510C: The following sample formed emulsions during the extraction procedure: Outfall #002 (580-73946-1) extracting for NWTPH\_Dx using 3510C\_LVI. The emulsions required additional DCM rinses and additional sodium sulfate in the funnel filter during pour-offs.

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

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## **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73946-2

### **Qualifiers**

#### **GC/MS Semi VOA**

Qualifier **Qualifier Description** 

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

#### GC Semi VOA

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.

## **Glossary**

DL

DLC

DL, RA, RE, IN

Abbreviation	These commonly used abbreviations may or may not be present in this report.
n	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

Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample

**EDL** Estimated Detection Limit (Dioxin) LOD Limit of Detection (DoD/DOE) LOQ Limit of Quantitation (DoD/DOE)

Detection Limit (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)

Decision Level Concentration (Radiochemistry)

**PQL Practical Quantitation Limit** 

**Quality Control** QC

**RER** Relative Error Ratio (Radiochemistry)

Reporting Limit or Requested Limit (Radiochemistry) RL

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

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

TestAmerica Seattle

Client Sample ID: Outfall #002

Date Collected: 12/28/17 10:20 Date Received: 12/28/17 14:55 Lab Sample ID: 580-73946-1

Matrix: Water

Method: 624 - Volatile Orga	•	•	•			_			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			01/03/18 17:02	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	91		74 - 123			-		01/03/18 17:02	1
Toluene-d8 (Surr)	105		79 - 122					01/03/18 17:02	1
4-Bromofluorobenzene (Surr)	101		78 - 119					01/03/18 17:02	1
Dibromofluoromethane (Surr)	91		70 - 120					01/03/18 17:02	1
1,2-Dichloroethane-d4 (Surr)	100		70 - 120					01/03/18 17:02	1

Method: 8270C SIM - Ser	nivolatile Organi	c Compou	nds (GC/MS	S SIM)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.22	0.022	ug/L		01/02/18 09:08	01/02/18 17:55	10
Chrysene	ND		0.22	0.067	ug/L		01/02/18 09:08	01/02/18 17:55	10
Benzo[b]fluoranthene	ND		0.22	0.089	ug/L		01/02/18 09:08	01/02/18 17:55	10
Benzo[k]fluoranthene	ND		0.33	0.10	ug/L		01/02/18 09:08	01/02/18 17:55	10
Benzo[a]pyrene	ND		0.22	0.033	ug/L		01/02/18 09:08	01/02/18 17:55	10
Indeno[1,2,3-cd]pyrene	ND		0.22	0.078	ug/L		01/02/18 09:08	01/02/18 17:55	10
Dibenz(a,h)anthracene	ND		0.22	0.022	ug/L		01/02/18 09:08	01/02/18 17:55	10
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	82		53 - 112				01/02/18 09:08	01/02/18 17:55	10

Method: NWTPH-Gx - Northw	est - Volatile Pet	troleum Products	(GC)				
Analyte	Result Qua	lifier RL	MDL Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND	0.25	0.050 mg/L			01/02/18 16:21	1
Surrogate	%Recovery Qua	lifier Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93	58 - 133				01/02/18 16:21	1
Trifluorotoluene (Surr)	98	77 - 128				01/02/18 16:21	1

Method: NWTPH-Dx - Norti			roleum Prod	•	•				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.077	JB	0.11	0.021	mg/L		01/03/18 08:30	01/05/18 13:59	1
Motor Oil (>C24-C36)	0.19	J	0.27	0.085	mg/L		01/03/18 08:30	01/05/18 13:59	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	75		50 - 150				01/03/18 08:30	01/05/18 13:59	1
n-Decanoic Acid (Surr)							01/03/18 08:30	01/05/18 13:59	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73946-2

Lab Sample ID: 580-73946-2

**Matrix: Water** 

Client Sample ID: Trip Blank Date Collected: 12/28/17 00:01

Date Received: 12/28/17 14:55

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			01/02/18 17:32	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	95		74 - 123					01/02/18 17:32	1
Toluene-d8 (Surr)	106		79 - 122					01/02/18 17:32	1
4-Bromofluorobenzene (Surr)	101		78 - 119					01/02/18 17:32	1
Dibromofluoromethane (Surr)	91		70 - 120					01/02/18 17:32	1
1,2-Dichloroethane-d4 (Surr)	96		70 - 120					01/02/18 17:32	1

Analyte	hwest - Volatile   Result (		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND ND		0.25	0.050	mg/L		<u> </u>	12/29/17 21:48	1
Surrogate	%Recovery 0	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		58 - 133			-		12/29/17 21:48	1
								12/29/17 21:48	

1/23/2018

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Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

## Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-264427/5

**Matrix: Water** 

**Analysis Batch: 264427** 

Analyte

Benzene

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 1.0 0.42 ug/L 01/02/18 15:38 ND

MB MB Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Trifluorotoluene (Surr) 97 74 - 123 01/02/18 15:38 Toluene-d8 (Surr) 105 79 - 122 01/02/18 15:38 4-Bromofluorobenzene (Surr) 102 78 - 119 01/02/18 15:38 70 - 120 89 Dibromofluoromethane (Surr) 01/02/18 15:38 70 - 120 1,2-Dichloroethane-d4 (Surr) 96 01/02/18 15:38

Lab Sample ID: LCS 580-264427/6

**Matrix: Water** 

**Analysis Batch: 264427** 

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzene 10.0 7.65 ug/L 77 37 - 151

LCS LCS Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 94 74 - 123 105 79 - 122 Toluene-d8 (Surr) 4-Bromofluorobenzene (Surr) 107 78 - 119 Dibromofluoromethane (Surr) 91 70 - 120 1,2-Dichloroethane-d4 (Surr) 94 70 - 120

Lab Sample ID: LCSD 580-264427/7

**Matrix: Water** 

**Analysis Batch: 264427** 

LCSD LCSD RPD Spike %Rec. Added **Analyte** Result Qualifier Unit D %Rec Limits **RPD** Limit Benzene 10.0 8.10 ug/L 81 37 - 151 6

LCSD LCSD Surrogate %Recovery Qualifier Limits 74 - 123 Trifluorotoluene (Surr) 94 Toluene-d8 (Surr) 105 79 - 122 4-Bromofluorobenzene (Surr) 107 78 - 119 Dibromofluoromethane (Surr) 93 70 - 120 96 70 - 120 1,2-Dichloroethane-d4 (Surr)

Lab Sample ID: MB 580-264480/5

**Matrix: Water** 

**Analysis Batch: 264480** 

Client Sample ID: Method Blank Prep Type: Total/NA

Client Sample ID: Lab Control Sample

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

Prep Type: Total/NA

Prep Type: Total/NA

MB MB Analyte Result Qualifier RL MDL Unit Prepared Analyzed Dil Fac Benzene  $\overline{\mathsf{ND}}$ 1.0 0.42 ug/L 01/03/18 11:16

MB MB Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Trifluorotoluene (Surr) 91 74 - 123 01/03/18 11:16 01/03/18 11:16 Toluene-d8 (Surr) 104 79 - 122

TestAmerica Seattle

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Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Method: 624 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 580-264480/5

**Matrix: Water** 

**Analysis Batch: 264480** 

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	102		78 - 119		01/03/18 11:16	1
Dibromofluoromethane (Surr)	91		70 - 120		01/03/18 11:16	1
1,2-Dichloroethane-d4 (Surr)	97		70 - 120		01/03/18 11:16	1
	4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr)	Surrogate%Recovery4-Bromofluorobenzene (Surr)102Dibromofluoromethane (Surr)91	Surrogate%RecoveryQualifier4-Bromofluorobenzene (Surr)102Dibromofluoromethane (Surr)91	Surrogate%RecoveryQualifierLimits4-Bromofluorobenzene (Surr)10278 - 119Dibromofluoromethane (Surr)9170 - 120	4-Bromofluorobenzene (Surr)       102       78 - 119         Dibromofluoromethane (Surr)       91       70 - 120	Surrogate         %Recovery 4-Bromofluorobenzene (Surr)         Qualifier 102         Limits 78 - 119         Prepared 01/03/18 11:16           Dibromofluoromethane (Surr)         91         70 - 120         01/03/18 11:16

Lab Sample ID: LCS 580-264480/6

**Matrix: Water** 

**Analysis Batch: 264480** 

Client Sample ID: Lab Control Sample Prep Type: Total/NA

 Analyte
 Added Benzene
 Result 10.0
 Result 8.16
 Qualifier ug/L
 Unit ug/L
 D 82
 Rec Limits 37 - 151

LCS LCS

Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	94		74 - 123
Toluene-d8 (Surr)	104		79 - 122
4-Bromofluorobenzene (Surr)	106		78 - 119
Dibromofluoromethane (Surr)	94		70 - 120
1,2-Dichloroethane-d4 (Surr)	98		70 - 120

Lab Sample ID: LCSD 580-264480/7

**Matrix: Water** 

**Analysis Batch: 264480** 

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

%Rec. RPD

Spike LCSD LCSD %Rec. Analyte Added Result Qualifier Limits Unit D %Rec RPD Limit Benzene 10.0 8.24 82 ug/L 37 - 151

LCSD	LCSD	
%Recovery	Qualifier	Limits
94		74 - 123
105		79 - 122
102		78 - 119
91		70 - 120
94		70 - 120
	%Recovery 94 105 102 91	105 102 91

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

Lab Sample ID: MB 580-264392/1-A

**Matrix: Water** 

**Analysis Batch: 264418** 

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 264392

	MB	MB						•	
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.00213	J	0.020	0.0020	ug/L		01/02/18 09:08	01/02/18 15:43	1
Chrysene	ND		0.020	0.0060	ug/L		01/02/18 09:08	01/02/18 15:43	1
Benzo[b]fluoranthene	ND		0.020	0.0080	ug/L		01/02/18 09:08	01/02/18 15:43	1
Benzo[k]fluoranthene	ND		0.030	0.0090	ug/L		01/02/18 09:08	01/02/18 15:43	1
Benzo[a]pyrene	ND		0.020	0.0030	ug/L		01/02/18 09:08	01/02/18 15:43	1
Indeno[1,2,3-cd]pyrene	ND		0.020	0.0070	ug/L		01/02/18 09:08	01/02/18 15:43	1
Dibenz(a,h)anthracene	ND		0.020	0.0020	ug/L		01/02/18 09:08	01/02/18 15:43	1

TestAmerica Seattle

1/23/2018

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Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-264392/1-A

Lab Sample ID: LCS 580-264392/2-A

**Matrix: Water** 

**Matrix: Water** 

**Analysis Batch: 264418** 

**Analysis Batch: 264418** 

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

**Prep Batch: 264392** 

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Terphenyl-d14 53 - 112 81

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

Prep Batch: 264392

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	3.37		ug/L		84	71 - 120	
Chrysene	4.00	3.54		ug/L		89	64 - 120	
Benzo[b]fluoranthene	4.00	3.41		ug/L		85	66 - 120	
Benzo[k]fluoranthene	4.00	3.67		ug/L		92	68 - 120	
Benzo[a]pyrene	4.00	3.75		ug/L		94	76 - 120	
Indeno[1,2,3-cd]pyrene	4.00	3.57		ug/L		89	63 - 120	
Dibenz(a,h)anthracene	4.00	3.66		ug/L		91	60 - 125	

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 76 53 - 112

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

Lab Sample ID: MB 580-264371/5

**Matrix: Water** 

**Analysis Batch: 264371** 

Client Sample ID: Method Blank Prep Type: Total/NA

12/29/17 19:09

79 - 110

	MR	MR							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			12/29/17 19:09	1
	МВ	МВ							
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		58 - 133			-		12/29/17 19:09	1

77 - 128

LCS LCS

Result Qualifier

mg/L

Lab Sample ID: LCS 580-264371/6

**Matrix: Water** 

Analyte

Gasoline

Trifluorotoluene (Surr)

**Analysis Batch: 264371** 

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

%Rec. Limits Unit D %Rec

93

1.00 0.927 LCS LCS %Recovery Qualifier Limits

Spike

Added

Surrogate 4-Bromofluorobenzene (Surr) 100 58 - 133 Trifluorotoluene (Surr) 94 77 - 128

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73946-2

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC) (Continued)

Lab Sample ID: LCSD 580-264371/7 Client Sample ID: Lab Control Sample Dup **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 264371** Spike LCSD LCSD %Rec. RPD Analyte Added Result Qualifier Unit D %Rec Limits RPD Limit 1.00 99 Gasoline 0.991 mg/L 79 - 110

LCSD LCSD Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 98 58 - 133 77 - 128 Trifluorotoluene (Surr) 102

Lab Sample ID: MB 580-264451/5 Client Sample ID: Method Blank Prep Type: Total/NA **Matrix: Water** 

**Analysis Batch: 264451** 

MB MB RL **MDL** Unit Dil Fac **Analyte** Result Qualifier D Prepared Analyzed Gasoline  $\overline{\mathsf{ND}}$ 0.25 0.050 mg/L 01/02/18 14:46

MB MB Qualifier Limits Surrogate %Recovery Prepared Analyzed Dil Fac 4-Bromofluorobenzene (Surr) 92 58 - 133 01/02/18 14:46 99 77 - 128 01/02/18 14:46 Trifluorotoluene (Surr)

Lab Sample ID: LCS 580-264451/6

**Matrix: Water** 

**Analysis Batch: 264451** 

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Gasoline 1.00 0.973 mg/L 79 - 110

LCS LCS %Recovery Qualifier Surrogate Limits 4-Bromofluorobenzene (Surr) 101 58 - 133 Trifluorotoluene (Surr) 100 77 - 128

Lab Sample ID: LCSD 580-264451/7

**Matrix: Water** 

**Analysis Batch: 264451** 

LCSD LCSD Spike %Rec. Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Gasoline 1.00 1.00 mg/L 100 79 - 110

LCSD LCSD Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 102 58 - 133 103 77 - 128 Trifluorotoluene (Surr)

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

Lab Sample ID: MB 580-264464/1-B **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA **Analysis Batch: 264663** Prep Batch: 264464

MB MB Result Qualifier RL Analyte MDL Unit D Prepared Analyzed Dil Fac #2 Diesel (C10-C24) 0.0299 J 0.10 0.019 mg/L 01/03/18 08:30 01/05/18 12:58

TestAmerica Seattle

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA **RPD** 

Prep Type: Total/NA

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

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-264464/1-B

**Matrix: Water** 

**Analysis Batch: 264663** 

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

Prep Batch: 264464

MB MB

RL **MDL** Unit Analyte Result Qualifier Prepared Dil Fac Motor Oil (>C24-C36) 0.25 01/03/18 08:30 01/05/18 12:58  $\overline{\mathsf{ND}}$ 0.077 mg/L

Analyzed

MB MB

Surrogate Qualifier Limits Prepared Dil Fac %Recovery Analyzed o-Terphenyl 84 50 - 150 01/03/18 08:30 01/05/18 12:58 01/03/18 08:30 01/05/18 12:58 n-Decanoic Acid (Surr)

Lab Sample ID: LCS 580-264464/2-B

**Matrix: Water** 

**Analysis Batch: 264663** 

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

Prep Batch: 264464

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits #2 Diesel (C10-C24) 2.00 1.85 mg/L 92 59 - 112 Motor Oil (>C24-C36) 2.00 2.06 mg/L 103 64 - 120

LCS LCS

Surrogate Limits %Recovery Qualifier 50 - 150 o-Terphenyl 88

Lab Sample ID: LCSD 580-264464/3-B

**Matrix: Water** 

**Analysis Batch: 264663** 

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

Prep Type: Total/NA

Prep Batch: 264464

Spike LCSD LCSD %Rec. **RPD** Added Result Qualifier D %Rec Limits RPD **Analyte** Unit Limit #2 Diesel (C10-C24) 2.00 1.77 mg/L 88 59 - 112 4 16 Motor Oil (>C24-C36) 2.00 2.05 103 64 - 120 17 mg/L n

LCSD LCSD

Limits Surrogate %Recovery Qualifier o-Terphenyl 87 50 - 150

TestAmerica Seattle

## **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73946-2

Lab Sample ID: 580-73946-1

Matrix: Water

Client Sample ID: Outfall #002 Date Collected: 12/28/17 10:20

Date Received: 12/28/17 14:55

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			264480	01/03/18 17:02	P1P	TAL SEA
Total/NA	Prep	3510C			264392	01/02/18 09:08	NDB	TAL SEA
Total/NA	Analysis	8270C SIM		10	264418	01/02/18 17:55	TL1	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	264451	01/02/18 16:21	JCV	TAL SEA
Total/NA	Prep	3510C			264464	01/03/18 08:30	NDB	TAL SEA
Total/NA	Cleanup	3630C			264557	01/04/18 09:26	MRG	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	264663	01/05/18 13:59	ADB	TAL SEA

Client Sample ID: Trip Blank

Date Collected: 12/28/17 00:01 Date Received: 12/28/17 14:55 Lab Sample ID: 580-73946-2

Matrix: Water

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			264427	01/02/18 17:32	T1W	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	264371	12/29/17 21:48	JCV	TAL SEA

#### **Laboratory References:**

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

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# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-73946-2

Project/Site: Edmonds Terminal

# **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	UST-022	03-02-18
ANAB	DoD ELAP		L2236	01-19-19
ANAB	ISO/IEC 17025		L2236	01-19-19
California	State Program	9	2901	01-31-18
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-18

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# **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73946-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-73946-1	Outfall #002	Water	12/28/17 10:20	12/28/17 14:55
580-73946-2	Trip Blank	Water	12/28/17 00:01	12/28/17 14:55

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THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047

www.testamericainc.com

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Rush

Chain of	
Custody	Record

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Comments																										

Client: ARCADIS U.S. Inc

Job Number: 580-73946-2

Login Number: 73946 List Source: TestAmerica Seattle

List Number: 1

Creator: Blankinship, Tom X

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	



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: 580-74109-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

Knistène D. allen

Authorized for release by: 1/12/2018 4:19:18 PM

Kristine Allen, Manager of Project Management

(253)248-4970

kristine.allen@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

.....LINKS .....

Review your project results through

Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74109-1

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## **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74109-1

Job ID: 580-74109-1

**Laboratory: TestAmerica Seattle** 

Narrative

Job Narrative 580-74109-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 1/5/2018 1:15 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.8° C.

#### **GC/MS VOA**

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

#### GC/MS Semi VOA

Method(s) 8270C SIM: The method blank for preparation batch 580-264742 and analytical batch 580-264886 contained Benzo[a]anthracene, Benzo[a]pyrene and Dibenz(a,h)anthracene above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

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

#### GC Semi VOA

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

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## **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Minimum Detectable Activity (Radiochemistry)

Method Detection Limit Minimum Level (Dioxin)

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)
Toxicity Equivalent Quotient (Dioxin)

Not Calculated

**Quality Control** 

Minimum Detectable Concentration (Radiochemistry)

Reporting Limit or Requested Limit (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

TestAmerica Job ID: 580-74109-1

#### **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.

## **Glossary**

MDA

MDC

MDL

ML NC

ND PQL

QC

RER RL

RPD

TEF

**TEQ** 

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)

TestAmerica Seattle

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Surrogate

o-Terphenyl

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74109-1

Lab Sample ID: 580-74109-1

Matrix: Water

Date Collected: 01/05/18 11:15 Date Received: 01/05/18 13:15

Client Sample ID: Outfall #002

Method: 624 - Volatile Organic Analyte		C/MS) Qualifier	RL	MDI	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	— ND	- Qualifier	1.0	0.42				01/10/18 08:51	1
201120110	110		1.0	0.12	ug/L			0 17 107 10 00.01	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123					01/10/18 08:51	1
Toluene-d8 (Surr)	100		79 - 122					01/10/18 08:51	1
4-Bromofluorobenzene (Surr)	98		78 - 119					01/10/18 08:51	1
Dibromofluoromethane (Surr)	98		70 - 120					01/10/18 08:51	1
1,2-Dichloroethane-d4 (Surr)	102		70 - 120					01/10/18 08:51	1
Method: 8270C SIM - Semivola	atile Organic Com	npounds (G	C/MS SIM)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.021	0.0021	ug/L		01/08/18 09:37	01/09/18 17:08	1
Chrysene	ND		0.021	0.0064	ug/L		01/08/18 09:37	01/09/18 17:08	1
Benzo[b]fluoranthene	ND		0.021	0.0085	ug/L		01/08/18 09:37	01/09/18 17:08	1
Benzo[k]fluoranthene	ND		0.032	0.0096	ug/L		01/08/18 09:37	01/09/18 17:08	1
Benzo[a]pyrene	ND		0.021	0.0032	ug/L		01/08/18 09:37	01/09/18 17:08	1
Indeno[1,2,3-cd]pyrene	ND		0.021	0.0075	ug/L		01/08/18 09:37	01/09/18 17:08	1
Dibenz(a,h)anthracene	ND		0.021	0.0021	ug/L		01/08/18 09:37	01/09/18 17:08	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	69		53 - 112				01/08/18 09:37	01/09/18 17:08	1
Method: NWTPH-Gx - Northwe	est - Volatile Petro	oleum Prod	ucts (GC)						
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			01/09/18 23:42	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		58 - 133					01/09/18 23:42	1
Trifluorotoluene (Surr)	95		77 - 128					01/09/18 23:42	1
Method: NWTPH-Dx - Northwe	est - Semi-Volatile	Petroleum	Products (GC)	1					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.10	0.020	mg/L		01/09/18 09:38	01/09/18 19:02	1
,									

Limits

50 - 150

%Recovery Qualifier

72

Dil Fac

Analyzed

Prepared

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74109-1

Lab Sample ID: 580-74109-2

Matrix: Water

Client Sample ID: Trip Blank Date Collected: 01/05/18 11:15 Date Received: 01/05/18 13:15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			01/10/18 08:23	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	103		74 - 123			-		01/10/18 08:23	1
Toluene-d8 (Surr)	101		79 - 122					01/10/18 08:23	1
4-Bromofluorobenzene (Surr)	99		78 - 119					01/10/18 08:23	1
Dibromofluoromethane (Surr)	100		70 - 120					01/10/18 08:23	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 120					01/10/18 08:23	1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			01/06/18 21:28	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93	-	58 - 133			=		01/06/18 21:28	1
Trifluorotoluene (Surr)	107		77 - 128					01/06/18 21:28	1

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Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74109-1

### Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-264881/5

**Matrix: Water** 

Analyte

Benzene

Analysis Batch: 264881

Client Sample ID: Method Blank

Prep Type: Total/NA

мв мв Result Qualifier RL MDL Unit D Prepared Analyzed Dil Fac 1.0 01/10/18 04:05 ND 0.42 ug/L

MB MB Qualifier Limits Prepared Analyzed Dil Fac Surrogate %Recovery Trifluorotoluene (Surr) 74 - 123 100 01/10/18 04:05 Toluene-d8 (Surr) 99 79 - 122 01/10/18 04:05 101 78 - 119 01/10/18 04:05 4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr) 99 70 - 120 01/10/18 04:05 70 - 120 1,2-Dichloroethane-d4 (Surr) 102 01/10/18 04:05

Lab Sample ID: LCS 580-264881/6

**Matrix: Water** 

Analysis Batch: 264881

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

-	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzene	10.0	9.85		ug/L		99	37 - 151	

LUS	LUS	
%Recovery	Qualifier	Limits
101		74 - 123
100		79 - 122
105		78 - 119
102		70 - 120
101		70 - 120
	%Recovery 101 100 105 102	101 100 105 102

100 100

Lab Sample ID: LCSD 580-264881/7

**Matrix: Water** 

Analysis Batch: 264881

Client Sample ID: Lab	<b>Control Sample Dup</b>
	Pron Type: Total/NA

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	10.0	10.2		ug/L		102	37 _ 151	4	30

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	101		74 - 123
Toluene-d8 (Surr)	100		79 - 122
4-Bromofluorobenzene (Surr)	102		78 - 119
Dibromofluoromethane (Surr)	99		70 - 120
1,2-Dichloroethane-d4 (Surr)	101		70 - 120

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

Lab Sample ID: MB 580-264742/1-A Client Sample ID: Method Blank

**Matrix: Water** 

Analysis Batch: 264886

MB MB Result Qualifier Dil Fac Analyte RL MDL Unit Prepared Analyzed Benzo[a]anthracene 0.00352 J 0.020 0.0020 ug/L 01/08/18 09:37 01/09/18 15:55 Chrysene ND 0.020 0.0060 ug/L 01/08/18 09:37 01/09/18 15:55 Benzo[b]fluoranthene ND 0.020 0.0080 ug/L 01/08/18 09:37 01/09/18 15:55

TestAmerica Seattle

1/12/2018

Prep Type: Total/NA

Prep Batch: 264742

Page 7 of 16

TestAmerica Job ID: 580-74109-1

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

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

Lab Sample ID: MB 580-264742/1-A

**Matrix: Water** 

Analyte

**Analysis Batch: 264886** 

Client Sample ID: Method Blank Prep Type: Total/NA

Prep Batch: 264742

MB MB Result Qualifier RL MDL Unit Prepared Dil Fac Analyzed Benzo[k]fluoranthene ND 0.030 0.0090 ug/L 01/08/18 09:37 01/09/18 15:55 Benzo[a]pyrene 0.00410 J 0.020 0.0030 ug/L 01/08/18 09:37 01/09/18 15:55 0.020 0.0070 ug/L Indeno[1,2,3-cd]pyrene ND 01/08/18 09:37 01/09/18 15:55 Dibenz(a,h)anthracene 0.00544 J 0.020 0.0020 ug/L 01/08/18 09:37 01/09/18 15:55

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Terphenyl-d14 53 - 112 01/08/18 09:37 01/09/18 15:55 83

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 264742

Lab Sample ID: LCS 580-264742/2-A

**Matrix: Water** 

Analysis Batch: 264886

Spike LCS LCS %Rec. Analyte Added Result Qualifier %Rec Limits Unit D Benzo[a]anthracene 4.00 3.62 ug/L 91 71 - 120 4.00 3.24 81 64 - 120 Chrysene ug/L Benzo[b]fluoranthene 4.00 3.36 ug/L 84 66 - 120 3.75 68 - 120 Benzo[k]fluoranthene 4.00 ug/L 76 - 120 Benzo[a]pyrene 4.00 3.80 ug/L 95 Indeno[1,2,3-cd]pyrene 4.00 3.47 ug/L 63 - 120 Dibenz(a,h)anthracene 4.00 3.85 ug/L 60 - 125

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 53 - 112

Lab Sample ID: LCSD 580-264742/3-A

**Matrix: Water** 

Analysis Batch: 264886

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 264742

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	3.68		ug/L		92	71 - 120	2	16
Chrysene	4.00	3.23		ug/L		81	64 - 120	0	16
Benzo[b]fluoranthene	4.00	3.48		ug/L		87	66 - 120	4	20
Benzo[k]fluoranthene	4.00	3.74		ug/L		93	68 - 120	0	20
Benzo[a]pyrene	4.00	3.86		ug/L		97	76 - 120	2	17
Indeno[1,2,3-cd]pyrene	4.00	3.53		ug/L		88	63 - 120	2	15
Dibenz(a,h)anthracene	4.00	3.85		ug/L		96	60 - 125	0	15

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 53 - 112 70

TestAmerica Seattle

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74109-1

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

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

Lab Sample ID: MB 580-264735/5

**Matrix: Water** 

Analyte

Gasoline

Analysis Batch: 264735

Client Sample ID: Method Blank Prep Type: Total/NA

мв мв Result Qualifier RL MDL Unit Dil Fac D Prepared Analyzed 0.050 mg/L 0.25 01/06/18 19:53 ND

MB MB

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		58 - 133		01/06/18 19:53	1
Trifluorotoluene (Surr)	89		77 - 128		01/06/18 19:53	1

Lab Sample ID: LCS 580-264735/6 Client Sample ID: Lab Control Sample Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 264735

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit %Rec Limits Gasoline 1.00 1.00 100 mg/L 79 - 110

LCS LCS

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	100		58 - 133
Trifluorotoluene (Surr)	103		77 - 128

Lab Sample ID: LCSD 580-264735/7

**Matrix: Water** 

Analysis Batch: 264735

	Spike	LCSD	LCSD				%Rec.		RPD	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Gasoline	1.00	0.984		ma/l		98	79 _ 110		10	

LCSD LCSD

MB MB

Surrogate	%Recovery Qualifier	Limits
4-Bromofluorobenzene (Surr)	100	58 - 133
Trifluorotoluene (Surr)	101	77 - 128

Lab Sample ID: MB 580-264910/5

**Matrix: Water** 

**Analysis Batch: 264910** 

Client Sample ID: Method Blank Prep Type: Total/NA

Analyte Result Qualifier RL MDL Unit Prepared Analyzed Dil Fac Gasoline ND 0.25 01/09/18 22:07 0.050 mg/L

MB MB Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac

4-Bromofluorobenzene (Surr) 90 58 - 133 01/09/18 22:07 Trifluorotoluene (Surr) 97 01/09/18 22:07 77 - 128

Lab Sample ID: LCS 580-264910/6

**Matrix: Water** 

Analysis Batch: 264910

	Spike	LCS	LCS					%Rec.	
Analyte	Added	Result	Qualifier	Unit	[	) %I	Rec	Limits	
Gasoline	 1.00	0.916		mg/L			92	79 - 110	

TestAmerica Seattle

Prep Type: Total/NA

**Client Sample ID: Lab Control Sample** 

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC) (Continued)

Lab Sample ID: LCS 580-264910/6

**Matrix: Water** 

**Analysis Batch: 264910** 

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

RPD

LCS LCS Limits Surrogate %Recovery Qualifier 4-Bromofluorobenzene (Surr) 97 58 - 133 Trifluorotoluene (Surr) 93 77 - 128

Lab Sample ID: LCSD 580-264910/7

**Matrix: Water** Analysis Batch: 264910 LCSD LCSD Spike

%Rec. Added Result Qualifier Analyte Unit D %Rec Limits RPD Limit Gasoline 1.00 0.944 79 <sub>-</sub> 110 3 mg/L

LCSD LCSD Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 99 58 - 133 Trifluorotoluene (Surr) 95 77 - 128

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

Lab Sample ID: MB 580-264821/1-B Client Sample ID: Method Blank Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 264905

**Prep Batch: 264821** MB MB RL MDL Unit Analyte Result Qualifier D Prepared Analyzed Dil Fac #2 Diesel (C10-C24) ND 0.10 0.019 mg/L 01/09/18 09:38 01/09/18 17:56

Motor Oil (>C24-C36) ND 0.25 0.077 mg/L 01/09/18 09:38 01/09/18 17:56 MB MB

Surrogate %Recovery Qualifier I imits Prepared Analyzed Dil Fac o-Terphenyl 76 50 - 150 01/09/18 09:38 01/09/18 17:56

Lab Sample ID: LCS 580-264821/2-B

**Matrix: Water** 

Analysis Batch: 264905

Client Sample ID: Lab Control Sample Prep Type: Total/NA

**Prep Batch: 264821** 

Client Sample ID: Lab Control Sample Dup

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits #2 Diesel (C10-C24) 2.00 87 1.74 mg/L 59 - 112 Motor Oil (>C24-C36) 2 00 1.99 100 64 - 120 mg/L

LCS LCS Surrogate %Recovery Qualifier Limits 50 - 150 o-Terphenyl 96

Lab Sample ID: LCSD 580-264821/3-B

**Matrix: Water** 

Prep Type: Total/NA Analysis Batch: 264905 **Prep Batch: 264821** LCSD LCSD Spike RPD %Rec. Added Result Qualifier %Rec RPD Limit Unit

2.00 #2 Diesel (C10-C24) 1.80 ma/L 90 59 - 112 16 Motor Oil (>C24-C36) 2 00 1.99 mg/L 100 64 - 120 0 17

TestAmerica Seattle

## **QC Sample Results**

Limits

50 - 150

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74109-1

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

LCSD LCSD

%Recovery Qualifier

96

Lab Sample ID: LCSD 580-264821/3-B

**Matrix: Water** 

Surrogate

o-Terphenyl

Analysis Batch: 264905

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

Prep Batch: 264821

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#### **Lab Chronicle**

Client: ARCADIS U.S. Inc

Date Received: 01/05/18 13:15

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74109-1

Lab Sample ID: 580-74109-1

Matrix: Water

Client Sample ID: Outfall #002 Date Collected: 01/05/18 11:15

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	264881	01/10/18 08:51	P1P	TAL SEA
Total/NA	Prep	3510C			264742	01/08/18 09:37	NDB	TAL SEA
Total/NA	Analysis	8270C SIM		1	264886	01/09/18 17:08	TL1	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	264910	01/09/18 23:42	JCV	TAL SEA
Total/NA	Prep	3510C			264821	01/09/18 09:38	NDB	TAL SEA
Total/NA	Cleanup	3630C			264876	01/09/18 14:19	NDB	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	264905	01/09/18 19:02	ADB	TAL SEA

Client Sample ID: Trip Blank

Lab Sample ID: 580-74109-2 Date Collected: 01/05/18 11:15

Matrix: Water

Date Received: 01/05/18 13:15

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	264881	01/10/18 08:23	P1P	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	264735	01/06/18 21:28	JCV	TAL SEA

#### Laboratory References:

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

# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74109-1

### **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	<b>Expiration Date</b>
Alaska (UST)	State Program	10	UST-022	03-02-18
ANAB	DoD ELAP		L2236	01-19-19
ANAB	ISO/IEC 17025		L2236	01-19-19
California	State Program	9	2901	01-31-18
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-18

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# **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74109-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-74109-1	Outfall #002	Water	01/05/18 11:15	01/05/18 13:15
580-74109-2	Trip Blank	Water	01/05/18 11:15	01/05/18 13:15

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THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047

Rush	
Short Hold	

Chain of	
Custody	Record

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## **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 580-74109-1

Login Number: 74109 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

Cleator. Hobbs, Refilletii F		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



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: 580-74216-1

Client Project/Site: Chevron Edmonds Terminal

#### For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

Kim hesley

Authorized for release by: 1/17/2018 2:57:52 PM Kim Presley, Project Management Assistant I (253)922-2310 kim.presley@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

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Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74216-1

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### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74216-1

Job ID: 580-74216-1

#### **Laboratory: TestAmerica Seattle**

#### **Narrative**

#### Receipt

The samples were received on 1/10/2018 2:20 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.9° C.

#### **GC/MS VOA**

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

#### GC/MS Semi VOA

Method(s) 8270C SIM: The method blank for preparation batch 580-265037 and analytical batch 580-265042 contained Benzo[a]anthracene above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

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

#### GC Semi VOA

Method(s) NWTPH-Dx: The method blank for preparation batch 580-265035 and 580-265082 and analytical batch 580-265094 contained #2 Diesel (C10-C24) and Motor Oil (>C24-C36) above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

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

#### **Organic Prep**

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

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## **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74216-1

#### **Qualifiers**

#### **GC/MS Semi VOA**

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

#### GC Semi VOA

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.

#### **Glossary**

Abbreviation These commonly used abbreviations may or may not be present in this repo
---

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

Decision Level Concentration (Radiochemistry) DLC

**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 Minimum Level (Dioxin) ML

NC Not Calculated

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

**PQL Practical Quantitation Limit** 

**Quality Control** QC

Relative Error Ratio (Radiochemistry) **RER** 

Reporting Limit or Requested Limit (Radiochemistry) RL

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

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

TestAmerica Seattle

# **Client Sample Results**

Client: ARCADIS U.S. Inc

1,2-Dichloroethane-d4 (Surr)

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74216-1

Lab Sample ID: 580-74216-1

01/15/18 22:34

**Matrix: Water** 

Client Sample ID: Outfall #002 Date Collected: 01/09/18 11:10

Date Received: 01/10/18 14:20

Method: 624 - Volatile Orga Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			01/15/18 22:34	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	107		74 - 123					01/15/18 22:34	1
Toluene-d8 (Surr)	98		79 - 122					01/15/18 22:34	1
4-Bromofluorobenzene (Surr)	101		78 - 119					01/15/18 22:34	1
Dibromofluoromethane (Surr)	104		70 - 120					01/15/18 22:34	

70 - 120

103

Analyte	mivolatile Organic Compor Result Qualifier	` RL	•	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND ND	0.020	0.0020	ug/L		01/12/18 09:18	01/12/18 15:50	1
Chrysene	ND	0.020	0.0061	ug/L		01/12/18 09:18	01/12/18 15:50	1
Benzo[b]fluoranthene	ND	0.020	0.0082	ug/L		01/12/18 09:18	01/12/18 15:50	1
Benzo[k]fluoranthene	ND	0.031	0.0092	ug/L		01/12/18 09:18	01/12/18 15:50	1
Benzo[a]pyrene	ND	0.020	0.0031	ug/L		01/12/18 09:18	01/12/18 15:50	1
Indeno[1,2,3-cd]pyrene	ND	0.020	0.0071	ug/L		01/12/18 09:18	01/12/18 15:50	1
Dibenz(a,h)anthracene	ND	0.020	0.0020	ug/L		01/12/18 09:18	01/12/18 15:50	1
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	66	53 - 112				01/12/18 09:18	01/12/18 15:50	1

Method: NWTPH-Gx - Northy	west - Volatile I	Petroleui	m Products (	GC)					
Analyte	Result C	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			01/12/18 17:51	1
Surrogate	%Recovery G	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		58 - 133					01/12/18 17:51	1
Trifluorotoluene (Surr)	107		77 - 128					01/12/18 17:51	1

Method: NWTPH-Dx - No	orthwest - Semi-Vo	olatile Pet	roleum Prod	ucts (G	<b>C</b> )				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.046	J B	0.10	0.019	mg/L		01/12/18 09:15	01/12/18 22:14	1
Motor Oil (>C24-C36)	0.14	JB	0.25	0.078	mg/L		01/12/18 09:15	01/12/18 22:14	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	66		50 - 150				01/12/18 09:15	01/12/18 22:14	1

1/17/2018

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74216-1

Lab Sample ID: 580-74216-2

**Matrix: Water** 

**Client Sample ID: Trip Blank** Date Collected: 01/09/18 00:01

Date Received: 01/10/18 14:20

Method: 624 - Volatile Orga Analyte	•	ds (GC/MS Qualifier	S) RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L	<u> </u>		01/12/18 18:05	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	103		74 - 123			•		01/12/18 18:05	1
Trifluorotoluene (Surr)	108		74 - 123					01/15/18 17:46	1
Toluene-d8 (Surr)	98		79 - 122					01/12/18 18:05	1
Toluene-d8 (Surr)	96		79 - 122					01/15/18 17:46	1
4-Bromofluorobenzene (Surr)	102		78 - 119					01/12/18 18:05	1
4-Bromofluorobenzene (Surr)	102		78 - 119					01/15/18 17:46	1
Dibromofluoromethane (Surr)	103		70 - 120					01/12/18 18:05	1
Dibromofluoromethane (Surr)	104		70 - 120					01/15/18 17:46	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 120					01/12/18 18:05	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 120					01/15/18 17:46	1

Method: NWTPH-Gx - Nort	hwest - Volatile Petroleu	m Products (	(GC)				
Analyte	Result Qualifier	RL	MDL Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND ND	0.25	0.050 mg/L			01/12/18 14:08	1
Surrogate	%Recovery Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93	58 - 133		-		01/12/18 14:08	1
Trifluorotoluene (Surr)	108	77 - 128				01/12/18 14:08	1

1/17/2018

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74216-1

**Client Sample ID: Lab Control Sample** 

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

Prep Type: Total/NA

## Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-265091/5

**Matrix: Water** 

Analyte

Benzene

Analysis Batch: 265091

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 1.0 0.42 ug/L 01/12/18 14:44 ND

MB MB Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Trifluorotoluene (Surr) 102 74 - 123 01/12/18 14:44 Toluene-d8 (Surr) 99 79 - 122 01/12/18 14:44 4-Bromofluorobenzene (Surr) 106 78 - 119 01/12/18 14:44 104 70 - 120 Dibromofluoromethane (Surr) 01/12/18 14:44 103 70 - 120 1,2-Dichloroethane-d4 (Surr) 01/12/18 14:44

Lab Sample ID: LCS 580-265091/6

**Matrix: Water** 

Analysis Batch: 265091

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzene 10.0 10.5 ug/L 105 37 - 151

LCS LCS Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 105 74 - 123 100 79 - 122 Toluene-d8 (Surr) 4-Bromofluorobenzene (Surr) 105 78 - 119 Dibromofluoromethane (Surr) 103 70 - 120 1,2-Dichloroethane-d4 (Surr) 101 70 - 120

Lab Sample ID: LCSD 580-265091/7

**Matrix: Water** 

Analysis Batch: 265091

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	10.0	11.1		ug/L		111	37 - 151	6	30

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	106		74 - 123
Toluene-d8 (Surr)	101		79 - 122
4-Bromofluorobenzene (Surr)	105		78 - 119
Dibromofluoromethane (Surr)	103		70 - 120
1,2-Dichloroethane-d4 (Surr)	103		70 - 120

Lab Sample ID: MB 580-265213/5

**Matrix: Water** 

**Analysis Batch: 265213** 

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB Prepared Analyte Result Qualifier RL MDL Unit Analyzed Dil Fac Benzene ND 1.0 0.42 ug/L 01/15/18 13:55

MB MB Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Trifluorotoluene (Surr) 109 74 - 123 01/15/18 13:55 01/15/18 13:55 Toluene-d8 (Surr) 98 79 - 122

TestAmerica Seattle

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Prep Type: Total/NA

TestAmerica Job ID: 580-74216-1

Project/Site: Chevron Edmonds Terminal

## Method: 624 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 580-265213/5

**Matrix: Water** 

**Analysis Batch: 265213** 

Client: ARCADIS U.S. Inc

Client Sample ID: Method Blank Prep Type: Total/NA

мв мв

	11.10					
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		78 - 119	 	01/15/18 13:55	1
Dibromofluoromethane (Surr)	99		70 - 120		01/15/18 13:55	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 120		01/15/18 13:55	1

Lab Sample ID: LCS 580-265213/6

**Matrix: Water** 

**Analysis Batch: 265213** 

Client Sample ID: Lab Control Sample Prep Type: Total/NA

 Analyte
 Added Benzene
 Result 10.0
 Qualifier 9.53
 Unit ug/L
 D y/Rec 10.0
 Limits 20.0
 10.1
 10.0
 9.53
 Ug/L
 95
 37 - 151
 37 - 151

LCS LCS Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 109 74 - 123 Toluene-d8 (Surr) 98 79 - 122 4-Bromofluorobenzene (Surr) 102 78 - 119 Dibromofluoromethane (Surr) 103 70 - 120 1,2-Dichloroethane-d4 (Surr) 99 70 - 120

Lab Sample ID: LCSD 580-265213/7

**Matrix: Water** 

**Analysis Batch: 265213** 

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

LCSD LCSD Spike %Rec. **RPD** Analyte Added Limits Result Qualifier Unit D %Rec RPD Limit Benzene 10.0 103 10.3 ug/L 37 - 151 8

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	108		74 - 123
Toluene-d8 (Surr)	100		79 - 122
4-Bromofluorobenzene (Surr)	106		78 - 119
Dibromofluoromethane (Surr)	103		70 - 120
1,2-Dichloroethane-d4 (Surr)	101		70 - 120

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

MD MD

Lab Sample ID: MB 580-265037/1-A

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 265042

Prep Batch: 265037

	IVID	INID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.00519	J	0.020	0.0020	ug/L		01/12/18 09:18	01/12/18 12:32	1
Chrysene	ND		0.020	0.0060	ug/L		01/12/18 09:18	01/12/18 12:32	1
Benzo[b]fluoranthene	ND		0.020	0.0080	ug/L		01/12/18 09:18	01/12/18 12:32	1
Benzo[k]fluoranthene	ND		0.030	0.0090	ug/L		01/12/18 09:18	01/12/18 12:32	1
Benzo[a]pyrene	ND		0.020	0.0030	ug/L		01/12/18 09:18	01/12/18 12:32	1
Indeno[1,2,3-cd]pyrene	ND		0.020	0.0070	ug/L		01/12/18 09:18	01/12/18 12:32	1
Dibenz(a,h)anthracene	ND		0.020	0.0020	ug/L		01/12/18 09:18	01/12/18 12:32	1
· ·									

TestAmerica Seattle

1/17/2018

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TestAmerica Job ID: 580-74216-1

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

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

Lab Sample ID: MB 580-265037/1-A

Lab Sample ID: LCS 580-265037/2-A

**Matrix: Water** 

**Matrix: Water** 

**Analysis Batch: 265042** 

**Analysis Batch: 265042** 

Client Sample ID: Method Blank Prep Type: Total/NA

**Prep Batch: 265037** 

Analyzed Dil Fac

MB MB

Surrogate %Recovery Qualifier Limits Prepared 01/12/18 09:18 01/12/18 12:32 Terphenyl-d14 53 - 112 85

Client Sample ID: Lab Control Sample

Prep Type: Total/NA Prep Batch: 265037

%Rec.

Limits 71 - 120

Spike LCS LCS Added Result Qualifier **Analyte** Unit D %Rec Benzo[a]anthracene 4.00 3.46 ug/L 87 4.00 3.61 90 Chrysene ug/L 64 - 120Benzo[b]fluoranthene 4.00 3.49 ug/L 87 66 - 120Benzo[k]fluoranthene 4.00 3.74 93 68 - 120 ug/L Benzo[a]pyrene 4 00 3.76 ug/L 94 76 - 120 Indeno[1,2,3-cd]pyrene 4.00 3.26 ug/L 81 63 - 120 4.00 88 Dibenz(a,h)anthracene 3.52 ug/L 60 - 125

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 53 - 112 72

Lab Sample ID: LCSD 580-265037/3-A

**Matrix: Water** 

**Analysis Batch: 265042** 

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 265037 **RPD** 

LCSD LCSD Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits RPD Limit 4.00 86 71 - 120 16 Benzo[a]anthracene 3.44 ug/L Chrysene 4.00 3.56 89 64 - 120 16 ug/L 4.00 3.46 86 66 - 120 20 Benzo[b]fluoranthene ug/L Benzo[k]fluoranthene 4.00 3.69 ug/L 92 68 - 120 20 ug/L Benzo[a]pyrene 4.00 3.73 93 76 - 120 17 4.00 Indeno[1,2,3-cd]pyrene 3 26 ug/L 81 63 - 1200 15 Dibenz(a,h)anthracene 4.00 3.46 ug/L 87 60 - 125 15

LCSD LCSD

%Recovery Qualifier Surrogate Limits 53 - 112 Terphenyl-d14 72

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

MB MB

Lab Sample ID: MB 580-265085/5 Client Sample ID: Method Blank

**Matrix: Water** 

**Analysis Batch: 265085** 

Prep Type: Total/NA

**Analyte** Result Qualifier RL **MDL** Unit D Prepared Analyzed Dil Fac Gasoline 0.25 01/12/18 12:33  $\overline{\sf ND}$ 0.050 mg/L

MB MB Qualifier Limits Prepared Dil Fac Surrogate %Recovery Analyzed 58 - 133 4-Bromofluorobenzene (Surr) 94 01/12/18 12:33 Trifluorotoluene (Surr) 99 77 - 128 01/12/18 12:33

TestAmerica Seattle

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Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74216-1

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC) (Continued)

Lab Sample ID: LCS 580-265085/6 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 265085** 

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits 1.00 Gasoline 0.922 mg/L 92 79 - 110

LCS LCS Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 100 58 - 133 Trifluorotoluene (Surr) 91 77 - 128

Client Sample ID: Lab Control Sample Dup Lab Sample ID: LCSD 580-265085/7 Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 265085

LCSD LCSD RPD Spike %Rec. Limits RPD **Analyte** Added Result Qualifier Unit %Rec Limit D Gasoline 1.00 0.966 97 79 - 110 10 mg/L

LCSD LCSD Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 58 - 133 100 95 77 - 128 Trifluorotoluene (Surr)

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

Client Sample ID: Method Blank Lab Sample ID: MB 580-265035/1-B **Matrix: Water** Prep Type: Total/NA Prep Batch: 265035

**Analysis Batch: 265094** 

мв мв Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac #2 Diesel (C10-C24) 0.0356 J 0.10 0.019 mg/L 01/12/18 09:15 01/12/18 21:09 Motor Oil (>C24-C36) 0.25 01/12/18 09:15 01/12/18 21:09 0.0841 J 0.077 mg/L

MB MB Qualifier Surrogate %Recovery Limits Prepared Analyzed Dil Fac 81 50 - 150 01/12/18 09:15 01/12/18 21:09 o-Terphenyl

Lab Sample ID: LCS 580-265035/2-B **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 265094** Prep Batch: 265035 LCS LCS %Rec.

Spike Analyte Added Result Qualifier Unit %Rec Limits #2 Diesel (C10-C24) 2.00 1.72 86 59 - 112 mg/L Motor Oil (>C24-C36) 2.00 1.91 96 mg/L 64 - 120

LCS LCS %Recovery Qualifier Limits Surrogate 50 - 150 o-Terphenyl 89

Lab Sample ID: LCSD 580-265035/3-B **Client Sample ID: Lab Control Sample Dup Matrix: Water** Prep Type: Total/NA **Analysis Batch: 265094 Prep Batch: 265035** Spike LCSD LCSD %Rec. **RPD** 

Added Analyte Result Qualifier Unit D %Rec Limits RPD Limit 59 - 112 #2 Diesel (C10-C24) 2.00 1.86 mg/L 93

TestAmerica Seattle

# **QC Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74216-1

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

Lab Sample ID: LCSD 580-265035/3-B Matrix: Water Analysis Batch: 265094 Spike				LCSD	Client S	ample	ID: Lat	Prep Ba %Rec.	oe: Tot	al/NA
	Analysis	- ·	_		I Imit	_	0/ Dag	Limits	DDD	Limit
	Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
	Motor Oil (>C24-C36)	2.00	2.04		mg/L		102	64 - 120	6	17

Surrogate	%Recovery Qualifier	Limits
o-Terphenyl	87	50 - 150

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## **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74216-1

Lab Sample ID: 580-74216-1

**Matrix: Water** 

Client Sample ID: Outfall #002 Date Collected: 01/09/18 11:10

Date Received: 01/10/18 14:20

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			265213	01/15/18 22:34	T1W	TAL SEA
Total/NA	Prep	3510C			265037	01/12/18 09:18	NDB	TAL SEA
Total/NA	Analysis	8270C SIM		1	265042	01/12/18 15:50	ERZ	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	265085	01/12/18 17:51	JCV	TAL SEA
Total/NA	Prep	3510C			265035	01/12/18 09:15	NDB	TAL SEA
Total/NA	Cleanup	3630C			265082	01/12/18 11:49	NDB	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	265094	01/12/18 22:14	W1T	TAL SEA

**Client Sample ID: Trip Blank** Lab Sample ID: 580-74216-2

Date Collected: 01/09/18 00:01 **Matrix: Water** 

Date Received: 01/10/18 14:20

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	265091	01/12/18 18:05	T1W	TAL SEA
Total/NA	Analysis	624		1	265213	01/15/18 17:46	T1W	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	265085	01/12/18 14:08	JCV	TAL SEA

**Laboratory References:** 

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

# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-74216-1

Project/Site: Chevron Edmonds Terminal

# **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	UST-022	03-02-18
ANAB	DoD ELAP		L2236	01-19-19
ANAB	ISO/IEC 17025		L2236	01-19-19
California	State Program	9	2901	01-31-18
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-18

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# **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74216-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-74216-1	Outfall #002	Water	01/09/18 11:10	01/10/18 14:20
580-74216-2	Trip Blank	Water	01/09/18 00:01	01/10/18 14:20

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310

Short	Hold	

Rush

Chain of Custody Record

THE LEADER IN ENVIRONMENTAL TESTING		i3-922-5047 estamericainc.com	<del></del>		,
Arcadis			campbell	Date 1/9/18	Chain of Custody Number 36555
Address	Telé	ephone Number (Area Code)/I		Lab Numbel	
1100 olive way, Suite 800	)	206-910-		74216	Page of
City State Zip			Lab Contact 📑 🕠 An	alvsis (Attach list if	
Seattle WA		ason Little	E WINE WAILER ST TO	ré space is needed)	
Project Name and Location (State)	Billi	ing Contact	Z 7 35		
Edmonds Terminal Contract/Purchase Order/Quote No.			20 X X X X X X X X X X X X X X X X X X X		Special Instructions/
Contract/Purchase Order/Quote No.		Matrix	Unpress H7504 H701 H701 H701 H701 H701 H701 H701 H701		Conditions of Receipt
Sample I.D. and Location/Description (Containers for each sample may be combined on one line)	Date Time	Air Aqueous Sed. Soil	HZS04 HH03 HH03 HCI NAOH NAOH NAOH NAOH NAOH NAOH NAOH CPAR		
DU+fa11 #002	1/9/18 1110		2 8 XXX		pH=
Trip Blank		-    X			
					of alcolor
					7.19
	-			Therm. ID	
				Cooler Dsc	Med Blue @Lab
				Wet/Packs	Packing Bubble
					Custody Seal: Yes No V
			580-74216 Chain of Custody		
Cooler Possible Ha	azard Identification		Sample Disposal	Disposal By Lab	(A fee may be assessed if samples
☐ Yes ☐ No Cooler Temp: ☐ Non-Ha		☐ Skin Irritant ☐ Po	1	Archive For Months	
Turn Around Time Required (business days)			QC Requirements (Specify)		
☐ 24 Hours ☐ 48 Hours 💢 5 Days ☐ 10 Day	rs 🗆 15 Days 🗆 (	Other			
1. Relinquished By Significant	Date		1. Received By Sign/Print		Date Time
for I Jain Lit.	<u> </u>	10/18/13/0	Francis	ico Langue	1/10/18 1310
2. Relinquished By Sign/Prihi Francisu Luna )	Date	Time U/14 IHOS	2. Received By Sign/Print and Som		Date 1/10/18 Time 1405
3. Relinquished By Sign/Print	Date		3. Received By Sign/Print		Date Time
Comments		1			

Client: ARCADIS U.S. Inc

Job Number: 580-74216-1

Login Number: 74216 List Source: TestAmerica Seattle

List Number: 1

Creator: Blankinship, Tom X

Creator. Dialikinship, Toni A		
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	



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: 580-74473-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 1/25/2018 5:06:13 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

·····LINKS ······

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Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

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.

Project/Site: Chevron Edmonds Terminal

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-74473-1

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### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74473-1

Job ID: 580-74473-1

Laboratory: TestAmerica Seattle

Narrative

Job Narrative 580-74473-1

#### Receipt

Two samples were received on 1/19/2018 1:30 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.2° C.

#### GC/MS VOA

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

#### GC/MS Semi VOA

Method(s) 8270D SIM: The method blank for preparation batch 580-265687 and analytical batch 580-265701 contained Benzo[a]anthracene, Benzo[a]pyrene, Chrysene, Dibenz(a,h)anthracene, and Indeno[1,2,3-cd]pyrene above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

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

#### GC Semi VOA

Method(s) NWTPH-Dx: 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: Outfall #002 (580-74473-1).

Method(s) NWTPH-Dx: The method blank for preparation batch preparation batch 580-265742 and analytical batch 580-265796 contained Motor Oil (>C24-C36) above the reporting limit (RL). None of the samples associated with this method blank contained the target compound at or above the RL; therefore, re-extraction and/or re-analysis of samples was not performed.

Method(s) NWTPH-Dx: The method blank for preparation batch 580-265742 and analytical batch 580-265796 contained #2 Diesel (C10-C24) above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and/or re-analysis of samples was not performed.

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

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TestAmerica Seattle 1/25/2018

## **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74473-1

### **Qualifiers**

#### **GC/MS Semi VOA**

Qualifier	Qualifier Description
В	Compound was found in the blank and sample.

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.

#### **GC Semi VOA**

O......

Qualifier	Qualifier Description
B	Compound was found in the blank and sa

B 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.

## 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)

O

0

Q

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74473-1

Lab Sample ID: 580-74473-1

**Matrix: Water** 

Client Sample ID: Outfall #002 Date Collected: 01/18/18 10:30 Date Received: 01/19/18 13:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0	0.42	ug/L			01/25/18 08:16	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	105		80 - 120					01/25/18 08:16	1
Toluene-d8 (Surr)	101		80 - 122					01/25/18 08:16	1
1,2-Dichloroethane-d4 (Surr)	101		80 - 126					01/25/18 08:16	1
4-Bromofluorobenzene (Surr)	103		75 - 125					01/25/18 08:16	1
Dibromofluoromethane (Surr)	104		77 - 120					01/25/18 08:16	1

Method: 8270D SIM - Sem	ivolatile Organi	c Compou	inds (GC/MS	SIM)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0078	JB	0.021	0.0021	ug/L		01/22/18 13:03	01/22/18 19:31	1
Benzo[a]pyrene	0.0063	J B	0.021	0.0031	ug/L		01/22/18 13:03	01/22/18 19:31	1
Benzo[b]fluoranthene	ND		0.021	0.0084	ug/L		01/22/18 13:03	01/22/18 19:31	1
Benzo[k]fluoranthene	ND		0.031	0.0094	ug/L		01/22/18 13:03	01/22/18 19:31	1
Chrysene	0.0065	J B	0.021	0.0063	ug/L		01/22/18 13:03	01/22/18 19:31	1
Dibenz(a,h)anthracene	0.0053	J B	0.021	0.0021	ug/L		01/22/18 13:03	01/22/18 19:31	1
Indeno[1,2,3-cd]pyrene	0.0075	JB	0.021	0.0073	ug/L		01/22/18 13:03	01/22/18 19:31	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	59		53 - 112				01/22/18 13:03	01/22/18 19:31	1

Method: NWTPH-Gx - Northwe	est - Volatile	Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			01/23/18 18:01	1
	a								
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		58 - 133					01/23/18 18:01	1
Trifluorotoluene (Surr)	109		77 - 128					01/23/18 18:01	1

Method: NWTPH-Dx - Nort				•	•				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.058	JB	0.10	0.020	mg/L		01/23/18 10:02	01/23/18 21:07	1
Motor Oil (>C24-C36)	0.13	JB	0.26	0.080	mg/L		01/23/18 10:02	01/23/18 21:07	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	74		50 - 150				01/23/18 10:02	01/23/18 21:07	1
n-Decanoic Acid (Surr)							01/23/18 10:02	01/23/18 21:07	1

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# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74473-1

Lab Sample ID: 580-74473-2

**Matrix: Water** 

Client Sample ID: Trip Blank Date Collected: 01/18/18 00:01

Date Received: 01/19/18 13:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0	0.42	ug/L			01/25/18 04:00	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	105		80 - 120					01/25/18 04:00	1
Toluene-d8 (Surr)	99		80 - 122					01/25/18 04:00	1
1,2-Dichloroethane-d4 (Surr)	102		80 - 126					01/25/18 04:00	1
4-Bromofluorobenzene (Surr)	100		75 - 125					01/25/18 04:00	1
Dibromofluoromethane (Surr)	102		77 - 120					01/25/18 04:00	1

Method: NWTPH-Gx - Nort	hwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			01/23/18 15:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		58 - 133			-		01/23/18 15:54	1
Trifluorotoluene (Surr)	99		77 - 128					01/23/18 15:54	

1/25/2018

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Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74473-1

01/25/18 02:35

## Method: 8260C - Volatile Organic Compounds by GC/MS

103

Lab Sample ID: MB 580-265884/5

Matrix: Water

Client Sample ID: Method Blank
Prep Type: Total/NA

Analysis Batch: 265884

7	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0	0.42	ug/L			01/25/18 02:35	1
	МВ	МВ							
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	106		80 - 120			-		01/25/18 02:35	1
Toluene-d8 (Surr)	99		80 - 122					01/25/18 02:35	1
1,2-Dichloroethane-d4 (Surr)	99		80 - 126					01/25/18 02:35	1
4-Bromofluorobenzene (Surr)	101		75 - 125					01/25/18 02:35	1

Lab Sample ID: LCS 580-265884/6

Matrix: Water

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

77 - 120

Analysis Batch: 265884

Dibromofluoromethane (Surr)

 Spike
 LCS
 LCS
 %Rec.

 Analyte
 Added
 Result
 Qualifier
 Unit
 D
 %Rec
 Limits

 Benzene
 10.0
 9.83
 ug/L
 98
 75 - 120

LCS LCS Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 105 80 - 120 100 80 - 122 Toluene-d8 (Surr) 1,2-Dichloroethane-d4 (Surr) 99 80 - 126 4-Bromofluorobenzene (Surr) 104 75 - 125 Dibromofluoromethane (Surr) 103 77 - 120

Lab Sample ID: LCSD 580-265884/7

Client Sample ID: Lab Control Sample Dup
Matrix: Water

Prep Type: Total/NA

Analysis Batch: 265884

LCSD LCSD RPD Spike %Rec. Added Result Qualifier Limits **Analyte** Unit D %Rec RPD Limit Benzene 10.0 9.79 ug/L 98 75 - 120

LCSD LCSD Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 105 80 - 120 Toluene-d8 (Surr) 101 80 - 122 1,2-Dichloroethane-d4 (Surr) 100 80 - 126 4-Bromofluorobenzene (Surr) 104 75 - 125 Dibromofluoromethane (Surr) 104 77 - 120

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

Lab Sample ID: MB 580-265687/1-A

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 265701

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 265687

MB MB Result Qualifier RL **MDL** Unit **Prepared** Analyte Analyzed Dil Fac Benzo[a]anthracene 0.00596 J. 0.020 0.0020 ug/L 01/22/18 13:03 01/22/18 17:29 Benzo[a]pyrene 0.00450 J 0.020 0.0030 ug/L 01/22/18 13:03 01/22/18 17:29 Benzo[b]fluoranthene ND 01/22/18 13:03 01/22/18 17:29 0.020 0.0080 ug/L

TestAmerica Seattle

1/25/2018

Page 7 of 15

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Project/Site: Chevron Edmonds Terminal

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-74473-1

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

Lab Sample ID: MB 580-265687/1-A

Lab Sample ID: LCS 580-265687/2-A

**Matrix: Water** 

**Matrix: Water** 

**Analysis Batch: 265701** 

**Analysis Batch: 265701** 

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

**Prep Batch: 265687** 

MB MB **MDL** Unit Analyte Result Qualifier RL Prepared Analyzed Dil Fac Benzo[k]fluoranthene  $\overline{\mathsf{ND}}$ 0.030 0.0090 ug/L 01/22/18 13:03 01/22/18 17:29 Chrysene 0.00728 J 0.020 0.0060 ug/L 01/22/18 13:03 01/22/18 17:29 Dibenz(a,h)anthracene 0.00627 J 0.020 0.0020 ug/L 01/22/18 13:03 01/22/18 17:29 Indeno[1,2,3-cd]pyrene 0.00790 J 0.020 0.0070 ug/L 01/22/18 13:03 01/22/18 17:29

MB MB

Qualifier Limits Surrogate %Recovery Prepared Analyzed Dil Fac 53 - 112 Terphenyl-d14 74 01/22/18 13:03 01/22/18 17:29

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

**Prep Batch: 265687** 

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzo[a]anthracene 4.00 3.42 ug/L 86 71 - 120 Benzo[a]pyrene 4.00 3.51 ug/L 88 76 - 120 4.00 3.22 Benzo[b]fluoranthene ug/L 81 66 - 120 Benzo[k]fluoranthene 4.00 3.44 86 68 - 120 ug/L Chrysene 4.00 3.02 ug/L 75 64 - 120 Dibenz(a,h)anthracene 4.00 3.59 ug/L 90 60 - 125 Indeno[1,2,3-cd]pyrene 4.00 3.34 ug/L 83 63 - 120

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 59 53 - 112

Lab Sample ID: LCSD 580-265687/3-A

**Matrix: Water** 

Analysis Batch: 265701

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

Prep Type: Total/NA **Prep Batch: 265687** 

7										
	Spike	LCSD	LCSD				%Rec.		RPD	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Benzo[a]anthracene	4.00	3.40		ug/L		85	71 - 120	1	16	
Benzo[a]pyrene	4.00	3.44		ug/L		86	76 - 120	2	17	
Benzo[b]fluoranthene	4.00	3.07		ug/L		77	66 - 120	5	20	
Benzo[k]fluoranthene	4.00	3.33		ug/L		83	68 - 120	3	20	
Chrysene	4.00	2.97		ug/L		74	64 - 120	1	16	
Dibenz(a,h)anthracene	4.00	3.45		ug/L		86	60 - 125	4	15	
Indeno[1,2,3-cd]pyrene	4.00	3.21		ug/L		80	63 - 120	4	15	

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 61 53 - 112

TestAmerica Seattle

TestAmerica Job ID: 580-74473-1

Project/Site: Chevron Edmonds Terminal

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-265777/5 Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 265777** 

Client: ARCADIS U.S. Inc

Analyte Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 0.25 Gasoline  $\overline{\mathsf{ND}}$ 0.050 mg/L 01/23/18 14:19

MB MB

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac 4-Bromofluorobenzene (Surr) 88 58 - 133 01/23/18 14:19 Trifluorotoluene (Surr) 111 77 - 128 01/23/18 14:19

Lab Sample ID: LCS 580-265777/6

**Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 265777** 

LCS LCS Spike %Rec. Unit **Analyte** Added Result Qualifier %Rec Limits D Gasoline 1.00 0.982 98 79 - 110 mg/L

LCS LCS

Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 58 - 133 98 Trifluorotoluene (Surr) 97 77 - 128

Lab Sample ID: LCSD 580-265777/7 **Client Sample ID: Lab Control Sample Dup** Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 265777** 

LCSD LCSD RPD Spike %Rec. Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Gasoline 1.00 1.02 mg/L 102 79 - 110

LCSD LCSD

%Recovery Qualifier Surrogate Limits 4-Bromofluorobenzene (Surr) 99 58 - 133 Trifluorotoluene (Surr) 101 77 - 128

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

Lab Sample ID: MB 580-265742/1-B **Client Sample ID: Method Blank** Prep Type: Total/NA **Matrix: Water Analysis Batch: 265796** Prep Batch: 265742

MB MB

Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac #2 Diesel (C10-C24) 0.10 01/23/18 10:02 01/23/18 18:34 0.0349 J 0.019 mg/L Motor Oil (>C24-C36) 0.365 0.25 01/23/18 10:02 01/23/18 18:34 0.077 mg/L

MB MB %Recovery

Qualifier Limits Prepared Dil Fac Surrogate Analyzed o-Terphenyl 87 50 - 150 01/23/18 10:02 01/23/18 18:34 n-Decanoic Acid (Surr) 01/23/18 10:02 01/23/18 18:34

TestAmerica Seattle

1/25/2018

## QC Sample Results

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74473-1

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

Lab Sample ID: MB 580-265742/1-B

**Matrix: Water** 

Analysis Batch: 265833

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

Prep Batch: 265742

		_						
Analyte	Result Qu	ualifier RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND	0.10	0.019	mg/L		01/23/18 10:02	01/24/18 14:25	1
Motor Oil (>C24-C36)	ND	0.25	0.077	mg/L		01/23/18 10:02	01/24/18 14:25	1

MB MB

MR MR

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac 50 - 150 o-Terphenyl 77 01/23/18 10:02 01/24/18 14:25

**Client Sample ID: Lab Control Sample** 

Lab Sample ID: LCS 580-265742/2-B **Matrix: Water** 

**Analysis Batch: 265796** 

#2 Diesel (C10-C24) Motor Oil (>C24-C36)

Prep Type: Total/NA **Prep Batch: 265742** 

	Spike	LCS	LCS				%Rec.	
	Added	Result	Qualifier	Unit	D	%Rec	Limits	
	2.00	1.79		mg/L		90	59 - 112	
	2.00	2.13		mg/L		107	64 - 120	

LCS LCS

Surrogate %Recovery Qualifier Limits o-Terphenyl 95 50 - 150

Lab Sample ID: LCSD 580-265742/3-B **Client Sample ID: Lab Control Sample Dup** 

Spike

Added

2.00

2.00

LCSD LCSD

1.98

2.38

Result Qualifier Unit

mg/L

mg/L

**Matrix: Water** 

#2 Diesel (C10-C24)

Motor Oil (>C24-C36)

Analyte

**Analyte** 

**Analysis Batch: 265796** 

**Prep Type: Total/NA Prep Batch: 265742** 

119

%Rec. **RPD** D %Rec Limits RPD Limit 99 59 - 112 10 16

11

64 - 120

LCSD LCSD Surrogate %Recovery Qualifier Limits o-Terphenyl 92 50 - 150

TestAmerica Seattle

1/25/2018

### **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74473-1

Client Sample ID: Outfall #002

Date Collected: 01/18/18 10:30 Date Received: 01/19/18 13:30 Lab Sample ID: 580-74473-1

Matrix: Water

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	265884	01/25/18 08:16	JSM	TAL SEA
Total/NA	Prep	3510C			265687	01/22/18 13:03	NDB	TAL SEA
Total/NA	Analysis	8270D SIM		1	265701	01/22/18 19:31	W1T	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	265777	01/23/18 18:01	JCV	TAL SEA
Total/NA	Prep	3510C			265742	01/23/18 10:02	REY	TAL SEA
Total/NA	Cleanup	3630C			265781	01/23/18 13:49	REY	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	265796	01/23/18 21:07	ADB	TAL SEA

Client Sample ID: Trip Blank Lab Sample ID: 580-74473-2

Date Collected: 01/18/18 00:01 Matrix: Water

Date Received: 01/18/18 00:01 Watrix: Water

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	265884	01/25/18 04:00	JSM	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	265777	01/23/18 15:54	JCV	TAL SEA

#### **Laboratory References:**

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

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TestAmerica Seattle

# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-74473-1

Project/Site: Chevron Edmonds Terminal

# **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	<b>Expiration Date</b>		
Alaska (UST)	State Program	10	UST-022	03-02-18		
ANAB	DoD ELAP		L2236	01-19-19		
ANAB	ISO/IEC 17025		L2236	01-19-19		
California	State Program	9	2901	01-31-18		
Montana (UST)	State Program	8	N/A	04-30-20		
Oregon	NELAP	10	WA100007	11-05-18		
US Fish & Wildlife	Federal		LE058448-0	10-31-18		
USDA	Federal		P330-14-00126	02-10-20		
Washington	State Program	10	C553	02-17-18		

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# **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74473-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-74473-1	Outfall #002	Water	01/18/18 10:30	01/19/18 13:30
580-74473-2	Trip Blank	Water	01/18/18 00:01	01/19/18 13:30

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THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Short	Hold	

Rush

Chain of **Custody Record** 

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Client: ARCADIS U.S. Inc

Job Number: 580-74473-1

Login Number: 74473 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
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	



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: 580-74658-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 2/6/2018 2:33:26 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

----- LINKS -----

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Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Chevron Edmonds Terminal TestAmerica Job ID: 580-74658-1

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#### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74658-1

Job ID: 580-74658-1

**Laboratory: TestAmerica Seattle** 

**Narrative** 

Job Narrative 580-74658-1

#### Receipt

Two samples were received on 1/25/2018 2:10 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.0° C.

#### GC/MS VOA

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

#### GC/MS Semi VOA

Method(s) 8270D SIM: The method blank for preparation batch 580-266194 and analytical batch 580-266333 contained Benzo[a]anthracene, Chrysene, Benzo[k]fluoranthene, Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene, and Dibenz(a,h)anthracene above the method detection limit. This target analyte concentration was less than the reporting limit (RL); therefore, re-extraction and/or re-analysis of samples was not performed.

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

#### GC Semi VOA

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

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# **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74658-1

#### **Qualifiers**

#### **GC/MS Semi VOA**

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.

### Glossary

Giossary	
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

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)

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# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74658-1

Lab Sample ID: 580-74658-1

Matrix: Water

Client Sample ID: Outfall #002 Date Collected: 01/24/18 10:20

Date Received: 01/25/18 14:10

Method: 8260C - Volatile Or	ganic Compounds	by GC/MS						
Analyte	Result Quali	ifier RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND ND	2.0	0.42	ug/L			01/31/18 20:17	1
Surrogate	%Recovery Qual	ifier Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	103	80 - 120			-		01/31/18 20:17	1
Toluene-d8 (Surr)	100	80 - 122					01/31/18 20:17	1
1,2-Dichloroethane-d4 (Surr)	98	80 - 126					01/31/18 20:17	1
4-Bromofluorobenzene (Surr)	103	75 - 125					01/31/18 20:17	1
Dibromofluoromethane (Surr)	99	77 - 120					01/31/18 20:17	1

Method: 8270D SIM - Sem Analyte	_	c Compou Qualifier	nds (GC/MS RL	SIM) MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0079	JB	0.021	0.0021	ug/L		01/29/18 14:21	01/30/18 23:34	1
Benzo[a]pyrene	0.0070	JB	0.021	0.0031	ug/L		01/29/18 14:21	01/30/18 23:34	1
Benzo[b]fluoranthene	ND		0.021	0.0082	ug/L		01/29/18 14:21	01/30/18 23:34	1
Benzo[k]fluoranthene	ND		0.031	0.0092	ug/L		01/29/18 14:21	01/30/18 23:34	1
Chrysene	0.0073	JB	0.021	0.0062	ug/L		01/29/18 14:21	01/30/18 23:34	1
Dibenz(a,h)anthracene	0.0060	JB	0.021	0.0021	ug/L		01/29/18 14:21	01/30/18 23:34	1
Indeno[1,2,3-cd]pyrene	0.0075	JB	0.021	0.0072	ug/L		01/29/18 14:21	01/30/18 23:34	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	67		53 - 112				01/29/18 14:21	01/30/18 23:34	1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)										
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
Gasoline	ND		0.25	0.050	mg/L			01/26/18 16:41	1	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac	
4-Bromofluorobenzene (Surr)	95		58 - 133					01/26/18 16:41	1	
Trifluorotoluene (Surr)	106		77 - 128					01/26/18 16:41	1	

Method. NWTPH-DX - North	west - Seiiii-v	orathe Pet	roleulli Prou	นษเร (ษา	<b>~)</b>				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11	0.067	mg/L		01/30/18 14:37	01/31/18 17:52	1
Motor Oil (>C24-C36)	ND		0.36	0.099	mg/L		01/30/18 14:37	01/31/18 17:52	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	59		50 - 150				01/30/18 14:37	01/31/18 17:52	1

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# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74658-1

Lab Sample ID: 580-74658-2

**Matrix: Water** 

Client Sample ID: Trip Blank Date Collected: 01/24/18 10:20

Date Received: 01/25/18 14:10

Method: 8260C - Volatile O Analyte	•	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0	0.42	ug/L			01/30/18 21:33	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		80 - 120					01/30/18 21:33	1
Toluene-d8 (Surr)	100		80 - 122					01/30/18 21:33	1
1,2-Dichloroethane-d4 (Surr)	100		80 - 126					01/30/18 21:33	1
4-Bromofluorobenzene (Surr)	103		75 - 125					01/30/18 21:33	1
Dibromofluoromethane (Surr)	101		77 - 120					01/30/18 21:33	1

Method: NWTPH-Gx - Nort	hwest - Volatile	Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			01/26/18 15:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		58 - 133			:		01/26/18 15:38	1
Trifluorotoluene (Surr)	107		77 - 128					01/26/18 15:38	1

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**Client Sample ID: Lab Control Sample** 

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

**Prep Type: Total/NA** 

Prep Type: Total/NA

2

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

# Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 580-266303/13

Matrix: Water

Prep Type: Total/NA

**Analysis Batch: 266303** 

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0	0.42	ug/L			01/30/18 20:07	1
	MB	MB							
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	99		80 - 120					01/30/18 20:07	1
Toluene-d8 (Surr)	99		80 - 122					01/30/18 20:07	1
1,2-Dichloroethane-d4 (Surr)	102		80 - 126					01/30/18 20:07	1
4-Bromofluorobenzene (Surr)	105		75 - 125					01/30/18 20:07	1
Dibromofluoromethane (Surr)	102		77 - 120					01/30/18 20:07	1

Lab Sample ID: LCS 580-266303/14

**Matrix: Water** 

**Analysis Batch: 266303** 

	<b>Spike</b>	LUS	LUS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzene	10.0	9.44		ug/L		94	75 - 120	

LCS	LCS	
%Recovery	Qualifier	Limits
96		80 - 120
101		80 - 122
100		80 - 126
103		75 - 125
99		77 - 120
	%Recovery 96 101 100 103	101 100 103

Lab Sample ID: LCSD 580-266303/15

**Matrix: Water** 

**Analysis Batch: 266303** 

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	10.0	10.1		ug/L	_	101	75 - 120	6	14

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	101		80 - 120
Toluene-d8 (Surr)	100		80 - 122
1,2-Dichloroethane-d4 (Surr)	100		80 - 126
4-Bromofluorobenzene (Surr)	104		75 - 125
Dibromofluoromethane (Surr)	101		77 - 120

Lab Sample ID: MB 580-266429/5 Client Sample ID: Method Blank

100

**Matrix: Water** 

Toluene-d8 (Surr)

**Analysis Batch: 266429** 

	MB	MB						
Analyte Benzene	Result ND	Qualifier		MDL Unit  0.42 ug/L	D	Prepared	Analyzed 01/31/18 16:57	Dil Fac
	МВ	MB						
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	102		80 - 120		-		01/31/18 16:57	1

TestAmerica Seattle

01/31/18 16:57

Prep Type: Total/NA

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80 - 122

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Project/Site: Chevron Edmonds Terminal

### Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-266429/5

**Matrix: Water** 

**Analysis Batch: 266429** 

Client: ARCADIS U.S. Inc

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

MR MR

		IND				
ogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dichloroethane-d4 (Surr)	94		80 - 126		01/31/18 16:57	1
omofluorobenzene (Surr)	103		75 - 125		01/31/18 16:57	1
omofluoromethane (Surr)	96		77 - 120		01/31/18 16:57	1
0	ichloroethane-d4 (Surr) mofluorobenzene (Surr)	ichloroethane-d4 (Surr) 94 mofluorobenzene (Surr) 103	ichloroethane-d4 (Surr) 94 mofluorobenzene (Surr) 103	ichloroethane-d4 (Surr) 94 80 - 126 mofluorobenzene (Surr) 103 75 - 125	ichloroethane-d4 (Surr) 94 80 - 126 mofluorobenzene (Surr) 103 75 - 125	ichloroethane-d4 (Surr) 94 80 - 126 01/31/18 16:57 mofluorobenzene (Surr) 103 75 - 125 01/31/18 16:57

Lab Sample ID: LCS 580-266429/6 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 266429** 

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzene	 10.0	9.92		ug/L	_	99	75 - 120	

	LCS	LCS	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	100		80 - 120
Toluene-d8 (Surr)	100		80 - 122
1,2-Dichloroethane-d4 (Surr)	97		80 - 126
4-Bromofluorobenzene (Surr)	103		75 - 125
Dibromofluoromethane (Surr)	99		77 - 120

Lab Sample ID: LCSD 580-266429/7 **Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA** 

**Matrix: Water** 

**Analysis Batch: 266429** 

	;	Spike LCS	D LCSD				%Rec.		RPD
Analyte		dded Resi	ılt Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Renzene		10.0	6	ua/l	_	106	75 120	7	1/

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	100		80 - 120
Toluene-d8 (Surr)	100		80 - 122
1,2-Dichloroethane-d4 (Surr)	96		80 - 126
4-Bromofluorobenzene (Surr)	104		75 - 125
Dibromofluoromethane (Surr)	100		77 - 120

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

Lab Sample ID: MB 580-266194/1-A Client Sample ID: Method Blank **Matrix: Water Prep Type: Total/NA Analysis Batch: 266333 Prep Batch: 266194** MD MD

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.00608	J	0.020	0.0020	ug/L		01/29/18 14:21	01/30/18 19:06	1
Benzo[a]pyrene	0.00544	J	0.020	0.0030	ug/L		01/29/18 14:21	01/30/18 19:06	1
Benzo[b]fluoranthene	ND		0.020	0.0080	ug/L		01/29/18 14:21	01/30/18 19:06	1
Benzo[k]fluoranthene	0.0105	J	0.030	0.0090	ug/L		01/29/18 14:21	01/30/18 19:06	1
Chrysene	0.0101	J	0.020	0.0060	ug/L		01/29/18 14:21	01/30/18 19:06	1
Dibenz(a,h)anthracene	0.00702	J	0.020	0.0020	ug/L		01/29/18 14:21	01/30/18 19:06	1
Indeno[1,2,3-cd]pyrene	0.00936	J	0.020	0.0070	ug/L		01/29/18 14:21	01/30/18 19:06	1

TestAmerica Seattle

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Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

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

Lab Sample ID: MB 580-266194/1-A

Lab Sample ID: LCS 580-266194/4-A

**Matrix: Water** 

**Matrix: Water** 

**Analysis Batch: 266333** 

Client Sample ID: Method Blank Prep Type: Total/NA

**Prep Batch: 266194** 

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac 01/29/18 14:21 01/30/18 19:06 Terphenyl-d14 53 - 112 62

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 266194

**Analysis Batch: 266333** Spike LCS LCS %Rec. Added Result Qualifier Limits **Analyte** Unit D %Rec Benzo[a]anthracene 8.00 6.23 ug/L 78 71 - 120 8.00 6.40 80 76 - 120 Benzo[a]pyrene ug/L Benzo[b]fluoranthene 8.00 6.02 ug/L 75 66 - 1208.00 77 68 - 120 Benzo[k]fluoranthene 6.14 ug/L Chrysene 8 00 5.56 ug/L 69 64 - 120 Dibenz(a,h)anthracene 8.00 6.40 ug/L 80 60 - 125 Indeno[1,2,3-cd]pyrene 8.00 75 6.03 ug/L 63 - 120

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 53 - 112 62

Lab Sample ID: LCSD 580-266194/5-A

**Matrix: Water** 

**Analysis Batch: 266333** 

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

**Prep Batch: 266194** 

LCSD LCSD Spike %Rec. **RPD** Analyte Added Result Qualifier Unit D %Rec Limits RPD Limit 8.00 6.29 79 71 - 120 16 Benzo[a]anthracene ug/L 8.00 6.59 82 76 - 120 17 Benzo[a]pyrene ug/L 8.00 6.20 78 66 - 120 20 Benzo[b]fluoranthene ug/L 3 Benzo[k]fluoranthene 8.00 6.32 ug/L 79 68 - 120 3 20 ug/L Chrysene 8.00 5.68 71 64 - 120 2 16 8.00 Dibenz(a,h)anthracene 6.72 ug/L 84 60 - 1255 15 Indeno[1,2,3-cd]pyrene 8.00 6.24 ug/L 78 63 - 120 15

LCSD LCSD

%Recovery Qualifier Surrogate Limits 53 - 112 Terphenyl-d14 63

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

MB MB

Lab Sample ID: MB 580-266076/5 Client Sample ID: Method Blank **Matrix: Water** 

**Analysis Batch: 266076** 

Prep Type: Total/NA

**Analyte** Result Qualifier RL **MDL** Unit D Prepared Analyzed Dil Fac Gasoline 0.25 01/26/18 12:59  $\overline{\sf ND}$ 0.050 mg/L

MB MB Qualifier Limits Prepared Dil Fac Surrogate %Recovery Analyzed 58 - 133 01/26/18 12:59 4-Bromofluorobenzene (Surr) 94 Trifluorotoluene (Surr) 109 77 - 128 01/26/18 12:59

TestAmerica Seattle

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Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

#### Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC) (Continued)

Lab Sample ID: LCS 580-266076/6 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 266076** 

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits 1.00 Gasoline 0.938 mg/L 94 79 - 110

LCS LCS Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 100 58 - 133 Trifluorotoluene (Surr) 95 77 - 128

Client Sample ID: Lab Control Sample Dup Lab Sample ID: LCSD 580-266076/7 Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 266076** 

LCSD LCSD RPD Spike %Rec. Limits RPD **Analyte** Added Result Qualifier Unit %Rec Limit D Gasoline 1.00 0.897 90 79 - 110 10 mg/L

LCSD LCSD Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 58 - 133 99 90 77 - 128 Trifluorotoluene (Surr)

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

MR MR

Lab Sample ID: MB 580-266313/1-B Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 266353** Prep Batch: 266313

Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac #2 Diesel (C10-C24) ND 0.11 0.065 mg/L 01/30/18 14:37 01/31/18 16:45 Motor Oil (>C24-C36) 01/30/18 14:37 01/31/18 16:45 ND 0.35 0.096 mg/L

MR MR Qualifier Surrogate %Recovery Limits Prepared Analyzed Dil Fac 70 50 - 150 01/30/18 14:37 01/31/18 16:45 o-Terphenyl

Lab Sample ID: LCS 580-266313/2-B **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 266353 Prep Batch: 266313** LCS LCS Spike %Rec.

Analyte Added Result Qualifier Unit %Rec Limits #2 Diesel (C10-C24) 2.00 1.88 94 59 - 112 mg/L Motor Oil (>C24-C36) 2.00 106 2.12 mg/L 64 - 120

LCS LCS Limits Surrogate %Recovery Qualifier 50 - 150 o-Terphenyl 98

Lab Sample ID: LCSD 580-266313/3-B **Client Sample ID: Lab Control Sample Dup Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 266353 Prep Batch: 266313** Spike LCSD LCSD %Rec. **RPD** Added RPD Analyte Result Qualifier Unit D %Rec Limits

Limit #2 Diesel (C10-C24) 2.00 1.67 mg/L 83 59 - 112 12

TestAmerica Seattle

2/6/2018

# **QC Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74658-1

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

Lab Sample ID: LCSD 580-266313/3-B **Client Sample ID: Lab Control Sample Dup Matrix: Water Prep Type: Total/NA Prep Batch: 266313 Analysis Batch: 266353** Spike LCSD LCSD %Rec.

Unit Analyte Added Result Qualifier Limits RPD Limit D %Rec Motor Oil (>C24-C36) 2.00 97 64 - 120 9 17 1.94 mg/L

LCSD LCSD Surrogate %Recovery Qualifier Limits o-Terphenyl 90 50 - 150

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2/6/2018

### **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74658-1

Lab Sample ID: 580-74658-1

Matrix: Water

Client Sample ID: Outfall #002 Date Collected: 01/24/18 10:20

Date Received: 01/25/18 14:10

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C			266429	01/31/18 20:17	JSM	TAL SEA
Total/NA	Prep	3510C			266194	01/29/18 14:21	APR	TAL SEA
Total/NA	Analysis	8270D SIM		1	266333	01/30/18 23:34	ERZ	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	266076	01/26/18 16:41	JCV	TAL SEA
Total/NA	Prep	3510C			266313	01/30/18 14:37	NDB	TAL SEA
Total/NA	Cleanup	3630C			266349	01/31/18 10:43	REY	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	266353	01/31/18 17:52	ADB	TAL SEA

Client Sample ID: Trip Blank

Lab Sample ID: 580-74658-2

Date Collected: 01/24/18 10:20 Matrix: Water

Date Received: 01/25/18 14:10

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	266303	01/30/18 21:33	JSM	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	266076	01/26/18 15:38	JCV	TAL SEA

#### **Laboratory References:**

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

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TestAmerica Seattle

# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-74658-1

Project/Site: Chevron Edmonds Terminal

## **Laboratory: TestAmerica Seattle**

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

Authority	Program	<b>EPA Region</b>	<b>Identification Number</b>	<b>Expiration Date</b>
Alaska (UST)	State Program	10	UST-022	03-02-18
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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-18

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# **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74658-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-74658-1	Outfall #002	Water	01/24/18 10:20	01/25/18 14:10
580-74658-2	Trip Blank	Water	01/24/18 10:20	01/25/18 14:10

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

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Short Hold	Custo

Chain			
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Client: ARCADIS U.S. Inc

Job Number: 580-74658-1

Login Number: 74658 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

Grouter: Hobbs, Remour.		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



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: 580-74854-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 2/9/2018 9:56:45 AM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

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**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Chevron Edmonds Terminal TestAmerica Job ID: 580-74854-1

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#### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74854-1

Job ID: 580-74854-1

**Laboratory: TestAmerica Seattle** 

**Narrative** 

Job Narrative 580-74854-1

#### Receipt

Three samples were received on 2/2/2018 12:33 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.0° C.

#### **GC/MS VOA**

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

#### GC/MS Semi VOA

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

#### GC Semi VOA

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

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# **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74854-1

## Glossary

ND

PQL

QC

RER

RL RPD

TEF

TEQ

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

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)

**Practical Quantitation Limit** 

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin)

**Quality Control** 

Project/Site: Chevron Edmonds Terminal

Client Sample ID: Outfall #002

Lab Sample ID: 580-74854-1

Matrix: Water

Date Collected: 02/01/18 15:00 Date Received: 02/02/18 12:33

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0	0.42	ug/L			02/08/18 15:14	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	108		74 - 123					02/08/18 15:14	1
Toluene-d8 (Surr)	90		79 - 122					02/08/18 15:14	1
1,2-Dichloroethane-d4 (Surr)	106		70 - 120					02/08/18 15:14	1
4-Bromofluorobenzene (Surr)	101		78 - 119					02/08/18 15:14	1
Dibromofluoromethane (Surr)	103		70 - 120					02/08/18 15:14	1

Analyte	mivolatile Organic Compo Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND	0.020	0.0020	ug/L	<del></del>	02/05/18 09:03	02/05/18 20:27	1
Benzo[a]pyrene	ND	0.020	0.0031	ug/L		02/05/18 09:03	02/05/18 20:27	1
Benzo[b]fluoranthene	ND	0.020	0.0082	ug/L		02/05/18 09:03	02/05/18 20:27	1
Benzo[k]fluoranthene	ND	0.031	0.0092	ug/L		02/05/18 09:03	02/05/18 20:27	1
Chrysene	ND	0.020	0.0061	ug/L		02/05/18 09:03	02/05/18 20:27	1
Dibenz(a,h)anthracene	ND	0.020	0.0020	ug/L		02/05/18 09:03	02/05/18 20:27	1
Indeno[1,2,3-cd]pyrene	ND	0.020	0.0072	ug/L		02/05/18 09:03	02/05/18 20:27	1
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenvl-d14	83	53 - 112				02/05/18 09:03	02/05/18 20:27	

Method: NWTPH-Gx - Northw	est - Volatile	Petroleui	m Products	(GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			02/06/18 14:31	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		58 - 133					02/06/18 14:31	1
Trifluorotoluene (Surr)								02/06/18 14:31	

Method: NWTPH-DX - North	vest - Semi-v	olatile Peti	roleum Prod	ucts (G	<b>-</b> )				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11	0.066	mg/L		02/06/18 09:21	02/06/18 19:11	1
Motor Oil (>C24-C36)	ND		0.36	0.098	mg/L		02/06/18 09:21	02/06/18 19:11	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	71		50 - 150				02/06/18 09:21	02/06/18 19:11	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc

**Client Sample ID: Dup-1** 

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74854-1

Lab Sample ID: 580-74854-2

Matrix: Water

Date Collected: 02/01/18 00:01 Date Received: 02/02/18 12:33

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0	0.42	ug/L			02/08/18 16:40	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	108		74 - 123					02/08/18 16:40	1
Toluene-d8 (Surr)	91		79 - 122					02/08/18 16:40	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 120					02/08/18 16:40	1
4-Bromofluorobenzene (Surr)	100		78 - 119					02/08/18 16:40	1
Dibromofluoromethane (Surr)	101		70 - 120					02/08/18 16:40	1

Analyte	Result Qualifi	er RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND ND	0.020	0.0020	ug/L		02/05/18 09:03	02/05/18 20:51	1
Benzo[a]pyrene	ND	0.020	0.0030	ug/L		02/05/18 09:03	02/05/18 20:51	1
Benzo[b]fluoranthene	ND	0.020	0.0081	ug/L		02/05/18 09:03	02/05/18 20:51	1
Benzo[k]fluoranthene	ND	0.030	0.0091	ug/L		02/05/18 09:03	02/05/18 20:51	1
Chrysene	ND	0.020	0.0061	ug/L		02/05/18 09:03	02/05/18 20:51	1
Dibenz(a,h)anthracene	ND	0.020	0.0020	ug/L		02/05/18 09:03	02/05/18 20:51	1
Indeno[1,2,3-cd]pyrene	ND	0.020	0.0071	ug/L		02/05/18 09:03	02/05/18 20:51	1
Surrogate	%Recovery Qualifi	ier Limits				Prepared	Analyzed	Dil Fac
Terphenvl-d14	80	53 - 112				02/05/18 09:03	02/05/18 20:51	

Method: NWTPH-Gx - Northy	est - Volatile	e Petroleur	n Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			02/06/18 16:06	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		58 - 133					02/06/18 16:06	1
Trifluorotoluene (Surr)	106		77 - 128					02/06/18 16:06	1

Method: MAALLIPPY - MOLITIM	est - Sellii-v	Clatile Fet	oleulli Fiou	ucis (G	<b>-</b> )				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11	0.066	mg/L		02/06/18 09:21	02/06/18 20:18	1
Motor Oil (>C24-C36)	ND		0.35	0.097	mg/L		02/06/18 09:21	02/06/18 20:18	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	71		50 - 150				02/06/18 09:21	02/06/18 20:18	1

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# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74854-1

Lab Sample ID: 580-74854-3

**Matrix: Water** 

Client Sample ID: Trip Blank Date Collected: 02/01/18 00:01

Date Received: 02/02/18 12:33

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0	0.42	ug/L			02/08/18 14:45	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	105		74 - 123					02/08/18 14:45	1
Toluene-d8 (Surr)	91		79 - 122					02/08/18 14:45	1
1,2-Dichloroethane-d4 (Surr)	109		70 - 120					02/08/18 14:45	1
4-Bromofluorobenzene (Surr)	101		78 - 119					02/08/18 14:45	1
Dibromofluoromethane (Surr)	104		70 - 120					02/08/18 14:45	1

Method: NWTPH-Gx - North	nwest - Volatile	e Petroleu	m Products (	(GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			02/06/18 14:00	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		58 - 133			=		02/06/18 14:00	1
Trifluorotoluene (Surr)	109		77 - 128					02/06/18 14:00	1

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Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

## Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-266916/5 **Client Sample ID: Method Blank Matrix: Water Prep Type: Total/NA Analysis Batch: 266916** MB MB Analyte Result Qualifier RL **MDL** Unit D Prepared Analyzed Dil Fac 2.0 02/08/18 12:50 Benzene ND 0.42 ug/L

	MB	MB				
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	107		74 - 123		02/08/18 12:50	1
Toluene-d8 (Surr)	93		79 - 122		02/08/18 12:50	1
1,2-Dichloroethane-d4 (Surr)	107		70 - 120		02/08/18 12:50	1
4-Bromofluorobenzene (Surr)	101		78 - 119		02/08/18 12:50	1
Dibromofluoromethane (Surr)	101		70 - 120		02/08/18 12:50	1

Lab Sample ID: LCS 580-266916/6 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 266916** 

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzene 10.0 9.27 ug/L 93 37 - 151

	LCS	LCS	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	106		74 - 123
Toluene-d8 (Surr)	93		79 - 122
1,2-Dichloroethane-d4 (Surr)	106		70 - 120
4-Bromofluorobenzene (Surr)	103		78 - 119
Dibromofluoromethane (Surr)	104		70 - 120

Lab Sample ID: LCSD 580-266916/7 **Client Sample ID: Lab Control Sample Dup Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 266916** 

Benzene

Spike LCSD LCSD %Rec. Analyte Added Result Qualifier Limits Unit D %Rec RPD

9.78

ug/L

98

37 - 151

10.0

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	106		74 - 123
Toluene-d8 (Surr)	91		79 - 122
1,2-Dichloroethane-d4 (Surr)	104		70 - 120
4-Bromofluorobenzene (Surr)	102		78 - 119
Dibromofluoromethane (Surr)	101		70 - 120

Lab Sample ID: 580-74854-1 MS Client Sample ID: Outfall #002 **Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 266916** 

MS MS Sample Sample Spike

Added Analyte Result Qualifier Result Qualifier Unit D %Rec Limits Benzene ND 11.6 12.5 ug/L 108 37 - 151

MS MS Surrogate %Recovery Qualifier Limits 107 74 - 123 Trifluorotoluene (Surr) Toluene-d8 (Surr) 79 - 122 92

TestAmerica Seattle

Page 8 of 18

RPD Limit

5

%Rec.

2/9/2018

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

### Method: 624 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 580-74854-1 MS

**Matrix: Water** 

**Analysis Batch: 266916** 

Client Sample ID: Outfall #002

**Prep Type: Total/NA** 

MS MS %Recovery Qualifier Surrogate Limits 1,2-Dichloroethane-d4 (Surr) 105 70 - 120 4-Bromofluorobenzene (Surr) 103 78 - 119 Dibromofluoromethane (Surr) 70 - 120 102

Lab Sample ID: 580-74854-1 MSD

**Matrix: Water** 

**Analysis Batch: 266916** 

Client Sample ID: Outfall #002 Prep Type: Total/NA

	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	ND		11.6	12.8		ug/L		110	37 - 151	2	30

MSD MSD Surrogate %Recovery Qualifier Limits 74 - 123 Trifluorotoluene (Surr) 106 Toluene-d8 (Surr) 93 79 - 122 106 70 - 120 1,2-Dichloroethane-d4 (Surr) 4-Bromofluorobenzene (Surr) 102 78 - 119 Dibromofluoromethane (Surr) 102 70 - 120

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

Lab Sample ID: MB 580-266640/1-A **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA **Analysis Batch: 266691 Prep Batch: 266640** MR MR

	IVID I	IVID							
Analyte	Result (	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.020	0.0020	ug/L		02/05/18 09:03	02/05/18 17:12	1
Benzo[a]pyrene	ND		0.020	0.0030	ug/L		02/05/18 09:03	02/05/18 17:12	1
Benzo[b]fluoranthene	ND		0.020	0.0080	ug/L		02/05/18 09:03	02/05/18 17:12	1
Benzo[k]fluoranthene	ND		0.030	0.0090	ug/L		02/05/18 09:03	02/05/18 17:12	1
Chrysene	ND		0.020	0.0060	ug/L		02/05/18 09:03	02/05/18 17:12	1
Dibenz(a,h)anthracene	ND		0.020	0.0020	ug/L		02/05/18 09:03	02/05/18 17:12	1
Indeno[1,2,3-cd]pyrene	ND		0.020	0.0070	ug/L		02/05/18 09:03	02/05/18 17:12	1

MB MB Limits Surrogate %Recovery Qualifier Prepared Analyzed Dil Fac Terphenyl-d14 92 53 - 112 02/05/18 09:03 02/05/18 17:12

Lab Sample ID: LCS 580-266640/2-A

**Matrix: Water** 

**Analysis Batch: 266691** 

Prep Type: Total/NA **Prep Batch: 266640** Sniko 100 100

	Spike	LUS	LUS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	3.76		ug/L		94	71 - 120	
Benzo[a]pyrene	4.00	3.97		ug/L		99	76 - 120	
Benzo[b]fluoranthene	4.00	3.71		ug/L		93	66 - 120	
Benzo[k]fluoranthene	4.00	3.68		ug/L		92	68 - 120	
Chrysene	4.00	3.48		ug/L		87	64 - 120	
Dibenz(a,h)anthracene	4.00	4.16		ug/L		104	60 - 125	

TestAmerica Seattle

**Client Sample ID: Lab Control Sample** 

Page 9 of 18 2/9/2018

Client: ARCADIS U.S. Inc Project/Site: Chevron Edmonds Terminal

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

Lab Sample ID: LCS 580-266640/2-A **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA **Analysis Batch: 266691 Prep Batch: 266640** LCS LCS Spike %Rec. Added Result Qualifier Analyte Unit D %Rec Limits Indeno[1,2,3-cd]pyrene 4.00 3.95 ug/L 99 63 - 120

LCS LCS %Recovery Qualifier Limits Surrogate Terphenyl-d14 53 - 112 82

Lab Sample ID: LCSD 580-266640/3-A

**Matrix: Water** 

**Analysis Batch: 266691** 

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA **Prep Batch: 266640** 

LCSD LCSD Spike %Rec. **RPD** Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Benzo[a]anthracene 4.00 3.83 96 71 - 120 16 ug/L Benzo[a]pyrene 4.00 4.00 ug/L 100 76 - 120 17 Benzo[b]fluoranthene 4.00 3.88 ug/L 97 66 - 120 20 4.00 3.65 91 68 - 120 20 Benzo[k]fluoranthene ug/L Chrysene 4.00 3.52 ug/L 88 64 - 120 16 4.00 3.92 60 - 125 Dibenz(a,h)anthracene ug/L 98 6 15 Indeno[1,2,3-cd]pyrene 4.00 4.06 101 63 - 120 15 ug/L

LCSD LCSD Surrogate %Recovery Qualifier Limits Terphenyl-d14 82 53 - 112

Lab Sample ID: 580-74854-1 MS

**Matrix: Water** 

**Analysis Batch: 266691** 

Client Sample ID: Outfall #002

Prep Type: Total/NA **Prep Batch: 266640** 

Sample Sample Spike MS MS %Rec. Result Qualifier Result Qualifier Added **Analyte** Unit D %Rec Limits Benzo[a]anthracene ND 4.17 3.58 ug/L 86 71 - 120 ug/L Benzo[a]pyrene ND 4.17 3.74 90 76 - 120 Benzo[b]fluoranthene ND ug/L 87 4.17 3.63 66 - 120Benzo[k]fluoranthene ND 4.17 3.29 ug/L 79 68 - 120 ND 3.25 78 64 - 120 Chrysene 4.17 ug/L Dibenz(a,h)anthracene ND 4.17 3.88 ug/L 93 60 - 125 ND 3.80 Indeno[1,2,3-cd]pyrene 4 17 ug/L 63 - 120

MS MS Surrogate %Recovery Qualifier Limits Terphenyl-d14 74 53 - 112

Sample Sample

Lab Sample ID: 580-74854-1 MSD

**Matrix: Water** 

Analysis Batch: 266691

Client Sample ID: Outfall #002

Prep Type: Total/NA **Prep Batch: 266640** 

RPD %Rec. Limits RPD Limit 71 - 120 3 16

Qualifier Added %Rec Analyte Result Result Qualifier Unit Benzo[a]anthracene ND 4.06 3.48 ug/L 86 Benzo[a]pyrene ND 4.06 3.54 ug/L 87 76 - 120 6 17 Benzo[b]fluoranthene ND 4.06 3.36 ug/L 83 66 - 120 20 8 Benzo[k]fluoranthene ND 4.06 3.10 ug/L 76 68 - 1206 20 64 - 120 Chrysene ND 4.06 3.14 ug/L 77 16

Spike

MSD MSD

TestAmerica Seattle

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2/9/2018

Client: ARCADIS U.S. Inc

4-Bromofluorobenzene (Surr)

Project/Site: Chevron Edmonds Terminal

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

Lab Sample ID: 580-74854 Matrix: Water Analysis Batch: 266691	4-1 MSD						C	lient Sa	ample ID: Prep Ty Prep Ba	pe: Tot	al/NA
	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Dibenz(a,h)anthracene	ND		4.06	3.61		ug/L		89	60 - 125	7	15
Indeno[1,2,3-cd]pyrene	ND		4.06	3.52		ug/L		87	63 - 120	8	15
	MSD	MSD									
Surrogate	%Recovery	Qualifier	Limits								
Terphenyl-d14	74		53 - 112								

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

102

Lab Sample ID: MB 580-266742/ Matrix: Water Analysis Batch: 266742	5					(	Client Sam	ple ID: Method Prep Type: To	
	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			02/06/18 12:25	1
	МВ	MB							
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		58 - 133			=		02/06/18 12:25	1
Trifluorotoluene (Surr)	96		77 - 128					02/06/18 12:25	1

Matrix: Water Analysis Batch: 266742	-266742/6				Cile	nt Sai	mpie il	Prep Type: To	•
,		Spike	LCS	LCS				%Rec.	
Analyte		Added	Result	Qualifier	Unit	D	%Rec	Limits	
Gasoline		1.00	0.952		mg/L		95	79 - 110	
	LCS LCS								
Surrogate	%Recovery Qualifier	Limits							

Trifluorotoluene (Surr)	98	77 - 128	
Lab Sample ID: LCSD 580-266742 Matrix: Water	<b>17</b>		Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA

58 - 133

Analysis Batch: 266742									
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Gasoline	1.00	0.971		ma/L	_	97	79 - 110	2	10

Gasoline			1.00	0.971	mg/L	97	79 - 110	2
	LCSD	LCSD						
Surrogate	%Recovery	Qualifier	Limits					
4-Bromofluorobenzene (Surr)	103		58 - 133					

Trifluorotoluene (Surr)	99	77 - 128	
Lab Sample ID: 580-74854- Matrix: Water	1 MS		Client Sample ID: Outfall #002 Prep Type: Total/NA

**Analysis Batch: 266742** Sample Sample Spike MS MS %Rec. Limits Analyte **Result Qualifier** Added Result Qualifier Unit D %Rec Gasoline ND 1.00 0.898 mg/L 90 79 - 110

TestAmerica Seattle

Client Sample ID: Outfall #002

**Client Sample ID: Method Blank** 

Prep Type: Total/NA

Prep Batch: 266712

Analyzed

Analyzed

Prep Type: Total/NA

Dil Fac

Dil Fac

Project/Site: Chevron Edmonds Terminal

IVIS	IVIS	
%Recovery	Qualifier	Limits
99		58 - 133
111		77 - 128
	%Recovery	

Lab Sample ID: 580-74854-1 MSD

**Matrix: Water** 

Client: ARCADIS U.S. Inc

Analysis Batch: 266742											
	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Gasoline	ND		1.00	0.941		mg/L		94	79 - 110	5	10
	MSD	MSD									
Surrogate	%Recovery	Qualifier	Limits								
4-Bromofluorobenzene (Surr)	99		58 - 133								

RL

0.11

0.35

Limits

Spike

Added

2.00

2.00

Spike Added

2.00

50 - 150

**MDL** Unit

0.065 mg/L

0.096 mg/L

LCS LCS

LCSD LCSD

1.72

1.92

Result Qualifier

1.65

1.84

Result Qualifier

Unit

mg/L

mg/L

Unit

mg/L

mg/L

77 - 128

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

106

Lab Sample ID: MB 580-266712/1-B

**Matrix: Water** 

Trifluorotoluene (Surr)

**Analysis Batch: 266768** 

MB MB Analyte Result Qualifier

#2 Diesel (C10-C24)	ND	
Motor Oil (>C24-C36)	ND	
	MD	MD
	MB	IVIB

Surrogate	%Recovery	Qualifier
o-Terphenyl	76	

Lab Sample ID: LCS 580-266712/2-B **Matrix: Water** 

**Analysis Batch: 266768** 

Analyte

#2 Diesel (C10-C24)

Motor Oil (>C24-C36)

#2 Diesel (C10-C24)

	LCS	LCS	
Surrogate	%Recovery	Qualifier	Limits
o-Terphenyl	90		50 - 150

Lab Sample ID: LCSD 580-266712/3-B

**Matrix: Water Analysis Batch: 266768** 

Motor Oil (>C24-C36)			2.00
	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
o-Terphenyl	93		50 - 150

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

02/06/18 09:21 02/06/18 17:22

02/06/18 09:21 02/06/18 17:22 02/06/18 09:21 02/06/18 17:22

Prepared

Prepared

**Prep Batch: 266712** 

		%Rec.	_
D	%Rec	Limits	
_	83	59 - 112	_

92 64 - 120

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA **Prep Batch: 266712** 

	%Rec.		RPD	
%Rec	Limits	RPD	Limit	
86	59 - 112	4	16	
96	64 - 120	4	17	

TestAmerica Seattle

# **QC Sample Results**

Client: ARCADIS U.S. Inc

o-Terphenyl

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74854-1

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

Lab Sample ID: 580-74854 Matrix: Water Analysis Batch: 266768	1-1 MS						С	lient Sa	ample ID: Outfall #002 Prep Type: Total/NA Prep Batch: 266712
	Sample	Sample	Spike	MS	MS				%Rec.
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits
#2 Diesel (C10-C24)	ND		2.03	1.51		mg/L		75	59 - 112
Motor Oil (>C24-C36)	ND		2.03	1.87		mg/L		93	64 - 120
	MS	MS							
Surrogate	%Recovery	Qualifier	Limits						
o-Terphenyl	87	-	50 - 150						

Lab Sample ID: 580-7485 Matrix: Water Analysis Batch: 266768	4-1 MSD						С	lient Sa	ample ID: Prep Tyl Prep Ba	pe: Tota	al/NA
, <b>,</b>	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
#2 Diesel (C10-C24)	ND		2.02	1.54		mg/L		76	59 - 112	2	16
Motor Oil (>C24-C36)	ND		2.02	1.88		mg/L		93	64 - 120	0	17
	MSD	MSD									
Surrogate	%Recovery	Qualifier	Limits								

50 - 150

86

3

4

6

8

9

10

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2/9/2018

#### **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74854-1

Lab Sample ID: 580-74854-1

TAL SEA

Matrix: Water

Client Sample ID: Outfall #002 Date Collected: 02/01/18 15:00

Date Received: 02/02/18 12:33

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type Total/NA	Type Analysis	- Method 624	Run	_	266916	or Analyzed 02/08/18 15:14	Analyst P1P	TAL SEA
Total/NA	Prep	3510C		•	266640	02/05/18 09:03		TAL SEA
Total/NA	Analysis	8270D SIM		1	266691	02/05/18 20:27	T1W	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	266742	02/06/18 14:31	JCV	TAL SEA
Total/NA	Prep	3510C			266712	02/06/18 09:21	NDB	TAL SEA
Total/NA	Cleanup	3630C			266750	02/06/18 12:34	NDB	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	266768	02/06/18 19:11	ADB	TAL SEA

Client Sample ID: Dup-1 Lab Sample ID: 580-74854-2

Date Collected: 02/01/18 00:01 Matrix: Water Date Received: 02/02/18 12:33

Batch Dilution Batch Batch **Prepared** Method Number **Prep Type** Type Run **Factor** or Analyzed Analyst Lab 624 266916 02/08/18 16:40 P1P TAL SEA Total/NA Analysis Total/NA 3510C TAL SEA Prep 266640 02/05/18 09:03 NDB Total/NA 8270D SIM 266691 02/05/18 20:51 T1W TAL SEA Analysis 1 Total/NA Analysis **NWTPH-Gx** 1 266742 02/06/18 16:06 JCV TAL SEA Prep 3510C TAL SEA Total/NA 266712 02/06/18 09:21 NDB Total/NA Cleanup 3630C 266750 02/06/18 12:34 NDB TAL SEA

Client Sample ID: Trip Blank

Lab Sample ID: 580-74854-3

1

266768 02/06/18 20:18 ADB

Date Collected: 02/01/18 00:01 Date Received: 02/02/18 12:33

Analysis

NWTPH-Dx

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	266916	02/08/18 14:45	P1P	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	266742	02/06/18 14:00	JCV	TAL SEA

**Laboratory References:** 

Total/NA

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

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**Matrix: Water** 

# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-74854-1

Project/Site: Chevron Edmonds Terminal

## **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	UST-022	03-02-18
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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-18

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# **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74854-1

Lab Sample ID	Client Sample ID	Matrix	Collected Received
580-74854-1	Outfall #002	Water	02/01/18 15:00 02/02/18 12:3
580-74854-2	Dup-1	Water	02/01/18 00:01 02/02/18 12:3
580-74854-3	Trip Blank	Water	02/01/18 00:01 02/02/18 12:3

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047

Rush	
	Chain of
Short Hold	Custody Record

v	vww.testamerical	inc.com							
Client Arcadis	Client Contact	Dela	m Diagell	· · · · · · · · · · · · · · · · · · ·	Date 2/1/18	Chain of Custody			
Address	Talanhana Number	Man Codal/Co	· Compbell		3659				
1100 Dive way, Suite 800	Telephone Number	(Area Code)/Fa)	x Number		Lab Number	Page of			
City State Zip Code WA 98101  Project Name and Location (State)  Edward S Terminal  Contract/Purchase Order/Quote No.	Sampler Jason Lit Billing Contact	tte E	nb Contact	-CAX -CAX -CAX -CAX -CAX -CAX -CAX -CAX	alysis (Attach list if re space is needed)	1 1	al Instructions/ ions of Receipt		
Sample I.D. and Location/Description (Containers for each sample may be combined on one line)  Date	Time Harman	SS.	Preservatives  HOSCH HORO NAOH NAOH NAOH NAOH NAOH NAOH NAOH NAO	Benzene NultPH- NANTPH- CPAH: 82					
	X 002	2	<del>                                     </del>	XXXX		-37#	PH= 7.5%		
	510 X	2	8	XXXX					
DMP-1 2/1/18 -	<u> </u>	2	. 8	XXXX					
Trip Blank	<u> </u>		6	XX					
· '		7							
	W. A. A. A. W. A.								
	580-748:	54 Chain of Ci	ustody		Therm. IDCooler Dsc_i	Fr Cor & C Blue @L Packing Es Custody Seal: Y	hb/ 0		
Cooler Possible Hazard Identification									
☐ Yes ☐ No Cooler Temp: ☐ Non-Hazard ☐ Flamma	able 🔲 Skin Irritar	nt 🗆 Poiso		•	Disposal By Lab Archive For Mont		assessed if samples nger than 1 month)		
Turn Around Time Required (business days)			QC Requirements (Specify)			V	igo man, i monany		
24 Hours	Date 7 2/2/(8	ime 1233	1. Received By Sign/Print	runcisco	una, Jr	Date 2/2/18	Time   1233		
2. Řelinquished By – Šígn/Print	Date T	ime	2. Received By Sign/Print			Date	Time		
3. Relinquished By Sign/Print	Date 7	îme	3. Received By Sign/Print	***************************************		Date	Time		
Comments	<u> </u>								

Job Number: 580-74854-1

Login Number: 74854 List Source: TestAmerica Seattle

List Number: 1

Creator: Blankinship, Tom X

Creator: Blankinship, Iom X		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td>Lab does not accept radioactive samples.</td>	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	N/A	Not present
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	



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: 580-74956-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 2/12/2018 4:04:31 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

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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.

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74956-1

# **Table of Contents**

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### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74956-1

Job ID: 580-74956-1

**Laboratory: TestAmerica Seattle** 

**Narrative** 

Job Narrative 580-74956-1

#### Receipt

Two samples were received on 2/7/2018 12:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.1° C.

#### **GC/MS VOA**

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

#### GC/MS Semi VOA

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

#### GC Semi VOA

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

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### **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74956-1

### **Qualifiers**

#### **GC/MS Semi VOA**

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### **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
DI C	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)

RLReporting Limit or Requested Limit (Radiochemistry)

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

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

TestAmerica Seattle

Page 4 of 15

2/12/2018

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Client Sample ID: Outfall #002

TestAmerica Job ID: 580-74956-1

Lab Sample ID: 580-74956-1

**Matrix: Water** 

Date Collected: 02/06/18 10:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			02/08/18 17:09	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
Trifluorotoluene (Surr)	108		74 - 123					02/08/18 17:09	- 1
Toluene-d8 (Surr)	92		79 - 122					02/08/18 17:09	
4-Bromofluorobenzene (Surr)	100		78 - 119					02/08/18 17:09	
Dibromofluoromethane (Surr)	101		70 - 120					02/08/18 17:09	
1,2-Dichloroethane-d4 (Surr)	104		70 - 120					02/08/18 17:09	1
Method: 8270D SIM - Semi Analyte		c Compou Qualifier	inds (GC/MS	SIM) MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0053		0.020				02/08/18 13:22	-	Dil Fat
Benzo[a]antifracene Benzo[a]pyrene	0.0053		0.020	0.0020	U			02/09/18 20:48	
Benzo[a]pyrene Benzo[b]fluoranthene	0.0048 ND	J	0.020	0.0030	•		02/08/18 13:22		
Benzo[k]fluoranthene	ND		0.020	0.0081	ug/L ug/L			02/09/18 20:48	
	ND ND		0.030		•		02/08/18 13:22		,
Chrysene				0.0061	•				
Dibenz(a,h)anthracene	0.0026		0.020	0.0020			02/08/18 13:22		
Indeno[1,2,3-cd]pyrene	ND		0.020	0.0071	ug/L		02/08/18 13:22	02/09/18 20:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	73		53 - 112				02/08/18 13:22	02/09/18 20:48	
Method: NWTPH-Gx - Nortl	hwest - Volatile	e Petroleui	m Products	(GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			02/08/18 19:35	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
4-Bromofluorobenzene (Surr)	96		58 - 133					02/08/18 19:35	1
Trifluorotoluene (Surr)	106		77 - 128					02/08/18 19:35	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)	ND ND	0.11	0.066	mg/L		02/08/18 09:29	02/08/18 18:11	1	
Motor Oil (>C24-C36)	ND	0.35	0.097	mg/L		02/08/18 09:29	02/08/18 18:11	1	
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac	
o-Terphenyl	78	50 - 150				02/08/18 09:29	02/08/18 18:11	1	

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74956-1

Lab Sample ID: 580-74956-2

**Matrix: Water** 

**Client Sample ID: Trip Blank** Date Collected: 02/06/18 00:01

Date Received: 02/07/18 12:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			02/08/18 14:17	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	106		74 - 123					02/08/18 14:17	1
Toluene-d8 (Surr)	92		79 - 122					02/08/18 14:17	1
4-Bromofluorobenzene (Surr)	101		78 - 119					02/08/18 14:17	1
Dibromofluoromethane (Surr)	102		70 - 120					02/08/18 14:17	1
1,2-Dichloroethane-d4 (Surr)	106		70 - 120					02/08/18 14:17	1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			02/08/18 19:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		58 - 133			=		02/08/18 19:03	
4-bioinionabenzene (Suit)	37		00 - 700					02/00/10 10:00	

2/12/2018

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74956-1

Client Sample ID: Lab Control Sample

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

Prep Type: Total/NA

Prep Type: Total/NA

### Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-266916/5

**Matrix: Water** 

Analyte

Benzene

Analysis Batch: 266916

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 1.0 0.42 ug/L 02/08/18 12:50 ND

MB MB Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Trifluorotoluene (Surr) 107 74 - 123 02/08/18 12:50 Toluene-d8 (Surr) 93 79 - 122 02/08/18 12:50 4-Bromofluorobenzene (Surr) 101 78 - 119 02/08/18 12:50 101 70 - 120 Dibromofluoromethane (Surr) 02/08/18 12:50 70 - 120 1,2-Dichloroethane-d4 (Surr) 107 02/08/18 12:50

Lab Sample ID: LCS 580-266916/6

**Matrix: Water** 

**Analysis Batch: 266916** 

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit %Rec Limits Benzene 10.0 9.27 ug/L 93 37 - 151

LCS LCS Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 106 74 - 123 93 79 - 122 Toluene-d8 (Surr) 4-Bromofluorobenzene (Surr) 103 78 - 119 104 70 - 120 Dibromofluoromethane (Surr) 1,2-Dichloroethane-d4 (Surr) 106 70 - 120

Lab Sample ID: LCSD 580-266916/7

**Matrix: Water** 

**Analysis Batch: 266916** 

LCSD LCSD RPD Spike %Rec. **Analyte** Added Result Qualifier Unit D %Rec Limits **RPD** Limit Benzene 10.0 9.78 ug/L 98 37 - 151

LCSD LCSD Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 106 74 - 123 Toluene-d8 (Surr) 91 79 - 122 4-Bromofluorobenzene (Surr) 102 78 - 119 Dibromofluoromethane (Surr) 101 70 - 120 104 70 - 120 1,2-Dichloroethane-d4 (Surr)

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

Lab Sample ID: MB 580-266949/1-A

**Matrix: Water** 

**Analysis Batch: 267043** 

**Prep Batch: 266949** MB MB Result Qualifier RL **MDL** Unit Prepared Analyte Analyzed Dil Fac Benzo[a]anthracene ND 0.020 0.0020 ug/L 02/08/18 13:22 02/09/18 19:35 Benzo[a]pyrene ND 0.020 0.0030 ug/L 02/08/18 13:22 02/09/18 19:35 1 Benzo[b]fluoranthene ND 02/08/18 13:22 02/09/18 19:35 0.020 0.0080 ug/L

TestAmerica Seattle

Prep Type: Total/NA

**Client Sample ID: Method Blank** 

Page 7 of 15 2/12/2018

Project/Site: Chevron Edmonds Terminal

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-74956-1

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

Lab Sample ID: MB 580-266949/1-A

**Matrix: Water** 

**Analysis Batch: 267043** 

Client Sample ID: Method Blank Prep Type: Total/NA

**Prep Batch: 266949** 

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.030	0.0090	ug/L		02/08/18 13:22	02/09/18 19:35	1
Chrysene	ND		0.020	0.0060	ug/L		02/08/18 13:22	02/09/18 19:35	1
Dibenz(a,h)anthracene	ND		0.020	0.0020	ug/L		02/08/18 13:22	02/09/18 19:35	1
Indeno[1,2,3-cd]pyrene	ND		0.020	0.0070	ug/L		02/08/18 13:22	02/09/18 19:35	1

MB MB

MR ME

Qualifier Limits Surrogate %Recovery Prepared Analyzed Dil Fac 53 - 112 02/08/18 13:22 02/09/18 19:35 Terphenyl-d14 99

**Client Sample ID: Lab Control Sample** 

Lab Sample ID: LCS 580-266949/2-A **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 267043 Prep Batch: 266949** 

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzo[a]anthracene 4.00 3.58 ug/L 90 71 - 120 Benzo[a]pyrene 4.00 3.92 ug/L 98 76 - 120 4.00 3.80 Benzo[b]fluoranthene ug/L 95 66 - 120 Benzo[k]fluoranthene 4.00 3.94 99 68 - 120 ug/L 4.00 Chrysene 3.58 ug/L 89 64 - 120 Dibenz(a,h)anthracene 4.00 3.91 ug/L 98 60 - 125 63 - 120 Indeno[1,2,3-cd]pyrene 4.00 3.56 ug/L 89

LCS LCS

75

Surrogate %Recovery Qualifier Limits Terphenyl-d14 78 53 - 112

Lab Sample ID: LCSD 580-266949/3-A

**Matrix: Water** 

Benzo[a]anthracene

Benzo[b]fluoranthene

Benzo[k]fluoranthene

Benzo[a]pyrene

Terphenyl-d14

Analyte

Chrysene

**Analysis Batch: 267043** 

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

87

%Rec. **RPD** Limits %Rec **RPD** Limit 87 71 - 120 97 76 - 120 17 94 66 - 120 20 20 96 68 - 120 3

64 - 120

**Prep Batch: 266949** 

16

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Dibenz(a,h)anthracene 4.00 3.90 ug/L 97 60 - 125Indeno[1,2,3-cd]pyrene 4.00 3.51 ug/L 88 63 - 120LCSD LCSD Surrogate %Recovery Qualifier Limits

Spike

Added

4.00

4.00

4.00

4.00

4.00

53 - 112

LCSD LCSD

3.50

3.88

3.76

3.84

3.49

Result Qualifier

Unit

ug/L

ug/L

ug/L

ug/L

ug/L

TestAmerica Seattle

2/12/2018

**Analysis Batch: 266996** 

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74956-1

Client Sample ID: Method Blank

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

Lab Sample ID: MB 580-266996/5

Prep Type: Total/NA

MB MB Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 0.25  $\overline{\mathsf{ND}}$ 0.050 mg/L 02/08/18 17:28

MB MB

%Recovery Surrogate Qualifier Limits Prepared Analyzed Dil Fac 4-Bromofluorobenzene (Surr) 94 58 - 133 02/08/18 17:28 Trifluorotoluene (Surr) 96 77 - 128 02/08/18 17:28

Lab Sample ID: LCS 580-266996/6

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

**Matrix: Water** 

**Matrix: Water** 

Analyte

Gasoline

Analysis Batch: 266996

LCS LCS Spike %Rec. **Analyte** Added Result Qualifier Limits Unit D %Rec Gasoline 1.00 0.924 92 79 - 110 mg/L

LCS LCS

Surrogate %Recovery Qualifier Limits 58 - 133 4-Bromofluorobenzene (Surr) 105 90 77 - 128 Trifluorotoluene (Surr)

Lab Sample ID: LCSD 580-266996/7

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

Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 266996** 

RPD Spike LCSD LCSD %Rec. Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Gasoline 1.00 0.944 mg/L 79 - 110

LCSD LCSD

%Recovery Qualifier Surrogate I imits 4-Bromofluorobenzene (Surr) 101 58 - 133 Trifluorotoluene (Surr) 92 77 - 128

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

Lab Sample ID: MB 580-266907/1-B

**Matrix: Water** 

**Analysis Batch: 266963** 

Client Sample ID: Method Blank

Prep Type: Total/NA

**Prep Batch: 266907** 

MB MB Analyte Result Qualifier RL **MDL** Unit

D Prepared Dil Fac Analyzed #2 Diesel (C10-C24) ND 0.11 02/08/18 09:29 02/08/18 17:05 0.065 mg/L Motor Oil (>C24-C36) ND 0.35 02/08/18 09:29 02/08/18 17:05 0.096 mg/L

MB MB

Limits Dil Fac Surrogate %Recovery Qualifier Prepared Analyzed 02/08/18 09:29 02/08/18 17:05 50 - 150 o-Terphenyl 77

Lab Sample ID: LCS 580-266907/2-B

**Analysis Batch: 266963** 

**Matrix: Water** 

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

**Prep Batch: 266907** 

Spike LCS LCS %Rec. Added Analyte Result Qualifier Unit D %Rec Limits #2 Diesel (C10-C24) 2.00 1.69 mg/L 85 59 - 112

TestAmerica Seattle

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2/12/2018

# **QC Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74956-1

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

Lab Sample ID: LCS 580-266907/2-B				Clie	nt Sai	nple ID	: Lab Control Sample
Matrix: Water							Prep Type: Total/NA
Analysis Batch: 266963							<b>Prep Batch: 266907</b>
_	Spike	LCS	LCS				%Rec.
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits
Motor Oil (>C24-C36)	2.00	1.85		mg/L		93	64 - 120

	LCS	LCS	
Surrogate	%Recovery	Qualifier	Limits
o-Terphenyl	90		50 - 150

Lab Sample ID: LCSD 580-266907/3-B			(	Client Sa	ample	ID: Lab	Control :	Sample	e Dup
Matrix: Water							Prep Ty	•	•
Analysis Batch: 266963							Prep Ba		
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
#2 Diesel (C10-C24)	2.00	1.70		mg/L		85	59 - 112	1	16
Motor Oil (>C24-C36)	2.00	1.88		mg/L		94	64 - 120	2	17

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
o-Terphenyl	95		50 - 150

2/12/2018

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### **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74956-1

Client Sample ID: Outfall #002

Date Collected: 02/06/18 10:30 Date Received: 02/07/18 12:00 Lab Sample ID: 580-74956-1

**Matrix: Water** 

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			266916	02/08/18 17:09	P1P	TAL SEA
Total/NA	Prep	3510C			266949	02/08/18 13:22	NDB	TAL SEA
Total/NA	Analysis	8270D SIM		1	267043	02/09/18 20:48	TL1	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	266996	02/08/18 19:35	JCV	TAL SEA
Total/NA	Prep	3510C			266907	02/08/18 09:29	NDB	TAL SEA
Total/NA	Cleanup	3630C			266953	02/08/18 13:22	NDB	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	266963	02/08/18 18:11	ADB	TAL SEA

Client Sample ID: Trip Blank

Date Collected: 02/06/18 00:01 Date Received: 02/07/18 12:00 Lab Sample ID: 580-74956-2

Matrix: Water

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	266916	02/08/18 14:17	P1P	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	266996	02/08/18 19:03	JCV	TAL SEA

**Laboratory References:** 

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

TestAmerica Seattle

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# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-74956-1

Project/Site: Chevron Edmonds Terminal

## **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	UST-022	03-02-18
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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-18

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# **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74956-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-74956-1	Outfall #002	Water	02/06/18 10:30	02/07/18 12:00
580-74956-2	Trip Blank	Water	02/06/18 00:01	02/07/18 12:00

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THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Rush	
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Job Number: 580-74956-1

Login Number: 74956 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

ordior. Hobbs, Reinicur		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey neter.</td <td>N/A</td> <td></td>	N/A	
he cooler's custody seal, if present, is intact.	True	
ample custody seals, if present, are intact.	True	
he cooler or samples do not appear to have been compromised or ampered with.	True	
amples were received on ice.	True	
ooler Temperature is acceptable.	True	
poler Temperature is recorded.	True	
DC is present.	True	
DC is filled out in ink and legible.	True	
OC is filled out with all pertinent information.	True	
the Field Sampler's name present on COC?	True	
ere are no discrepancies between the containers received and the COC.	True	
imples are received within Holding Time (excluding tests with immediate s)	True	
imple containers have legible labels.	True	
ntainers are not broken or leaking.	True	
imple collection date/times are provided.	True	
propriate sample containers are used.	True	
ample bottles are completely filled.	True	
ample Preservation Verified.	True	
nere is sufficient vol. for all requested analyses, incl. any requested S/MSDs	True	
containers requiring zero headspace have no headspace or bubble is 6mm (1/4").	True	
ultiphasic samples are not present.	True	
amples do not require splitting or compositing.	True	
esidual Chlorine Checked.	N/A	



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: 580-75109-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 2/20/2018 2:02:58 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

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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.

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75109-1

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### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75109-1

Job ID: 580-75109-1

**Laboratory: TestAmerica Seattle** 

Narrative

Job Narrative 580-75109-1

#### Receipt

Two samples were received on 2/14/2018 12:20 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.8° C.

#### **GC/MS VOA**

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

#### GC/MS Semi VOA

Method(s) 8270D SIM: The method blank for preparation batch 580-267557 and analytical batch 580-267585 contained Benzo[a]anthracene above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

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

#### GC Semi VOA

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

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# **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75109-1

### **Qualifiers**

### **GC/MS Semi VOA**

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.

### Glossary

ND

PQL

QC RER

RL

RPD TEF

TEQ

Glossary	
Abbreviation	These commonly used abbreviations may or may not be present in this report.
a	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

Toxicity Equivalent Quotient (Dioxin)

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

Reporting Limit or Requested Limit (Radiochemistry)

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

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

**Quality Control** 

TestAmerica Seattle

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# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75109-1

Lab Sample ID: 580-75109-1

**Matrix: Water** 

Client Sample ID: Outfall #002 Date Collected: 02/13/18 11:30

Date Received: 02/14/18 12:20

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			02/15/18 23:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	105		74 - 123					02/15/18 23:03	1
Toluene-d8 (Surr)	99		79 - 122					02/15/18 23:03	1
4-Bromofluorobenzene (Surr)	106		78 - 119					02/15/18 23:03	1
Dibromofluoromethane (Surr)	110		70 - 120					02/15/18 23:03	1
1,2-Dichloroethane-d4 (Surr)	106		70 - 120					02/15/18 23:03	1

Method: 8270D SIM - Sei Analyte	mivolatile Organic ( Result Q		nds (GC/MS RL	SIM) MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0043 J	В	0.020	0.0020	ug/L		02/19/18 08:56	02/19/18 15:18	1
Benzo[a]pyrene	ND		0.020	0.0030	ug/L		02/19/18 08:56	02/19/18 15:18	1
Benzo[b]fluoranthene	ND		0.020	0.0081	ug/L		02/19/18 08:56	02/19/18 15:18	1
Benzo[k]fluoranthene	ND		0.030	0.0091	ug/L		02/19/18 08:56	02/19/18 15:18	1
Chrysene	ND		0.020	0.0061	ug/L		02/19/18 08:56	02/19/18 15:18	1
Dibenz(a,h)anthracene	ND		0.020	0.0020	ug/L		02/19/18 08:56	02/19/18 15:18	1
Indeno[1,2,3-cd]pyrene	ND		0.020	0.0071	ug/L		02/19/18 08:56	02/19/18 15:18	1
Surrogate	%Recovery Q	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	83		53 - 112				02/19/18 08:56	02/19/18 15:18	1

Method: NWTPH-Gx - Northw	est - Volatile	Petroleur	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			02/15/18 15:49	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	86		58 - 133					02/15/18 15:49	1
Trifluorotoluene (Surr)	117		77 - 128					02/15/18 15:49	

Method: NW I PH-DX - Northwe	est - Semi-v	olatile Petr	oleum Proc	iucts (GC	(د				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11	0.066	mg/L		02/15/18 13:17	02/16/18 01:30	1
Motor Oil (>C24-C36)	ND		0.36	0.097	mg/L		02/15/18 13:17	02/16/18 01:30	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	62		50 - 150				02/15/18 13:17	02/16/18 01:30	1

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# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75109-1

Lab Sample ID: 580-75109-2

**Matrix: Water** 

Client Sample ID: Trip Blank Date Collected: 02/13/18 00:01

Date Received: 02/14/18 12:20

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			02/15/18 15:28	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	105		74 - 123					02/15/18 15:28	1
Toluene-d8 (Surr)	96		79 - 122					02/15/18 15:28	1
4-Bromofluorobenzene (Surr)	102		78 - 119					02/15/18 15:28	1
Dibromofluoromethane (Surr)	104		70 - 120					02/15/18 15:28	1
1,2-Dichloroethane-d4 (Surr)	107		70 - 120					02/15/18 15:28	1

Method: NWTPH-Gx - Norti	hwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			02/15/18 14:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		58 - 133			-		02/15/18 14:48	1
Trifluorotoluene (Surr)	109		77 - 128					02/15/18 14:48	1

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Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75109-1

## Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-267378/5

**Matrix: Water** 

**Analysis Batch: 267378** 

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

MB MB

Analyte Result Qualifier RL MDL Unit D Prepared Analyzed Dil Fac Benzene 1.0 0.42 ug/L 02/15/18 13:41 ND

	MB	MB				
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	104		74 - 123		02/15/18 13:41	1
Toluene-d8 (Surr)	95		79 - 122		02/15/18 13:41	1
4-Bromofluorobenzene (Surr)	101		78 - 119		02/15/18 13:41	1
Dibromofluoromethane (Surr)	105		70 - 120		02/15/18 13:41	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 120		02/15/18 13:41	1

Lab Sample ID: LCS 580-267378/6

**Matrix: Water** 

Analyte

Benzene

**Analysis Batch: 267378** 

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

LCS LCS Spike %Rec. Added Result Qualifier Unit D %Rec Limits 37 - 151 10.0 10.3 ug/L 103

LCS	LCS	
%Recovery	Qualifier	Limits
104		74 - 123
93		79 - 122
100		78 - 119
103		70 - 120
103		70 - 120
	%Recovery 104 93 100 103	93 100 103

Lab Sample ID: LCSD 580-267378/7

**Matrix: Water** 

**Analysis Batch: 267378** 

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

Spike LCSD LCSD %Rec. RPD Analyte Added Result Qualifier Limits Limit Unit D %Rec RPD Benzene 10.0 10.9 ug/L 109 37 - 151 5

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	104		74 - 123
Toluene-d8 (Surr)	97		79 - 122
4-Bromofluorobenzene (Surr)	102		78 - 119
Dibromofluoromethane (Surr)	103		70 - 120
1,2-Dichloroethane-d4 (Surr)	102		70 - 120

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

Lab Sample ID: MB 580-267557/1-A

**Matrix: Water** 

**Analysis Batch: 267585** 

**Client Sample ID: Method Blank** Prep Type: Total/NA Prep Batch: 267557

-	MB	MB						•	
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.00255	J	0.020	0.0020	ug/L		02/19/18 08:56	02/19/18 14:06	1
Benzo[a]pyrene	ND		0.020	0.0030	ug/L		02/19/18 08:56	02/19/18 14:06	1
Benzo[b]fluoranthene	ND		0.020	0.0080	ug/L		02/19/18 08:56	02/19/18 14:06	1

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TestAmerica Job ID: 580-75109-1

Client: ARCADIS U.S. Inc Project/Site: Chevron Edmonds Terminal

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

Lab Sample ID: MB 580-267557/1-A

**Matrix: Water** 

**Analysis Batch: 267585** 

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

**Prep Batch: 267557** 

	MB	МВ							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.030	0.0090	ug/L		02/19/18 08:56	02/19/18 14:06	1
Chrysene	ND		0.020	0.0060	ug/L		02/19/18 08:56	02/19/18 14:06	1
Dibenz(a,h)anthracene	ND		0.020	0.0020	ug/L		02/19/18 08:56	02/19/18 14:06	1
Indeno[1,2,3-cd]pyrene	ND		0.020	0.0070	ug/L		02/19/18 08:56	02/19/18 14:06	1

MB MB

%Recovery Qualifier Limits Prepared Surrogate Analyzed Dil Fac Terphenyl-d14 96 53 - 112 02/19/18 08:56 02/19/18 14:06

Lab Sample ID: LCS 580-267557/2-A **Client Sample ID: Lab Control Sample** 

**Matrix: Water** 

**Analysis Batch: 267585** 

Prep Type: Total/NA

Prep Batch: 267557

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	3.64		ug/L		91	71 - 120	
Benzo[a]pyrene	4.00	3.93		ug/L		98	76 - 120	
Benzo[b]fluoranthene	4.00	3.69		ug/L		92	66 - 120	
Benzo[k]fluoranthene	4.00	3.81		ug/L		95	68 - 120	
Chrysene	4.00	3.54		ug/L		88	64 - 120	
Dibenz(a,h)anthracene	4.00	3.99		ug/L		100	60 - 125	
Indeno[1,2,3-cd]pyrene	4.00	3.66		ug/L		92	63 - 120	

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 88 53 - 112

Lab Sample ID: LCSD 580-267557/3-A

**Matrix: Water** 

Analysis Batch: 267585

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

**Prep Batch: 267557** 

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	_	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	3.79		ug/L		95	71 - 120	4	16
Benzo[a]pyrene	4.00	4.11		ug/L		103	76 - 120	5	17
Benzo[b]fluoranthene	4.00	3.91		ug/L		98	66 - 120	6	20
Benzo[k]fluoranthene	4.00	3.87		ug/L		97	68 - 120	2	20
Chrysene	4.00	3.61		ug/L		90	64 - 120	2	16
Dibenz(a,h)anthracene	4.00	4.04		ug/L		101	60 - 125	1	15
Indeno[1,2,3-cd]pyrene	4.00	3.82		ug/L		96	63 - 120	4	15

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 88 53 - 112

TestAmerica Seattle

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Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75109-1

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

Lab Sample ID: MB 580-267389/6 Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 267389** 

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			02/15/18 13:17	1

MB MB Surrogate Qualifier Limits Prepared Analyzed %Recovery 4-Bromofluorobenzene (Surr) 87 58 - 133 02/15/18 13:17 Trifluorotoluene (Surr) 111 77 - 128 02/15/18 13:17

Lab Sample ID: LCS 580-267389/7 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

Analysis Batch: 267389

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Gasoline	1.00	0.886		mg/L		89	79 - 110	

LCS LCS Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 58 - 133 92 98 77 - 128 Trifluorotoluene (Surr)

Lab Sample ID: LCSD 580-267389/8 **Client Sample ID: Lab Control Sample Dup** Prep Type: Total/NA

**Matrix: Water** 

#2 Diesel (C10-C24)

**Analysis Batch: 267389** 

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Gasoline	1 00	0.966		ma/l		97	79 - 110	9	10

LCSD LCSD %Recovery Qualifier Surrogate I imits 4-Bromofluorobenzene (Surr) 92 58 - 133 Trifluorotoluene (Surr) 106 77 - 128

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

Lab Sample ID: MB 580-267402/1-B **Client Sample ID: Method Blank** Prep Type: Total/NA **Matrix: Water Analysis Batch: 267426** Prep Batch: 267402

MB MB Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac #2 Diesel (C10-C24) ND 0.11 02/15/18 13:17 02/16/18 11:18 0.065 mg/L Motor Oil (>C24-C36) ND 0.35 02/15/18 13:17 02/16/18 11:18 0.096 mg/L

MB MB Qualifier Limits Dil Fac Surrogate %Recovery Prepared Analyzed o-Terphenyl 50 - 150 <u>02/15/18 13:17</u> <u>02/16/18 11:18</u> 69

Lab Sample ID: LCS 580-267402/2-B **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA **Analysis Batch: 267426 Prep Batch: 267402** Spike LCS LCS %Rec. Added Limits Analyte Result Qualifier Unit D %Rec

1.64

2.00

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82

59 - 112

mg/L

Dil Fac

## **QC Sample Results**

LCS LCS

LCSD LCSD

1.58

1.68

Result Qualifier

1.72

Result Qualifier

Unit

mg/L

Unit

mg/L

mg/L

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

Spike

Added

2.00

Spike

Added

2.00

2.00

Client: ARCADIS U.S. Inc

**Analysis Batch: 267426** 

**Matrix: Water** 

Motor Oil (>C24-C36)

Analyte

Surrogate

Analyte

Surrogate

o-Terphenyl

o-Terphenyl

Project/Site: Chevron Edmonds Terminal

Lab Sample ID: LCS 580-267402/2-B

TestAmerica Job ID: 580-75109-1

**Client Sample ID: Lab Control Sample** 

D %Rec

**Prep Type: Total/NA** 

**Prep Batch: 267402** 

%Rec.

Limits

86

64 - 120

LCS LCS

%Recovery Qualifier Limits 81 50 - 150

Lab Sample ID: LCSD 580-267402/3-B

**Matrix: Water** 

**Analysis Batch: 267426** 

#2 Diesel (C10-C24)

Motor Oil (>C24-C36)

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

**Prep Type: Total/NA** 

**Prep Batch: 267402** %Rec. **RPD** 

RPD Limits 59 - 112 4

D %Rec Limit 16 79 84 64 - 120 3 17

LCSD LCSD

%Recovery Qualifier Limits 50 - 150 78

TestAmerica Seattle

2/20/2018

### **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75109-1

Client Sample ID: Outfall #002 Lab Sample ID: 580-75109-1

Date Collected: 02/13/18 11:30 Matrix: Water

Date Collected: 02/13/18 11:30 Matrix: Wate Date Received: 02/14/18 12:20

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			267378	02/15/18 23:03	P1P	TAL SEA
Total/NA	Prep	3510C			267557	02/19/18 08:56	NDB	TAL SEA
Total/NA	Analysis	8270D SIM		1	267585	02/19/18 15:18	T1W	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	267389	02/15/18 15:49	JCV	TAL SEA
Total/NA	Prep	3510C			267402	02/15/18 13:17	NDB	TAL SEA
Total/NA	Cleanup	3630C			267448	02/15/18 16:24	NDB	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	267426	02/16/18 01:30	ADB	TAL SEA

Client Sample ID: Trip Blank Lab Sample ID: 580-75109-2

Date Collected: 02/13/18 00:01 Matrix: Water

Date Received: 02/14/18 12:20

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	267378	02/15/18 15:28	P1P	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	267389	02/15/18 14:48	JCV	TAL SEA

**Laboratory References:** 

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

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# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-75109-1

Project/Site: Chevron Edmonds Terminal

# **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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

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# **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75109-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-75109-1	Outfall #002	Water	02/13/18 11:30	02/14/18 12:20
580-75109-2	Trip Blank	Water	02/13/18 00:01	02/14/18 12:20

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THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Rush
Short Hold

Chain of	
Custody	Record

Client	**	**************************************	Client	Contact		n .											·	Date	· •	1.5	. <i>i</i>		7	Chain o	f Custoa	y Nun	nber	- m	
Arcadis				Peter campbell Telephone Number (Area Code)/Fax Number										2/13/18						3668									
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City	State Zi	o Code		Sampler Lab Contact T Ana							alysis (Attach list if ore space is needed)						Lgo .												
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Edmonds Tei Contract/Purchase Order/Quote No.	mina	1				***************************************								EPA	- 6x	8	္								Specia	al In	struci	tions/	
Contract/Purchase Urder/Quote No.											82							Conditions of Recei											
Sample I.D. and Location/Descr (Containers for each sample may be combin	iption ed on one line)	Date	Time	Air	Sed.	Soil	Unpres.	H2S04	HNO3	НСІ	NaOH	ZnAc/ NaOH		Benzent	NWTPH	NWI	£8				-								
Outfall #002		2/13/17	1130	X			2			8				/	V	/									PH:		-		
Trip Blank	······································			X						6				V	V													***************************************	
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							-																<del>-1</del>	Custo	dy Seal	l: Ye:	SNo	<u>*</u>	
Cooler :																										Çy.			
☐ Yes; ☐ No Cooler Temp;	<b>!</b>	azard Identification		<b>.</b>		<b></b>							Sample					Dispo						(A fee	may be	asses	sed if	samples	
Turn Around Time Required (business days)	☐ Non-Ha	zard 🗌 Flamı	mable L	Skin Ir	ritant		Poisoi			Uni	-		] Ret	urn 1	o Cli	ent		Archi	e For			Mont	ths		tained lo				
□ 24 Hours □ 48 Hours ■ 5 Days	☐ 10 Da)	rs 🗌 15 Days	☐ Othei					QC F	Requii	reme	nts (	(Speci	fy)																
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DISTRIBUTION: WHITE – Stays with the Samples; CANARY – Returned to Client with Report; PINK – Field Copy
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TAL-8274-5**20/200/12/01/8** 

# **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 580-75109-1

Login Number: 75109 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

Creator. Hobbs, Neilletin		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
The cooler's custody seal, if present, is intact.	N/A	Not present
Sample custody seals, if present, are intact.	N/A	Not Present
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").	False	Headspace larger than 1/4".
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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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: 580-75387-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 3/8/2018 4:14:45 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

·····LINKS ·······

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Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

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.

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75387-1

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### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Job ID: 580-75387-1

**Laboratory: TestAmerica Seattle** 

**Narrative** 

Job Narrative 580-75387-1

#### Receipt

Two samples were received on 2/28/2018 12:10 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.5° C.

#### **GC/MS VOA**

Method(s) NWTPH-Gx: Surrogate recovery for the following sample was outside the upper control limit: Trip Blank (580-75387-2). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

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

#### GC/MS Semi VOA

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

#### GC Semi VOA

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

TestAmerica Job ID: 580-75387-1

### **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75387-1

#### **Qualifiers**

#### **GC VOA**

X Surrogate is outside control limits

#### **Glossary**

Abbreviation	These commonly used abbreviations may or may not be present in this report.
n	Listed under the "D" column to designate that the result is reported on a dry weight basis

Listed under the Discouling 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)

TestAmerica Seattle

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# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Client Sample ID: Outfall #002

TestAmerica Job ID: 580-75387-1

Lab Sample ID: 580-75387-1

03/01/18 13:32 03/05/18 18:27

03/01/18 13:32 03/05/18 18:27

Analyzed

Prepared

Matrix: Water

Date Collected: 02/27/18 10:00 Date Received: 02/28/18 12:10

Dibenz(a,h)anthracene

Surrogate

Terphenyl-d14

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			03/06/18 05:08	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	106		74 - 123					03/06/18 05:08	1
Toluene-d8 (Surr)	94		79 - 122					03/06/18 05:08	1
4-Bromofluorobenzene (Surr)	109		78 - 119					03/06/18 05:08	1
Dibromofluoromethane (Surr)	107		70 - 120					03/06/18 05:08	1
1,2-Dichloroethane-d4 (Surr)	106		70 - 120					03/06/18 05:08	1
Method: 8270C SIM - Semi	volatile Organi	c Compou	nds (GC/MS	SIM)					
Analyte	Result	Qualifier	` RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.021	0.0021	ug/L		03/01/18 13:32	03/05/18 18:27	1
Chrysene	ND		0.021	0.0062	ug/L		03/01/18 13:32	03/05/18 18:27	1
Benzo[b]fluoranthene	ND		0.021	0.0083	ug/L		03/01/18 13:32	03/05/18 18:27	1
Benzo[k]fluoranthene	ND		0.031	0.0093	ug/L		03/01/18 13:32	03/05/18 18:27	1
Benzo[a]pyrene	ND		0.021	0.0031	ug/L		03/01/18 13:32	03/05/18 18:27	1

Method: NWTPH-Gx - North	west - Volatile	e Petroleur	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			03/07/18 15:35	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		58 - 133			-		03/07/18 15:35	1
Trifluorotoluene (Surr)	103		77 - 128					03/07/18 15:35	

0.021

Limits

53 - 112

0.0021 ug/L

ND

%Recovery Qualifier

83

Method: NWTPH-Dx - Northwe	est - Semi-V	olatile Peti	roleum Prod	lucts (GC	(ز				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11	0.067	mg/L		03/02/18 08:07	03/07/18 16:47	1
Motor Oil (>C24-C36)	ND		0.36	0.099	mg/L		03/02/18 08:07	03/07/18 16:47	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	80		50 - 150				03/02/18 08:07	03/07/18 16:47	1

Dil Fac

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75387-1

Lab Sample ID: 580-75387-2

Matrix: Water

Client Sample ID: Trip Blank Date Collected: 02/27/18 10:00

Date Received: 02/28/18 12:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			03/06/18 04:41	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	113		74 - 123					03/06/18 04:41	1
Toluene-d8 (Surr)	94		79 - 122					03/06/18 04:41	1
4-Bromofluorobenzene (Surr)	102		78 - 119					03/06/18 04:41	1
Dibromofluoromethane (Surr)	110		70 - 120					03/06/18 04:41	1
1,2-Dichloroethane-d4 (Surr)	110		70 - 120					03/06/18 04:41	1

Method: NWTPH-Gx - Nort	hwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			03/07/18 15:04	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		58 - 133			-		03/07/18 15:04	1
								03/07/18 15:04	

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Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75387-1

## Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-268340/5

**Matrix: Water** 

Analysis Batch: 268340

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

**Client Sample ID: Lab Control Sample** 

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

**Prep Type: Total/NA** 

MB MB

Analyte Result Qualifier RL **MDL** Unit D Prepared Analyzed Dil Fac 1.0 Benzene ND 0.53 ug/L 03/06/18 02:54

	МВ	MB				
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	117		74 - 123		03/06/18 02:54	1
Toluene-d8 (Surr)	92		79 - 122		03/06/18 02:54	1
4-Bromofluorobenzene (Surr)	104		78 - 119		03/06/18 02:54	1
Dibromofluoromethane (Surr)	109		70 - 120		03/06/18 02:54	1
1,2-Dichloroethane-d4 (Surr)	112		70 - 120		03/06/18 02:54	1

Lab Sample ID: LCS 580-268340/6

**Matrix: Water** 

Analysis Batch: 268340

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzene 10.0 10.2 ug/L 102 37 - 151

LCS LCS Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 115 74 - 123 Toluene-d8 (Surr) 93 79 - 122 4-Bromofluorobenzene (Surr) 106 78 - 119 Dibromofluoromethane (Surr) 106 70 - 120 1,2-Dichloroethane-d4 (Surr) 106 70 - 120

Lab Sample ID: LCSD 580-268340/7

**Matrix: Water** Prep Type: Total/NA Analysis Batch: 268340 I COD I COD

•	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	 10.0	11.0		ug/L		110	37 - 151	7	30

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	109		74 - 123
Toluene-d8 (Surr)	92		79 - 122
4-Bromofluorobenzene (Surr)	104		78 - 119
Dibromofluoromethane (Surr)	108		70 - 120
1,2-Dichloroethane-d4 (Surr)	108		70 - 120

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

Lab Sample ID: MB 580-268174/1-A **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA **Analysis Batch: 268287** Prep Batch: 268174

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.020	0.0020	ug/L		03/01/18 13:32	03/02/18 15:05	1
Chrysene	ND		0.020	0.0060	ug/L		03/01/18 13:32	03/02/18 15:05	1
Benzo[b]fluoranthene	ND		0.020	0.0080	ug/L		03/01/18 13:32	03/02/18 15:05	1

TestAmerica Seattle

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TestAmerica Job ID: 580-75387-1 Project/Site: Chevron Edmonds Terminal

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

Lab Sample ID: MB 580-268174/1-A

**Matrix: Water** 

**Analysis Batch: 268287** 

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

**Prep Batch: 268174** 

, , , , , , , , , , , , , , , , , , , ,	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.030	0.0090	ug/L		03/01/18 13:32	03/02/18 15:05	1
Benzo[a]pyrene	ND		0.020	0.0030	ug/L		03/01/18 13:32	03/02/18 15:05	1
Indeno[1,2,3-cd]pyrene	ND		0.020	0.0070	ug/L		03/01/18 13:32	03/02/18 15:05	1
Dibenz(a,h)anthracene	ND		0.020	0.0020	ug/L		03/01/18 13:32	03/02/18 15:05	1

MB MB

%Recovery Qualifier Limits Surrogate Prepared Analyzed Dil Fac 53 - 112 03/01/18 13:32 03/02/18 15:05 Terphenyl-d14 90

Lab Sample ID: LCS 580-268174/2-A **Client Sample ID: Lab Control Sample** 

**Analysis Batch: 268287** 

**Matrix: Water** 

Prep Type: Total/NA Prep Batch: 268174

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzo[a]anthracene 4.00 3.59 ug/L 90 71 - 120 4.00 Chrysene 3.37 ug/L 84 64 - 120 4.00 Benzo[b]fluoranthene 3.54 ug/L 89 66 - 120 Benzo[k]fluoranthene 4.00 3.63 91 68 - 120 ug/L 4.00 ug/L Benzo[a]pyrene 3.80 95 76 - 120 Indeno[1,2,3-cd]pyrene 4.00 3.65 ug/L 91 63 - 120Dibenz(a,h)anthracene 4.00 3.88 ug/L 97 60 - 125

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 83 53 - 112

Lab Sample ID: LCSD 580-268174/3-A

**Matrix: Water** 

**Analysis Batch: 268287** 

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

Prep Batch: 268174

•	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	3.58		ug/L		90	71 - 120	0	16
Chrysene	4.00	3.37		ug/L		84	64 - 120	0	16
Benzo[b]fluoranthene	4.00	3.57		ug/L		89	66 - 120	1	20
Benzo[k]fluoranthene	4.00	3.62		ug/L		90	68 - 120	0	20
Benzo[a]pyrene	4.00	3.80		ug/L		95	76 - 120	0	17
Indeno[1,2,3-cd]pyrene	4.00	3.77		ug/L		94	63 - 120	3	15
Dibenz(a,h)anthracene	4.00	3.94		ug/L		98	60 - 125	2	15

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 83 53 - 112

TestAmerica Seattle

3/8/2018

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75387-1

Client Sample ID: Method Blank

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

Prep Type: Total/NA

Prep Type: Total/NA

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

Lab Sample ID: MB 580-268425/6

**Matrix: Water** 

**Analysis Batch: 268425** 

MB MB

Analyte Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 0.25 Gasoline  $\overline{\mathsf{ND}}$ 0.050 mg/L 03/06/18 13:53

MB MB

%Recovery Surrogate Qualifier Limits Prepared Analyzed Dil Fac 4-Bromofluorobenzene (Surr) 88 58 - 133 03/06/18 13:53 Trifluorotoluene (Surr) 113 77 - 128 03/06/18 13:53

Lab Sample ID: LCS 580-268425/7

**Analysis Batch: 268425** 

**Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

LCS LCS Spike %Rec. Unit **Analyte** Added Result Qualifier %Rec Limits D Gasoline 1.00 0.945 95 79 - 110 mg/L

LCS LCS

Surrogate %Recovery Qualifier Limits 58 - 133 4-Bromofluorobenzene (Surr) 91 105 77 - 128 Trifluorotoluene (Surr)

Lab Sample ID: LCSD 580-268425/8

**Matrix: Water** 

**Analysis Batch: 268425** 

RPD Spike LCSD LCSD %Rec. Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Gasoline 1.00 0.930 mg/L 79 - 110

LCSD LCSD

%Recovery Qualifier Surrogate Limits 4-Bromofluorobenzene (Surr) 91 58 - 133 Trifluorotoluene (Surr) 102 77 - 128

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

Lab Sample ID: MB 580-268220/1-B Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 268469** Prep Batch: 268220

MB MB

Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac #2 Diesel (C10-C24) ND 0.11 03/02/18 08:07 03/07/18 04:28 0.065 mg/L Motor Oil (>C24-C36) ND 0.35 03/02/18 08:07 03/07/18 04:28 0.096 mg/L

MB MB

Qualifier Limits Dil Fac Surrogate %Recovery Prepared Analyzed 03/02/18 08:07 03/07/18 04:28 50 - 150 o-Terphenyl 77

Lab Sample ID: MB 580-268220/1-B

**Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA **Analysis Batch: 268521 Prep Batch: 268220** MB MB

RL Analyte Result Qualifier MDL Unit D Prepared Analyzed Dil Fac #2 Diesel (C10-C24)  $\overline{\mathsf{ND}}$ 0.11 0.065 mg/L 03/02/18 08:07 03/07/18 15:46

TestAmerica Seattle

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## QC Sample Results

Client: ARCADIS U.S. Inc

**Analysis Batch: 268521** 

Project/Site: Chevron Edmonds Terminal

Lab Sample ID: MB 580-268220/1-B

TestAmerica Job ID: 580-75387-1

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

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

Prep Batch: 268220

Prep Type: Total/NA

Prep Batch: 268220

RL **MDL** Unit Result Qualifier Prepared Analyzed Dil Fac 0.35 03/02/18 08:07 03/07/18 15:46  $\overline{\mathsf{ND}}$ 0.096 mg/L

Unit

mg/L

mg/L

Unit

mg/L

mg/L

MB MB

LCS LCS

%Recovery Qualifier

88

95

мв мв

Surrogate %Recovery Qualifier Limits Dil Fac Prepared Analyzed o-Terphenyl 89 50 - 150 03/02/18 08:07 03/07/18 15:46

Lab Sample ID: LCS 580-268220/2-B

**Matrix: Water** 

**Matrix: Water** 

Motor Oil (>C24-C36)

Analyte

Analysis Batch: 268521

Analyte

#2 Diesel (C10-C24) Motor Oil (>C24-C36)

Surrogate

o-Terphenyl

Analyte

o-Terphenyl

Lab Sample ID: LCSD 580-268220/3-B

**Matrix: Water** 

**Analysis Batch: 268521** 

#2 Diesel (C10-C24) Motor Oil (>C24-C36)

Surrogate

LCSD LCSD %Recovery Qualifier

LCS LCS Result Qualifier 1.81

LCSD LCSD

1.94

2.15

Result Qualifier

2.00 2.00 2.09

Limits 50 - 150

Spike

Added

2.00

2.00

Spike

Added

Client Sample ID: Lab Control Sample Dup

D %Rec

91

105

**Client Sample ID: Lab Control Sample** 

%Rec.

Limits

59 - 112

64 - 120

Prep Type: Total/NA Prep Batch: 268220 %Rec. **RPD** 

D %Rec Limits RPD Limit 97 59 - 112 16 107 64 - 120 17

Limits 50 - 150

TestAmerica Seattle

3/8/2018

#### **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75387-1

Lab Sample ID: 580-75387-1

Matrix: Water

Client Sample ID: Outfall #002 Date Collected: 02/27/18 10:00

Date Received: 02/28/18 12:10

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			268340	03/06/18 05:08	RSB	TAL SEA
Total/NA	Prep	3510C			268174	03/01/18 13:32	NDB	TAL SEA
Total/NA	Analysis	8270C SIM		1	268316	03/05/18 18:27	T1W	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	268425	03/07/18 15:35	JCV	TAL SEA
Total/NA	Prep	3510C			268220	03/02/18 08:07	NDB	TAL SEA
Total/NA	Cleanup	3630C			268273	03/02/18 15:36	TTN	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	268521	03/07/18 16:47	ADB	TAL SEA

Client Sample ID: Trip Blank Lab Sample ID: 580-75387-2

Date Collected: 02/27/18 10:00 Matrix: Water

Date Received: 02/28/18 12:10

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	268340	03/06/18 04:41	RSB	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	268425	03/07/18 15:04	JCV	TAL SEA

#### **Laboratory References:**

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

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# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-75387-1

Project/Site: Chevron Edmonds Terminal

## **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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

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# **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75387-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-75387-1	Outfall #002	Water	02/27/18 10:00	02/28/18 12:10
580-75387-2	Trip Blank	Water	02/27/18 10:00	02/28/18 12:10

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Ku	sn	

Short Hold

Chain of Custody Record

Client Arcadis			Conta				v (			ρl	)C	:ll						Date 2	1/2	7/	18		10	Chain	of Custoo	ly Numb		77	6
Address 1100 Olive Way, Sui City State	te 800	Teleph	one Nu	umbei	r (Area	a Code	e)/Fax	Numi	ber									Lab Nu	mber				P	Page	L	(	of	]	
Seattle WA Project Name and Location (State) Edwords Terminal		Sampli Eric Billing	Kr	Ul ct	ege	× _		Con Ha		ev	Va	uiK.	er	EPA 624	ž	X	5	nalysis (Att ore space i	tach lis is need	t if led)					Spec	ial Insi	ructio	ons/	
Contract/Purchase Order/Quote No.				Ma	atrix					ntaine serva				ere	ANTOH-GX	¥- DX	827(				Loc			'	Cond	tions (	of Rec	eipt	
Sample I.D. and Location/Description (Containers for each sample may be combined on one	line) Date	Time	Air	Aqueous	Sed.	500	Unpres.	H2S04	HNO3	HCI	NaOH	ZnAc/ NaOH		Benzene	130	NWTPH- PX W/	PARS				75	S	37						
Outfail #002	2-27-18	1000		X,			2			8				X	X,	X,	X								PH:	7.	35		
Trip Blank				XL						6			*	X,	X					-	-				ŧ	<del></del>			
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Turn Around Time Required (business days)  ☐ 24 Hours ☐ 48 Hours ☐ 5 Days ☐	10 Days 🗀 15 Days	□ Oth	er					QC I	Requ	iirem	ents	(Spec	ify)									··············			*******				
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2. Relinquished By Sign/Print	<b>V</b>	Date	U . ( )		Time			2. R	eceiv	ved B	y s	ign/P	rint	,,		Bu.	<u> </u>	7.5						Date		Til			
3. Relinquished By Sign/Print		Date			Time			3. Ri	ecei.	ved B	y s	ign/P	rint		•						···········	······································		Date	······································	Tii	ne		
Comments		<u> </u>												<del></del>															*******

List Source: TestAmerica Seattle

Job Number: 580-75387-1

Login Number: 75387

List Number: 1

Creator: Hobbs, Kenneth F

oreator. Hobbs, Reinicur i		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
The cooler's custody seal, if present, is intact.	N/A	Not present
Sample custody seals, if present, are intact.	N/A	
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	



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: 580-75584-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 3/19/2018 4:36:38 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

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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.

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75584-1

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#### Case Narrative

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75584-1

Job ID: 580-75584-1

Laboratory: TestAmerica Seattle

**Narrative** 

Job Narrative 580-75584-1

#### Receipt

Two samples were received on 3/6/2018 12:50 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.2° C.

#### **Receipt Exceptions**

One of the voa vials of the following sample lacks sample ID, sampling date and time. Outfall #002 (580-75584-1).

#### GC/MS VOA

Method(s) 624: The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for batch analytical batch 580-268906 recovered outside control limits for the following analyte: Benzene. The LCS and LCSD recoveries met acceptance limits.

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

#### GC/MS Semi VOA

Method(s) 8270C SIM, 8270D SIM: Surrogate recovery for the following samples were outside control limits: (580-75594-E-19-B MS) and (580-75594-F-19-A MSD). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method(s) 8270C SIM: The method blank for preparation batch 580-268855 and analytical batch 580-268901 contained Dibenz(a,h)anthracene, Indeno[1,2,3-cd]pyrene, Benzo[k]fluoranthene, Benzo[a]pyrene, Benzo[b]fluoranthene, Chrysene and Benzo[a]anthracene above the method detection limit. This target analyte concentration was less than the reporting limit (RL); therefore, re-extraction and/or re-analysis of samples was not performed.

Method(s) 8270C SIM, 8270D SIM: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 580-268855 and analytical batch 580-268901 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

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

#### GC Semi VOA

Method(s) NWTPH-Dx: The following sample contained a hydrocarbon pattern in the diesel range; however, the elution pattern was earlier than the typical diesel fuel pattern used by the laboratory for quantitative purposes: (580-75594-C-19-B).

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

### **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75584-1

#### **Qualifiers**

#### **GC/MS VOA**

Qualifier **Qualifier Description** 

RPD of the LCS and LCSD exceeds the control limits

#### GC/MS Semi VOA

Qualifier **Qualifier Description** 

В Compound was found in the blank and sample.

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

#### **Glossary**

Abbreviation	These commonly used abbreviations may or may not be present in this report.
a	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** 

**Quality Control** QC

Relative Error Ratio (Radiochemistry) **RER** 

Reporting Limit or Requested Limit (Radiochemistry) RL

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

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

Project/Site: Chevron Edmonds Terminal

Client Sample ID: Outfall #002

Date Collected: 03/05/18 10:30 Date Received: 03/06/18 12:50 Lab Sample ID: 580-75584-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND	*	1.0	0.53	ug/L			03/13/18 21:10	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	99		74 - 123			•		03/13/18 21:10	1
Toluene-d8 (Surr)	98		79 - 122					03/13/18 21:10	1
4-Bromofluorobenzene (Surr)	105		78 - 119					03/13/18 21:10	1
Dibromofluoromethane (Surr)	103		70 - 120					03/13/18 21:10	1
1,2-Dichloroethane-d4 (Surr)	99		70 - 120					03/13/18 21:10	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0044	JB	0.021	0.0021	ug/L		03/12/18 13:31	03/13/18 19:26	1
Chrysene	ND		0.021	0.0064	ug/L		03/12/18 13:31	03/13/18 19:26	1
Benzo[b]fluoranthene	ND		0.021	0.0085	ug/L		03/12/18 13:31	03/13/18 19:26	1
Benzo[k]fluoranthene	ND		0.032	0.0096	ug/L		03/12/18 13:31	03/13/18 19:26	1
Benzo[a]pyrene	ND		0.021	0.0032	ug/L		03/12/18 13:31	03/13/18 19:26	1
Indeno[1,2,3-cd]pyrene	ND		0.021	0.0074	ug/L		03/12/18 13:31	03/13/18 19:26	1
Dibenz(a,h)anthracene	0.0021	JB	0.021	0.0021	ug/L		03/12/18 13:31	03/13/18 19:26	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	72		53 - 112				03/12/18 13:31	03/13/18 19:26	1

Method: NWTPH-Gx - Northw Analyte Gasoline		Qualifier	m Products ( RL  0.25	GC) MDL 0.050	 <u>D</u>	Prepared	Analyzed 03/10/18 22:06	Dil Fac
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		58 - 133		,		03/10/18 22:06	1
Trifluorotoluene (Surr)	109		77 - 128				03/10/18 22:06	1

Method: NWTPH-Dx - Se	emi-Volatile Petroleum Pro	ducts by NW	TPH with	Silica G	el Cle	eanup		
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND	0.11	0.067	mg/L		03/15/18 13:34	03/17/18 00:25	1
Motor Oil (>C24-C36)	ND	0.36	0.099	mg/L		03/15/18 13:34	03/17/18 00:25	1
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	53	50 - 150				03/15/18 13:34	03/17/18 00:25	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75584-1

Lab Sample ID: 580-75584-2

Matrix: Water

Client Sample ID: Trip Blank Date Collected: 03/05/18 00:01 Date Received: 03/06/18 12:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND	*	1.0	0.53	ug/L			03/13/18 14:30	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	104		74 - 123					03/13/18 14:30	1
Toluene-d8 (Surr)	101		79 - 122					03/13/18 14:30	1
4-Bromofluorobenzene (Surr)	106		78 - 119					03/13/18 14:30	1
Dibromofluoromethane (Surr)	106		70 - 120					03/13/18 14:30	1
1,2-Dichloroethane-d4 (Surr)	105		70 - 120					03/13/18 14:30	1

Method: NWTPH-Gx - Nortl	hwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			03/10/18 14:09	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		58 - 133			=		03/10/18 14:09	1

3/19/2018

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Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75584-1

## Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-268906/5

**Matrix: Water** 

Analysis Batch: 268906

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

MB MB

Analyte **Result Qualifier** RL MDL Unit Prepared Analyzed Dil Fac Benzene 1.0 0.53 ug/L 03/13/18 13:11 ND

	MB	MB				
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	105		74 - 123		03/13/18 13:11	1
Toluene-d8 (Surr)	101		79 - 122		03/13/18 13:11	1
4-Bromofluorobenzene (Surr)	106		78 - 119		03/13/18 13:11	1
Dibromofluoromethane (Surr)	106		70 - 120		03/13/18 13:11	1
1,2-Dichloroethane-d4 (Surr)	110		70 - 120		03/13/18 13:11	1

Lab Sample ID: LCS 580-268906/6

**Matrix: Water** 

Analysis Batch: 268906

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

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

Prep Type: Total/NA

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits 37 - 151 Benzene 10.0 8.37 ug/L

	LCS	LCS	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	100		74 - 123
Toluene-d8 (Surr)	101		79 - 122
4-Bromofluorobenzene (Surr)	104		78 - 119
Dibromofluoromethane (Surr)	99		70 - 120
1,2-Dichloroethane-d4 (Surr)	106		70 - 120

Lab Sample ID: LCSD 580-268906/7

**Matrix: Water** 

Analysis Batch: 268906 Snika I CED I CED

	эріке	LCOD	LCSD				%Rec.		KPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	10.0	12.1	*	ug/L	_	121	37 - 151	36	30

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	102		74 - 123
Toluene-d8 (Surr)	99		79 - 122
4-Bromofluorobenzene (Surr)	106		78 - 119
Dibromofluoromethane (Surr)	105		70 - 120
1,2-Dichloroethane-d4 (Surr)	105		70 - 120

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

**Matrix: Water** 

Lab Sample ID: MB 580-268855/1-A **Client Sample ID: Method Blank** Prep Type: Total/NA **Analysis Batch: 268901 Prep Batch: 268855** 

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0111	J	0.020	0.0020	ug/L		03/12/18 13:31	03/13/18 09:39	1
Chrysene	0.0152	J	0.020	0.0060	ug/L		03/12/18 13:31	03/13/18 09:39	1
Benzo[b]fluoranthene	0.0107	J	0.020	0.0080	ug/L		03/12/18 13:31	03/13/18 09:39	1

TestAmerica Seattle

3/19/2018

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Project/Site: Chevron Edmonds Terminal

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

Lab Sample ID: MB 580-268855/1-A

**Matrix: Water** 

**Analysis Batch: 268901** 

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

**Prep Batch: 268855** 

	MB	INIR							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	0.0141	J	0.030	0.0090	ug/L		03/12/18 13:31	03/13/18 09:39	1
Benzo[a]pyrene	0.00750	J	0.020	0.0030	ug/L		03/12/18 13:31	03/13/18 09:39	1
Indeno[1,2,3-cd]pyrene	0.0110	J	0.020	0.0070	ug/L		03/12/18 13:31	03/13/18 09:39	1
Dibenz(a,h)anthracene	0.0108	J	0.020	0.0020	ug/L		03/12/18 13:31	03/13/18 09:39	1

MB MB

%Recovery Qualifier Limits Surrogate Prepared Analyzed Dil Fac 03/12/18 13:31 03/13/18 09:39 53 - 112 Terphenyl-d14 88

**Client Sample ID: Lab Control Sample** 

Lab Sample ID: LCS 580-268855/2-A

**Matrix: Water** 

**Analysis Batch: 268901** 

Prep Type: Total/NA **Prep Batch: 268855** 

-	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	3.48		ug/L		87	71 - 120	
Chrysene	4.00	3.37		ug/L		84	64 - 120	
Benzo[b]fluoranthene	4.00	3.30		ug/L		83	66 - 120	
Benzo[k]fluoranthene	4.00	3.48		ug/L		87	68 - 120	
Benzo[a]pyrene	4.00	3.51		ug/L		88	76 - 120	
Indeno[1,2,3-cd]pyrene	4.00	3.17		ug/L		79	63 - 120	
Dibenz(a,h)anthracene	4.00	3.50		ug/L		88	60 - 125	

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 72 53 - 112

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

MB MB

Lab Sample ID: MB 580-268785/5 **Matrix: Water** 

**Analysis Batch: 268785** 

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	D	)	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L		_		03/10/18 12:02	1
	МВ	МВ								

%Recovery Qualifier Limits Dil Fac Surrogate Prepared Analyzed 58 - 133 4-Bromofluorobenzene (Surr) 88 03/10/18 12:02 Trifluorotoluene (Surr) 104 77 - 128 03/10/18 12:02

Lab Sample ID: LCS 580-268785/6

**Matrix: Water** 

**Analysis Batch: 268785** 

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

LCS LCS Spike %Rec. Added Analyte Result Qualifier Unit D %Rec Limits Gasoline 1.00 0.973 mg/L 97 79 - 110

LCS LCS

Surrogate	%Recovery Qualifier	Limits
4-Bromofluorobenzene (Surr)	93	58 - 133
Trifluorotoluene (Surr)	97	77 - 128

TestAmerica Seattle

Project/Site: Chevron Edmonds Terminal

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

TestAmerica Job ID: 580-75584-1

Lab Sample ID: LCSD 580-268785/7 **Matrix: Water** 

Analysis Batch: 268785

CSD				%Rec.		RPD
ualifiar	Linit	П	% Boo	Limite	DDD	Limit

Spike LCSD LC Analyte Added Result Qualifier Gasoline 1.00 92 79 - 110 0.923 mg/L 5 10

LCSD LCSD Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 93 58 - 133 93 Trifluorotoluene (Surr) 77 - 128

#### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-269156/1-B **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA

#2 Diesel (C10-C24)

Motor Oil (>C24-C36)

**Analyte** 

**Analysis Batch: 269276** 

**Prep Batch: 269156** MB MB MDL Unit RL n Dil Fac Result Qualifier Prepared Analyzed  $\overline{\mathsf{ND}}$ 0.11 0.065 mg/L 03/15/18 13:34 03/16/18 16:23 ND 0.35 0.096 mg/L 03/15/18 13:34 03/16/18 16:23

MB MB Surrogate %Recovery Qualifier

Limits o-Terphenyl 62 50 - 150

Prepared Analyzed Dil Fac 03/15/18 13:34 03/16/18 16:23

Lab Sample ID: LCS 580-269156/2-B

**Matrix: Water** 

**Analysis Batch: 269276** 

**Client Sample ID: Lab Control Sample** Prep Type: Total/NA **Prep Batch: 269156** 

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit %Rec Limits #2 Diesel (C10-C24) 2.00 1.31 mg/L 66 59 - 112 Motor Oil (>C24-C36) 2.00 64 - 120 1.45 mg/L 73

LCS LCS Surrogate %Recovery Qualifier

Limits o-Terphenyl 63 50 - 150

Lab Sample ID: LCSD 580-269156/3-B

**Matrix: Water** 

**Analysis Batch: 269276** 

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

Prep Type: Total/NA **Prep Batch: 269156** 

LCSD LCSD Spike %Rec. **RPD** Analyte Added Result Qualifier Unit %Rec Limits RPD Limit #2 Diesel (C10-C24) 2.00 1.36 mg/L 68 59 - 112 3 16 Motor Oil (>C24-C36) 2.00 1.58 mg/L 79 64 - 12017

LCSD LCSD Surrogate Limits %Recovery Qualifier 50 - 150 o-Terphenyl 66

TestAmerica Seattle

3/19/2018

#### **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75584-1

Lab Sample ID: 580-75584-1

**Matrix: Water** 

**Matrix: Water** 

Client Sample ID: Outfall #002 Date Collected: 03/05/18 10:30

Date Received: 03/06/18 12:50

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			268906	03/13/18 21:10	T1W	TAL SEA
Total/NA	Prep	3510C			268855	03/12/18 13:31	NDB	TAL SEA
Total/NA	Analysis	8270C SIM		1	268901	03/13/18 19:26	T1W	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	268785	03/10/18 22:06	W1T	TAL SEA
Total/NA	Prep	3510C			269156	03/15/18 13:34	NDB	TAL SEA
Total/NA	Cleanup	3630C			269243	03/16/18 12:02	NDB	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	269276	03/17/18 00:25	ADB	TAL SEA

**Client Sample ID: Trip Blank** Lab Sample ID: 580-75584-2

Date Collected: 03/05/18 00:01 Date Received: 03/06/18 12:50

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	268906	03/13/18 14:30	T1W	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	268785	03/10/18 14:09	W1T	TAL SEA

**Laboratory References:** 

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

3/19/2018

# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-75584-1

Project/Site: Chevron Edmonds Terminal

# **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		
Oregon	NELAP	10	WA100007	11-05-18		
US Fish & Wildlife	Federal		LE058448-0	10-31-18		
USDA	Federal		P330-14-00126	02-10-20		
Washington	State Program	10	C553	02-17-19		

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# **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75584-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-75584-1	Outfall #002	Water	03/05/18 10:30	03/06/18 12:50
580-75584-2	Trip Blank	Water	03/05/18 00:01	03/06/18 12:50

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# **TestAmerico**

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Rush	1
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Short Hold

# Chain of Custody Record

Client			1	Client Coi	ntact 🖍	(a	, sa_0	, ,	11											Date 3/	5/	1 X			(	Chain of	Custody	Number	867	77
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Job Number: 580-75584-1

Login Number: 75584 List Source: TestAmerica Seattle

List Number: 1

Creator: Blankinship, Tom X

Creator. Diankinship, Toni A		
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	Refer to Job Narrative for details.
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	



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# **ANALYTICAL REPORT**

TestAmerica Laboratories, Inc.

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

TestAmerica Job ID: 580-75831-1 Client Project/Site: Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 3/21/2018 5:04:46 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

.....LINKS .....

Review your project results through
Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-75831-1

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#### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-75831-1

Job ID: 580-75831-1

**Laboratory: TestAmerica Seattle** 

**Narrative** 

Job Narrative 580-75831-1

#### Receipt

Two samples were received on 3/14/2018 1:45 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.0° C.

#### GC/MS VOA

Method(s) 624: The surrogate (1,2-Dichloroethane-d4) recovery for the method blank (MB) and the laboratory control sample duplicate (LCSD) associated with analytical batch 580-269460 was outside the upper control limits. (LCSD 580-269460/7) and (MB 580-269460/5).

Method(s) 624: Surrogate recovery for the following sample was outside the upper control limit: Trip Blank (580-75831-2). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

Method(s) 624: The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for batch analytical batch 580-269460 recovered outside control limits for Benzene. The LCS and LCSD recoveries met acceptance limits.

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

#### GC/MS Semi VOA

Method(s) 8270C SIM: The method blank for preparation batch 580-269355 and analytical batch 580-269366 contained Benzo[a]anthracene above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

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

#### GC Semi VOA

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

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### **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-75831-1

#### **Qualifiers**

#### **GC/MS VOA**

Qualifier	Qualifier Description
Y	Surrogate is outside control li

Surrogate is outside control limits

RPD of the LCS and LCSD exceeds the control limits

#### **GC/MS Semi VOA**

#### Qualifier **Qualifier Description**

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

#### **Glossary**

¤ Listed under the "D" column to designate that the result is reported on a dry weight basis

Percent Recovery %R 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

Decision Level Concentration (Radiochemistry) DLC

**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 Minimum Level (Dioxin) ML

NC Not Calculated

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

**PQL Practical Quantitation Limit** 

**Quality Control** QC

Relative Error Ratio (Radiochemistry) **RER** 

Reporting Limit or Requested Limit (Radiochemistry) RL

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

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

TestAmerica Job ID: 580-75831-1

Project/Site: Edmonds Terminal

Client Sample ID: Outfall #002

Date Collected: 03/14/18 10:00 Date Received: 03/14/18 13:45

Lab Sample ID: 580-75831-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			03/20/18 22:20	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	103		74 - 123					03/20/18 22:20	1
Toluene-d8 (Surr)	102		79 - 122					03/20/18 22:20	1
4-Bromofluorobenzene (Surr)	101		78 - 119					03/20/18 22:20	1
Dibromofluoromethane (Surr)	99		70 - 120					03/20/18 22:20	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 120					03/20/18 22:20	1

Method: 8270C SIM - Sen	nivolatile Organic Compou	inds (GC/MS	SIM)					
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND ND	0.020	0.0020	ug/L		03/19/18 10:06	03/19/18 19:26	1
Chrysene	ND	0.020	0.0061	ug/L		03/19/18 10:06	03/19/18 19:26	1
Benzo[b]fluoranthene	ND	0.020	0.0082	ug/L		03/19/18 10:06	03/19/18 19:26	1
Benzo[k]fluoranthene	ND	0.031	0.0092	ug/L		03/19/18 10:06	03/19/18 19:26	1
Benzo[a]pyrene	ND	0.020	0.0031	ug/L		03/19/18 10:06	03/19/18 19:26	1
Indeno[1,2,3-cd]pyrene	ND	0.020	0.0072	ug/L		03/19/18 10:06	03/19/18 19:26	1
Dibenz(a,h)anthracene	ND	0.020	0.0020	ug/L		03/19/18 10:06	03/19/18 19:26	1
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	71	53 - 112				03/19/18 10:06	03/19/18 19:26	1

Method: NWTPH-Gx - North	hwest - Volatile	Petroleui	m Products (	GC)					
Analyte	Result (	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND ND		0.25	0.050	mg/L			03/17/18 23:19	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		58 - 133					03/17/18 23:19	1
Trifluorotoluene (Surr)	111		77 - 128					03/17/18 23:19	1

Method: NWTPH-Dx - Se	emi-Volatile Petroleum Prod	ucts by NW7	PH with	Silica G	el Cle	eanup		
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND ND	0.11	0.067	mg/L		03/19/18 14:21	03/21/18 12:45	1
Motor Oil (>C24-C36)	ND	0.36	0.099	mg/L		03/19/18 14:21	03/21/18 12:45	1
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	63	50 - 150				03/19/18 14:21	03/21/18 12:45	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-75831-1

**Client Sample ID: Trip Blank** 

Date Collected: 03/14/18 00:01 Date Received: 03/14/18 13:45 Lab Sample ID: 580-75831-2

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND	*	1.0	0.53	ug/L			03/20/18 17:02	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	117		74 - 123					03/20/18 17:02	1
Toluene-d8 (Surr)	95		79 - 122					03/20/18 17:02	1
4-Bromofluorobenzene (Surr)	112		78 - 119					03/20/18 17:02	1
Dibromofluoromethane (Surr)	120		70 - 120					03/20/18 17:02	1
1,2-Dichloroethane-d4 (Surr)	125	X	70 - 120					03/20/18 17:02	1

Method: NWTPH-Gx - Nort	hwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			03/17/18 21:44	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		58 - 133			ē		03/17/18 21:44	1
Trifluorotoluene (Surr)	102		77 - 128					03/17/18 21:44	1

3/21/2018

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-75831-1

## Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-269460/5 **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA

Analysis Batch: 269460

Analysis Duton. 200400									
	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			03/20/18 13:29	1
	МВ	MB							
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	120		74 - 123			-		03/20/18 13:29	1
Toluene-d8 (Surr)	92		79 - 122					03/20/18 13:29	1
4-Bromofluorobenzene (Surr)	115		78 - 119					03/20/18 13:29	1
Dibromofluoromethane (Surr)	117		70 - 120					03/20/18 13:29	1
1,2-Dichloroethane-d4 (Surr)	124	X	70 - 120					03/20/18 13:29	1

Lab Sample ID: LCS 580-269460/6 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 269460** 

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits 37 - 151 Benzene 10.0 8.51 ug/L 85

	LCS	LCS	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	115		74 - 123
Toluene-d8 (Surr)	93		79 - 122
4-Bromofluorobenzene (Surr)	115		78 - 119
Dibromofluoromethane (Surr)	111		70 - 120
1,2-Dichloroethane-d4 (Surr)	115		70 - 120

Lab Sample ID: LCSD 580-269460/7 **Client Sample ID: Lab Control Sample Dup Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 269460** 

Spike LCSD LCSD %Rec. Analyte Added Result Qualifier Unit Limits RPD Limit D %Rec 11.8 \* Benzene 10.0 ug/L 118 37 - 151

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	116		74 - 123
Toluene-d8 (Surr)	90		79 - 122
4-Bromofluorobenzene (Surr)	107		78 - 119
Dibromofluoromethane (Surr)	120		70 - 120
1,2-Dichloroethane-d4 (Surr)	123	X	70 - 120

MB MB

Lab Sample ID: MB 580-269475/5 Client Sample ID: Method Blank **Matrix: Water** 

**Analysis Batch: 269475** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			03/20/18 14:23	1
	MR	MR							

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac 74 - 123 03/20/18 14:23 Trifluorotoluene (Surr) 103 03/20/18 14:23 Toluene-d8 (Surr) 102 79 - 122

TestAmerica Seattle

Page 7 of 16

RPD

Prep Type: Total/NA

3/21/2018

TestAmerica Job ID: 580-75831-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Method: 624 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 580-269475/5

Lab Sample ID: LCS 580-269475/6

**Matrix: Water** 

**Matrix: Water** 

**Analysis Batch: 269475** 

**Client Sample ID: Method Blank** 

Prep Type: Total/NA

MB MB Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac 4-Bromofluorobenzene (Surr) 102 78 - 119 03/20/18 14:23 Dibromofluoromethane (Surr) 100 70 - 120 03/20/18 14:23 1 1,2-Dichloroethane-d4 (Surr) 101 70 - 120 03/20/18 14:23

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

% Doc

**Analysis Batch: 269475** 

	Spike	LUS	LUS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzene	10.0	10.9		ug/L		109	37 - 151	

Snika

Spike

Added

10.0

100 100

10.8

ug/L

LCS LCS Surrogate %Recovery Qualifier Limits 104 74 - 123 Trifluorotoluene (Surr) Toluene-d8 (Surr) 95 79 - 122 101 78 - 119 4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr) 100 70 - 120 1,2-Dichloroethane-d4 (Surr) 70 - 120 99

Lab Sample ID: LCSD 580-269475/7

**Matrix: Water** 

Analyte

Benzene

**Analysis Batch: 269475** 

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

LCSD LCSD %Rec. **RPD** Result Qualifier Unit D %Rec Limits RPD Limit

37 - 151

0

108

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	103		74 - 123
Toluene-d8 (Surr)	97		79 - 122
4-Bromofluorobenzene (Surr)	100		78 - 119
Dibromofluoromethane (Surr)	100		70 - 120
1,2-Dichloroethane-d4 (Surr)	99		70 - 120

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

Lab Sample ID: MB 580-269355/1-A **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA

Analysis Batch: 269366 **Prep Batch: 269355** 

	MBI	MR								
Analyte	Result (	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
Benzo[a]anthracene	0.00256	J	0.020	0.0020	ug/L		03/19/18 10:06	03/19/18 13:18	1	
Chrysene	ND		0.020	0.0060	ug/L		03/19/18 10:06	03/19/18 13:18	1	
Benzo[b]fluoranthene	ND		0.020	0.0080	ug/L		03/19/18 10:06	03/19/18 13:18	1	
Benzo[k]fluoranthene	ND		0.030	0.0090	ug/L		03/19/18 10:06	03/19/18 13:18	1	
Benzo[a]pyrene	ND		0.020	0.0030	ug/L		03/19/18 10:06	03/19/18 13:18	1	
Indeno[1,2,3-cd]pyrene	ND		0.020	0.0070	ug/L		03/19/18 10:06	03/19/18 13:18	1	
Dibenz(a,h)anthracene	ND		0.020	0.0020	ug/L		03/19/18 10:06	03/19/18 13:18	1	
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TestAmerica Seattle

3/21/2018

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TestAmerica Job ID: 580-75831-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-269355/1-A

Lab Sample ID: LCS 580-269355/2-A

**Matrix: Water** 

**Matrix: Water** 

**Analysis Batch: 269366** 

**Analysis Batch: 269366** 

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

**Prep Batch: 269355** 

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Terphenyl-d14 53 - 112 03/19/18 10:06 03/19/18 13:18 75

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

**Prep Batch: 269355** 

•	Spike	LCS	LCS			%Rec.	
Analyte	Added	Result	Qualifier	Unit	D %Rec	Limits	
Benzo[a]anthracene	4.00	4.25		ug/L		71 - 120	
Chrysene	4.00	3.80		ug/L	95	64 - 120	
Benzo[b]fluoranthene	4.00	3.85		ug/L	96	66 - 120	
Benzo[k]fluoranthene	4.00	3.82		ug/L	96	68 - 120	
Benzo[a]pyrene	4.00	4.04		ug/L	101	76 - 120	
Indeno[1,2,3-cd]pyrene	4.00	4.02		ug/L	100	63 - 120	
Dibenz(a,h)anthracene	4.00	4.00		ug/L	100	60 - 125	

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 71 53 - 112

Lab Sample ID: LCSD 580-269355/3-A

**Matrix: Water** 

**Analysis Batch: 269366** 

Client Sample ID: Lab Control Sample Dup

**Prep Type: Total/NA** 

**Prep Batch: 269355** 

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	4.51		ug/L		113	71 - 120	6	16
Chrysene	4.00	4.03		ug/L		101	64 - 120	6	16
Benzo[b]fluoranthene	4.00	4.02		ug/L		100	66 - 120	4	20
Benzo[k]fluoranthene	4.00	3.99		ug/L		100	68 - 120	4	20
Benzo[a]pyrene	4.00	4.27		ug/L		107	76 - 120	6	17
Indeno[1,2,3-cd]pyrene	4.00	4.21		ug/L		105	63 - 120	5	15
Dibenz(a,h)anthracene	4.00	4.21		ug/L		105	60 - 125	5	15

LCSD LCSD

%Recovery Qualifier Limits Surrogate

53 - 112 Terphenyl-d14 71

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

MB MB

Lab Sample ID: MB 580-269327/5 Client Sample ID: Method Blank

**Matrix: Water** 

Analysis Batch: 269327

Prep Type: Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L	 _		03/17/18 20:09	1
	MB	MB							

	1410						
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac	
4-Bromofluorobenzene (Surr)	87		58 - 133		03/17/18 20:09	1	
Trifluorotoluene (Surr)	105		77 - 128		03/17/18 20:09	1	

TestAmerica Seattle

Page 9 of 16 3/21/2018

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-75831-1

Prep Type: Total/NA

#### Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC) (Continued)

Lab Sample ID: LCS 580-269327/6 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 269327** 

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits 1.00 Gasoline 1.03 mg/L 103 79 - 110

LCS LCS Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 97 58 - 133 Trifluorotoluene (Surr) 104 77 - 128

Client Sample ID: Lab Control Sample Dup Lab Sample ID: LCSD 580-269327/7

**Matrix: Water** 

**Analysis Batch: 269327** 

LCSD LCSD RPD Spike %Rec. Limits RPD **Analyte** Added Result Qualifier Unit %Rec Limit D Gasoline 1.00 0.986 99 79 - 110 10 mg/L

LCSD LCSD Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 58 - 133 96 98 77 - 128 Trifluorotoluene (Surr)

#### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-269403/1-B Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 269505** Prep Batch: 269403

MR MR

Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac #2 Diesel (C10-C24) ND 0.11 0.065 mg/L 03/19/18 14:21 03/20/18 16:52 Motor Oil (>C24-C36) 03/19/18 14:21 03/20/18 16:52 ND 0.35 0.096 mg/L MB MB

Qualifier Prepared Surrogate %Recovery Limits Analyzed Dil Fac 67 50 - 150 03/19/18 14:21 03/20/18 16:52 o-Terphenyl

Lab Sample ID: MB 580-269403/1-B Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 269540** Prep Batch: 269403 MB MB

MB MB

Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac #2 Diesel (C10-C24) ND 0.11 03/19/18 14:21 03/21/18 12:23 0.065 mg/L Motor Oil (>C24-C36) ND 0.35 03/19/18 14:21 03/21/18 12:23 0.096 mg/L

Qualifier Limits Dil Fac Surrogate %Recovery Prepared Analyzed 50 - 150 03/19/18 14:21 03/21/18 12:23 o-Terphenyl 94

Lab Sample ID: LCS 580-269403/2-B **Client Sample ID: Lab Control Sample** 

**Matrix: Water** Prep Type: Total/NA **Analysis Batch: 269505 Prep Batch: 269403** 

Spike LCS LCS %Rec. Added Analyte Result Qualifier Unit D %Rec Limits #2 Diesel (C10-C24) 2.00 1.50 mg/L 75 59 - 112

TestAmerica Seattle

3/21/2018

## **QC Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Edmonds Terminal

TestAmerica Job ID: 580-75831-1

# Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: LCS 580-2 Matrix: Water Analysis Batch: 269505	269403/2-B					Clie	nt Sa	mple ID	: Lab Control Sample Prep Type: Total/NA Prep Batch: 269403
, , , , , , , , , , , , , , , , , , , ,			Spike	LCS	LCS				%Rec.
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits
Motor Oil (>C24-C36)			2.00	1.61		mg/L		80	64 - 120
	LCS	LCS							
Surrogate	%Recovery	Qualifier	Limits						
o-Terphenyl	73		50 - 150						

Lab Sample ID: LCSD 580-269403/3-B				Client Sai	mple	ID: Lat	Control :	Sample	e Dup
Matrix: Water							Prep Ty	e: Tot	al/NA
Analysis Batch: 269505							Prep Ba	itch: 20	<mark>69403</mark>
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
#2 Diesel (C10-C24)	2.00	1.43	-	mg/L		72	59 - 112	4	16
Motor Oil (>C24-C36)	2.00	1.56		mg/L		78	64 - 120	3	17
LCSD LCSD									

Limits

50 - 150

%Recovery Qualifier

72

Surrogate

o-Terphenyl

TestAmerica Seattle

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## **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-75831-1

Lab Sample ID: 580-75831-1

Matrix: Water

Client Sample ID: Outfall #002 Date Collected: 03/14/18 10:00

Date Received: 03/14/18 13:45

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			269475	03/20/18 22:20	TL1	TAL SEA
Total/NA	Prep	3510C			269355	03/19/18 10:06	NDB	TAL SEA
Total/NA	Analysis	8270C SIM		1	269405	03/19/18 19:26	T1W	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	269327	03/17/18 23:19	W1T	TAL SEA
Total/NA	Prep	3510C			269403	03/19/18 14:21	NDB	TAL SEA
Total/NA	Cleanup	3630C			269477	03/20/18 12:30	NDB	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	269540	03/21/18 12:45	ADB	TAL SEA

**Client Sample ID: Trip Blank** 

Date Collected: 03/14/18 00:01

Date Received: 03/14/18 13:45

Lab Sample ID:	580-75831-2
	Matrix: Water

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	269460	03/20/18 17:02	TL1	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	269327	03/17/18 21:44	W1T	TAL SEA

#### **Laboratory References:**

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

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TestAmerica Seattle

## **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-75831-1

Project/Site: Edmonds Terminal

## **Laboratory: TestAmerica Seattle**

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

Authority	ithority 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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

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## **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-75831-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-75831-1	Outfall #002	Water	03/14/18 10:00	03/14/18 13:45
580-75831-2	Trip Blank	Water	03/14/18 00:01	03/14/18 13:45

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	Chain of
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Arcadis		Client Contact	Peter	Car	أجيما	n P	ŧ I					Dai	te Z	114	/18		Chair	of Cus	tody Nu	mber ) (	ccoc
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city 1100 Olive way, 5 mite 21/1	Code	Sampler		Lab Co	ntact								Attach	liot If	<del></del>	<del>, - ,</del>	13-				
Seattle WA	98101	Jasen	ittle	Elo	ine	Wa	LIKA	U	624		<u> </u>	nore spa	ice is no	eeded)							
Project Name and Location (State)		Billing Contact		1					9	[	3 7	2					***************************************				
Edmonds Terminal Contract/Purchase Order/Quote No.	***************************************			·		****			EPA	X,	<b>y</b> \$	3								nstruc	
Contract/Purchase Order/Quote No.			Matrix		Conta Prese				ž	PH-6	4- D	4						Con	dition	s of R	eceipt
Sample I.D. and Location/Description (Containers for each sample may be combined on one line)	Date	Time Air Aqueous	Sed.	Unpres. H2S04	ниоз	HCI	NaOH NaOH		Benzene	NWTPH-6X	NAMITOH - DX W/SONC										
Outfall #002	3/14/18 1	1000 X		2	(	ક			X	$\langle \rangle$	$\langle \rangle$							PH	= 7,	70	
Trip blank		X				6			X	X											
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	azard Identification						Ĩ	Samp	ole Dis	posa	<i></i>	☐ Disp	osal By	Lab			(A	fee may	he ass	essed if	samples
☐ Yes ☐ No Cooler Temp: ☐ Non-Ha.	zard 🗌 Flamn	nable 🗌 Skin Ir	ritant 🗌 P	oison B		Unkr			eturn 1	To Cli	ent	☐ Arch	nive For			Month				r than 1	
Turn Around Time Required (business days)				1 QC	Require	emen	ts (Spec	cify)													
□ 24 Hours □ 48 Hours □ 5 Days □ 10 Day 1. Relinguished By Sign/Print	ıs 🗌 15 Days	☐ Other , Date	, Time	- 1	Receive	d Du	Cion/I	During									D-1		·····	77	
The Erickours	er	3/14/18	1345					Fi	anı	115	CØ	Luna	. ]	^			Date 3	14/1	8	Time 134	5
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3. Relinquished By Sign/Print	<del></del>	Date	Time	3.1	Receive	d By	Sign/P	rint					······································		*		Date	?	<u>_</u>	Time	
Comments			<u> </u>				····														

DISTRIBUTION: WHITE -- Stays with the Samples; CANARY -- Returned to Client with Report; PINK -- Field Copy
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TAL-8274-5892972018

Job Number: 580-75831-1

Login Number: 75831 List Source: TestAmerica Seattle

List Number: 1

Creator: Blankinship, Tom X

Creator. Dialikiliship, Tolli X		
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	
s 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	



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: 580-77215-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 5/17/2018 1:36:41 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

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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.

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77215-1

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#### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77215-1

Job ID: 580-77215-1

**Laboratory: TestAmerica Seattle** 

**Narrative** 

Job Narrative 580-77215-1

#### Receipt

Two samples were received on 5/9/2018 11:43 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.5° C.

#### GC/MS VOA

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

#### GC/MS Semi VOA

Method(s) 8270C SIM: The method blank for preparation batch 580-273742 and analytical batch 580-274008 contained Benzo[a]anthracene, Chrysene, Dibenz(a,h)anthracene and Indeno[1,2,3-cd]pyrene above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

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

#### GC Semi VOA

Method(s) NWTPH-Dx: The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for batch preparation batch 580-273587 and 580-273640 and analytical batch 580-273843 recovered outside control limits for the following analytes: #2 Diesel (C10-C24).

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

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## **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77215-1

#### **Qualifiers**

#### **GC/MS Semi VOA**

Qualifier **Qualifier Description** 

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

#### GC Semi VOA

Qualifier **Qualifier Description** 

RPD of the LCS and LCSD exceeds the control limits

### **Glossary**

Abbreviation	These commonly used abbreviations may or may not be present in this report.					
n	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 MLMinimum Level (Dioxin) NC Not Calculated

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

**PQL Practical Quantitation Limit** 

**Quality Control** QC

Relative Error Ratio (Radiochemistry) **RER** 

Reporting Limit or Requested Limit (Radiochemistry) RL

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

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

TestAmerica Seattle

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## **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Client Sample ID: Outfall #002

TestAmerica Job ID: 580-77215-1

Lab Sample ID: 580-77215-1

Matrix: Water

Date Collected: 05/08/18 09:00 Date Received: 05/09/18 11:43

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			05/13/18 01:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	115		74 - 123			-		05/13/18 01:13	1
Toluene-d8 (Surr)	92		79 - 122					05/13/18 01:13	1
4-Bromofluorobenzene (Surr)	106		78 - 119					05/13/18 01:13	1
Dibromofluoromethane (Surr)	111		70 - 120					05/13/18 01:13	1
1,2-Dichloroethane-d4 (Surr)	109		70 - 120					05/13/18 01:13	1

Method: 8270C SIM - Sen	Method: 8270C SIM - Semivolatile Organic Compounds (GC/MS SIM)											
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac				
Benzo[a]anthracene	ND ND	0.020	0.0020	ug/L		05/14/18 10:35	05/16/18 17:48	1				
Benzo[a]pyrene	ND	0.020	0.0030	ug/L		05/14/18 10:35	05/16/18 17:48	1				
Benzo[b]fluoranthene	ND	0.020	0.0081	ug/L		05/14/18 10:35	05/16/18 17:48	1				
Benzo[k]fluoranthene	ND	0.030	0.0091	ug/L		05/14/18 10:35	05/16/18 17:48	1				
Chrysene	ND	0.020	0.0061	ug/L		05/14/18 10:35	05/16/18 17:48	1				
Dibenz(a,h)anthracene	ND	0.020	0.0020	ug/L		05/14/18 10:35	05/16/18 17:48	1				
Indeno[1,2,3-cd]pyrene	ND	0.020	0.0071	ug/L		05/14/18 10:35	05/16/18 17:48	1				
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac				
Terphenyl-d14	69	53 - 112				05/14/18 10:35	05/16/18 17:48	1				

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)											
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac		
Gasoline	ND		0.25	0.10	mg/L			05/12/18 16:55	1		
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac		
4-Bromofluorobenzene (Surr)	85		58 - 133					05/12/18 16:55	1		

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup												
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac			
#2 Diesel (C10-C24)	ND	*	0.11	0.068	mg/L		05/11/18 09:32	05/15/18 15:52	1			
Motor Oil (>C24-C36)	ND		0.36	0.10	mg/L		05/11/18 09:32	05/15/18 15:52	1			
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac			
o-Terphenyl	77		50 - 150				05/11/18 09:32	05/15/18 15:52	1			

## **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77215-1

Lab Sample ID: 580-77215-2

Matrix: Water

Client Sample ID: Trip Blank Date Collected: 05/08/18 00:01

Date Received: 05/09/18 11:43

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			05/12/18 17:16	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	114		74 - 123					05/12/18 17:16	1
Toluene-d8 (Surr)	92		79 - 122					05/12/18 17:16	1
4-Bromofluorobenzene (Surr)	104		78 - 119					05/12/18 17:16	1
Dibromofluoromethane (Surr)	105		70 - 120					05/12/18 17:16	1
1,2-Dichloroethane-d4 (Surr)	109		70 - 120					05/12/18 17:16	1

Method: NWTPH-Gx - Nort	hwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			05/12/18 15:52	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	87		58 - 133			-		05/12/18 15:52	1
Trifluorotoluene (Surr)			77 - 128					05/12/18 15:52	

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5/17/2018

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Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77215-1

## Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-273676/5

**Matrix: Water** 

Analysis Batch: 273676

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB

AnalyteResultQualifierRLMDLUnitDPreparedAnalyzedDil FacBenzeneND1.00.53ug/L0.530.53ug/L0.510.510.51

	MB	МВ			
Surrogate	%Recovery	Qualifier	Limits	Prepared Analyzed	Dil Fac
Trifluorotoluene (Surr)	112		74 - 123	05/12/18 16:01	1
Toluene-d8 (Surr)	92		79 - 122	05/12/18 16:01	1
4-Bromofluorobenzene (Surr)	104		78 - 119	05/12/18 16:01	1
Dibromofluoromethane (Surr)	109		70 - 120	05/12/18 16:01	1
1,2-Dichloroethane-d4 (Surr)	108		70 - 120	05/12/18 16:01	1

Lab Sample ID: LCS 580-273676/6

**Matrix: Water** 

**Analysis Batch: 273676** 

Client Sample ID: Lab Control Sample Prep Type: Total/NA

 Analyte
 Added Benzene
 Result 10.0
 Qualifier 13.2
 Unit ug/L
 D wit ug/L
 WRec Limits 237 - 151

	LCS	LCS	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	113		74 - 123
Toluene-d8 (Surr)	88		79 - 122
4-Bromofluorobenzene (Surr)	103		78 - 119
Dibromofluoromethane (Surr)	106		70 - 120
1,2-Dichloroethane-d4 (Surr)	104		70 - 120

Lab Sample ID: LCSD 580-273676/7

**Matrix: Water** 

**Analysis Batch: 273676** 

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

	<b>Бріке</b>	LC2D	LC2D				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	10.0	13.7		ug/L		137	37 - 151	4	30

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	113		74 - 123
Toluene-d8 (Surr)	87		79 - 122
4-Bromofluorobenzene (Surr)	102		78 - 119
Dibromofluoromethane (Surr)	109		70 - 120
1,2-Dichloroethane-d4 (Surr)	108		70 - 120

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

Lab Sample ID: MB 580-273742/1-A

**Matrix: Water** 

**Analysis Batch: 274008** 

Client Sample ID: Method Blank Prep Type: Total/NA Prep Batch: 273742

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.00596	J	0.020	0.0020	ug/L		05/14/18 10:35	05/16/18 16:41	1
Benzo[a]pyrene	ND		0.020	0.0030	ug/L		05/14/18 10:35	05/16/18 16:41	1
Benzo[b]fluoranthene	ND		0.020	0.0080	ug/L		05/14/18 10:35	05/16/18 16:41	1

TestAmerica Seattle

Page 7 of 15 5/17/2018

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77215-1

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

Lab Sample ID: MB 580-273742/1-A

**Matrix: Water** 

**Analysis Batch: 274008** 

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

**Prep Batch: 273742** 

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.030	0.0090	ug/L		05/14/18 10:35	05/16/18 16:41	1
Chrysene	0.00662	J	0.020	0.0060	ug/L		05/14/18 10:35	05/16/18 16:41	1
Dibenz(a,h)anthracene	0.00889	J	0.020	0.0020	ug/L		05/14/18 10:35	05/16/18 16:41	1
Indeno[1,2,3-cd]pyrene	0.00782	J	0.020	0.0070	ug/L		05/14/18 10:35	05/16/18 16:41	1

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Terphenyl-d14 53 - 112 05/14/18 10:35 05/16/18 16:41 77

**Client Sample ID: Lab Control Sample** 

Lab Sample ID: LCS 580-273742/2-A

**Matrix: Water** 

**Analysis Batch: 274008** 

**Prep Type: Total/NA** 

Prep Batch: 273742

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	3.09		ug/L		77	71 - 120	
Benzo[a]pyrene	4.00	3.41		ug/L		85	76 - 120	
Benzo[b]fluoranthene	4.00	3.61		ug/L		90	66 - 120	
Benzo[k]fluoranthene	4.00	3.30		ug/L		83	68 - 120	
Chrysene	4.00	3.44		ug/L		86	64 - 120	
Dibenz(a,h)anthracene	4.00	3.65		ug/L		91	60 - 125	
Indeno[1,2,3-cd]pyrene	4.00	3.72		ug/L		93	63 - 120	

LCS LCS

Surrogate %Recovery Qualifier Limits 53 - 112 Terphenyl-d14 74

Lab Sample ID: LCSD 580-273742/3-A

**Matrix: Water** 

**Analysis Batch: 274008** 

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

**Prep Batch: 273742** 

•	Spike	LCSD	LCSD				%Rec.		RPD	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Benzo[a]anthracene	4.00	3.29		ug/L		82	71 - 120	6	16	
Benzo[a]pyrene	4.00	3.61		ug/L		90	76 - 120	6	17	
Benzo[b]fluoranthene	4.00	3.76		ug/L		94	66 - 120	4	20	
Benzo[k]fluoranthene	4.00	3.51		ug/L		88	68 - 120	6	20	
Chrysene	4.00	3.49		ug/L		87	64 - 120	1	16	
Dibenz(a,h)anthracene	4.00	3.84		ug/L		96	60 - 125	5	15	
Indeno[1,2,3-cd]pyrene	4.00	3.89		ug/L		97	63 - 120	5	15	

LCSD LCSD

Surrogate %Recovery Qualifier Limits 53 - 112 Terphenyl-d14 74

TestAmerica Seattle

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77215-1

Client Sample ID: Method Blank

**Client Sample ID: Lab Control Sample** 

Client Sample ID: Lab Control Sample Dup

**Prep Type: Total/NA** 

Prep Type: Total/NA

Prep Type: Total/NA

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

Lab Sample ID: MB 580-273690/5

**Matrix: Water** 

**Analysis Batch: 273690** 

MB MB

Analyte Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 0.25 Gasoline  $\overline{\mathsf{ND}}$ 0.10 mg/L 05/12/18 14:16

MB MB

%Recovery Surrogate Qualifier Limits Prepared Analyzed Dil Fac 4-Bromofluorobenzene (Surr) 90 58 - 133 05/12/18 14:16 Trifluorotoluene (Surr) 101 77 - 128 05/12/18 14:16

Lab Sample ID: LCS 580-273690/6

**Matrix: Water** 

Analysis Batch: 273690

LCS LCS Spike %Rec. **Analyte** Added Result Qualifier Limits Unit D %Rec Gasoline 1.00 0.942 94 79 - 110 mg/L

LCS LCS

Surrogate %Recovery Qualifier Limits 58 - 133 4-Bromofluorobenzene (Surr) 94 98 77 - 128 Trifluorotoluene (Surr)

Lab Sample ID: LCSD 580-273690/7

**Matrix: Water** 

**Analysis Batch: 273690** 

RPD Spike LCSD LCSD %Rec. Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Gasoline 1.00 0.987 mg/L 79 - 110

LCSD LCSD

%Recovery Qualifier Surrogate Limits 4-Bromofluorobenzene (Surr) 92 58 - 133 Trifluorotoluene (Surr) 103 77 - 128

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-273587/1-B

**Matrix: Water** 

**Analysis Batch: 273843** 

Client Sample ID: Method Blank Prep Type: Total/NA Prep Batch: 273587 MB MB

Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac #2 Diesel (C10-C24) ND 0.11 05/11/18 09:32 05/15/18 14:32 0.065 mg/L Motor Oil (>C24-C36) ND 0.35 05/11/18 09:32 05/15/18 14:32 0.096 mg/L

MB MB

Qualifier Limits Dil Fac Surrogate %Recovery Prepared Analyzed 50 - 150 05/11/18 09:32 05/15/18 14:32 o-Terphenyl 78

Lab Sample ID: LCS 580-273587/2-B

**Matrix: Water** 

Prep Type: Total/NA **Analysis Batch: 273843 Prep Batch: 273587** Spike LCS LCS %Rec. Added Analyte Result Qualifier Unit D %Rec Limits #2 Diesel (C10-C24) 2.00 1.28 mg/L 64 59 - 112

TestAmerica Seattle

**Client Sample ID: Lab Control Sample** 

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## **QC Sample Results**

Client: ARCADIS U.S. Inc

Surrogate

o-Terphenyl

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77215-1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: LCS 580- Matrix: Water Analysis Batch: 273843	273587/2-B					Clie	nt Sai	mple ID	: Lab Control S Prep Type: To Prep Batch: 2	tal/NA
Analysis Daton. 273043			Spike	LCS	LCS				%Rec.	7 3307
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits	
Motor Oil (>C24-C36)			2.00	1.78		mg/L		89	64 - 120	
	LCS	LCS								
Surrogate	%Recovery	Qualifier	Limits							
o-Terphenyl	84		50 - 150							
_										

Lab Sample ID: LCSD 580-273587/3-B Matrix: Water Analysis Batch: 273843			(	Client Sai	nple	ID: Lat	Lab Control Sampl Prep Type: To Prep Batch: 2			
•	Spike	LCSD	LCSD				%Rec.		RPD	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
#2 Diesel (C10-C24)	2.00	1.55	*	mg/L		78	59 - 112	19	16	
Motor Oil (>C24-C36)	2.00	1.96		mg/L		98	64 - 120	9	17	

Limits

50 - 150

LCSD LCSD %Recovery Qualifier

91

## **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77215-1

Lab Sample ID: 580-77215-1

**Matrix: Water** 

Client Sample ID: Outfall #002 Date Collected: 05/08/18 09:00

Date Received: 05/09/18 11:43

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			273676	05/13/18 01:13	TL1	TAL SEA
Total/NA	Prep	3510C			273742	05/14/18 10:35	JCM	TAL SEA
Total/NA	Analysis	8270C SIM		1	274008	05/16/18 17:48	W1T	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	273690	05/12/18 16:55	JSM	TAL SEA
Total/NA	Prep	3510C			273587	05/11/18 09:32	JCM	TAL SEA
Total/NA	Cleanup	3630C			273640	05/11/18 14:42	JCM	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	273843	05/15/18 15:52	TL1	TAL SEA

**Client Sample ID: Trip Blank** 

Date Collected: 05/08/18 00:01 Date Received: 05/09/18 11:43 Lab Sample ID: 580-77215-2

**Matrix: Water** 

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	273676	05/12/18 17:16	TL1	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	273690	05/12/18 15:52	JSM	TAL SEA

#### **Laboratory References:**

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

TestAmerica Seattle

## **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-77215-1

Project/Site: Chevron Edmonds Terminal

## **Laboratory: TestAmerica Seattle**

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

Authority	Program	<b>EPA Region</b>	<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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

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## **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77215-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-77215-1	Outfall #002	Water	05/08/18 09:00	05/09/18 11:43
580-77215-2	Trip Blank	Water	05/08/18 00:01	05/09/18 11:43

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

	Rush
٦	Short Hold

Chain of **Custody Record** 

Client Aread. S		,	Client Contac	"Detar c	am	obell						1	Date (	5/9	118	C	hain of Custody I	38033
Address	Svite	800		mber (Area Code						```	· አ s	1	ab Nun		55 th	P	age	of \
Scottle	State Zip	Code		1 Little	Lab EL	Contact	- W	all	9/ 3 3	STICE THE PERSON	4	Analy more s	sis (Atta space is	221 ach list i i needec				
Project Name and Location (State) Edmonds terminal	(WA)		Billing Contac	t	<del>-1</del>				5,52.A	1 ( S ) 1		2		ANNOTATION DESCRIPTION OF THE PROPERTY OF THE	TANKS THE RESIDENCE OF THE PARTY OF THE PART		,	Instructions/
Contract/Purchase Order/Quote No.	······································	1		Matrix	1.2	Pre	ntainer: eservati	ves		Ž L	33						Conaina	ns of Receipt
Sample I.D. and Location/Descr (Containers for each sample may be combin	ription ned on one line)	Date	1.2	Soil Soil		HZS04 HN03		ZnAc/ NaOH	م	3	8	3					<u> </u>	
Outfall #002		5/ <b>8</b> /18	<u> </u>	10	2		8			-	V 1	_					p[-]==	t.13
TRIP BLANK				6			6		V	<b>V</b>	<b>V</b>						Benzene	& CPAHS
					++		+			+								quantitative
					++					+							1055 tha	n 1 ug/L
										<del> </del>								
							1.			<b>†</b>							Run st	andard
					-      <b>   </b>			Ther	m. ID:	tr	<u> </u>	or: <u>3</u>	5.	Unc:_	3.4 .		54C	
								Cool Pack	er Dsc	5m Brb.	828 12		FedEx	::				
								Cust	. Seal:	Yes	No	<u>×</u>	UPS:_ Lab C	our:	×			
		580-	77215 Chain of C	Custody				V@	Packs/	Dry I	ce/Non		Other					
Cooler	Possible H	i lazard Identification							Sample	Dispo	sal			i By Lab		k	(A fee may be a	assessed if samples
☐ Yes ☐ No Cooler Temp:	☐ Non-Ha	azard 🗆 Flam	mable 🗆 Skir	ı Irritant 🗆	Poison			nown   [ nts (Spec		rn To i	Client		Archive	For	M	onths	are retained lor	nger than 1 month)
Turn Around Time Required (business days)  24 Hours  48 Hours  5 Day	vs □ 10 Da	ivs 🗆 15 Days	☐ Other	STAT		ис пец	штетте	пь (әрес	лгу)									
1. Relinquished By Sign/Pyint  J 1 Ja1			Date 5/9/18	Time	ξ .	1. Rece	ived By	Sign/F	rini Fra	nci	Sco	L41	na, ]	,			Date 5/4/18	Time N 4 3
2/Relinquished By Sign/Print			Date	Time		2. Rece	ived By	Sign/F	rint				7				Date	Time
3. Relinquished By Sign/Print	yya diga ara yinni anna a mara yinni anna a mara a mara a mara a mara a mara a mara a mara a mara a mara a mar		Date	Time		3. Rece	ived By	Sign/P	rint						***************************************		Date	Time
Comments						······································												

Job Number: 580-77215-1

Login Number: 77215 List Source: TestAmerica Seattle

List Number: 1

Creator: Blankinship, Tom X

Creator: Blankinship, Tom X		
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	



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# **ANALYTICAL REPORT**

TestAmerica Laboratories, Inc.

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

TestAmerica Job ID: 580-77414-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 5/25/2018 1:25:00 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

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**Have a Question?** 



Visit us at: www.testamericainc.com

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.

TestAmerica Job ID: 580-77414-1 Project/Site: Chevron Edmonds Terminal

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#### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77414-1

Job ID: 580-77414-1

**Laboratory: TestAmerica Seattle** 

Narrative

Job Narrative 580-77414-1

#### Receipt

Two samples were received on 5/18/2018 2:34 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.2° C.

#### **GC/MS VOA**

Method(s) NWTPH-Gx: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 580-274372 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recovery was within acceptance limits.

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

#### GC/MS Semi VOA

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

#### GC Semi VOA

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

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## **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77414-1

### **Qualifiers**

### **GC/MS Semi VOA**

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.

## Glossary

ND

PQL

QC **RER** 

RL

**RPD** TEF

TEQ

Glossary	
Abbreviation	These commonly used abbreviations may or may not be present in this report.
a	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

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)

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin)

**Quality Control** 

TestAmerica Seattle

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5/25/2018

Project/Site: Chevron Edmonds Terminal

Client Sample ID: Outfall #002

Date Collected: 05/17/18 14:30 Date Received: 05/18/18 14:34

Lab Sample ID: 580-77414-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			05/23/18 16:02	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123			-		05/23/18 16:02	
Toluene-d8 (Surr)	106		79 - 122					05/23/18 16:02	1
4-Bromofluorobenzene (Surr)	97		78 - 119					05/23/18 16:02	1
Dibromofluoromethane (Surr)	101		70 - 120					05/23/18 16:02	1
1,2-Dichloroethane-d4 (Surr)	105		70 - 120					05/23/18 16:02	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0045	JB	0.020	0.0020	ug/L		05/22/18 09:41	05/23/18 14:54	1
Benzo[a]pyrene	ND		0.020	0.0030	ug/L		05/22/18 09:41	05/23/18 14:54	1
Benzo[b]fluoranthene	ND		0.020	0.0081	ug/L		05/22/18 09:41	05/23/18 14:54	1
Benzo[k]fluoranthene	ND		0.030	0.0091	ug/L		05/22/18 09:41	05/23/18 14:54	1
Chrysene	ND		0.020	0.0061	ug/L		05/22/18 09:41	05/23/18 14:54	1
Dibenz(a,h)anthracene	ND		0.020	0.0020	ug/L		05/22/18 09:41	05/23/18 14:54	1
Indeno[1,2,3-cd]pyrene	ND		0.020	0.0071	ug/L		05/22/18 09:41	05/23/18 14:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenvl-d14	71		53 - 120				05/22/18 09:41	05/23/18 14:54	

Method: NWTPH-Gx - Northw	est - Volatile Pe	etroleum Products (	GC)				
Analyte	Result Qua	alifier RL	MDL Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND	0.25	0.10 mg/L			05/22/18 15:49	1
Surrogate	%Recovery Qua	alifier Limits			Prepared	Analvzed	Dil Fac
	, , , , , , , , , , , , , , , , , , , ,	a			rrepared	Allalyzea	<i>5</i> ao
4-Bromofluorobenzene (Surr)	96	50 - 150			Теригеа	05/22/18 15:49	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11	0.065	mg/L		05/23/18 09:49	05/24/18 14:47	1
Motor Oil (>C24-C36)	ND		0.35	0.096	mg/L		05/23/18 09:49	05/24/18 14:47	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	67		50 - 150				05/23/18 09:49	05/24/18 14:47	1

## **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77414-1

Lab Sample ID: 580-77414-2

**Matrix: Water** 

<b>Client Sample ID: Trip Blank</b>
Date Collected: 05/17/18 00:00

Date Received: 05/18/18 14:34

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			05/23/18 15:12	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123					05/23/18 15:12	1
Toluene-d8 (Surr)	107		79 - 122					05/23/18 15:12	1
4-Bromofluorobenzene (Surr)	96		78 - 119					05/23/18 15:12	1
Dibromofluoromethane (Surr)	102		70 - 120					05/23/18 15:12	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 120					05/23/18 15:12	1

<b>Method: NWTPH-Gx - Nort</b>	hwest - Volatile	Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			05/20/18 00:22	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		50 - 150			-		05/20/18 00:22	1
Trifluorotoluene (Surr)	99		50 - 150					05/20/18 00:22	1

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Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77414-1

## Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-274475/5

**Matrix: Water** 

**Analysis Batch: 274475** 

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

MB MB

Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac 1.0 Benzene ND 0.53 ug/L 05/23/18 13:30

	MB	MB				
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123		05/23/18 13:30	1
Toluene-d8 (Surr)	106		79 - 122		05/23/18 13:30	1
4-Bromofluorobenzene (Surr)	97		78 - 119		05/23/18 13:30	1
Dibromofluoromethane (Surr)	101		70 - 120		05/23/18 13:30	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 120		05/23/18 13:30	1

Lab Sample ID: LCS 580-274475/6

**Matrix: Water** 

Analyte

Benzene

**Analysis Batch: 274475** 

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

LCS LCS Spike %Rec. Added Result Qualifier Unit D %Rec Limits 10.0 10.5 ug/L 105 37 - 151

LCS LCS Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 99 74 - 123 Toluene-d8 (Surr) 96 79 - 122 4-Bromofluorobenzene (Surr) 97 78 - 119 Dibromofluoromethane (Surr) 100 70 - 120 1,2-Dichloroethane-d4 (Surr) 100 70 - 120

Lab Sample ID: LCSD 580-274475/7

**Client Sample ID: Lab Control Sample Dup Matrix: Water** Prep Type: Total/NA **Analysis Batch: 274475** 

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	10.0	10.2		ug/L		102	37 - 151	3	30

Qualifier Limits
74 - 123
79 - 122
78 - 119
70 - 120
70 - 120
•

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

Lab Sample ID: MB 580-274341/1-A

**Matrix: Water** 

**Analysis Batch: 274480** 

**Client Sample ID: Method Blank** Prep Type: Total/NA **Prep Batch: 274341** 

	MB	МВ							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0160	J	0.020	0.0020	ug/L		05/22/18 09:41	05/23/18 11:58	1
Benzo[a]pyrene	0.00884	J	0.020	0.0030	ug/L		05/22/18 09:41	05/23/18 11:58	1
Benzo[b]fluoranthene	0.0126	J	0.020	0.0080	ug/L		05/22/18 09:41	05/23/18 11:58	1

TestAmerica Seattle

5/25/2018

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Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77414-1

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

Lab Sample ID: MB 580-274341/1-A

**Matrix: Water** 

**Analysis Batch: 274480** 

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

Prep Batch: 274341

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	0.0151	J	0.030	0.0090	ug/L		05/22/18 09:41	05/23/18 11:58	1
Chrysene	0.0169	J	0.020	0.0060	ug/L		05/22/18 09:41	05/23/18 11:58	1
Dibenz(a,h)anthracene	0.0113	J	0.020	0.0020	ug/L		05/22/18 09:41	05/23/18 11:58	1
Indeno[1,2,3-cd]pyrene	0.0141	J	0.020	0.0070	ug/L		05/22/18 09:41	05/23/18 11:58	1

MB MB

MR ME

%Recovery Qualifier Limits Surrogate Prepared Analyzed Dil Fac 05/22/18 09:41 05/23/18 11:58 53 - 120 Terphenyl-d14 94

**Client Sample ID: Lab Control Sample** 

Lab Sample ID: LCS 580-274341/2-A **Matrix: Water** 

Analysis Batch: 274480

Prep Type: Total/NA Prep Batch: 274341

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzo[a]anthracene 4.00 3.52 ug/L 88 61 - 120 4.00 Benzo[a]pyrene 3.95 ug/L 99 65 - 120 4.00 Benzo[b]fluoranthene 3.98 ug/L 99 58 - 120 Benzo[k]fluoranthene 4.00 3.98 100 58 - 120 ug/L 4.00 ug/L Chrysene 3.87 97 58 - 120 Dibenz(a,h)anthracene 4.00 3.55 ug/L 89 60 - 125 Indeno[1,2,3-cd]pyrene 4.00 3.45 ug/L 86 56 - 120

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 85 53 - 120

Lab Sample ID: LCSD 580-274341/3-A

**Matrix: Water** 

**Analysis Batch: 274480** 

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

Prep Batch: 274341

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	3.53		ug/L		88	61 - 120	0	16
Benzo[a]pyrene	4.00	3.96		ug/L		99	65 - 120	0	17
Benzo[b]fluoranthene	4.00	3.82		ug/L		96	58 - 120	4	20
Benzo[k]fluoranthene	4.00	4.06		ug/L		102	58 - 120	2	20
Chrysene	4.00	3.95		ug/L		99	58 - 120	2	16
Dibenz(a,h)anthracene	4.00	3.53		ug/L		88	60 - 125	1	15
Indeno[1,2,3-cd]pyrene	4.00	3.43		ug/L		86	56 - 120	1	15

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 82 53 - 120

TestAmerica Seattle

5/25/2018

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

TestAmerica Job ID: 580-77414-1

Project/Site: Chevron Edmonds Terminal

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-274244/5 **Client Sample ID: Method Blank Matrix: Water Prep Type: Total/NA** 

Analysis Batch: 274244

Client: ARCADIS U.S. Inc

	MB	MR							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			05/19/18 22:52	1
	МВ	MB							

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac 50 - 150 4-Bromofluorobenzene (Surr) 94 05/19/18 22:52 05/19/18 22:52 Trifluorotoluene (Surr) 106 50 - 150

Lab Sample ID: LCS 580-274244/6

**Matrix: Water** 

Analysis Batch: 274244

randiyolo Zatom Zi izi i	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Gasoline	 1.00	0.960		mg/L		96	79 - 120	 

LCS LCS Limits Surrogate %Recovery Qualifier 50 - 150 4-Bromofluorobenzene (Surr) 101 Trifluorotoluene (Surr) 103 50 - 150

Lab Sample ID: LCSD 580-274244/7 **Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA** 

**Matrix: Water** 

**Analysis Batch: 274244** 

-	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Gasoline	 1.00	0.977		ma/l		98	79 - 120		10

LCSD LCSD %Recovery Qualifier Surrogate I imits 4-Bromofluorobenzene (Surr) 98 50 - 150 Trifluorotoluene (Surr) 103 50 - 150

Lab Sample ID: MB 580-274372/5 **Client Sample ID: Method Blank** Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 274372** 

	IVID	IVID							
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			05/22/18 13:18	1

	MB	MB					
Surrogate	%Recovery	Qualifier	Limits	Prepa	red	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		50 - 150		0	5/22/18 13:18	1
Trifluorotoluene (Surr)	107		50 - 150		0	5/22/18 13:18	1

Lab Sample ID: LCS 580-274372/6 **Client Sample ID: Lab Control Sample** Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 274372

	Spike	e LCS	LCS				%Rec.	
Analyte	Added	l Result	Qualifier	Unit	D	%Rec	Limits	
Gasoline	1.00	0.937		mg/L	_	94	79 - 120	

TestAmerica Seattle

TestAmerica Job ID: 580-77414-1

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC) (Continued)

Lab Sample ID: LCS 580-274372/6

**Matrix: Water** 

**Analysis Batch: 274372** 

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

Prep Batch: 274454

**Client Sample ID: Lab Control Sample** 

Client Sample ID: Lab Control Sample Dup

LCS LCS

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	97		50 - 150
Trifluorotoluene (Surr)	98		50 - 150

Lab Sample ID: LCSD 580-274372/7 **Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA** 

**Matrix: Water** 

**Analysis Batch: 274372** 

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Gasoline	1.00	0.960		mg/L		96	79 - 120	2	10

LCSD LCSD %Recovery Qualifier Surrogate Limits 4-Bromofluorobenzene (Surr) 96 50 - 150 Trifluorotoluene (Surr) 100 50 - 150

#### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-274454/1-B **Client Sample ID: Method Blank** Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 274578** 

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11	0.065	mg/L		05/23/18 09:49	05/24/18 12:36	1
Motor Oil (>C24-C36)	ND		0.35	0.096	mg/L		05/23/18 09:49	05/24/18 12:36	1
	MD	MD							

MB MB %Recovery Qualifier Surrogate Limits Prepared Analyzed Dil Fac o-Terphenyl 80 50 - 150 05/23/18 09:49 05/24/18 12:36

Lab Sample ID: LCS 580-274454/2-B

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Matrix: Water			•	Prep Type: Total/NA
analysis Batch: 274578				<b>Prep Batch: 274454</b>
-	Spike	LCS LCS		%Rec.
naluto	Addad	Popult Qualifier Unit	D % Boo	Limite

Analyte	Added	Result	Qualifier (	Unit D	%Rec	Limits	
#2 Diesel (C10-C24)	2.00	1.59	r	mg/L	80	50 - 120	
Motor Oil (>C24-C36)	2.00	2.12	r	mg/L	106	64 - 120	

LCS LCS Surrogate %Recovery Qualifier Limits o-Terphenyl 50 - 150

Lab Sample ID: LCSD 580-274454/3-B

Lub Gumpio IB: LOGB GGG Zi 110-70 B				,,,o,,,, o,	4111PIO	ID. Lui		Jumpi	Jup
Matrix: Water							Prep Typ	e: Tot	al/NA
Analysis Batch: 274578							Prep Ba	itch: 27	74454
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
#0 Discarl (040,004)		4.50					FO 400		

#2 Diesel (C10-C24) 2.00 ma/L 26 1.59 80 50 - 120 0 Motor Oil (>C24-C36) 2.00 2 12 mg/L 106 64 - 120 0 24

TestAmerica Seattle

5/25/2018

## **QC Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77414-1

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: LCSD 580-274454/3-B

**Matrix: Water** 

**Analysis Batch: 274578** 

LCSD LCSD

Surrogate %Recovery Qualifier Limits o-Terphenyl 92 50 - 150 **Client Sample ID: Lab Control Sample Dup** Prep Type: Total/NA

Prep Batch: 274454

## **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77414-1

Lab Sample ID: 580-77414-1

**Matrix: Water** 

Client Sample ID: Outfall #002

Date Collected: 05/17/18 14:30 Date Received: 05/18/18 14:34

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			274475	05/23/18 16:02	T1W	TAL SEA
Total/NA	Prep	3510C			274341	05/22/18 09:41	JCM	TAL SEA
Total/NA	Analysis	8270C SIM		1	274480	05/23/18 14:54	W1T	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	274372	05/22/18 15:49	JCV	TAL SEA
Total/NA	Prep	3510C			274454	05/23/18 09:49	JCM	TAL SEA
Total/NA	Cleanup	3630C			274531	05/23/18 16:05	JCM	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	274578	05/24/18 14:47	NMI	TAL SEA

Client Sample ID: Trip Blank

Lab Sample ID: 580-77414-2

Date Collected: 05/17/18 00:00 Matrix: Water

Date Received: 05/18/18 14:34

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	274475	05/23/18 15:12	T1W	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	274244	05/20/18 00:22	CJ	TAL SEA

#### **Laboratory References:**

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

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## **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-77414-1

Project/Site: Chevron Edmonds Terminal

## **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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

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## **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77414-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-77414-1	Outfall #002	Water	05/17/18 14:30	05/18/18 14:34
580-77414-2	Trip Blank	Water	05/17/18 00:00	05/18/18 14:34

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Short	Hold	

Rush

Chain of	
Custody	Record

		WWW.LCSLAIN	micanic.com				
Arcadis		Client Conta	ot Pete	x Campbell		Date 5/17/18	Chain of Custody Number 36775
Address 1100 Olive Way. S	uite 800	,	umber (Area Code)			Lab Number	Page of
Seattle	State Zip Code WA 2510	Sampler JUSO	n Little	Lab Contact Elaine Walkle	\$ 7.5ªnd	nalysis (Attach list if ore space is needed)	
Project Name and Location (State)  Edwords Term Contract/Purchase Order/Quote No.	inal	Billing Conta			-6x 0x w 30c s	Loc: 58	0 Special Instructions/
			Matrix	Containers & Preservatives	の発音型	//4	14 Conditions of Receipt
Sample I.D. and Location/Descrip (Containers for each sample may be combined	d on one line)   Date	Time ₹	Aqueous Sed. Soil	Unpres. H2S04 HNO3 HCI NaOH ZnAc/ NaOH	NWTPH- Benzene 1 CPARS 87		
outfall #002	5/17/1	8 1430	X	2 8	XXXX		pH= 8.04
Trip Blank			X	6	X X X		
							* NWTH-DX W/ SGC-use Standard
			-				Sqc-use Standard
							\$4C
			580-77414	Chain of Custody			* Banzane & cPAHS
					A		w/ quantitative leve
				Therm Cooler	1. ID: WOOD Co	r: 1,2 . Unc: 1,4 FedEx:	less than 1 Mg/L
				Packir	ng: <b>BVb</b> Seal: Yes No	redex:	
					acks/Dry Ice/None	— Lan Cour: 7~	
Cooler  Yes No Cooler Temp:	Possible Hazard Identifica	ntion Flammable \( \simeq \) Skin	Irritant 🗆 Po	į ·		Disposal By Lab Archive For Mor	(A fee may be assessed if samples  other are retained longer than 1 month)
Turn Around Time Required (business days)  ☐ 24 Hours ☐ 48 Hours 💢 5 Days	10 Days 🗆 15 I	Days 🗆 Other		QC Requirements (Specify)			
1. Relinquished By Sign/Print  JAM Little	71	Date \$/18/18	Time 1125	1 Received By Sign/Print	R. Call	512a Ta	Date Time 5.18-15 112.5
2. Relinguished By Sign/Print	Gay Sir	Date 548 18	Time 1434	2. Received By Sign/Print  3. Received By Sign/Print	Hobbs		5-18-18 1434
3. Relinquished By Sign/Print		Date	Time	3. Received By Sign/Print		***************************************	Date Time
Comments							

Client: ARCADIS U.S. Inc

Job Number: 580-77414-1

Login Number: 77414 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

oroator. Hosso, Rollingti i		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
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").	False	Headspace larger than 1/4".
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



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: 580-77584-1 Client Project/Site: Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

Kristine D. allen

Authorized for release by: 6/1/2018 5:42:13 PM

Kristine Allen, Manager of Project Management

(253)248-4970

kristine.allen@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

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**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77584-1

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#### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77584-1

Job ID: 580-77584-1

**Laboratory: TestAmerica Seattle** 

Narrative

Job Narrative 580-77584-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 5/26/2018 11:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.3° C.

#### GC/MS VOA

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

#### GC/MS Semi VOA

Method(s) 8270C SIM, 8270D SIM: The method blank for preparation batch 580-274804 and analytical batch 580-274853 contained Benzo[a]anthracene and Dibenz(a,h)anthracene above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

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

#### GC Semi VOA

Method(s) NWTPH-Dx: The %D of surrogate (o-Terphenyl) for CCV associated with batch 580-275088 was outside the lower control limits. All associated sample surrogate fell within acceptance criteria; therefore, the data have been reported. (CCVRT 580-275088/3)

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

#### **Organic Prep**

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

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### **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77584-1

#### **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.

#### **Glossary**

MDC

MDL

ML NC

ND PQL

QC

RER RL

Abbreviation	These commonly used abbreviations may or may not be present in this report.
a	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)
.OD	Limit of Detection (DoD/DOE)
_OQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Method Detection Limit Minimum Level (Dioxin)

Not Calculated

**Quality Control** 

Minimum Detectable Concentration (Radiochemistry)

Reporting Limit or Requested Limit (Radiochemistry)

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

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Received: 05/26/18 11:00

Indeno[1,2,3-cd]pyrene

Surrogate

Terphenyl-d14

TestAmerica Job ID: 580-77584-1

Client Sample ID: Outfall #002 Date Collected: 05/23/18 09:00

Lab Sample ID: 580-77584-1

Matrix: Water

05/29/18 14:38

Analyzed

Dil Fac

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			05/29/18 20:27	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123			-		05/29/18 20:27	1
Toluene-d8 (Surr)	105		79 - 122					05/29/18 20:27	1
4-Bromofluorobenzene (Surr)	99		78 - 119					05/29/18 20:27	1
Dibromofluoromethane (Surr)	100		70 - 120					05/29/18 20:27	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 120					05/29/18 20:27	1

Toluene-d8 (Surr)	105	79 - 122					05/29/18 20:27	1
4-Bromofluorobenzene (Surr)	99	78 - 119					05/29/18 20:27	1
Dibromofluoromethane (Surr)	100	70 - 120					05/29/18 20:27	1
1,2-Dichloroethane-d4 (Surr)	103	70 - 120					05/29/18 20:27	1
- Method: 8270C SIM - Semivolat	ile Organic Compound	s (GC/MS SIM)						
Analyte	Result Qualifie	r RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND	0.022	0.0022	ug/L		05/26/18 12:15	05/29/18 14:38	1
Benzo[a]pyrene	ND	0.022	0.0032	ug/L		05/26/18 12:15	05/29/18 14:38	1
Benzo[b]fluoranthene	ND	0.022	0.0087	ug/L		05/26/18 12:15	05/29/18 14:38	1
Benzo[k]fluoranthene	ND	0.032	0.0097	ug/L		05/26/18 12:15	05/29/18 14:38	1
Chrysene	ND	0.022	0.0065	ug/L		05/26/18 12:15	05/29/18 14:38	1
Dibenz(a,h)anthracene	ND	0.022	0.0022	ug/L		05/26/18 12:15	05/29/18 14:38	1

ND

%Recovery Qualifier

63

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)										
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
Gasoline	ND		0.25	0.10	mg/L			05/26/18 16:40	1	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac	
4-Bromofluorobenzene (Surr)	91		50 - 150			-		05/26/18 16:40	1	
Trifluorotoluene (Surr)	95		50 <sub>-</sub> 150					05/26/18 16:40	1	

0.022

Limits

53 - 120

0.0076 ug/L

05/26/18 12:15

Prepared

05/26/18 12:15 05/29/18 14:38

Method: NWTPH-Dx - Semi-	Volatile Petroleum I	Products by	NWTPH with	Silica Gel	l Cleanup	)			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11	0.066	mg/L		05/30/18 09:16	05/31/18 15:25	1
Motor Oil (>C24-C36)	ND		0.36	0.098	mg/L		05/30/18 09:16	05/31/18 15:25	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	78		50 - 150				05/30/18 09:16	05/31/18 15:25	1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Received: 05/26/18 11:00

TestAmerica Job ID: 580-77584-1

Lab Sample ID: 580-77584-2

Matrix: Water

**Client Sample ID: Trip Blank** Date Collected: 05/23/18 00:01

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			05/29/18 15:00	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123			-		05/29/18 15:00	1
Toluene-d8 (Surr)	106		79 - 122					05/29/18 15:00	1
4-Bromofluorobenzene (Surr)	99		78 - 119					05/29/18 15:00	1
Dibromofluoromethane (Surr)	99		70 - 120					05/29/18 15:00	1
1,2-Dichloroethane-d4 (Surr)	105		70 - 120					05/29/18 15:00	1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)										
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
Gasoline	ND		0.25	0.10	mg/L			05/26/18 16:08	1	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac	
4-Bromofluorobenzene (Surr)	93	-	50 - 150			=		05/26/18 16:08	1	
Trifluorotoluene (Surr)	104		50 - 150					05/26/18 16:08	1	

6/1/2018

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77584-1

#### Method: 624 - Volatile Organic Compounds (GC/MS)

мв мв

Lab Sample ID: MB 580-274858/9

**Matrix: Water** 

Analysis Batch: 274858

Client Sample ID: Method Blank

Prep Type: Total/NA

RL Analyte Result Qualifier MDL Unit D Prepared Analyzed Dil Fac Benzene ND 1.0 0.53 ug/L 05/29/18 13:19

MB MB Qualifier Prepared Analyzed Dil Fac Surrogate %Recovery Limits Trifluorotoluene (Surr) 74 - 123 102 05/29/18 13:19 Toluene-d8 (Surr) 104 79 - 122 05/29/18 13:19 98 78 - 119 05/29/18 13:19 4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr) 100 70 - 120 05/29/18 13:19 70 - 120 1,2-Dichloroethane-d4 (Surr) 105 05/29/18 13:19

Lab Sample ID: LCS 580-274858/10

**Matrix: Water** 

Analysis Batch: 274858

Client Sample ID: Lab Control Sample Prep Type: Total/NA

-	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzene	 10.0	9.49		ug/L		95	37 - 151	

LCS	LUS	
%Recovery	Qualifier	Limits
98		74 - 123
99		79 - 122
98		78 - 119
102		70 - 120
103		70 - 120
	%Recovery 98 99 98 102	98 99 98 102

100 100

Lab Sample ID: LCSD 580-274858/11

**Matrix: Water** 

Analysis Batch: 274858

Client Sample ID: Lab	<b>Control Sample Dup</b>
	Prop Type: Total/NA

Spike LCSD LCSD %Rec. Analyte Added Result Qualifier Unit D %Rec Limits RPD Limit Benzene 10.0 10.4 ug/L 104 37 - 151

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	99		74 - 123
Toluene-d8 (Surr)	96		79 - 122
4-Bromofluorobenzene (Surr)	97		78 - 119
Dibromofluoromethane (Surr)	102		70 - 120
1,2-Dichloroethane-d4 (Surr)	103		70 - 120

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

Lab Sample ID: MB 580-274804/1-A

**Matrix: Water** 

Analysis Batch: 274853

Client Sample ID: Method Blank

MB MB Dil Fac Analyte Result Qualifier RL MDL Unit Prepared Analyzed Benzo[a]anthracene 0.00284 0.020 0.0020 ug/L 05/26/18 12:15 05/29/18 11:48 Benzo[a]pyrene ND 0.020 0.0030 ug/L 05/26/18 12:15 05/29/18 11:48 Benzo[b]fluoranthene ND 0.020 0.0080 ug/L 05/26/18 12:15 05/29/18 11:48

TestAmerica Seattle

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RPD

Prep Type: Total/NA

Prep Batch: 274804

TestAmerica Job ID: 580-77584-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-274804/1-A

**Matrix: Water** 

Analysis Batch: 274853

Client Sample ID: Method Blank Prep Type: Total/NA

**Prep Batch: 274804** 

	IVID	IAID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.030	0.0090	ug/L		05/26/18 12:15	05/29/18 11:48	1
Chrysene	ND		0.020	0.0060	ug/L		05/26/18 12:15	05/29/18 11:48	1
Dibenz(a,h)anthracene	0.00787	J	0.020	0.0020	ug/L		05/26/18 12:15	05/29/18 11:48	1
Indeno[1,2,3-cd]pyrene	ND		0.020	0.0070	ug/L		05/26/18 12:15	05/29/18 11:48	1

MB MB

%Recovery Qualifier Surrogate Limits Prepared Analyzed Dil Fac 53 - 120 Terphenyl-d14 05/26/18 12:15 05/29/18 11:48 81

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

**Prep Batch: 274804** 

Lab Sample ID: LCS 580-274804/2-A

**Matrix: Water** 

Analysis Batch: 274853

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	3.82		ug/L		96	61 - 120	
Benzo[a]pyrene	4.00	3.45		ug/L		86	65 - 120	
Benzo[b]fluoranthene	4.00	3.67		ug/L		92	58 - 120	
Benzo[k]fluoranthene	4.00	3.23		ug/L		81	58 - 120	
Chrysene	4.00	3.47		ug/L		87	58 - 120	
Dibenz(a,h)anthracene	4.00	3.14		ug/L		79	60 - 125	
Indeno[1,2,3-cd]pyrene	4.00	3.47		ug/L		87	56 - 120	

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 78 53 - 120

Lab Sample ID: LCSD 580-274804/3-A

**Matrix: Water** 

Analysis Batch: 274853

Client	Sample	ID: Lab	Control	Sample	Dun
Ollelit	Januare	ID. Lab	COLLIGOR	Jailible	Dub

Prep Type: Total/NA

Prep Batch: 274804

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	3.92		ug/L		98	61 - 120	2	16
Benzo[a]pyrene	4.00	3.56		ug/L		89	65 - 120	3	17
Benzo[b]fluoranthene	4.00	3.78		ug/L		94	58 - 120	3	20
Benzo[k]fluoranthene	4.00	3.38		ug/L		84	58 - 120	4	20
Chrysene	4.00	3.60		ug/L		90	58 - 120	4	16
Dibenz(a,h)anthracene	4.00	3.24		ug/L		81	60 - 125	3	15
Indeno[1,2,3-cd]pyrene	4.00	3.57		ug/L		89	56 - 120	3	15

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 53 - 120 77

TestAmerica Seattle

6/1/2018

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77584-1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-274813/5

**Matrix: Water** 

Analyte

Gasoline

Analysis Batch: 274813

Client Sample ID: Method Blank Prep Type: Total/NA

мв мв RL Result Qualifier MDL Unit D Analyzed Dil Fac Prepared 0.25 ND 0.10 mg/L 05/26/18 14:33

MB MB

Qualifier Dil Fac Surrogate %Recovery Prepared Analyzed 50 - 150 4-Bromofluorobenzene (Surr) 78 05/26/18 14:33 Trifluorotoluene (Surr) 103 50 - 150 05/26/18 14:33

Lab Sample ID: LCS 580-274813/6 Client Sample ID: Lab Control Sample Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 274813

LCS LCS %Rec. Spike Analyte Added Result Qualifier Unit D %Rec Limits Gasoline 1.00 1.03 mg/L 103 79 - 120

LCS LCS

Surrogate %Recovery Qualifier Limits 50 - 150 4-Bromofluorobenzene (Surr) 97 105 Trifluorotoluene (Surr) 50 - 150

Lab Sample ID: LCSD 580-274813/7

**Matrix: Water** 

Analysis Batch: 274813

LCSD LCSD RPD Spike %Rec. Analyte Added Result Qualifier RPD Limit Unit %Rec Gasoline 1.00 1.04 104 mg/L 79 - 120 10

LCSD LCSD

%Recovery Qualifier I imits Surrogate 4-Bromofluorobenzene (Surr) 81 50 - 150 108 50 - 150 Trifluorotoluene (Surr)

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte

Lab Sample ID: MB 580-274947/1-B Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA Analysis Batch: 275088 Prep Batch: 274947 мв мв

RL

MDL Unit D

Prepared

Result Qualifier

#2 Diesel (C10-C24) 0.11 05/30/18 09:16 ND 0.065 mg/L 05/31/18 13:13 Motor Oil (>C24-C36) ND 0.35 0.096 mg/L 05/30/18 09:16 05/31/18 13:13 MB MB

Limits Dil Fac Surrogate %Recovery Qualifier Prepared Analyzed o-Terphenyl 74 50 - 150 05/30/18 09:16 05/31/18 13:13

Lab Sample ID: LCS 580-274947/2-B

**Matrix: Water** 

Analysis Batch: 275088							Prep E	satcn: 2/494/
	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
#2 Diesel (C10-C24)	2.00	1.46		mg/L		73	50 - 120	

TestAmerica Seattle

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Prep Type: Total/NA

Client Sample ID: Lab Control Sample Dup

Analyzed

Dil Fac

Client Sample ID: Lab Control Sample Prep Type: Total/NA

6/1/2018

## **QC Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

o-Terphenyl

TestAmerica Job ID: 580-77584-1

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Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: LCS 580-274947/2-B			Client Sample ID: Lab Control Sample
Matrix: Water			Prep Type: Total/NA
Analysis Batch: 275088			Prep Batch: 274947
	Spike	LCS LCS	%Rec.

Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits	
Motor Oil (>C24-C36)			2.00	1.87		mg/L		93	64 - 120	
	LCS	LCS								
Surrogate	%Recovery	Qualifier	Limits							

50 - 150

Lab Sample ID: LCSD 580-274947/3-B Client Sample ID: Lab Control Sample Dup **Matrix: Water** Prep Type: Total/NA Analysis Batch: 275088 **Prep Batch: 274947** Spike LCSD LCSD %Rec. RPD Analyte Result Qualifier Limit Added Unit %Rec Limits RPD #2 Diesel (C10-C24) 2.00 1.52 mg/L 76 50 - 120 26 Motor Oil (>C24-C36) 2.00 1.95 mg/L 97 64 - 120 24

#### **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77584-1

Lab Sample ID: 580-77584-1

Matrix: Water

Client Sample ID: Outfall #002 Date Collected: 05/23/18 09:00

Date Received: 05/26/18 11:00

Batch

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	274858	05/29/18 20:27	CJ	TAL SEA
Total/NA	Prep	3510C			274804	05/26/18 12:15	JCM	TAL SEA
Total/NA	Analysis	8270C SIM		1	274853	05/29/18 14:38	W1T	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	274813	05/26/18 16:40	JCV	TAL SEA
Total/NA	Prep	3510C			274947	05/30/18 09:16	JCM	TAL SEA
Total/NA	Cleanup	3630C			275039	05/30/18 18:28	JCM	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	275088	05/31/18 15:25	CJ	TAL SEA

Client Sample ID: Trip Blank

Lab Sample ID: 580-77584-2

Date Collected: 05/23/18 00:01

Matrix: Water

Date Received: 05/26/18 11:00

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	274858	05/29/18 15:00	CJ	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	274813	05/26/18 16:08	JCV	TAL SEA

Laboratory References:

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

6/1/2018

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## **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77584-1

#### **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	<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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

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## **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77584-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-77584-1	Outfall #002	Water	05/23/18 09:00	05/26/18 11:00
580-77584-2	Trip Blank	Water	05/23/18 00:01	05/26/18 11:00

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Loc: 580 77584

Rush Short Hold

Chain of Custody Reco

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Address	(00)	Telephone	NUITID	ei (Alea	couej.	/Fax N	umber			,				Lab Numb	er 0		Page		of	
City State Zip	Code 18101	Sampler					Contact		W	*W/	3			lysis (Attacl space is n	list if eeded)				· · · · · · · · · · · · · · · · · · ·	
Project Name and Location (State)		Billing Cor	ntact			1		<u>}-</u>	***************************************		Ø 4	λ.	~ by v 82702				Spi	ecial Ir	nstructio	ns/
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Sample I.D. and Location/Description (Containers for each sample may be combined on one line)	Date	Time 🛓	Aqueous	Sed. Soil		Unpres.	HZS04 HN03	HCI	NaOH	ZnAc/ NaOH	Przzze	SE SE	RWTH CPAHS							
QUITA!! #002	5/23/18 09	00	10			2		8			X	X	XX				H	<del>-</del> 7	.98	
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Cooler Possible H.  Yes No Cooler Temp: Non-Ha	azard Identification uzard ☐ Flamma	ble 🗆 S	kin Irri	tant	□ <i>P</i>	oison L	3 [	⊐ Ui	nknov	Sam vn 🗀 F	ple Di Return			Disposal By Archive For		Months	(A fee ma are retain			
Turn Around Time Required (business days)  24 Hours 48 Hours \$\int_65 \text{Days} 10 Da	vs 🗆 15 Days	☐ Other				1	QC Req	uirem	ents	(Specify)										
1. Relinquished By Sign/Print		Date S/27	110	Time	0		I. Rece	ived E	y Si	ign/Print	F	ra	in a's r	o Lu	na, 5)	A	Date /	18	Time     <i>00</i>	
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3 Relinquished By Sign/Print		Date		Time		3	3. Recei	ived B	y Si	ign/Print							Date		Time	
Comments			1										<u>.</u>		***************************************		1			

## **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 580-77584-1

Login Number: 77584 List Source: TestAmerica Seattle

List Number: 1

Creator: Gall, Brandon A

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td>Lab does not accept radioactive samples.</td>	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	N/A	Not present
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").	False	Headspace larger than 1/4" in one or more vials, 4 vial with accpt. headspace
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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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: 580-77727-1 Client Project/Site: Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 6/7/2018 2:41:48 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

·····LINKS ·······

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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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77727-1

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#### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77727-1

Job ID: 580-77727-1

**Laboratory: TestAmerica Seattle** 

Narrative

Job Narrative 580-77727-1

#### Receipt

Three samples were received on 5/31/2018 2:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 6.1° C.

#### **Receipt Exceptions**

The VOA vials for the following samples were not provided by TestAmerica. Outfall #002 (580-77727-1), Outfall #002 (580-77727-1[MS]), Outfall #002 (580-77727-1[MSD]) and DUP-1 (580-77727-2).

#### GC/MS VOA

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

#### GC/MS Semi VOA

Method(s) 8270C SIM: The method blank for preparation batch 580-275384 and analytical batch 580-275611 contained Benzo[a]anthracene above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and/or re-analysis of samples was not performed.

Method(s) 8270C SIM: The matrix spike (MS) recoveries for preparation batch 580-275384 and analytical batch 580-275611 were 2% outside lower control limits for Benzo[a]anthracene. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

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

#### GC Semi VOA

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

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## **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77727-1

#### **Qualifiers**

#### **GC/MS Semi VOA**

## Glossary

ND

PQL

QC

RER

RPD TEF

TEQ

RL

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

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)

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

**Quality Control** 

TestAmerica Seattle

Page 4 of 18 6/7/2018

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Collected: 05/29/18 16:00

Client Sample ID: Outfall #002

TestAmerica Job ID: 580-77727-1

Lab Sample ID: 580-77727-1

**Matrix: Water** 

Method: 624 - Volatile Orga Analyte	•	ds (GC/MS) Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND	Qualifier	1.0	0.53	ug/L		Fiepaieu	06/06/18 17:21	Dilla
201120110	115		1.0	0.00	ug/L			00/00/10 17:21	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
Trifluorotoluene (Surr)	101		74 - 123					06/06/18 17:21	
Toluene-d8 (Surr)	103		79 - 122					06/06/18 17:21	
4-Bromofluorobenzene (Surr)	99		78 - 119					06/06/18 17:21	
Dibromofluoromethane (Surr)	96		70 - 120					06/06/18 17:21	
1,2-Dichloroethane-d4 (Surr)	103		70 - 120					06/06/18 17:21	
Method: 8270C SIM - Semi	volatile Organi	c Compour	nde (GC/MS	SIM)					
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0049	JBF1	0.022	0.0022	ug/L		06/05/18 09:44	06/07/18 10:53	
Benzo[a]pyrene	ND		0.022	0.0032	ug/L		06/05/18 09:44	06/07/18 10:53	1
Benzo[b]fluoranthene	ND		0.022	0.0087	ug/L		06/05/18 09:44	06/07/18 10:53	1
Benzo[k]fluoranthene	ND		0.032	0.0097	ug/L		06/05/18 09:44	06/07/18 10:53	1
Chrysene	ND		0.022	0.0065	ug/L		06/05/18 09:44	06/07/18 10:53	1
Dibenz(a,h)anthracene	0.0061	J	0.022	0.0022	ug/L		06/05/18 09:44	06/07/18 10:53	1
Indeno[1,2,3-cd]pyrene	ND		0.022	0.0076	ug/L		06/05/18 09:44	06/07/18 10:53	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	74		53 - 120				06/05/18 09:44	06/07/18 10:53	
Method: NWTPH-Gx - Nort	bweet Veletik	Dotroloum	. Droduoto	(CC)					
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L		<u> </u>	06/02/18 19:56	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
4-Bromofluorobenzene (Surr)	90		50 - 150					06/02/18 19:56	
Trifluorotoluene (Surr)	101		50 - 150					06/02/18 19:56	
<del>-</del>									
-		leum Prodi	ucts by NW			el Cle	eanup Prepared	Analyzed	Dil Fac
Method: NWTPH-Dx - Sem			PI			ט			
Analyte	Result	Qualifier	RL 0.12	MDL			•	•	
Analyte #2 Diesel (C10-C24)	Result ND		0.12	0.072	mg/L		06/04/18 10:56	06/06/18 15:47	
Analyte	Result			0.072			•	•	
Analyte #2 Diesel (C10-C24)	Result ND	Qualifier	0.12	0.072	mg/L		06/04/18 10:56 06/04/18 10:56 <b>Prepared</b>	06/06/18 15:47	Dil Fac

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Received: 05/31/18 14:00

Terphenyl-d14

TestAmerica Job ID: 580-77727-1

**Client Sample ID: DUP-1** Lab Sample ID: 580-77727-2 Date Collected: 05/29/18 16:10

**Matrix: Water** 

06/05/18 09:44 06/07/18 11:59

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			06/06/18 18:35	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	103		74 - 123					06/06/18 18:35	1
Toluene-d8 (Surr)	105		79 - 122					06/06/18 18:35	1
4-Bromofluorobenzene (Surr)	102		78 - 119					06/06/18 18:35	1
Dibromofluoromethane (Surr)	101		70 - 120					06/06/18 18:35	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 120					06/06/18 18:35	1

Method: 8270C SIM - Sem	ivolatile Organi	c Compou	nds (GC/MS	SIM)					
Analyte	Result	Qualifier	` RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0050	J B	0.022	0.0022	ug/L		06/05/18 09:44	06/07/18 11:59	1
Benzo[a]pyrene	ND		0.022	0.0032	ug/L		06/05/18 09:44	06/07/18 11:59	1
Benzo[b]fluoranthene	ND		0.022	0.0086	ug/L		06/05/18 09:44	06/07/18 11:59	1
Benzo[k]fluoranthene	ND		0.032	0.0097	ug/L		06/05/18 09:44	06/07/18 11:59	1
Chrysene	ND		0.022	0.0065	ug/L		06/05/18 09:44	06/07/18 11:59	1
Dibenz(a,h)anthracene	0.0060	J	0.022	0.0022	ug/L		06/05/18 09:44	06/07/18 11:59	1
Indeno[1,2,3-cd]pyrene	ND		0.022	0.0075	ug/L		06/05/18 09:44	06/07/18 11:59	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac

53 - 120

Method: NWTPH-Gx - Northw	est - Volatile Pe	etroleum Products	s (GC)				
Analyte	Result Qu	ualifier RL	MDL	Unit D	Prepared	Analyzed	Dil Fac
Gasoline	ND	0.25	0.10	mg/L		06/02/18 17:21	1
Surrogate	%Recovery Qu	ualifier Limits			Duamanad	A	Dil Ess
Surrogate	Mecovery Qu	uanner Linns			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90	50 - 150			Prepared	06/02/18 17:21	DII Fac

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup												
Analyte	Result Qu	ualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac			
#2 Diesel (C10-C24)	ND		0.11	0.067	mg/L		06/04/18 10:56	06/06/18 16:53	1			
Motor Oil (>C24-C36)	ND		0.36	0.099	mg/L		06/04/18 10:56	06/06/18 16:53	1			
Surrogate	%Recovery Qu	ualifier	Limits				Prepared	Analyzed	Dil Fac			
o-Terphenyl	72		50 - 150				06/04/18 10:56	06/06/18 16:53	1			

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Received: 05/31/18 14:00

TestAmerica Job ID: 580-77727-1

Lab Sample ID: 580-77727-3

**Matrix: Water** 

Client Sample ID: Trip Blank Date Collected: 05/29/18 00:01

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			06/06/18 16:08	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123					06/06/18 16:08	1
Toluene-d8 (Surr)	104		79 - 122					06/06/18 16:08	1
4-Bromofluorobenzene (Surr)	102		78 - 119					06/06/18 16:08	1
Dibromofluoromethane (Surr)	98		70 - 120					06/06/18 16:08	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 120					06/06/18 16:08	1

<b>Method: NWTPH-Gx - Nort</b>	hwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			06/02/18 14:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		50 - 150			-		06/02/18 14:46	1
Trifluorotoluene (Surr)	100		50 - 150					06/02/18 14:46	1

6/7/2018

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Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77727-1

06/06/18 14:54

## Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-275526/5 **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA

Analysis Batch: 275526

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			06/06/18 14:54	1
	МВ	MB							
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	102		74 - 123			-		06/06/18 14:54	1
Toluene-d8 (Surr)	107		79 - 122					06/06/18 14:54	1
4-Bromofluorobenzene (Surr)	101		78 - 119					06/06/18 14:54	1
Dibromofluoromethane (Surr)	101		70 - 120					06/06/18 14:54	1

Lab Sample ID: LCS 580-275526/6 **Client Sample ID: Lab Control Sample Matrix: Water Prep Type: Total/NA** 

70 - 120

Analysis Batch: 275526

1,2-Dichloroethane-d4 (Surr)

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzene 10.0 10.3 ug/L 103 37 - 151

103

	LCS	LCS	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	102		74 - 123
Toluene-d8 (Surr)	101		79 - 122
4-Bromofluorobenzene (Surr)	101		78 - 119
Dibromofluoromethane (Surr)	100		70 - 120
1,2-Dichloroethane-d4 (Surr)	99		70 - 120

Lab Sample ID: LCSD 580-275526/7 **Client Sample ID: Lab Control Sample Dup Matrix: Water** 

**Analysis Batch: 275526** 

Spike LCSD LCSD %Rec. Added Analyte Result Qualifier Unit Limits RPD Limit D %Rec Benzene 10.0 99 37 - 151 9.88 ug/L

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	99		74 - 123
Toluene-d8 (Surr)	100		79 - 122
4-Bromofluorobenzene (Surr)	101		78 - 119
Dibromofluoromethane (Surr)	98		70 - 120
1,2-Dichloroethane-d4 (Surr)	100		70 - 120

Lab Sample ID: 580-77727-1 MS Client Sample ID: Outfall #002 **Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 275526** 

•	Sample	Sample	Spike	MS	MS				%Rec.
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits
Benzene	ND		11.6	11.3		ug/L		98	37 - 151

	IVIS IVIS	
Surrogate	%Recovery Quan	lifier Limits
Trifluorotoluene (Surr)	105	74 - 123
Toluene-d8 (Surr)	102	79 - 122

TestAmerica Seattle

6/7/2018

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Prep Type: Total/NA

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Method: 624 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 580-77727-1 MS

**Matrix: Water** 

**Analysis Batch: 275526** 

Client Sample ID: Outfall #002 Prep Type: Total/NA

MS MS

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	101		78 - 119
Dibromofluoromethane (Surr)	104		70 - 120
1,2-Dichloroethane-d4 (Surr)	104		70 - 120

Lab Sample ID: 580-77727-1 MSD

**Matrix: Water** 

**Analysis Batch: 275526** 

Client Sample ID: Outfall #002 Prep Type: Total/NA

Sample Sample Spike MSD MSD %Rec. **RPD** Result Qualifier Added Result Qualifier D %Rec Limits RPD **Analyte** Unit Limit 95 Benzene  $\overline{\mathsf{ND}}$ 11.6 <u>11.1</u> ug/L 37 - 151 30

MSD MSD Surrogate %Recovery Qualifier Limits 101 74 - 123 Trifluorotoluene (Surr) Toluene-d8 (Surr) 99 79 - 122 101 78 - 119 4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr) 100 70 - 120 1,2-Dichloroethane-d4 (Surr) 98 70 - 120

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

Lab Sample ID: MB 580-275384/1-A

**Matrix: Water** 

**Analysis Batch: 275611** 

Client Sample ID: Method Blank Prep Type: Total/NA Prep Batch: 275384

MB MB Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac Benzo[a]anthracene 0.00274 J 0.020 0.0020 ug/L 06/05/18 09:44 06/07/18 09:25 ND 0.0030 ug/L 06/05/18 09:44 06/07/18 09:25 Benzo[a]pyrene 0.020 Benzo[b]fluoranthene ND 0.020 0.0080 ug/L 06/05/18 09:44 06/07/18 09:25 Benzo[k]fluoranthene ND 0.030 0.0090 ug/L 06/05/18 09:44 06/07/18 09:25 Chrysene ND 0.020 0.0060 ug/L 06/05/18 09:44 06/07/18 09:25 Dibenz(a,h)anthracene ND 0.020 0.0020 ug/L 06/05/18 09:44 06/07/18 09:25 ND 0.020 0.0070 ug/L 06/05/18 09:44 06/07/18 09:25 Indeno[1,2,3-cd]pyrene

MB MB

 Surrogate
 %Recovery
 Qualifier
 Limits
 Prepared

 Terphenyl-d14
 83
 53 ـ 120
 06/05/18 09:

06/05/18 09:44 06/07/18 09:25 1

Client Sample ID: Lab Control Sample

Analyzed

Lab Sample ID: LCS 580-275384/2-A

Matrix: Water

Analysis Batch: 275611

Prep Type: Total/NA
Prep Batch: 275384

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	2.67		ug/L		67	61 - 120	
Benzo[a]pyrene	4.00	2.94		ug/L		74	65 - 120	
Benzo[b]fluoranthene	4.00	2.99		ug/L		75	58 - 120	
Benzo[k]fluoranthene	4.00	2.80		ug/L		70	58 - 120	
Chrysene	4.00	2.79		ug/L		70	58 - 120	
Dibenz(a,h)anthracene	4.00	3.23		ug/L		81	60 - 125	

TestAmerica Seattle

Dil Fac

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Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

**Analysis Batch: 275611** 

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

Lab Sample ID: LCS 580-275384/2-A **Client Sample ID: Lab Control Sample Matrix: Water** 

Prep Type: Total/NA Prep Batch: 275384

LCS LCS Spike Added Result Qualifier Analyte Unit D %Rec Limits Indeno[1,2,3-cd]pyrene 4.00 3.30 ug/L 83 56 - 120

%Rec.

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 53 - 120

Client Sample ID: Outfall #002

Prep Batch: 275384

Lab Sample ID: 580-77727-1 MS **Matrix: Water** Prep Type: Total/NA Analysis Batch: 275611

Sample Sample MS MS Spike %Rec. Analyte Result Qualifier Added Result Qualifier Unit %Rec Limits Benzo[a]anthracene 0.0049 JBF1 4.26 2.52 F1 59 61 - 120 ug/L 4.26 Benzo[a]pyrene ND 2.79 ug/L 66 65 - 120Benzo[b]fluoranthene ND 4.26 2.66 ug/L 62 58 - 120 Benzo[k]fluoranthene ND 4.26 66 58 - 120 2.82 ug/L Chrysene ND 4.26 2.74 ug/L 64 58 - 120 4.26 72 Dibenz(a,h)anthracene 0.0061 J 3.08 ug/L 60 - 125 Indeno[1,2,3-cd]pyrene ND 4.26 3.08 ug/L 72 56 - 120

MS MS

%Recovery Qualifier Limits Surrogate Terphenyl-d14 53 - 120 66

Lab Sample ID: 580-77727-1 MSD Client Sample ID: Outfall #002

**Matrix: Water** 

**Analysis Batch: 275611** 

Prep Type: Total/NA

Prep Batch: 275384

, , , , , , , , , , , , , , , , , , , ,	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	0.0049	J B F1	4.21	2.87		ug/L		68	61 - 120	13	16
Benzo[a]pyrene	ND		4.21	3.08		ug/L		73	65 - 120	10	17
Benzo[b]fluoranthene	ND		4.21	2.94		ug/L		70	58 - 120	10	20
Benzo[k]fluoranthene	ND		4.21	3.15		ug/L		75	58 - 120	11	20
Chrysene	ND		4.21	3.11		ug/L		74	58 - 120	13	16
Dibenz(a,h)anthracene	0.0061	J	4.21	3.39		ug/L		80	60 - 125	10	15
Indeno[1,2,3-cd]pyrene	ND		4.21	3.38		ug/L		80	56 - 120	9	15

MSD MSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 53 - 120

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

Lab Sample ID: MB 580-275249/6 **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 275249** 

MB MB

Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac ND 0.25 0.10 mg/L Gasoline 06/02/18 12:37

TestAmerica Seattle

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC) (Continued)

Lab Sample ID: MB 580-275249/6

Lab Sample ID: LCS 580-275249/7

Lab Sample ID: LCSD 580-275249/8

**Matrix: Water** 

**Analysis Batch: 275249** 

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

MB MB

Surrogate	%Recovery Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	85	50 - 150		06/02/18 12:37	1
Trifluorotoluene (Surr)	97	50 - 150		06/02/18 12:37	1

**Client Sample ID: Lab Control Sample** 

**Prep Type: Total/NA** 

**Matrix: Water** 

**Analysis Batch: 275249** 

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Gasoline	 1.00	0.953		mg/L		95	79 - 120	 

LCS LCS

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	102		50 - 150
Trifluorotoluene (Surr)	108		50 - 150

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

**Matrix: Water** 

**Analysis Batch: 275249** 

	Spi	ke LCSD	LCSD			%Rec.		RPD
Analyte	Add	ed Result	Qualifier U	nit D	%Rec	Limits	RPD	Limit
Gasoline		0.959		na/L	96	79 - 120		10

LCSD LCSD

Surrogate	%Recovery Qualifier	Limits
4-Bromofluorobenzene (Surr)	103	50 - 150
Trifluorotoluene (Surr)	104	50 - 150

Lab Sample ID: 580-77727-1 MS Client Sample ID: Outfall #002

watrix: water				Prep Type: Total/NA
Analysis Batch: 275249				
-	Sample Sample	Spike	MS MS	%Rec.

Analyte **Result Qualifier** Added Result Qualifier Unit D %Rec Limits Gasoline 1.00 0.904  $\overline{\mathsf{ND}}$ mg/L 90 79 - 120

MS MS Surrogato % Pocovery Qualifier

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	102		50 - 150
Trifluorotoluene (Surr)	101		50 - 150

Lab Sample ID: 580-77727-1 MSD Client Sample ID: Outfall #002 Prep Type: Total/NA

**Matrix: Water** 

Trifluorotoluene (Surr)

Analysis Batch: 275249

	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Gasoline	ND		1.00	0.965	-	ma/L		97	79 - 120	7	10	

MSD MSD Surrogate %Recovery Qualifier Limits 50 - 150 4-Bromofluorobenzene (Surr) 104

99

TestAmerica Seattle

6/7/2018

50 - 150

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77727-1

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-275309/1-B

**Matrix: Water** 

**Analysis Batch: 275495** 

Client Sample ID: Method Blank Prep Type: Total/NA

**Prep Batch: 275309** 

MB MB Analyte Result Qualifier RL **MDL** Unit D Prepared Analyzed Dil Fac 0.11 #2 Diesel (C10-C24)  $\overline{\mathsf{ND}}$ 0.065 mg/L 06/04/18 10:56 06/06/18 14:41 Motor Oil (>C24-C36) ND 0.35 0.096 mg/L 06/04/18 10:56 06/06/18 14:41

MB MB

%Recovery Qualifier Limits Surrogate Prepared Analyzed Dil Fac 50 - 150 o-Terphenyl 70 06/04/18 10:56 06/06/18 14:41

**Client Sample ID: Lab Control Sample** 

Lab Sample ID: LCS 580-275309/2-B

**Matrix: Water** 

**Analysis Batch: 275495** 

Prep Type: Total/NA **Prep Batch: 275309** 

LCS LCS Spike %Rec. Result Qualifier Limits **Analyte** Added Unit D %Rec #2 Diesel (C10-C24) 2.00 1.61 mg/L 81 50 - 120 Motor Oil (>C24-C36) 2.00 1.98 99 64 - 120 mg/L

LCS LCS

Surrogate %Recovery Qualifier I imits o-Terphenyl 50 - 150 98

Lab Sample ID: LCSD 580-275309/3-B Client Sample ID: Lab Control Sample Dup

Spike

**Matrix: Water** 

**Analysis Batch: 275495** 

Prep Type: Total/NA

**Prep Batch: 275309** %Rec. **RPD** 

Analyte Added Result Qualifier Unit D %Rec Limits **RPD** Limit #2 Diesel (C10-C24) 2.00 1.56 mg/L 78 50 - 120 3 26 2.00 64 - 120 Motor Oil (>C24-C36) 1.88 mg/L 94 5 24

LCSD LCSD

MS MS

LCSD LCSD

Surrogate %Recovery Qualifier Limits o-Terphenyl 86 50 - 150

Lab Sample ID: 580-77727-1 MS

**Matrix: Water** 

**Analysis Batch: 275495** 

Client Sample ID: Outfall #002 Prep Type: Total/NA

**Prep Batch: 275309** 

%Rec.

Sample Sample Spike Analyte Result Qualifier Added Result Qualifier Unit %Rec Limits #2 Diesel (C10-C24) ND 2.12 1.47 mg/L 70 50 - 120 Motor Oil (>C24-C36) ND 2.12 1.92 mg/L 90 64 - 120

MS MS

%Recovery Qualifier Limits Surrogate 88 50 - 150 o-Terphenyl

Lab Sample ID: 580-77727-1 MSD

**Matrix: Water** 

**Analysis Batch: 275495** 

Client Sample ID: Outfall #002 Prep Type: Total/NA

**Prep Batch: 275309** 

Sample Sample Spike MSD MSD %Rec. **RPD** Result Qualifier Added Result Qualifier Unit %Rec Limits **RPD** Limit Analyte D 2.13 #2 Diesel (C10-C24) ND 1.37 mg/L 64 50 - 1208 26 Motor Oil (>C24-C36) ND 2.13 1.77 mg/L 83 64 - 120 24

TestAmerica Seattle

## **QC Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

MSD MSD

TestAmerica Job ID: 580-77727-1

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: 580-77727-1 MSD Client Sample ID: Outfall #002

Prep Type: Total/NA **Matrix: Water Analysis Batch: 275495** 

**Prep Batch: 275309** 

Surrogate Limits %Recovery Qualifier o-Terphenyl 76 50 - 150

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Lab Sample ID: 580-77727-1

**Matrix: Water** 

Client Sample ID: Outfall #002 Date Collected: 05/29/18 16:00

Date Received: 05/31/18 14:00

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			275526	06/06/18 17:21	CJ	TAL SEA
Total/NA	Prep	3510C			275384	06/05/18 09:44	KMS	TAL SEA
Total/NA	Analysis	8270C SIM		1	275611	06/07/18 10:53	ERZ	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	275249	06/02/18 19:56	T1W	TAL SEA
Total/NA	Prep	3510C			275309	06/04/18 10:56	JCM	TAL SEA
Total/NA	Cleanup	3630C			275480	06/05/18 18:03	JCM	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	275495	06/06/18 15:47	W1T	TAL SEA

**Client Sample ID: DUP-1** Lab Sample ID: 580-77727-2

Date Collected: 05/29/18 16:10 Matrix: Water Date Received: 05/31/18 14:00

Batch **Dilution** Batch Batch **Prepared** Method Number **Prep Type** Type Run **Factor** or Analyzed Analyst Lab Total/NA 624 275526 06/06/18 18:35 CJ TAL SEA Analysis Total/NA 3510C TAL SEA Prep 275384 06/05/18 09:44 KMS 275611 06/07/18 11:59 ERZ Total/NA 8270C SIM TAL SEA Analysis 1 Total/NA Analysis **NWTPH-Gx** 1 275249 06/02/18 17:21 T1W TAL SEA Prep 3510C TAL SEA Total/NA 275309 06/04/18 10:56 JCM Total/NA Cleanup 3630C 275480 06/05/18 18:03 JCM TAL SEA Total/NA Analysis NWTPH-Dx 275495 06/06/18 16:53 W1T TAL SEA 1

Client Sample ID: Trip Blank Lab Sample ID: 580-77727-3 Date Collected: 05/29/18 00:01

Date Received: 05/31/18 14:00

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	275526	06/06/18 16:08	CJ	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	275249	06/02/18 14:46	T1W	TAL SEA

**Laboratory References:** 

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

**Matrix: Water** 

TestAmerica Seattle

## **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-77727-1

Project/Site: Edmonds Terminal

## **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	<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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

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## **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77727-1

Lab Sample ID	Client Sample ID	Matrix	Collected Received
580-77727-1	Outfall #002	Water	05/29/18 16:00 05/31/18 14:00
580-77727-2	DUP-1	Water	05/29/18 16:10 05/31/18 14:00
580-77727-3	Trip Blank	Water	05/29/18 00:01 05/31/18 14:00

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Rush	
Short Hold	

Chain of	
Custody	Record

Client	Client Contact										Date		Chain of Custody Number				
Arcadis		Peter Campbell								5/29/1	8		38	<u> 1034</u>			
Address		Telephone N	umber (A	rea Code)	/Fax N	umber	1						Lab Number	,			
City State Zip	vite 800				<b>,</b>				204	<u>.</u>	Ų		17727		Page	of	
	Code	Sampler	3	Lab Contact				) }	ऄ	_}}∆	Analysis (Attach list if nore space is needed)						
Seattle WA	98101	Jason					Elaine Walker				1	Ö	lure space is rieeded)		_		
Project Name and Location (State)		Billing Conta	ct						40	, 1	ر ا	_					
Edmonds terminal		<u> </u>			r				i i	1 14	δ	8270				pecial Instructi	
Contract/Purchase Order/Quote No.			Matri	x			tainers servativ		26.00	HE	- Hd				C	onditions of Re	ceipt
Sample I.D. and Location/Description (Containers for each sample may be combined on one line)	Date	Time 🕌	Aqueous Sed.	Sail	Unpres.	HZSU4 HNO3	HCI	ZnAc/ NaOH	Ronzemo	NWTOH-(ax	NWTOH - DX	CPAH;					
Jutfall # 002	5/29/18 16	100	χ		2		8		X		Х				P -1	-7.XI	
Outfall # 002 MS/MSD	5/29/18 18	no	X		2		8		X	χ	χ	X					
DUP-1	5/79/18 -		χ		2		8		Х	X	Х	X			D1 12	CA + CPA	145
Trip Blank		_	X				6		X	λ					Must	have	prother
	***************************************													No	Wall	l lose than	
																14	**************************************
								Therm	ւ ID: 🤻	[r. 5	· ·	or:	6.) . (nc. 6.	0 .	Rva	NWILL-	-D×
					Cooler Dsc: 14ed Red FedEx: Packing: Dsb) le 1796.										tendend Si		
														M 11	645W6 31	<u>, C</u>	
		Cust. Seal: YesNo_\(\frac{\sqrt{\chi}}{\chi} \) Lah Cour: \(\frac{\sqrt{\chi}}{\chi}\)								·							
				Wel/Packs/Dry Ice/None Other:									I				
								T									
Cooler Possible Ha	nzard Identification							476	ample L	lienos	201		Disposal By Lab				
☐ Yes ☐ No Cooler Temp: ☐ Non-Ha		ble 🗆 Skir	n Irritant	$\Box P$	oison E	3 [	Unkn	own $\Box$	-				Archive For				
Turn Around Time Required (business days						OC Requi								580-77	727 Cha	in of Custody	11361 1841
🗆 24 Hours 🗆 48 Hours 🕽 5 Days 🗆 10 Daj	rs 🔲 15 Days	☐ Other															
1. Relinquished By Sign/Print / Errz Lvu		Date 5/31/1.	X Tin	<sup>пе</sup> 400	1	. Receiy	ed By	Sign/Pr	int Fran	1.15	1.0	/	Lnna, Jr.		Date 3/3	/18   Time	
2. Relinquished By Sign/Print	<i>v</i> ) ≺	Date	S I I	ne	2	. Receiv	ed By	Sign/Pr	int	V 1 1			many in		Date	Time	
3. Relinquished By Sign/Print		Date	Tin	ne	3	. Receiv	ed By	Sign/Pri	int						Date	Time	
Comments							<del></del>								<u> </u>		

Job Number: 580-77727-1

Client: ARCADIS U.S. Inc

Login Number: 77727 List Source: TestAmerica Seattle

List Number: 1

Creator: Blankinship, Tom X

μ,		
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").	False	Refer to Job Narrative for details.
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

**TestAmerica Seattle** 



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## **ANALYTICAL REPORT**

TestAmerica Laboratories, Inc.

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

TestAmerica Job ID: 580-77886-1 Client Project/Site: Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 6/14/2018 5:46:13 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

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**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77886-1

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Receipt Checklists	16

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#### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77886-1

Job ID: 580-77886-1

**Laboratory: TestAmerica Seattle** 

**Narrative** 

Job Narrative 580-77886-1

#### Receipt

Two samples were received on 6/7/2018 11:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 17.3° C.

#### **GC/MS VOA**

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

#### GC/MS Semi VOA

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

#### GC Semi VOA

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

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## **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77886-1

## Glossary

ND

PQL

QC

RER

RPD TEF

TEQ

RL

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

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)

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin)

**Quality Control** 

## **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Collected: 06/07/18 08:45

Date Received: 06/07/18 11:50

Surrogate

4-Bromofluorobenzene (Surr)

Trifluorotoluene (Surr)

Client Sample ID: Outfall #002

TestAmerica Job ID: 580-77886-1

Lab Sample ID: 580-77886-1

Prepared

Analyzed

06/12/18 18:45

06/12/18 18:45

Dil Fac

**Matrix: Water** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	2.9		1.0	0.53	ug/L			06/11/18 14:34	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123					06/11/18 14:34	1
Toluene-d8 (Surr)	107		79 - 122					06/11/18 14:34	1
4-Bromofluorobenzene (Surr)	103		78 - 119					06/11/18 14:34	1
Dibromofluoromethane (Surr)	98		70 - 120					06/11/18 14:34	1
1,2-Dichloroethane-d4 (Surr)	99		70 - 120					06/11/18 14:34	1
Method: 8270C SIM - Semi Analyte		c Compou Qualifier	inds (GC/MS	SIM) MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND	<del>Qualifier</del>	0.023	0.0023	ug/L		06/08/18 09:38	06/12/18 18:14	1
Benzo[a]pyrene	ND.		0.023	0.0020	J		06/08/18 09:38	06/12/18 18:14	
Benzo[b]fluoranthene	ND.		0.023	0.0090	•		06/08/18 09:38	06/12/18 18:14	1
Benzo[k]fluoranthene	ND		0.034	0.010	Ū		06/08/18 09:38	06/12/18 18:14	
Chrysene	ND		0.023	0.0068	•		06/08/18 09:38	06/12/18 18:14	1
Dibenz(a,h)anthracene	ND		0.023	0.0023	U		06/08/18 09:38	06/12/18 18:14	1
Indeno[1,2,3-cd]pyrene	ND		0.023	0.0079			06/08/18 09:38	06/12/18 18:14	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	72		53 - 120				06/08/18 09:38	06/12/18 18:14	1
Method: NWTPH-Gx - Nort	hwest - Volatile	e Petroleui	m Products	(GC)					
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			06/12/18 18:45	

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup											
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac			
#2 Diesel (C10-C24)	ND	0.12	0.073	mg/L		06/11/18 13:05	06/12/18 14:24	1			
Motor Oil (>C24-C36)	ND	0.40	0.11	mg/L		06/11/18 13:05	06/12/18 14:24	1			
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac			
o-Terphenyl	106	50 - 150				06/11/18 13:05	06/12/18 14:24	1			

Limits

50 - 150

50 - 150

%Recovery Qualifier

90

## **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77886-1

Client Sample ID: Trip Blank Date Collected: 06/07/18 00:00 Lab Sample ID: 580-77886-2

**Matrix: Water** 

Date Received: 06/07/18 11:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			06/11/18 12:56	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123					06/11/18 12:56	1
Toluene-d8 (Surr)	106		79 - 122					06/11/18 12:56	1
4-Bromofluorobenzene (Surr)	100		78 - 119					06/11/18 12:56	1
Dibromofluoromethane (Surr)	99		70 - 120					06/11/18 12:56	1
1,2-Dichloroethane-d4 (Surr)	102		70 - 120					06/11/18 12:56	1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)											
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac		
Gasoline	ND		0.25	0.10	mg/L			06/08/18 17:16	1		
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac		
4-Bromofluorobenzene (Surr)	89		50 - 150			-		06/08/18 17:16	1		
Trifluorotoluene (Surr)	105		50 - 150					06/08/18 17:16	1		

6/14/2018

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Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77886-1

## Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-275911/5

Matrix: Water

Client Sample ID: Method Blank

Prep Type: Total/NA

**Analysis Batch: 275911** 

Alialysis Dalcii. 213311									
	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			06/11/18 11:42	1
	MB	MB							
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	99		74 - 123					06/11/18 11:42	1
Toluene-d8 (Surr)	105		79 - 122					06/11/18 11:42	1
4-Bromofluorobenzene (Surr)	101		78 - 119					06/11/18 11:42	1
Dibromofluoromethane (Surr)	99		70 - 120					06/11/18 11:42	1
1,2-Dichloroethane-d4 (Surr)	102		70 - 120					06/11/18 11:42	1

Lab Sample ID: LCS 580-275911/6

Matrix: Water

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analysis Batch: 275911

 Analyte
 Added Benzene
 Result 10.0
 Qualifier 10.1
 Unit ug/L
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 D ug/L
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	LCS	LCS	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	99		74 - 123
Toluene-d8 (Surr)	100		79 - 122
4-Bromofluorobenzene (Surr)	100		78 - 119
Dibromofluoromethane (Surr)	100		70 - 120
1,2-Dichloroethane-d4 (Surr)	102		70 - 120

Lab Sample ID: LCSD 580-275911/7

Client Sample ID: Lab Control Sample Dup Matrix: Water

Prep Type: Total/NA

**Analysis Batch: 275911** 

Spike LCSD LCSD RPD %Rec. D %Rec Analyte Added Result Qualifier Unit Limits RPD Limit Benzene 10.0 8.87 ug/L 89 37 - 151

LCSD LCSD Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 98 74 - 123 Toluene-d8 (Surr) 100 79 - 122 4-Bromofluorobenzene (Surr) 101 78 - 119 Dibromofluoromethane (Surr) 99 70 - 120 1,2-Dichloroethane-d4 (Surr) 100 70 - 120

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

MR MR

Lab Sample ID: MB 580-275767/1-A

Matrix: Water

Analysis Batch: 276070

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 275767

Analyte	Result Q	ualifier RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND	0.020	0.0020	ug/L		06/08/18 09:38	06/12/18 14:55	1
Benzo[a]pyrene	ND	0.020	0.0030	ug/L		06/08/18 09:38	06/12/18 14:55	1
Benzo[b]fluoranthene	ND	0.020	0.0080	ug/L		06/08/18 09:38	06/12/18 14:55	1

TestAmerica Seattle

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TestAmerica Job ID: 580-77886-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-275767/1-A

**Matrix: Water** 

**Analysis Batch: 276070** 

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

**Prep Batch: 275767** 

	MB	MR							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.030	0.0090	ug/L		06/08/18 09:38	06/12/18 14:55	1
Chrysene	ND		0.020	0.0060	ug/L		06/08/18 09:38	06/12/18 14:55	1
Dibenz(a,h)anthracene	ND		0.020	0.0020	ug/L		06/08/18 09:38	06/12/18 14:55	1
Indeno[1,2,3-cd]pyrene	ND		0.020	0.0070	ug/L		06/08/18 09:38	06/12/18 14:55	1

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Terphenyl-d14 53 - 120 06/08/18 09:38 06/12/18 14:55 112

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA Prep Batch: 275767

Lab Sample ID: LCS 580-275767/2-A **Matrix: Water** 

**Analysis Batch: 276070** 

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	3.71		ug/L		93	61 - 120	
Benzo[a]pyrene	4.00	4.24		ug/L		106	65 - 120	
Benzo[b]fluoranthene	4.00	4.22		ug/L		105	58 - 120	
Benzo[k]fluoranthene	4.00	4.21		ug/L		105	58 - 120	
Chrysene	4.00	4.03		ug/L		101	58 - 120	
Dibenz(a,h)anthracene	4.00	4.55		ug/L		114	60 - 125	
Indeno[1,2,3-cd]pyrene	4.00	4.54		ug/L		113	56 - 120	

LCS LCS

Surrogate %Recovery Qualifier Limits 53 - 120 Terphenyl-d14 86

Lab Sample ID: LCSD 580-275767/3-A

**Matrix: Water** 

Analysis Batch: 276070

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

Prep Batch: 275767

, , , , , , , , , , , , , , , , , , , ,	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	3.77		ug/L		94	61 - 120	2	16
Benzo[a]pyrene	4.00	4.27		ug/L		107	65 - 120	1	17
Benzo[b]fluoranthene	4.00	4.16		ug/L		104	58 - 120	1	20
Benzo[k]fluoranthene	4.00	4.37		ug/L		109	58 - 120	4	20
Chrysene	4.00	4.16		ug/L		104	58 - 120	3	16
Dibenz(a,h)anthracene	4.00	4.60		ug/L		115	60 - 125	1	15
Indeno[1,2,3-cd]pyrene	4.00	4.57		ug/L		114	56 <sub>-</sub> 120	1	15

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 89 53 - 120

TestAmerica Seattle

6/14/2018

TestAmerica Job ID: 580-77886-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-275792/5 Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 275792** 

MB MB

Analyte Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 0.25 Gasoline  $\overline{\mathsf{ND}}$ 0.10 mg/L 06/08/18 13:28 MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac 06/08/18 13:28 4-Bromofluorobenzene (Surr) 88 50 - 150 Trifluorotoluene (Surr) 99 50 - 150 06/08/18 13:28

Lab Sample ID: LCS 580-275792/6 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA **Analysis Batch: 275792** 

LCS LCS Spike %Rec. Unit **Analyte** Added Result Qualifier Limits D %Rec Gasoline 1.00 0.864 86 79 - 120 mg/L

LCS LCS Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 50 - 150 92 93 50 - 150 Trifluorotoluene (Surr)

Lab Sample ID: LCSD 580-275792/7 **Client Sample ID: Lab Control Sample Dup** Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 275792** 

LCSD LCSD RPD Spike %Rec. Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Gasoline 1.00 0.814 mg/L 81 79 - 120

LCSD LCSD Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 76 50 - 150 Trifluorotoluene (Surr) 89 50 - 150

Lab Sample ID: MB 580-276069/6 **Client Sample ID: Method Blank Matrix: Water** 

**Analysis Batch: 276069** 

MB MB Analyte RL **MDL** Unit Result Qualifier Prepared Analyzed Dil Fac 0.25 Gasoline  $\overline{\mathsf{ND}}$ 0.10 mg/L 06/12/18 16:10

MB MB Qualifier Limits Surrogate %Recovery Prepared Analyzed Dil Fac 4-Bromofluorobenzene (Surr) 88 50 - 150 06/12/18 16:10 98 06/12/18 16:10 Trifluorotoluene (Surr) 50 - 150

Lab Sample ID: LCS 580-276069/7 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 276069** 

Spike LCS LCS %Rec. Added Result Qualifier Unit %Rec Limits Analyte D Gasoline 1.00 0.883 mg/L 88 79 - 120

TestAmerica Seattle

Prep Type: Total/NA

6/14/2018

TestAmerica Job ID: 580-77886-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

### Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC) (Continued)

Lab Sample ID: LCS 580-276069/7

**Matrix: Water** 

**Analysis Batch: 276069** 

**Client Sample ID: Lab Control Sample** 

Client Sample ID: Method Blank

Prep Type: Total/NA

LCS LCS %Recovery Qualifier Surrogate Limits 4-Bromofluorobenzene (Surr) 50 - 150 107 Trifluorotoluene (Surr) 99 50 - 150

Lab Sample ID: LCSD 580-276069/8 Client Sample ID: Lab Control Sample Dup **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 276069

Spike LCSD LCSD %Rec. RPD Analyte Added Result Qualifier Unit %Rec Limits RPD Limit Gasoline 1.00 0.917 mg/L 92 79 - 120 4

LCSD LCSD %Recovery Qualifier Surrogate Limits 4-Bromofluorobenzene (Surr) 103 50 - 150 101 50 - 150 Trifluorotoluene (Surr)

#### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-275937/1-B

**Matrix: Water** Prep Type: Total/NA **Analysis Batch: 275993** Prep Batch: 275937 MB MB

Analyte Result Qualifier RL **MDL** Unit D Prepared Analyzed Dil Fac #2 Diesel (C10-C24)  $\overline{\mathsf{ND}}$ 0.11 0.065 mg/L 06/11/18 13:05 06/12/18 13:04 Motor Oil (>C24-C36) ND 0.35 0.096 mg/L 06/11/18 13:05 06/12/18 13:04

MB MB Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac o-Terphenyl 108 50 - 150 06/11/18 13:05 06/12/18 13:04

Lab Sample ID: LCS 580-275937/2-B **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 275993** 

Spike LCS LCS %Rec. **Analyte** Added Result Qualifier %Rec Limits Unit D

#2 Diesel (C10-C24) 2.00 1.78 89 50 - 120 mg/L Motor Oil (>C24-C36) 2.00 2.03 102 64 - 120 mg/L

LCS LCS %Recovery Qualifier Limits Surrogate

o-Terphenyl 50 - 150 101

Lab Sample ID: LCSD 580-275937/3-B Client Sample ID: Lab Control Sample Dup **Matrix: Water** 

Prep Type: Total/NA Prep Batch: 275937 **Analysis Batch: 275993** Spike LCSD LCSD %Rec. **RPD** Added Result Qualifier Unit %Rec Limits **RPD** Limit

Analyte #2 Diesel (C10-C24) 2.00 1.74 87 26 ma/L 50 - 120 Motor Oil (>C24-C36) 2.00 2.12 mg/L 106 64 - 12024

TestAmerica Seattle

Prep Batch: 275937

## **QC Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77886-1

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: LCSD 580-275937/3-B

**Matrix: Water** 

**Analysis Batch: 275993** 

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

**Prep Batch: 275937** 

LCSD LCSD

Surrogate %Recovery Qualifier Limits o-Terphenyl 102 50 - 150

### **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77886-1

Lab Sample ID: 580-77886-1

Matrix: Water

Client Sample ID: Outfall #002 Date Collected: 06/07/18 08:45

Date Received: 06/07/18 11:50

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	275911	06/11/18 14:34	CJ	TAL SEA
Total/NA	Prep	3510C			275767	06/08/18 09:38	JCM	TAL SEA
Total/NA	Analysis	8270C SIM		1	276070	06/12/18 18:14	TL1	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	276069	06/12/18 18:45	JCV	TAL SEA
Total/NA	Prep	3510C			275937	06/11/18 13:05	JCM	TAL SEA
Total/NA	Cleanup	3630C			275978	06/11/18 17:40	JCM	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	275993	06/12/18 14:24	CJ	TAL SEA

Client Sample ID: Trip Blank Lab Sample ID: 580-77886-2

Date Collected: 06/07/18 00:00 Matrix: Water

Date Received: 06/07/18 11:50

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	275911	06/11/18 12:56	CJ	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	275792	06/08/18 17:16	JCV	TAL SEA

#### **Laboratory References:**

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

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## **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-77886-1

Project/Site: Edmonds Terminal

## **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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

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## **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77886-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-77886-1	Outfall #002	Water	06/07/18 08:45	06/07/18 11:50
580-77886-2	Trip Blank	Water	06/07/18 00:00	06/07/18 11:50

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Short	Hold	

Rush

Chain of	
Custody	Record

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Contract/Purchase Order/Quote No.			M	atrix				ntaine eserva						1 1	ARABAN ARAMA ARAMA	11	788	6	1	ns of Receipt
Sample I.D. and Location/Description (Containers for each sample may be combined on one line)	Date	Time	Aqueous	Sed.		Unpres.	HN03	HCI	NaOH	ZnAc/ NaOH	Nwtrh	No Toh	Perzin CPAH			ì,				
Oct Fill # 002	6/7/18 0	845	X			2		8			>	X	××						PH= 8	1.15
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☐ Yes ☐ No Cooler Temp: ☐ Non-Ha.	zard Identification zard 🔲 Flamm	able 🗆 S	Skin Irrita	ınt	□ <i>P</i> e	oison B		] Un	know	Sai	mple D Retun	•			sposal By chive For		Me	onths		ssessed if samples ger than 1 month)
urn Around Time Required (business days)  2 4 Hours	s 🗆 15 Days	☐ Other				10	C Requ	iireme	ents (S	Specify)	)									
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Client: ARCADIS U.S. Inc

Job Number: 580-77886-1

Login Number: 77886 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

oreator. Hobbs, Neillieth i		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



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: 580-78119-1 Client Project/Site: Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

## M. Elains Walker

Authorized for release by: 6/27/2018 5:54:47 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

·····LINKS ·······

Review your project results through
Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78119-1

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#### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78119-1

Job ID: 580-78119-1

**Laboratory: TestAmerica Seattle** 

Narrative

Job Narrative 580-78119-1

#### Receipt

Two samples were received on 6/15/2018 12:25 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.7° C.

#### **GC/MS VOA**

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

#### GC/MS Semi VOA

Method(s) 8270C SIM: The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 580-276570 and analytical batch 580-276870 recovered outside control limits for the following analytes: Benzo[a]anthracene, Benzo[a]pyrene, and Benzo[b]fluoranthene. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

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

#### GC Semi VOA

Method(s) NWTPH-Dx: The following samples and QC were reanalyzed due to CCV failure in the initial analysis: (LCS 580-277249/2-B), (LCSD 580-277249/3-B) and (MB 580-277249/1-B).

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

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## **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78119-1

#### **Qualifiers**

#### **GC/MS Semi VOA**

\* LCS or LCSD is outside acceptance limits.

### **Glossary**

Abbreviation	These commonly used abbreviations may or may not be present in this report.
a	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)

AMDA Detection (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)

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## **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Terphenyl-d14

TestAmerica Job ID: 580-78119-1

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Client Sample ID: Outfall #002

Date Collected: 06/15/18 09:55
Date Received: 06/15/18 12:25

Lab Sample ID: 580-78119-1

06/18/18 12:32 06/21/18 00:09

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			06/20/18 23:14	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	97		74 - 123			-		06/20/18 23:14	1
Toluene-d8 (Surr)	106		79 - 122					06/20/18 23:14	1
4-Bromofluorobenzene (Surr)	102		78 - 119					06/20/18 23:14	1
Dibromofluoromethane (Surr)	96		70 - 120					06/20/18 23:14	1
1,2-Dichloroethane-d4 (Surr)	102		70 - 120					06/20/18 23:14	1

Analyte	Result	Qualifier	. RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND	*	0.052	0.015	ug/L		06/18/18 12:32	06/21/18 00:09	1
Benzo[a]pyrene	ND	*	0.10	0.012	ug/L		06/18/18 12:32	06/21/18 00:09	1
Benzo[b]fluoranthene	ND	*	0.052	0.012	ug/L		06/18/18 12:32	06/21/18 00:09	1
Benzo[k]fluoranthene	ND		0.052	0.013	ug/L		06/18/18 12:32	06/21/18 00:09	1
Chrysene	ND		0.10	0.017	ug/L		06/18/18 12:32	06/21/18 00:09	1
Dibenz(a,h)anthracene	ND		0.10	0.010	ug/L		06/18/18 12:32	06/21/18 00:09	1
Indeno[1,2,3-cd]pyrene	ND		0.052	0.015	ug/L		06/18/18 12:32	06/21/18 00:09	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analvzed	Dil Fac

Method: NWTPH-Gx - Nort	hwest - Volatile P	Petroleun	n Products (	GC)					
Analyte	Result Q	ualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND ND		0.25	0.10	mg/L			06/23/18 22:56	1
Surrogate	%Recovery Q	ualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		50 - 150					06/23/18 22:56	1

Method: NWTPH-Dx - Se	emi-Volatile Petroleum Prod	lucts by NW	ΓPH with	Silica G	el Cle	eanup		
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND	0.12	0.069	mg/L		06/25/18 08:54	06/26/18 21:38	1
Motor Oil (>C24-C36)	ND	0.37	0.10	mg/L		06/25/18 08:54	06/26/18 21:38	1
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	61	50 - 150				06/25/18 08:54	06/26/18 21:38	1

## **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78119-1

Client Sample ID: Trip Blank

Date Collected: 06/15/18 00:00 Date Received: 06/15/18 12:25 Lab Sample ID: 580-78119-2

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			06/20/18 16:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123					06/20/18 16:38	1
Toluene-d8 (Surr)	106		79 - 122					06/20/18 16:38	1
4-Bromofluorobenzene (Surr)	101		78 - 119					06/20/18 16:38	1
Dibromofluoromethane (Surr)	97		70 - 120					06/20/18 16:38	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 120					06/20/18 16:38	1

<b>Method: NWTPH-Gx - Nort</b>	hwest - Volatile	Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			06/23/18 18:11	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	86		50 - 150			-		06/23/18 18:11	1
Trifluorotoluene (Surr)	83		50 - 150					06/23/18 18:11	1

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Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78119-1

Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-276819/5

**Matrix: Water** 

**Analysis Batch: 276819** 

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

**Client Sample ID: Lab Control Sample** 

**Prep Type: Total/NA** 

MB MB

Analyte Result Qualifier RL **MDL** Unit D Prepared Analyzed Dil Fac 1.0 Benzene ND 0.53 ug/L 06/20/18 15:25

	MB	MB				
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123		06/20/18 15:25	1
Toluene-d8 (Surr)	106		79 - 122		06/20/18 15:25	1
4-Bromofluorobenzene (Surr)	101		78 - 119		06/20/18 15:25	1
Dibromofluoromethane (Surr)	97		70 - 120		06/20/18 15:25	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 120		06/20/18 15:25	1

Lab Sample ID: LCS 580-276819/6

**Matrix: Water** 

**Analysis Batch: 276819** 

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzene 10.0 9.75 ug/L 97 37 - 151

	LCS LCS					
Surrogate	%Recovery	Qualifier	Limits			
Trifluorotoluene (Surr)	99		74 - 123			
Toluene-d8 (Surr)	100		79 - 122			
4-Bromofluorobenzene (Surr)	99		78 - 119			
Dibromofluoromethane (Surr)	99		70 - 120			
1,2-Dichloroethane-d4 (Surr)	101		70 - 120			

Lab Sample ID: LCSD 580-276819/7

**Matrix: Water** 

**Analysis Batch: 276819** 

	Spike	LCSD	LCSD			%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit I	%Rec	Limits	RPD	Limit
Benzene	10.0	9.97		ug/L	100	37 - 151	2	30

LCSD LCSD Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 98 74 - 123 Toluene-d8 (Surr) 101 79 - 122 4-Bromofluorobenzene (Surr) 100 78 - 119 Dibromofluoromethane (Surr) 99 70 - 120 1,2-Dichloroethane-d4 (Surr) 101 70 - 120

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

Lab Sample ID: MB 580-276570/1-A **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA **Analysis Batch: 276870 Prep Batch: 276570** 

	INIB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050	0.014	ug/L		06/18/18 12:32	06/20/18 17:11	1
Benzo[a]pyrene	ND		0.10	0.011	ug/L		06/18/18 12:32	06/20/18 17:11	1
Benzo[b]fluoranthene	ND		0.050	0.011	ug/L		06/18/18 12:32	06/20/18 17:11	1

TestAmerica Seattle

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

TestAmerica Job ID: 580-78119-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-276570/1-A

Lab Sample ID: LCS 580-276570/2-A

**Matrix: Water** 

**Matrix: Water** 

**Analysis Batch: 276870** 

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

**Prep Batch: 276570** 

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.050	0.012	ug/L		06/18/18 12:32	06/20/18 17:11	1
Chrysene	ND		0.10	0.016	ug/L		06/18/18 12:32	06/20/18 17:11	1
Dibenz(a,h)anthracene	ND		0.10	0.010	ug/L		06/18/18 12:32	06/20/18 17:11	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.014	ug/L		06/18/18 12:32	06/20/18 17:11	1

MB MB

MR ME

%Recovery Qualifier Limits Surrogate Prepared Analyzed Dil Fac 53 - 120 06/18/18 12:32 06/20/18 17:11 Terphenyl-d14 97

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA **Prep Batch: 276570** 

**Analysis Batch: 276870** Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzo[a]anthracene 4.00 4.83 ug/L 121 61 - 120 4.00 4.83 \* Benzo[a]pyrene ug/L 121 65 - 120 5.10 \* 4.00 Benzo[b]fluoranthene ug/L 127 58 - 120 Benzo[k]fluoranthene 4.00 4.56 114 58 - 120 ug/L Chrysene 4.00 4.54 ug/L 114 58 - 120 Dibenz(a,h)anthracene 4.00 4.43 ug/L 111 60 - 125 Indeno[1,2,3-cd]pyrene 4.00 4.50 ug/L 112 56 - 120

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 107 53 - 120

Lab Sample ID: LCSD 580-276570/3-A

**Matrix: Water** 

**Analysis Batch: 276870** 

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

**Prep Batch: 276570** 

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	5.05	*	ug/L		126	61 - 120	4	16
Benzo[a]pyrene	4.00	4.96	*	ug/L		124	65 - 120	3	17
Benzo[b]fluoranthene	4.00	5.37	*	ug/L		134	58 - 120	5	20
Benzo[k]fluoranthene	4.00	4.54		ug/L		113	58 - 120	0	20
Chrysene	4.00	4.72		ug/L		118	58 - 120	4	16
Dibenz(a,h)anthracene	4.00	4.50		ug/L		113	60 - 125	2	15
Indeno[1,2,3-cd]pyrene	4.00	4.43		ug/L		111	56 - 120	2	15

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 110 53 - 120

TestAmerica Seattle

TestAmerica Job ID: 580-78119-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-277212/5 Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 277212** 

MB MB Analyte Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 0.25 Gasoline  $\overline{\mathsf{ND}}$ 0.10 mg/L 06/23/18 14:09

MB MB %Recovery

Surrogate Qualifier Limits Prepared Analyzed Dil Fac 4-Bromofluorobenzene (Surr) 91 50 - 150 06/23/18 14:09 Trifluorotoluene (Surr) 80 50 - 150 06/23/18 14:09

Lab Sample ID: LCS 580-277212/6

**Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 277212** 

LCS LCS Spike %Rec. **Analyte** Added Result Qualifier Limits Unit D %Rec Gasoline 1.00 0.829 83 79 - 120 mg/L

LCS LCS

Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 50 - 150 96 95 50 - 150 Trifluorotoluene (Surr)

Lab Sample ID: LCSD 580-277212/7 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 277212** 

RPD Spike LCSD LCSD %Rec. Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Gasoline 1.00 0.809 mg/L 81 79 - 120

LCSD LCSD

%Recovery Surrogate Qualifier I imits 4-Bromofluorobenzene (Surr) 88 50 - 150 Trifluorotoluene (Surr) 98 50 - 150

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-277249/1-B

Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 277389** Prep Batch: 277249 MB MB

Analyte Result Qualifier RL **MDL** Unit Prepared Dil Fac Analyzed 06/25/18 08:54 06/26/18 13:21 #2 Diesel (C10-C24) ND 0.11 0.065 mg/L

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac o-Terphenyl 76 50 - 150 06/25/18 08:54 06/26/18 13:21

Lab Sample ID: LCS 580-277249/2-B

**Matrix: Water** Prep Type: Total/NA **Analysis Batch: 277389** Prep Batch: 277249 LCS LCS Spike %Rec.

Analyte Added Result Qualifier Unit %Rec Limits #2 Diesel (C10-C24) 2.00 1.36 mg/L 68 50 - 120

TestAmerica Seattle

6/27/2018

**Client Sample ID: Lab Control Sample** 

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-78119-1

Project/Site: Edmonds Terminal

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: LCS 580-277249/2-B **Client Sample ID: Lab Control Sample Prep Type: Total/NA** 

**Matrix: Water Analysis Batch: 277389** 

LCS LCS

Surrogate %Recovery Qualifier Limits 50 - 150 o-Terphenyl 85

Lab Sample ID: LCSD 580-277249/3-B Client Sample ID: Lab Control Sample Dup

**Matrix: Water** 

**Prep Type: Total/NA Analysis Batch: 277389** Prep Batch: 277249 Spike LCSD LCSD %Rec. **RPD** 

Analyte Added Result Qualifier D %Rec Limits Limit Unit #2 Diesel (C10-C24) 2 00 1 57 mg/L 79 50 - 120 14 26

LCSD LCSD Surrogate %Recovery Qualifier Limits o-Terphenyl 50 - 150

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup - RA

Lab Sample ID: MB 580-277249/1-B Client Sample ID: Method Blank Prep Type: Total/NA **Matrix: Water** Prep Batch: 277249

**Analysis Batch: 277513** 

MR MR **MDL** Unit Result Qualifier Prepared Analyzed 0.35 06/25/18 08:54 06/27/18 11:59 Motor Oil (>C24-C36) - RA ND 0.096 mg/L

Lab Sample ID: LCS 580-277249/2-B Client Sample ID: Lab Control Sample **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 277513** Prep Batch: 277249 LCS LCS Spike %Rec.

Added Result Qualifier Unit %Rec Limits 2.00 1.78 Motor Oil (>C24-C36) - RA 89 64 - 120 mg/L

Lab Sample ID: LCSD 580-277249/3-B Client Sample ID: Lab Control Sample Dup **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 277513 Prep Batch: 277249** LCSD LCSD Spike %Rec. **RPD** 

Analyte Added Result Qualifier Unit %Rec Limits RPD Limit Motor Oil (>C24-C36) - RA 2.00 1.87 mg/L 94 64 - 120 5 24

**Prep Batch: 277249** 

### **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78119-1

Lab Sample ID: 580-78119-1

Matrix: Water

Client Sample ID: Outfall #002 Date Collected: 06/15/18 09:55

Date Received: 06/15/18 12:25

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	276819	06/20/18 23:14	W1T	TAL SEA
Total/NA	Prep	3510C			276570	06/18/18 12:32	JCM	TAL SEA
Total/NA	Analysis	8270C SIM		1	276870	06/21/18 00:09	T1W	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	277212	06/23/18 22:56	JSM	TAL SEA
Total/NA	Prep	3510C			277249	06/25/18 08:54	JCM	TAL SEA
Total/NA	Cleanup	3630C			277358	06/26/18 08:51	JCM	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	277389	06/26/18 21:38	T1W	TAL SEA

**Client Sample ID: Trip Blank** 

Date Collected: 06/15/18 00:00 Date Received: 06/15/18 12:25 Lab Sample ID: 580-78119-2

Matrix: Water

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	276819	06/20/18 16:38	W1T	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	277212	06/23/18 18:11	JSM	TAL SEA

#### **Laboratory References:**

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

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## **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-78119-1

Project/Site: Edmonds Terminal

## **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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

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## **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78119-1

Lab Sample ID	Client Sample ID	Matrix	Collected Received
580-78119-1	Outfall #002	Water	06/15/18 09:55 06/15/18 12:25
580-78119-2	Trip Blank	Water	06/15/18 00:00 06/15/18 12:25

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Group # Sample # **Lancaster Laboratories** instructions on reverse side correspond with circled numbers. **Environmental Client Information** Matrix Analyses Requested SCR #: Edmuds Imminal Results in Dry V J value reporting Ground Surface Must meet lowe WTPH-Dx without Silica Gel Cleanup NWTPH-Dx with Silica Gel Cleanup fimits possible for Consultant/Office compounds 8021 MTBE Cor Confirm MTBE E1 Oxygenates Confirm highest CPA Potable Confirm all hits I Total Number Total Run \_\_\_\_ oxy + MTBE V30 Composite taron Little Run **NWTPH-GX** Collected BTEX Sample Identification Date Time OVERALL #00) 095 trip blank A Brazar and CPAH MUST have a jument Cust. Seal: Yes No & (Wel/Packs/Dry Ice/None Turnaround Time Requested (TAT) (please circle) Standard 5 day 4 day 72 hour 48 hour 24 hour Relinguished by Commercial Carrier: Data Package (circle if required) EDD (circle if required) FedEx Other Type I - Full CVX-RTBU-FI\_05 (default) Temperature Upon Receipt **Custody Seals Intact?** Yes No Other: Type Vi (Raw Data) 6/23/2018

Chevron Northwest Region Analysis Request/Chain of Coloc: 580

For Eurofins Lancaster Laboratories Environmental use only

🔅 eurofins

Client: ARCADIS U.S. Inc

Job Number: 580-78119-1

Login Number: 78119 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

Creator. Hobbs, Reinieth F		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
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").	False	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



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## **ANALYTICAL REPORT**

TestAmerica Laboratories, Inc.

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

TestAmerica Job ID: 580-78160-1 Client Project/Site: Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 6/27/2018 6:01:27 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

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**Have a Question?** 



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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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78160-1

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Receipt Checklists	15

#### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78160-1

Job ID: 580-78160-1

**Laboratory: TestAmerica Seattle** 

Narrative

Job Narrative 580-78160-1

#### Receipt

Two samples were received on 6/18/2018 12:03 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.2° C.

#### **GC/MS VOA**

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

#### GC/MS Semi VOA

Method(s) 8270C SIM, 8270D SIM: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 580-277304 and analytical batch 580-277376 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

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

#### GC Semi VOA

Method(s) NWTPH-Dx: The following samples and QC were reanalyzed due to CCV failure in the initial analysis: (LCS 580-277249/2-B), (LCSD 580-277249/3-B) and (MB 580-277249/1-B).

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

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## **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Not Calculated

**Quality Control** 

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin)

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 Job ID: 580-78160-1

## Glossary

NC

ND

**PQL** 

QC

RER

RLRPD

TEF

TEQ

Abbreviation	These commonly used abbreviations may or may not be present in this report.
n	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)

## **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Received: 06/18/18 12:03

Client Sample ID: Outfall #002 Date Collected: 06/18/18 09:00

TestAmerica Job ID: 580-78160-1

Lab Sample ID: 580-78160-1 **Matrix: Water** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			06/20/18 23:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123					06/20/18 23:38	1
Toluene-d8 (Surr)	107		79 - 122					06/20/18 23:38	1
4-Bromofluorobenzene (Surr)	101		78 - 119					06/20/18 23:38	1
Dibromofluoromethane (Surr)	99		70 - 120					06/20/18 23:38	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 120					06/20/18 23:38	1
Method: 8270C SIM - Semi	Result	c Compou Qualifier	RL	MDL		D	Prepared	Analyzed	Dil Fac
Analyte	Result		RL	MDL		D	•	•	Dil Fac
Analyte Benzo[a]anthracene	Result ND		0.051	<b>MDL</b> 0.014	ug/L	<u>D</u>	06/25/18 14:24	06/26/18 13:49	Dil Fac
Analyte Benzo[a]anthracene Benzo[a]pyrene	Result ND ND		0.051 0.10	0.014 0.011	ug/L ug/L	<u>D</u>	06/25/18 14:24 06/25/18 14:24	06/26/18 13:49 06/26/18 13:49	<b>Dil Fac</b> 1 1
Analyte Benzo[a]anthracene Benzo[a]pyrene Benzo[b]fluoranthene	Result ND		0.051 0.10 0.051	0.014 0.011 0.011	ug/L ug/L ug/L	<u>D</u>	06/25/18 14:24 06/25/18 14:24 06/25/18 14:24	06/26/18 13:49	Dil Fac 1 1 1
Analyte Benzo[a]anthracene Benzo[a]pyrene Benzo[b]fluoranthene Benzo[k]fluoranthene	Result ND ND ND ND		0.051 0.10	0.014 0.011 0.011 0.012	ug/L ug/L ug/L ug/L	<u>D</u>	06/25/18 14:24 06/25/18 14:24 06/25/18 14:24 06/25/18 14:24	06/26/18 13:49 06/26/18 13:49 06/26/18 13:49	Dil Fac 1 1 1 1
Analyte Benzo[a]anthracene Benzo[a]pyrene Benzo[b]fluoranthene Benzo[k]fluoranthene Chrysene	Result ND ND ND ND		0.051 0.10 0.051 0.051	0.014 0.011 0.011 0.012 0.016	ug/L ug/L ug/L ug/L ug/L	<u>D</u>	06/25/18 14:24 06/25/18 14:24 06/25/18 14:24 06/25/18 14:24 06/25/18 14:24	06/26/18 13:49 06/26/18 13:49 06/26/18 13:49 06/26/18 13:49	Dil Fac 1 1 1 1 1 1
Analyte Benzo[a]anthracene Benzo[a]pyrene Benzo[b]fluoranthene	Result ND ND ND ND ND ND		0.051 0.10 0.051 0.051 0.051	0.014 0.011 0.011 0.012	ug/L ug/L ug/L ug/L ug/L ug/L	<u>D</u>	06/25/18 14:24 06/25/18 14:24 06/25/18 14:24 06/25/18 14:24 06/25/18 14:24 06/25/18 14:24	06/26/18 13:49 06/26/18 13:49 06/26/18 13:49 06/26/18 13:49 06/26/18 13:49	Dil Fac 1 1 1 1 1 1
Analyte Benzo[a]anthracene Benzo[a]pyrene Benzo[b]fluoranthene Benzo[k]fluoranthene Chrysene Dibenz(a,h)anthracene	Result ND ND ND ND ND ND ND	Qualifier	RL 0.051 0.10 0.051 0.051 0.10 0.10	0.014 0.011 0.011 0.012 0.016 0.010	ug/L ug/L ug/L ug/L ug/L ug/L	<u>D</u>	06/25/18 14:24 06/25/18 14:24 06/25/18 14:24 06/25/18 14:24 06/25/18 14:24 06/25/18 14:24	06/26/18 13:49 06/26/18 13:49 06/26/18 13:49 06/26/18 13:49 06/26/18 13:49	Dil Fac  1 1 1 1 1 1 1 1 1 1 1 1 1 Dil Fac

_ Method: NWTPH-Gx - North	west - Volatile	e Petroleu	m Products (	GC)					
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			06/26/18 20:49	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		50 - 150					06/26/18 20:49	1
Trifluorotoluene (Surr)	83		50 - 150					06/26/18 20:49	1

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup									
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
#2 Diesel (C10-C24)	ND ND	0.11	0.066	mg/L		06/25/18 08:54	06/26/18 22:06	1	
Motor Oil (>C24-C36)	ND	0.35	0.097	mg/L		06/25/18 08:54	06/26/18 22:06	1	
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac	
o-Terphenyl	69	50 - 150				06/25/18 08:54	06/26/18 22:06	1	

## **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78160-1

2

Client Sample ID: Trip Blank
Date Collected: 06/18/18 00:01

Lab Sample ID: 580-78160-2

**Matrix: Water** 

Date	Conected:	00/10/10	00:01
Date	Received:	06/18/18	12:03

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			06/20/18 17:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123					06/20/18 17:03	1
Toluene-d8 (Surr)	105		79 - 122					06/20/18 17:03	1
4-Bromofluorobenzene (Surr)	102		78 - 119					06/20/18 17:03	1
Dibromofluoromethane (Surr)	97		70 - 120					06/20/18 17:03	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 120					06/20/18 17:03	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			06/26/18 19:47	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	88		50 - 150			:		06/26/18 19:47	1
Trifluorotoluene (Surr)	82		50 - 150					06/26/18 19:47	1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78160-1

#### Method: 624 - Volatile Organic Compounds (GC/MS)

MB MB

Lab Sample ID: MB 580-276819/5

**Matrix: Water** 

**Analysis Batch: 276819** 

Client Sample ID: Method Blank Prep Type: Total/NA

Analyte Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared Benzene 1.0 0.53 ug/L 06/20/18 15:25 ND

MB MB Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Trifluorotoluene (Surr) 100 74 - 123 06/20/18 15:25 Toluene-d8 (Surr) 106 79 - 122 06/20/18 15:25 4-Bromofluorobenzene (Surr) 101 78 - 119 06/20/18 15:25 97 70 - 120 Dibromofluoromethane (Surr) 06/20/18 15:25 103 70 - 120 1,2-Dichloroethane-d4 (Surr) 06/20/18 15:25

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

**Matrix: Water** 

**Analysis Batch: 276819** 

Lab Sample ID: LCS 580-276819/6

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzene 10.0 9.75 ug/L 97 37 - 151

LCS LCS Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 99 74 - 123 100 79 - 122 Toluene-d8 (Surr) 4-Bromofluorobenzene (Surr) 99 78 - 119 99 70 - 120 Dibromofluoromethane (Surr) 1,2-Dichloroethane-d4 (Surr) 101 70 - 120

Lab Sample ID: LCSD 580-276819/7

**Matrix: Water** 

**Analysis Batch: 276819** 

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

LCSD LCSD RPD Spike %Rec. **Analyte** Added Result Qualifier Unit D %Rec Limits RPD Limit Benzene 10.0 9.97 ug/L 100 37 - 151

LCSD LCSD Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 98 74 - 123 Toluene-d8 (Surr) 101 79 - 122 100 78 - 119 4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr) 99 70 - 120 101 70 - 120 1,2-Dichloroethane-d4 (Surr)

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

**Matrix: Water** 

**Analysis Batch: 277376** 

Lab Sample ID: MB 580-277304/1-A **Client Sample ID: Method Blank** Prep Type: Total/NA Prep Batch: 277304 MD MD

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050	0.014	ug/L		06/25/18 14:24	06/26/18 11:23	1
Benzo[a]pyrene	ND		0.10	0.011	ug/L		06/25/18 14:24	06/26/18 11:23	1
Benzo[b]fluoranthene	ND		0.050	0.011	ug/L		06/25/18 14:24	06/26/18 11:23	1

TestAmerica Seattle

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TestAmerica Job ID: 580-78160-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-277304/1-A **Matrix: Water** 

**Analysis Batch: 277376** 

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

**Prep Batch: 277304** 

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.050	0.012	ug/L		06/25/18 14:24	06/26/18 11:23	1
Chrysene	ND		0.10	0.016	ug/L		06/25/18 14:24	06/26/18 11:23	1
Dibenz(a,h)anthracene	ND		0.10	0.010	ug/L		06/25/18 14:24	06/26/18 11:23	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.014	ug/L		06/25/18 14:24	06/26/18 11:23	1

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Terphenyl-d14 93 53 - 120 06/25/18 14:24 06/26/18 11:23

**Client Sample ID: Lab Control Sample** 

**Prep Type: Total/NA** Prep Batch: 277304

Lab Sample ID: LCS 580-277304/2-A

**Matrix: Water** 

Analysis Batch: 277376

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	3.87		ug/L		97	61 - 120	
Benzo[a]pyrene	4.00	3.80		ug/L		95	65 - 120	
Benzo[b]fluoranthene	4.00	3.82		ug/L		96	58 - 120	
Benzo[k]fluoranthene	4.00	3.72		ug/L		93	58 - 120	
Chrysene	4.00	3.57		ug/L		89	58 - 120	
Dibenz(a,h)anthracene	4.00	3.65		ug/L		91	60 - 125	
Indeno[1,2,3-cd]pyrene	4.00	3.68		ug/L		92	56 - 120	

LCS LCS

Surrogate %Recovery Qualifier Limits 53 - 120 Terphenyl-d14 92

Lab Sample ID: LCSD 580-277304/3-A

**Matrix: Water** 

Analysis Batch: 277376

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

Prep Batch: 277304

, , , , , , , , , , , , , , , , , , , ,	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	4.03		ug/L		101	61 - 120	4	16
Benzo[a]pyrene	4.00	4.04		ug/L		101	65 - 120	6	17
Benzo[b]fluoranthene	4.00	4.15		ug/L		104	58 - 120	8	20
Benzo[k]fluoranthene	4.00	3.93		ug/L		98	58 - 120	6	20
Chrysene	4.00	3.79		ug/L		95	58 - 120	6	16
Dibenz(a,h)anthracene	4.00	3.86		ug/L		96	60 - 125	6	15
Indeno[1,2,3-cd]pyrene	4.00	3.85		ug/L		96	56 - 120	5	15

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 89 53 - 120

TestAmerica Seattle

6/27/2018

TestAmerica Job ID: 580-78160-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-27745	2/6						Client Sam	ple ID: Method	Blank
Matrix: Water								Prep Type: To	otal/NA
Analysis Batch: 277452									
_	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			06/26/18 18:14	1

Gasoline	ND		0.25	0.10	mg/L	_		06/26/18 18:14	1
	МВ	MB							
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		50 - 150					06/26/18 18:14	1
Trifluorotoluene (Surr)	80		50 - 150					06/26/18 18:14	1

Lab Sample ID: LCS 580-277452/7 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA **Analysis Batch: 277452** Spike LCS LCS %Rec. Analyte Result Qualifier Unit Limits Added D %Rec Gasoline 1.00 0.872 mg/L 79 - 120

	LCS LCS	
Surrogate	%Recovery Qualifie	r Limits
4-Bromofluorobenzene (Surr)	104	50 - 150
Trifluorotoluene (Surr)	95	50 - 150

Lab Sample ID: LCSD 580-277452/8 **Client Sample ID: Lab Control Sample Dup Matrix: Water Prep Type: Total/NA** 

**Analysis Batch: 277452** 

-	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Gasoline	1.00	0.920		mg/L		92	79 - 120	5	10

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	102	-	50 - 150
Trifluorotoluene (Surr)	98		50 - 150

### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-2772 Matrix: Water Analysis Batch: 277389	49/1-B					j	ole ID: Method Prep Type: To Prep Batch:	otal/NA
Analyte #2 Diesel (C10-C24)	MB Result ND	MB Qualifier	RL 0.11	<b>MDL</b> 0.065	<u>D</u>	Prepared 06/25/18 08:54	Analyzed 06/26/18 13:21	Dil Fac
	МВ	МВ						

Surrogate	%Recovery Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	76	50 - 150	06/25/18 08:54	06/26/18 13:21	

Lab Sample ID: LCS 580-277249/2-B				Clier	ıt Saı	mple ID	: Lab Control Sample
Matrix: Water							Prep Type: Total/NA
Analysis Batch: 277389							Prep Batch: 277249
	Spike	LCS	LCS				%Rec.
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits
#2 Diesel (C10-C24)	2.00	1.36		mg/L		68	50 - 120

TestAmerica Seattle

6/27/2018

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TestAmerica Job ID: 580-78160-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

# Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Spike

2 00

Added

Lab Sample ID: LCS 580-277249/2-B **Client Sample ID: Lab Control Sample Matrix: Water** 

**Prep Type: Total/NA** 

**Analysis Batch: 277389** 

**Analysis Batch: 277389** 

**Matrix: Water** 

#2 Diesel (C10-C24)

Analyte

**Prep Batch: 277249** 

LCS LCS

Surrogate %Recovery Qualifier Limits 50 - 150 o-Terphenyl 85

Client Sample ID: Lab Control Sample Dup

**Prep Type: Total/NA** 

Prep Batch: 277249

%Rec. **RPD** 

Limits Limit

LCSD LCSD Result Qualifier D %Rec Unit 1 57 mg/L 79 50 - 120 14 26

LCSD LCSD

ND

Surrogate %Recovery Qualifier Limits o-Terphenyl 50 - 150

### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup - RA

Lab Sample ID: MB 580-277249/1-B

Lab Sample ID: LCSD 580-277249/3-B

**Matrix: Water** 

Motor Oil (>C24-C36) - RA

**Analysis Batch: 277513** 

Client Sample ID: Method Blank Prep Type: Total/NA

06/25/18 08:54 06/27/18 11:59

Client Sample ID: Lab Control Sample Dup

Prep Batch: 277249

MR MR **MDL** Unit Result Qualifier Prepared Analyzed

Lab Sample ID: LCS 580-277249/2-B

**Matrix: Water** 

**Analysis Batch: 277513** 

Client Sample ID: Lab Control Sample Prep Type: Total/NA Prep Batch: 277249

0.096 mg/L

LCS LCS Spike %Rec.

Added Result Qualifier Unit %Rec Limits 2.00 1.78 Motor Oil (>C24-C36) - RA 89 64 - 120 mg/L

Lab Sample ID: LCSD 580-277249/3-B

**Matrix: Water** Prep Type: Total/NA **Analysis Batch: 277513 Prep Batch: 277249** LCSD LCSD Spike %Rec. **RPD** Analyte Added Result Qualifier Unit %Rec Limits RPD Limit Motor Oil (>C24-C36) - RA 2.00 1.87 mg/L 94 64 - 120 5 24

0.35

TestAmerica Seattle

### **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78160-1

Lab Sample ID: 580-78160-1

**Matrix: Water** 

**Matrix: Water** 

Client Sample ID: Outfall #002 Date Collected: 06/18/18 09:00

Date Received: 06/18/18 12:03

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			276819	06/20/18 23:38	W1T	TAL SEA
Total/NA	Prep	3510C			277304	06/25/18 14:24	JCM	TAL SEA
Total/NA	Analysis	8270C SIM		1	277376	06/26/18 13:49	TL1	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	277452	06/26/18 20:49	JCV	TAL SEA
Total/NA	Prep	3510C			277249	06/25/18 08:54	JCM	TAL SEA
Total/NA	Cleanup	3630C			277358	06/26/18 08:51	JCM	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	277389	06/26/18 22:06	T1W	TAL SEA

**Client Sample ID: Trip Blank** Lab Sample ID: 580-78160-2

Date Collected: 06/18/18 00:01

Date Received: 06/18/18 12:03

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624	<del></del>	1	276819	06/20/18 17:03	W1T	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	277452	06/26/18 19:47	JCV	TAL SEA

**Laboratory References:** 

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

TestAmerica Seattle

# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-78160-1

Project/Site: Edmonds Terminal

# **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	
Oregon	NELAP	10	WA100007	11-05-18	
US Fish & Wildlife	Federal		LE058448-0	10-31-18	
USDA	Federal		P330-14-00126	02-10-20	
Washington	State Program	10	C553	02-17-19	

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# **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78160-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-78160-1	Outfall #002	Water	06/18/18 09:00 06	6/18/18 12:03
580-78160-2	Trip Blank	Water	06/18/18 00:01 06	6/18/18 12:03

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# **TestAmerica**

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com Loc: 580 78160

Short Hold

Rush

Chain of **Custody Record** 

Client Arcadis		Client Co		ampbell		Date 6/18/18	Chain of Custody N	37651
Address		Telephon	ne Number (Area Code			I ah Number		JIUJT
1100 other way, Sui		10.00	o real round of	an Humbur		Lab reamber	Page	of\
Seattle State	Zip Code	Sampler		Lab Contact	₹ 25Ana	elysis (Attach list if e space is needed)		
Project Name and Location (State)	4 98101	Jaso	n Little	Elaine waiver	3 3 3 5 mor	e space is needed)		
Edmonds Terminal		Billing Co	ontact		4 30			
Contract/Purchase Order/Quote No.					1 1 2 1 1 1 1 1		, , ,	Instructions/
			Matrix	Containers & Preservatives	PH-19-18-18-18-18-18-18-18-18-18-18-18-18-18-		Conaitio	ons of Receipt
Sample I.D. and Location/Description (Containers for each sample may be combined on on	e line) Date	Time	Aqueous Sed. Soil	Unpres. H2S04 HICI NaOH NaOH NaOH	Benzene NWTPH- OLUTPH-D CPAHS 82			
outfair#002	6/18/18	0900	X	2 8	XXXX		DH= 8.7	23
TripBlank			X	6	XX			
<u> </u>							NWTPH	-Dx: use
							Stande	ard Silica
								eva onteq
							gel	
							* Benz	ene & cPAH
				Therm. I	D: 17 _Cor:_	3, 2 ° Unc: 3, 1 ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° °	wl awar	Hitraliale
				Cooler D	sc: Med Re	FedEx:	18.54.	Hitative esthun
				- Packing:	Bubble al: YesNo	UPS:	TIME	03 (Nach
				Wet/Pac	SDry Ice/None	-Lab Cour:	1 Mg/	
		580-78160	Chain of Custody			Other.		
	sible Hazard Identification			Samp	ole Disposal	Disposal By Lab	(Δ fee may he as	ssessed if samples
	Non-Hazard 🗌 Flam	mable 🗆 :	Skin Irritant 🔲 I	Poison B 🔲 Unknown 🗀 Re	eturn To Client 🔲	Archive For Montl		ger than 1 month)
Turn Around Time Required (business days)  ☐ 24 Hours ☐ 48 Hours ☐ 5 Days ☐	10 Days 75 Days	[T] 0#	STAT	QC Requirements (Specify)				
」 24 Hours □ 5 Days □ 1. Relinguished By Sign/Print	10 Days 🔲 15 Days	☐ Other Date	, Time	1. Received By Sign/Print		3	Data	T'
, , , , , ,		Duit	Tare	The control of significant and the control of the c	Francisco	Lana Jr	Date 6/18/18	Time 1203
2. Relinquished By Sign/Print		Date	Time	2. Received By Sign/Prim	Husm	(:xr( )	Date	Time
3. Relinquished By Sign/Print		Date	Time	3. Received By Sign/Print		<i>&gt;, \</i>	Date	Time
Comments								

Client: ARCADIS U.S. Inc

Job Number: 580-78160-1

Login Number: 78160 List Source: TestAmerica Seattle

List Number: 1

Creator: Gall, Brandon A

Creator. Gail, Braildon A		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td>Lab does not accept radioactive samples.</td>	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	N/A	Not present
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	



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: 580-78490-1 Client Project/Site: Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

Knittene D. allen

Authorized for release by: 7/10/2018 3:00:48 PM
Kristine Allen, Manager of Project Management (253)248-4970
kristine.allen@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

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Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78490-1

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### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78490-1

Job ID: 580-78490-1

Laboratory: TestAmerica Seattle

Narrative

Job Narrative 580-78490-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 6/30/2018 10:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.0° C.

#### GC/MS VOA

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

#### GC/MS Semi VOA

Method(s) 8270C SIM, 8270D SIM: The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for batch preparation batch 580-277943 and analytical batch 580-278195 recovered outside control limits for the following analytes: Indeno[1,2,3-cd]pyrene. The individual recoveries of both the LCS and LCSD met the acceptance criteria.

Method(s) 8270C SIM, 8270D SIM: The surrogate ( Terphenyl-d14) of CCVIS associated with batch 278195 have %D -27.4 (%D Limit +/-20); that result was outside the control limits. Since the %Recovery is within the acceptance criteria for the surrogate in associated samples (unless matrix interferes) and all the other surrogates and target analytes were within %D criteria; therefore, the data have been reported. (CCVIS 580-278195/3)

Method(s) 8270C SIM, 8270D SIM: The opening DFTPP tune has a Benzidine Tailing Factor at 3.2 (8270D limit is 2.0 and 8207C limit is 3.0). However for SIM analysis, Benzidine is not representative of any of the target analytes, and all other instrument QC (other DFTPP parameters and CCVIS) met acceptance criteria, therefore in the data is reported. (DFTPP 580-278195/2)

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

#### GC Semi VOA

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

### **Organic Prep**

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

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### **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78490-1

### **Qualifiers**

### GC/MS Semi VOA

Quaimer	Qualifier Description
*	RPD of the LCS and LCSD exceeds the control limits

### **GC 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.

### **Glossary**

Abbreviation	These commonly used abbreviations may or may not be present in this report.
n	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

110 Hot Galculated

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)

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# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78490-1

Client Sample ID: Outfall #002 Lab Sample ID: 580-78490-1 Date Collected: 06/29/18 10:45

Matrix: Water

Date Received: 06/30/18 10:00

Motor Oil (>C24-C36)

Surrogate

o-Terphenyl

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			07/04/18 02:29	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	99		74 - 123					07/04/18 02:29	1
Toluene-d8 (Surr)	106		79 - 122					07/04/18 02:29	1
4-Bromofluorobenzene (Surr)	100		78 - 119					07/04/18 02:29	1
Dibromofluoromethane (Surr)	100		70 - 120					07/04/18 02:29	1
1,2-Dichloroethane-d4 (Surr)	105		70 - 120					07/04/18 02:29	1
Method: 8270C SIM - Semivol	atile Organic Con	npounds (G	C/MS SIM)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.055	0.015	ug/L		07/02/18 14:04	07/05/18 18:42	1
Benzo[a]pyrene	ND		0.11	0.012	ug/L		07/02/18 14:04	07/05/18 18:42	1
Benzo[b]fluoranthene	ND		0.055	0.012	ug/L		07/02/18 14:04	07/05/18 18:42	1
Benzo[k]fluoranthene	ND		0.055	0.013	ug/L		07/02/18 14:04	07/05/18 18:42	1
Chrysene	ND		0.11	0.017	ug/L		07/02/18 14:04	07/05/18 18:42	1
Dibenz(a,h)anthracene	ND		0.11	0.011	ug/L		07/02/18 14:04	07/05/18 18:42	1
Indeno[1,2,3-cd]pyrene	ND	*	0.055	0.015	ug/L		07/02/18 14:04	07/05/18 18:42	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	77		53 - 120				07/02/18 14:04	07/05/18 18:42	1
Method: NWTPH-Gx - Northwo	est - Volatile Petro	oleum Prod	ucts (GC)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	0.10	J	0.25	0.10	mg/L			06/30/18 23:43	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		50 - 150					06/30/18 23:43	1
Trifluorotoluene (Surr)	84		50 - 150					06/30/18 23:43	1
Method: NWTPH-Dx - Semi-Vo	olatile Petroleum	Products by	NWTPH with	Silica Ge	l Cleanup	)			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	MD		0.14	0.083			07/05/18 10:41	07/06/18 12:43	1

0.45

Limits

50 - 150

0.12 mg/L

07/05/18 10:41

Prepared

07/05/18 10:41 07/06/18 12:43

07/06/18 12:43

Analyzed

Dil Fac

ND

%Recovery Qualifier

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78490-1

Client Sample ID: Trip Blank Date Collected: 06/29/18 00:00 Lab Sample ID: 580-78490-2

Matrix: Water

Date Received: 06/30/18 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			07/03/18 23:14	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123			-		07/03/18 23:14	1
Toluene-d8 (Surr)	105		79 - 122					07/03/18 23:14	1
4-Bromofluorobenzene (Surr)	102		78 - 119					07/03/18 23:14	1
Dibromofluoromethane (Surr)	100		70 - 120					07/03/18 23:14	1
1,2-Dichloroethane-d4 (Surr)	107		70 - 120					07/03/18 23:14	1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			06/30/18 18:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		50 - 150			-		06/30/18 18:03	1
Trifluorotoluene (Surr)	85		50 - 150					06/30/18 18:03	1

7/10/2018

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Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78490-1

Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-278037/5

**Matrix: Water** 

Analyte

Analysis Batch: 278037

Client Sample ID: Method Blank

Prep Type: Total/NA

мв мв Result Qualifier RLMDL Unit D Analyzed Dil Fac Prepared ND 1.0 0.53 ug/L 07/03/18 18:22

Benzene MB MB Qualifier Dil Fac Surrogate %Recovery Limits Prepared Analyzed Trifluorotoluene (Surr) 100 74 123 07/03/18 18:22 Toluene-d8 (Surr) 106 79 - 122 07/03/18 18:22 100 78 - 119 07/03/18 18:22 4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr) 100 70 - 120 07/03/18 18:22 1,2-Dichloroethane-d4 (Surr) 107 70 - 120 07/03/18 18:22

Lab Sample ID: LCS 580-278037/6

**Matrix: Water** 

Analyte

Benzene

**Analysis Batch: 278037** 

Client Sample ID: Lab Control Sample Prep Type: Total/NA

LCS LCS Spike %Rec. Added Result Qualifier Unit %Rec Limits 10.0 10.8 ug/L 108 37 151

LCS LCS Surrogate %Recovery Qualifier Limits 74 - 123 Trifluorotoluene (Surr) 100 79 - 122 102 Toluene-d8 (Surr) 4-Bromofluorobenzene (Surr) 101 78 - 119 101 70 - 120 Dibromofluoromethane (Surr) 1,2-Dichloroethane-d4 (Surr) 103 70 - 120

Lab Sample ID: LCSD 580-278037/7

**Matrix: Water** 

Analysis Batch: 278037

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

LCSD LCSD RPD Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits RPD Limit Benzene 10.0 10.8 ug/L 108 37 - 151

LCSD LCSD %Recovery Qualifier Surrogate Limits Trifluorotoluene (Surr) 99 74 - 123 Toluene-d8 (Surr) 100 79 - 122 4-Bromofluorobenzene (Surr) 99 78 - 119 101 70 - 120 Dibromofluoromethane (Surr) 70 - 120 1,2-Dichloroethane-d4 (Surr) 103

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

Lab Sample ID: MB 580-277943/1-A

**Matrix: Water** 

Analysis Batch: 278195

Client Sample ID: Method Blank

Prep Type: Total/NA Prep Batch: 277943

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050	0.014	ug/L		07/02/18 14:04	07/05/18 17:34	1
Benzo[a]pyrene	ND		0.10	0.011	ug/L		07/02/18 14:04	07/05/18 17:34	1
Benzo[b]fluoranthene	ND		0.050	0.011	ug/L		07/02/18 14:04	07/05/18 17:34	1

TestAmerica Seattle

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7/10/2018

TestAmerica Job ID: 580-78490-1

Client Sample ID: Method Blank

Prep Type: Total/NA

**Prep Batch: 277943** 

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Dil Fac

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

%Recovery Qualifier

97

Lab Sample ID: MB 580-277943/1-A

**Matrix: Water** 

Analysis Batch: 278195

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.050	0.012	ug/L		07/02/18 14:04	07/05/18 17:34	1
Chrysene	ND		0.10	0.016	ug/L		07/02/18 14:04	07/05/18 17:34	1
Dibenz(a,h)anthracene	ND		0.10	0.010	ug/L		07/02/18 14:04	07/05/18 17:34	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.014	ug/L		07/02/18 14:04	07/05/18 17:34	1
	МВ	МВ							

Limits

53 - 120

Terphenyl-d14

Lab Sample ID: LCS 580-277943/2-A

**Matrix: Water** 

Surrogate

Analysis Batch: 278195

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

Analyzed

07/05/18 17:34

Prepared

07/02/18 14:04

**Prep Batch: 277943** 

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	3.76		ug/L		94	61 - 120	
Benzo[a]pyrene	4.00	4.30		ug/L		108	65 - 120	
Benzo[b]fluoranthene	4.00	4.35		ug/L		109	58 <sub>-</sub> 120	
Benzo[k]fluoranthene	4.00	4.19		ug/L		105	58 <sub>-</sub> 120	
Chrysene	4.00	4.28		ug/L		107	58 - 120	
Dibenz(a,h)anthracene	4.00	4.63		ug/L		116	60 _ 125	
Indeno[1,2,3-cd]pyrene	4.00	4.62		ug/L		115	56 - 120	
Dibenz(a,h)anthracene	4.00	4.63		ug/L		116	60 - 125	

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 85 53 - 120

Lab Sample ID: LCSD 580-277943/3-A

**Matrix: Water** 

Analysis Batch: 278195

Client S	Sample	ID: L	_ab (	Control	Samp	le l	Dup
----------	--------	-------	-------	---------	------	------	-----

Prep Type: Total/NA

**Prep Batch: 277943** 

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	3.96		ug/L		99	61 - 120	5	16
Benzo[a]pyrene	4.00	4.47		ug/L		112	65 - 120	4	17
Benzo[b]fluoranthene	4.00	4.61		ug/L		115	58 - 120	6	20
Benzo[k]fluoranthene	4.00	4.41		ug/L		110	58 - 120	5	20
Chrysene	4.00	4.52		ug/L		113	58 - 120	5	16
Dibenz(a,h)anthracene	4.00	3.98		ug/L		99	60 - 125	15	15
Indeno[1,2,3-cd]pyrene	4.00	3.79	*	ug/L		95	56 - 120	20	15

LCSD LCSD

Surrogate	%Recovery Qualifier	Limits
Terphenyl-d14	88	53 - 120

TestAmerica Seattle

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78490-1

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 278147

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-277895/6

**Matrix: Water** 

Analyte

Gasoline

Analysis Batch: 277895

Client Sample ID: Method Blank Prep Type: Total/NA

мв мв RL Result Qualifier MDL Unit D Analyzed Dil Fac Prepared 0.25 ND 0.10 mg/L 06/30/18 16:00

MB MB Qualifier Dil Fac Surrogate %Recovery Prepared Analyzed 50 - 150 4-Bromofluorobenzene (Surr) 90 06/30/18 16:00 Trifluorotoluene (Surr) 81 50 - 150 06/30/18 16:00

Lab Sample ID: LCS 580-277895/7 Client Sample ID: Lab Control Sample Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 277895

LCS LCS %Rec. Spike Analyte Added Result Qualifier Unit D %Rec Limits Gasoline 1.00 1.03 mg/L 103 79 - 120

LCS LCS %Recovery Qualifier Limits Surrogate 50 - 150 4-Bromofluorobenzene (Surr) 106 101 Trifluorotoluene (Surr) 50 - 150

Lab Sample ID: LCSD 580-277895/8

**Matrix: Water** 

Analysis Batch: 277895

LCSD LCSD RPD Spike %Rec. Added Result Qualifier RPD Limit Analyte Unit %Rec Limits Gasoline 1.00 1.11 mg/L 111 79 - 120 10

LCSD LCSD %Recovery Qualifier I imits Surrogate 4-Bromofluorobenzene (Surr) 105 50 - 150 105 50 - 150 Trifluorotoluene (Surr)

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-278147/1-B Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 278229

мв мв RL Analyte Result Qualifier MDL Unit D Prepared Dil Fac Analyzed #2 Diesel (C10-C24) 0.11 07/05/18 10:41 ND 0.065 mg/L 07/06/18 11:22 Motor Oil (>C24-C36) ND 0.35 0.096 mg/L 07/05/18 10:41 07/06/18 11:22

MB MB %Recovery Limits Dil Fac Surrogate Qualifier Prepared Analyzed o-Terphenyl 86 50 - 150 07/05/18 10:41 07/06/18 11:22

Lab Sample ID: LCS 580-278147/2-B

**Matrix: Water** 

Analysis Batch: 278229

**Prep Batch: 278147** LCS LCS Spike %Rec. Added Result Qualifier Limits Analyte Unit %Rec #2 Diesel (C10-C24) 2.00 1.77 mg/L 88 50 - 120

TestAmerica Seattle

7/10/2018

Prep Type: Total/NA

Client Sample ID: Lab Control Sample

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### **QC Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Surrogate

o-Terphenyl

TestAmerica Job ID: 580-78490-1

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: LCS 580-278147/2-B			Client Sample ID: Lab Control Sample
Matrix: Water			Prep Type: Total/NA
Analysis Batch: 278229			Prep Batch: 278147
	Spike	LCS LCS	%Rec.

			Spike	200	LOG				/ortec.	
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits	
Motor Oil (>C24-C36)			2.00	2.12		mg/L		106	64 - 120	
	LCS I	LCS								

Surrogate	%Recovery	Qualifier	Limits	
o-Terphenyl	96		50 - 150	

%Recovery Qualifier

97

Lab Sample ID: LCSD 580-278147/3-B

Matrix: Water

Analysis Batch: 278229

Spike
Analyte

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 278147

Spike
LCSD LCSD

KRec.
RPD
Analyte

Added
Result Qualifier
Unit D KRec Limits RPD Limit

Analyte		Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
#2 Diesel (C10-C24)		2.00	1.83		mg/L		91	50 - 120	3	26	
Motor Oil (>C24-C36)		2.00	2.12		mg/L		106	64 - 120	0	24	
	LCSD LCSD										

Limits

50 - 150

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### **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Collected: 06/29/18 10:45

Date Received: 06/30/18 10:00

Client Sample ID: Outfall #002

TestAmerica Job ID: 580-78490-1

Lab Sample ID: 580-78490-1

**Matrix: Water** 

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	278037	07/04/18 02:29	W1T	TAL SEA
Total/NA	Prep	3510C			277943	07/02/18 14:04	JCM	TAL SEA
Total/NA	Analysis	8270C SIM		1	278195	07/05/18 18:42	W1T	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	277895	06/30/18 23:43	JCV	TAL SEA
Total/NA	Prep	3510C			278147	07/05/18 10:41	JCM	TAL SEA
Total/NA	Cleanup	3630C			278213	07/05/18 17:44	JCM	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	278229	07/06/18 12:43	T1W	TAL SEA

**Client Sample ID: Trip Blank** Lab Sample ID: 580-78490-2

Date Collected: 06/29/18 00:00 **Matrix: Water** 

Batch Batch Dilution Batch Prepared Method Prep Type Туре Factor Number or Analyzed Run Analyst Lab Total/NA 624 278037 TAL SEA Analysis 07/03/18 23:14 W1T TAL SEA Total/NA Analysis NWTPH-Gx 277895 06/30/18 18:03 JCV 1

### Laboratory References:

Date Received: 06/30/18 10:00

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

TestAmerica Seattle

# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78490-1

### **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	<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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

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# **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78490-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-78490-1	Outfall #002	Water	06/29/18 10:45	06/30/18 10:00
580-78490-2	Trip Blank	Water	06/29/18 00:00	06/30/18 10:00

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TestAm	erica
THE LEADER IN ENVIRO	NMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Rush	
Short Hold	

Chain	of	
Custo	dy	Record

	Client Rontact		Date /29/11	Chain of Custody Number
Client (6213	Client Sontact	mplyll	0/4/18	Chain of Custody Number 37557
11001	Telephone Number (Area	a Code)/Fax Number	Lab Number	i II
Address VADCO Rd	-			Page of W
CMY A FINA	Sampler Tring Little	Lab Contact Elain (WalVe)	more chare is needed)	
Project Name and Location (State)	Billing Contact		5) F S Loc: 580	
Project Name and Location (State)  Lange Sylvesty No.			Loc: 580 78490	Special Instructions/ Conditions of Receipt
Contract/Purchase Order/Quote No.	Matrix	Containers & Preservatives		Conditions of necespt
i O white	SIN		Brzene Nath-	
Sample I.D. and Location/Description (Containers for each sample may be combined on one line)  Date	Time Aqueous Sed.			NI = / 10/
	195 10	2 8	XXXX	H1=6.78
Trip Black	_ 6	6	$\times^{\times}$	
Trap or all				* usc standard
				Clica gel
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			12 +42:0349	skould have a
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	illi illi illi illi illi illi illi ill	Packi	ng: Bb FedEx: UPS:	gyntitetia detection
000 101	o onan or outra,	Cust.	Seal: Yes NoLab Cour:	limit of lug/L
			Packs/Dry Ice/None Other:	
Cooler Possible Hazard Identification			ample Disposal Disposal By Lab	(A fee may be assessed if samples onths are retained longer than 1 month)
☐ Yes ☐ No Cooler Temp: ☐ Non-Hazard ☐ Flamm	nable 🗆 Skin Irritant	☐ Poison B ☐ Unknown ☐		Julia are retained tenger than I mortaly
Turn Around Time Required (business days)	Other Stand	2 +A+   OC Requirements (Specify	9)	
□ 24 Hours □ 48 Hours □ 15 Days □ 10 Days □ 15 Days			int	6-30-18   Time
1. Relinguisher By Sign/Print Just Listy	Date 6/29/18   Time	Received By Sign/Pri	Then Hobbs	6-30-18 1000 Date Time
2. Relipquished By Sign/Print	Date Time	ne 2. Received By Sign/Pri	int	Daid
Karriebad Ov. O. (D.)	Date Time	ne 3. Received By Sign/Pri	nı	Date Time
3. Relinquished By Sign/Print				

Comments

# **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 580-78490-1

Login Number: 78490 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

ent



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: 580-78657-1 Client Project/Site: Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 7/20/2018 3:28:40 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

·····LINKS ······

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Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78657-1

# **Table of Contents**

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Sample Summary	13
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### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78657-1

Job ID: 580-78657-1

**Laboratory: TestAmerica Seattle** 

Narrative

Job Narrative 580-78657-1

### Receipt

Two samples were received on 7/6/2018 11:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.3° C.

### GC/MS VOA

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

### GC/MS Semi VOA

Method(s) 8270C SIM: The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for preparation batch 580-278525 and analytical batch 580-278919 recovered outside control limits for the following analytes: Dibenz(a,h)anthracene (LCS and LCSD) and Indeno[1,2,3-cd]pyrene (LCSD only). These analytes were biased high in the LCS/LCSD and not detected in the associated samples; therefore, the data have been reported.

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

#### GC Semi VOA

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

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### **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78657-1

### **Qualifiers**

### **GC/MS Semi VOA**

LCS or LCSD is outside acceptance limits.

### **Glossary**

DLC

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)							
DI RA RE IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample							

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)

RLReporting Limit or Requested Limit (Radiochemistry)

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

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

Page 4 of 15

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78657-1

Client Sample ID: Outfall #002 Lab Sample ID: 580-78657-1 Date Collected: 07/05/18 14:45

**Matrix: Water** 

Date Received: 07/06/18 11:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			07/09/18 18:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123					07/09/18 18:46	1
Toluene-d8 (Surr)	104		79 - 122					07/09/18 18:46	1
4-Bromofluorobenzene (Surr)	101		78 - 119					07/09/18 18:46	1
Dibromofluoromethane (Surr)	100		70 - 120					07/09/18 18:46	1
1,2-Dichloroethane-d4 (Surr)	110		70 - 120					07/09/18 18:46	1

Method: 8270C SIM - Sei Analyte		Qualifier	. RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050	0.014	ug/L		07/10/18 09:51	07/19/18 15:17	1
Benzo[a]pyrene	ND		0.10	0.011	ug/L		07/10/18 09:51	07/19/18 15:17	1
Benzo[b]fluoranthene	ND		0.050	0.011	ug/L		07/10/18 09:51	07/19/18 15:17	1
Benzo[k]fluoranthene	ND		0.050	0.012	ug/L		07/10/18 09:51	07/19/18 15:17	1
Chrysene	ND		0.10	0.016	ug/L		07/10/18 09:51	07/19/18 15:17	1
Dibenz(a,h)anthracene	ND	*	0.10	0.010	ug/L		07/10/18 09:51	07/19/18 15:17	1
Indeno[1,2,3-cd]pyrene	ND	*	0.050	0.014	ug/L		07/10/18 09:51	07/19/18 15:17	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	81		53 - 120				07/10/18 09:51	07/19/18 15:17	1

Method: NWTPH-Gx - Nort Analyte		Petroleui Qualifier	m Products ( RL	GC) MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L		<u> </u>	07/12/18 07:41	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		50 - 150			•		07/12/18 07:41	1
Trifluorotoluene (Surr)	99		50 - 150					07/12/18 07:41	1

Method: NWTPH-Dx - Se	emi-Volatile Petroleum Pro	ducts by NW	TPH with	Silica C	Gel Cle	eanup		
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND ND	0.11	0.067	mg/L		07/10/18 09:44	07/12/18 13:19	1
Motor Oil (>C24-C36)	ND	0.36	0.099	mg/L		07/10/18 09:44	07/12/18 13:19	1
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	87	50 - 150				07/10/18 09:44	07/12/18 13:19	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78657-1

Client Sample ID: Trip Blank Date Collected: 07/05/18 00:00

Lab Sample ID: 580-78657-2

**Matrix: Water** 

	Deseived.		
Date	Received:	07/06/18	11:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			07/09/18 17:33	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123					07/09/18 17:33	1
Toluene-d8 (Surr)	102		79 - 122					07/09/18 17:33	1
4-Bromofluorobenzene (Surr)	100		78 - 119					07/09/18 17:33	1
Dibromofluoromethane (Surr)	101		70 - 120					07/09/18 17:33	1
1,2-Dichloroethane-d4 (Surr)	109		70 - 120					07/09/18 17:33	1

<b>Method: NWTPH-Gx - Nort</b>	hwest - Volatile	Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			07/11/18 20:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		50 - 150			-		07/11/18 20:48	1
` ,									

7/20/2018

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78657-1

Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-278424/5

**Matrix: Water** 

Analyte

Benzene

Analysis Batch: 278424

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

MB MB Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 1.0 0.53 ug/L 07/09/18 14:18 ND

MB MB Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Trifluorotoluene (Surr) 102 74 - 123 07/09/18 14:18 Toluene-d8 (Surr) 105 79 - 122 07/09/18 14:18 4-Bromofluorobenzene (Surr) 102 78 - 119 07/09/18 14:18 101 70 - 120 Dibromofluoromethane (Surr) 07/09/18 14:18 108 70 - 120 1,2-Dichloroethane-d4 (Surr) 07/09/18 14:18

Lab Sample ID: LCS 580-278424/6

**Matrix: Water** 

**Analysis Batch: 278424** 

Client Sample ID: Lab Control Sample Prep Type: Total/NA

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzene 10.0 10.8 ug/L 108 37 - 151

LCS LCS Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 101 74 - 123 99 79 - 122 Toluene-d8 (Surr) 4-Bromofluorobenzene (Surr) 99 78 - 119 99 70 - 120 Dibromofluoromethane (Surr) 1,2-Dichloroethane-d4 (Surr) 107 70 - 120

Lab Sample ID: LCSD 580-278424/7

**Matrix: Water** 

**Analysis Batch: 278424** 

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

LCSD LCSD RPD Spike %Rec. **Analyte** Added Result Qualifier Unit D %Rec Limits RPD Limit Benzene 10.0 10.7 ug/L 107 37 - 151

LCSD LCSD Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 100 74 - 123 Toluene-d8 (Surr) 101 79 - 122 101 78 - 119 4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr) 100 70 - 120 104 70 - 120 1,2-Dichloroethane-d4 (Surr)

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

Lab Sample ID: MB 580-278525/1-A **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA **Analysis Batch: 278919 Prep Batch: 278525** MR MR

	1410	1110							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050	0.014	ug/L		07/10/18 09:51	07/12/18 22:39	1
Benzo[a]pyrene	ND		0.10	0.011	ug/L		07/10/18 09:51	07/12/18 22:39	1
Benzo[b]fluoranthene	ND		0.050	0.011	ug/L		07/10/18 09:51	07/12/18 22:39	1

TestAmerica Seattle

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TestAmerica Job ID: 580-78657-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-278525/1-A

**Matrix: Water** 

**Analysis Batch: 278919** 

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

**Prep Batch: 278525** 

, ,	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.050	0.012	ug/L		07/10/18 09:51	07/12/18 22:39	1
Chrysene	ND		0.10	0.016	ug/L		07/10/18 09:51	07/12/18 22:39	1
Dibenz(a,h)anthracene	ND		0.10	0.010	ug/L		07/10/18 09:51	07/12/18 22:39	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.014	ug/L		07/10/18 09:51	07/12/18 22:39	1

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Terphenyl-d14 53 - 120 07/10/18 09:51 07/12/18 22:39 115

**Client Sample ID: Lab Control Sample** 

**Prep Type: Total/NA Prep Batch: 278525** 

Lab Sample ID: LCS 580-278525/2-A **Matrix: Water** 

Analysis Batch: 278919

•	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	4.67	-	ug/L		117	61 - 120	
Benzo[a]pyrene	4.00	4.33		ug/L		108	65 - 120	
Benzo[b]fluoranthene	4.00	4.43		ug/L		111	58 - 120	
Benzo[k]fluoranthene	4.00	4.60		ug/L		115	58 - 120	
Chrysene	4.00	4.17		ug/L		104	58 - 120	
Dibenz(a,h)anthracene	4.00	5.07	*	ug/L		127	60 - 125	
Indeno[1,2,3-cd]pyrene	4.00	4.75		ug/L		119	56 - 120	

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 117 53 - 120

Lab Sample ID: LCSD 580-278525/3-A

**Matrix: Water** 

Analysis Batch: 278919

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

**Prep Batch: 278525** 

•	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	4.82		ug/L		120	61 - 120	3	16
Benzo[a]pyrene	4.00	4.50		ug/L		112	65 - 120	4	17
Benzo[b]fluoranthene	4.00	4.63		ug/L		116	58 - 120	4	20
Benzo[k]fluoranthene	4.00	4.79		ug/L		120	58 - 120	4	20
Chrysene	4.00	4.25		ug/L		106	58 - 120	2	16
Dibenz(a,h)anthracene	4.00	5.21	*	ug/L		130	60 - 125	3	15
Indeno[1,2,3-cd]pyrene	4.00	4.84	*	ug/L		121	56 - 120	2	15

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 119 53 - 120

TestAmerica Seattle

7/20/2018

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78657-1

Client Sample ID: Method Blank

**Client Sample ID: Lab Control Sample** 

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Type: Total/NA

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-278725/6

**Matrix: Water** 

**Analysis Batch: 278725** 

Prep Type: Total/NA MB MB

Analyte Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 0.25 Gasoline  $\overline{\mathsf{ND}}$ 0.10 mg/L 07/11/18 18:13

MB MB

%Recovery Surrogate Qualifier Limits Prepared Analyzed Dil Fac 4-Bromofluorobenzene (Surr) 89 50 - 150 07/11/18 18:13 Trifluorotoluene (Surr) 97 50 - 150 07/11/18 18:13

Lab Sample ID: LCS 580-278725/7

**Matrix: Water** 

**Analysis Batch: 278725** 

LCS LCS Spike %Rec. **Analyte** Added Result Qualifier Limits Unit D %Rec Gasoline 1.00 0.912 91 79 - 120 mg/L

LCS LCS

Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 102 50 - 150 105 50 - 150 Trifluorotoluene (Surr)

Lab Sample ID: LCSD 580-278725/8

**Matrix: Water** 

**Analysis Batch: 278725** 

RPD Spike LCSD LCSD %Rec. Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Gasoline 1.00 0.925 mg/L 79 - 120

LCSD LCSD

%Recovery Qualifier Surrogate I imits 4-Bromofluorobenzene (Surr) 100 50 - 150 Trifluorotoluene (Surr) 105 50 - 150

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-278523/1-B Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 278793** Prep Batch: 278523

MB MB

Analyte Result Qualifier RL **MDL** Unit Prepared #2 Diesel (C10-C24) ND 0.11 07/10/18 09:44 07/12/18 10:07 0.065 mg/L Motor Oil (>C24-C36) ND 0.35 07/10/18 09:44 07/12/18 10:07 0.096 mg/L

MB MB

Qualifier Limits Surrogate %Recovery Prepared 07/10/18 09:44 07/12/18 10:07 50 - 150 o-Terphenyl 90

Lab Sample ID: LCS 580-278523/2-B

**Matrix: Water** 

#2 Diesel (C10-C24)

Prep Type: Total/NA **Analysis Batch: 278793 Prep Batch: 278523** Spike LCS LCS %Rec. Added Analyte Result Qualifier Unit D %Rec Limits

2.00

TestAmerica Seattle

7/20/2018

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1.75

mg/L

Analyzed Dil Fac

**Client Sample ID: Lab Control Sample** 

# **QC Sample Results**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-78657-1 Project/Site: Edmonds Terminal

# Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: LCS 580-	b Sample ID: LCS 580-278523/2-B							Client Sample ID: Lab Control Sampl					
Matrix: Water									Prep Type: Total/NA				
Analysis Batch: 278793									<b>Prep Batch: 278523</b>				
_			Spike	LCS	LCS				%Rec.				
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits				
Motor Oil (>C24-C36)			2.00	1.97		mg/L		98	64 - 120				
	LCS	LCS											
Surrogate	%Recovery	Qualifier	Limits										
o-Terphenyl	104		50 - 150										

Lab Sample ID: LCSD 580-278523/3-B Matrix: Water		(	Client S	ample	ID: Lat	Control S	e: Tot	al/NA	
Analysis Batch: 278793	Spike Added	_	LCSD Qualifier	Unit	D	%Rec	Prep Ba %Rec. Limits	RPD	RPD Limit
Analyte	Added	Result	Qualifier	Unit	ט	%Rec	Limits	KPU	Limit
#2 Diesel (C10-C24)	2.00	1.80		mg/L		90	50 - 120	3	26
Motor Oil (>C24-C36)	2.00	2.02		mg/L		101	64 - 120	3	24

LCSD LCSD %Recovery Qualifier Limits Surrogate 50 - 150 o-Terphenyl 105

7/20/2018

### **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78657-1

Lab Sample ID: 580-78657-1

Matrix: Water

Date Collected: 07/05/18 14:45 Date Received: 07/06/18 11:30

Client Sample ID: Outfall #002

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			278424	07/09/18 18:46	TL1	TAL SEA
Total/NA	Prep	3510C			278525	07/10/18 09:51	JCM	TAL SEA
Total/NA	Analysis	8270C SIM		1	279507	07/19/18 15:17	T1W	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	278725	07/12/18 07:41	T1W	TAL SEA
Total/NA	Prep	3510C			278523	07/10/18 09:44	JCM	TAL SEA
Total/NA	Cleanup	3630C			278734	07/11/18 16:57	JCM	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	278793	07/12/18 13:19	T1W	TAL SEA

Client Sample ID: Trip Blank Lab Sample ID: 580-78657-2

Date Collected: 07/05/18 00:00 Matrix: Water

Date Received: 07/06/18 11:30

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	278424	07/09/18 17:33	TL1	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	278725	07/11/18 20:48	T1W	TAL SEA

**Laboratory References:** 

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

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TestAmerica Seattle

# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-78657-1

Project/Site: Edmonds Terminal

# **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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

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# **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78657-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-78657-1	Outfall #002	Water	07/05/18 14:45	07/06/18 11:30
580-78657-2	Trip Blank	Water	07/05/18 00:00	07/06/18 11:30

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

-	Rush	1

Short Hold

Chain of **Custody Record** 

Client Arcadis			Client	Conta	ct P	ete	x C	ah	npl	001	l							Date	7	/5	/18	\$	Chaii	n of Cusi	ody Nu	mber 3	<u> 7650</u>
Address 1100 Olive way, Suite &	00.		Teleph	one Ni	umber	(Area C	Code)/F	ax Nui	mber	***************************************				***********			L	ab Nu	ımbei	•			Page	1		of	1
1100 01/1/6 morti 20110 2	State Zip	Code	Sample	AP				Lab Co	ntoct							<u> </u>	Anglia	cie /At	Hach i	iot if			ray	e			
Seattle	WA	98101	En	c K	rw	eger		Eli	iliv	ic L	Nα	ile	( =	<u> </u>			nore s	sis (At space	is nee	eded)	T	<b>1</b> 1					
Project Name and Location (State) Edwards Tex	minal		Billing	Conta	ct	y						ike	DA G	5	K Z	M X	5		***************************************		Loc:		-	Spe	cial l	nstruc	tions/
Contract/Purchase Order/Quote No.					Ma	tríx			Coi	ntaine eserva	rs &		Rongeno F		NWTVR - CIK	* X	4				78(	657	<b>p</b>	Con	dition	s of R	eceipt
Sample I.D. and Location/Descrip (Containers for each sample may be combine	ption ed on one line)	Date	Time	Air	Aqueous	Soil		Unpres. H2S04	HNO3	нсі	NaOH	ZnAc/ NaOH	Kows	מכאוג	3	NWTO											
Outfall #002		7/5/18	1445		X.			2		8			$\downarrow$	abla	$\langle \rangle$	$\langle \! \rangle$				_		1 1		PH=	8.	17	
Trip Blank					Х					6			$\rightarrow$	$\langle \rangle$	<b>X</b>									•			
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										1	C	ust. Se	al: V	es es	20	146 No 5	Z U	PS:_							***************************************		
9-1-4-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-			580-78657	Chair	n of Ci	ustody					V	el/Pac	ks/Di	ry Ic	e/N	one		ab Co ther:_									
					-				1					T							1				•		
Cooler	Possible H	azard Identification	<u> </u>				LL.			<u></u>		L S	ample	Dien	1088	<u>.</u>	$\Box$	Disposa	al By	l ah							:6
☐ Yes ☐ No Cooler Temp:	□ Non-Ha			] Ski	n Irrita	nt l	☐ Poi	ison B		□ Ur	nknov	1	Retu	,				rchive	-			Month					if samples 1 month)
Turn Around Time Required (business days)		**************************************						I Q	C Requ	uirem	ents	(Specif	y)														
☐ 24 Hours ☐ 48 Hours 💢 5 Days	□ 10 Da	ys 🗌 15 Days	: 🗆 Oth	er												,,,	,										
1. Relinquished By Sign/Print	Frir K	'vucger	Date 7/6	18		Time [ (	(30)	) 1.	Recei	ived E	y S	ign/Pri	int * /	/ F	- -	4H (	150	20	L	hne	ند	<u>),</u>	Da	te //6/1	ζ	Time	30
2. Relinquished By Sign/Prin			Date	***********	·····	Time		2.	Recei	ived E	y s	ign/Pri									7		Da	ite		Time	
3. Relinquished By Sign/Print			Date			Time		3.	Recei	ived E	y S	ign/Pri	int								·····		Da	te	<del>-</del>	Time	
Comments											*****					<u></u>			.,.,								

Job Number: 580-78657-1

Login Number: 78657 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

Creator: Hobbs, Kenneth F		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
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	



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: 580-78765-1 Client Project/Site: Edmonds Terminal

#### For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles



Authorized for release by: 7/26/2018 12:24:00 PM
Ashley Worthy, Project Manager I ashley.worthy@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972 elaine.walker@testamericainc.com

LINKS

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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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78765-1

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#### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78765-1

Job ID: 580-78765-1

Laboratory: TestAmerica Seattle

**Narrative** 

Job Narrative 580-78765-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 7/11/2018 11:55 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.4° C.

#### GC/MS VOA

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

#### GC/MS Semi VOA

Method(s) 8270C SIM: The following sample was diluted due to the nature of the sample matrix: Outfall #002 (580-78765-1). Elevated reporting limits (RLs) are provided.

Method(s) 8270C SIM: The following analyte recovered outside control limits for the LCS/LCSD associated with preparation batch 580-279060 and analytical batch 580-279306: Indeno[1,2,3-cd]pyrene. This is not indicative of a systematic control problem because these were random marginal exceedances. Qualified results have been reported.

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

#### GC Semi VOA

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

#### **Organic Pres**

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

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### **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78765-1

#### **Qualifiers**

#### GC/MS Semi VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
Х	Surrogate is outside control limits

### **Glossary**

MDC

MDL

ML

NC ND

PQL

QC RER

RL RPD

TEF

TEQ

Minimum Detectable Concentration (Radiochemistry)

Reporting Limit or Requested Limit (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

Method Detection Limit

Minimum Level (Dioxin) Not Calculated

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

**Quality Control** 

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	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)
Oil 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)
≣DL	Estimated Detection Limit (Dioxin)
_OD	Limit of Detection (DoD/DOE)
.OQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)

TestAmerica Seattle

7/26/2018

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### **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78765-1

Lab Sample ID: 580-78765-1

07/18/18 02:18

07/18/18 02:18

Matrice Mater

Matrix: Water

Client Sample ID: Outfall #002
Date Collected: 07/11/18 08:15

Date Received: 07/11/18 11:55

Dibenz(a,h)anthracene

Indeno[1,2,3-cd]pyrene

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			07/16/18 19:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123					07/16/18 19:48	1
Toluene-d8 (Surr)	103		79 - 122					07/16/18 19:48	1
4-Bromofluorobenzene (Surr)	101		78 - 119					07/16/18 19:48	1
Dibromofluoromethane (Surr)	102		70 - 120					07/16/18 19:48	1
1,2-Dichloroethane-d4 (Surr)	107		70 - 120					07/16/18 19:48	1
Method: 8270C SIM - Semivola	atile Organic Com	npounds (G	C/MS SIM)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.28	0.078	ug/L		07/15/18 11:18	07/18/18 02:18	5
Benzo[a]pyrene	ND		0.56	0.062	ug/L		07/15/18 11:18	07/18/18 02:18	5
Benzo[b]fluoranthene	ND		0.28	0.062	ug/L		07/15/18 11:18	07/18/18 02:18	5
Benzo[k]fluoranthene	ND		0.28	0.067	ug/L		07/15/18 11:18	07/18/18 02:18	5
Chrysene	ND		0.56	0.090	. //		07/15/18 11:18	07/18/18 02:18	5

	0/5	0 ""	,	_ ,		57.5
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	89		53 - 120	07/15/18 11:18	07/18/18 02:18	5

0.56

0.28

0.056 ug/L

0.078 ug/L

07/15/18 11:18

07/15/18 11:18

ND

ND

Method: NWTPH-Gx - Northwest	t - Volatile Petro	oleum Produ	ıcts (GC)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			07/25/18 20:56	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)			50 - 150			_		07/25/18 20:56	1
Trifluorotoluene (Surr)	101		50 <sub>-</sub> 150					07/25/18 20:56	1

Method: NWTPH-Dx - Semi-Volatile	Petroleum	Products by	NW I PH with	Silica Gel	Cleanup	)			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.12	0.070	mg/L		07/15/18 11:10	07/16/18 23:10	1
Motor Oil (>C24-C36)	ND		0.38	0.10	mg/L		07/15/18 11:10	07/16/18 23:10	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	79		50 - 150				07/15/18 11:10	07/16/18 23:10	1

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### **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78765-1

Lab Sample ID: 580-78765-2

Matrix: Water

Client Sample ID: Trip Blank
Date Collected: 07/11/18 00:00
Date Received: 07/11/18 11:55

		Ma	trix

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			07/16/18 16:58	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123			-		07/16/18 16:58	1
Toluene-d8 (Surr)	105		79 - 122					07/16/18 16:58	1
4-Bromofluorobenzene (Surr)	100		78 - 119					07/16/18 16:58	1
Dibromofluoromethane (Surr)	101		70 - 120					07/16/18 16:58	1
1,2-Dichloroethane-d4 (Surr)	106		70 - 120					07/16/18 16:58	1

Method: NWTPH-Gx - Northwe Analyte		oleum Prod Qualifier	ucts (GC) RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND ND		0.25	0.10	mg/L		· · · · · · · · · · · · · · · · · · ·	07/25/18 20:25	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94	-	50 - 150			=		07/25/18 20:25	1
Trifluorotoluene (Surr)	105		50 - 150					07/25/18 20:25	1

7/26/2018

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Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78765-1

Method: 624 - Volatile Organic Compounds (GC/MS)

MB MB

Lab Sample ID: MB 580-279121/5

**Matrix: Water** 

Analysis Batch: 279121

Client Sample ID: Method Blank

Prep Type: Total/NA

Result Qualifier RLMDL Unit D Analyzed Dil Fac Analyte Prepared Benzene ND 1.0 0.53 ug/L 07/16/18 14:56

MB MB Qualifier Dil Fac Surrogate %Recovery Limits Prepared Analyzed Trifluorotoluene (Surr) 101 74 123 07/16/18 14:56 Toluene-d8 (Surr) 103 79 - 122 07/16/18 14:56 104 78 - 119 07/16/18 14:56 4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr) 101 70 - 120 07/16/18 14:56 1,2-Dichloroethane-d4 (Surr) 103 70 - 120 07/16/18 14:56

Lab Sample ID: LCS 580-279121/6

**Matrix: Water** 

Analysis Batch: 279121

Client Sample ID: Lab Control Sample Prep Type: Total/NA

LCS LCS Spike %Rec. Added Analyte Result Qualifier Unit %Rec Limits 10.0 Benzene 10.2 ug/L 102 37 151

LCS LCS Surrogate %Recovery Qualifier Limits 74 - 123 Trifluorotoluene (Surr) 99 79 - 122 100 Toluene-d8 (Surr) 4-Bromofluorobenzene (Surr) 102 78 - 119 70 - 120 Dibromofluoromethane (Surr) 99 1,2-Dichloroethane-d4 (Surr) 100 70 - 120

Lab Sample ID: LCSD 580-279121/7

**Matrix: Water** 

Analysis Batch: 279121

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

LCSD LCSD RPD Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits RPD Limit Benzene 10.0 10.2 ug/L 102 37 - 151

LCSD LCSD %Recovery Qualifier Surrogate Limits Trifluorotoluene (Surr) 101 74 - 123 Toluene-d8 (Surr) 99 79 - 122 4-Bromofluorobenzene (Surr) 101 78 - 119 70 - 120 Dibromofluoromethane (Surr) 99 70 - 120 1,2-Dichloroethane-d4 (Surr) 103

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

Lab Sample ID: MB 580-279060/1-A

**Matrix: Water** 

Analysis Batch: 279306

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 279060

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050	0.014	ug/L		07/15/18 11:18	07/17/18 21:28	1
Benzo[a]pyrene	ND		0.10	0.011	ug/L		07/15/18 11:18	07/17/18 21:28	1
Benzo[b]fluoranthene	ND		0.050	0.011	ug/L		07/15/18 11:18	07/17/18 21:28	1

TestAmerica Seattle

7/26/2018

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TestAmerica Job ID: 580-78765-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-279060/1-A

Lab Sample ID: LCS 580-279060/2-A

**Matrix: Water** 

Benzo[k]fluoranthene

Dibenz(a,h)anthracene

Indeno[1,2,3-cd]pyrene

**Matrix: Water** 

Analyte

Chrysene

**Analysis Batch: 279306** 

Client Sample ID: Method Blank Prep Type: Total/NA

Prep Batch: 279060

MB MB Result Qualifier RL MDL Unit D Prepared Dil Fac Analyzed 0.050 07/17/18 21:28 ND 0.012 ug/L 07/15/18 11:18 ND 0.10 0.016 ug/L 07/15/18 11:18 07/17/18 21:28 ND 0.10 0.010 ug/L 07/15/18 11:18 07/17/18 21:28 ND 0.050 0.014 ug/L 07/15/18 11:18 07/17/18 21:28

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Terphenyl-d14 53 - 120 07/15/18 11:18 07/17/18 21:28 104

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 279060

Analysis Batch: 279306 Spike LCS LCS %Rec. Analyte Added Result Qualifier %Rec Limits Unit D Benzo[a]anthracene 4.00 4.00 ug/L 100 61 - 120 4.00 4.23 106 65 - 120 Benzo[a]pyrene ug/L Benzo[b]fluoranthene 4.00 4.15 ug/L 104 58 - 120 4.04 Benzo[k]fluoranthene 4.00 ug/L 101 58 - 120 58 - 120 Chrysene 4.00 4.21 ug/L 105

4.77

4.94

ug/L

ug/L

4.00

4.00

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 133 X 53 - 120

Lab Sample ID: LCSD 580-279060/3-A

**Matrix: Water** 

Dibenz(a,h)anthracene

Indeno[1,2,3-cd]pyrene

Analysis Batch: 279306

Client Sample ID: Lab Control Sample Dup

60 - 125

56 - 120

119

124

Prep Type: Total/NA

**Prep Batch: 279060** 

LCSD LCSD Spike %Rec. RPD Analyte Added Result Qualifier Unit %Rec Limits Limit Benzo[a]anthracene 4.00 3.85 96 61 - 120 16 ug/L Benzo[a]pyrene 4.00 4.19 ug/L 105 65 - 120 17 Benzo[b]fluoranthene 4.00 4.25 106 58 - 120 ug/L 20 3 3.89 Benzo[k]fluoranthene 4.00 ug/L 97 58 - 120 20 Chrysene 4.00 4.20 ug/L 105 58 - 120 16 4.00 Dibenz(a,h)anthracene 4.71 ug/L 118 60 - 12515 4.00 4.90 123 15 Indeno[1,2,3-cd]pyrene ug/L 56 - 120

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 53 - 120 84

TestAmerica Seattle

7/26/2018

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78765-1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-280047/5

**Matrix: Water** 

Analyte

Gasoline

Analysis Batch: 280047

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB RL Result Qualifier MDL Unit D Analyzed Dil Fac Prepared 0.25 ND 0.10 mg/L 07/25/18 18:52

MB MB Qualifier Dil Fac Surrogate %Recovery Prepared Analyzed 50 - 150 4-Bromofluorobenzene (Surr) 108 07/25/18 18:52 Trifluorotoluene (Surr) 103 50 - 150 07/25/18 18:52

Lab Sample ID: LCS 580-280047/6 **Client Sample ID: Lab Control Sample** Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 280047

LCS LCS %Rec. Spike Analyte Added Result Qualifier Unit D %Rec Limits Gasoline 1.00 0.937 mg/L 79 - 120

LCS LCS Surrogate %Recovery Qualifier Limits 50 - 150 4-Bromofluorobenzene (Surr) 114 Trifluorotoluene (Surr) 113 50 - 150

Lab Sample ID: LCSD 580-280047/7 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 280047

LCSD LCSD RPD Spike %Rec. Analyte Added Result Qualifier RPD Limit Unit %Rec Gasoline 1.00 0.945 95 mg/L 79 - 120 10

LCSD LCSD %Recovery Qualifier I imits Surrogate 4-Bromofluorobenzene (Surr) 111 50 - 150 50 - 150 Trifluorotoluene (Surr) 113

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-279058/1-B Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 279178

мв мв

Analyte Result Qualifier RL MDL Unit Prepared Dil Fac Analyzed #2 Diesel (C10-C24) 0.11 07/15/18 11:10 ND 0.065 mg/L 07/16/18 22:02 Motor Oil (>C24-C36) ND 0.35 0.096 mg/L 07/15/18 11:10 07/16/18 22:02

MB MB %Recovery Limits Dil Fac Surrogate Qualifier Prepared Analyzed o-Terphenyl 83 50 - 150 07/15/18 11:10 07/16/18 22:02

Lab Sample ID: LCS 580-279058/2-B

**Matrix: Water** 

Analysis Batch: 2/91/8						Prep B	atcn: 2/9058
	Spike	LCS	LCS			%Rec.	
Analyte	Added	Result	Qualifier	Unit	D %Rec	Limits	
#2 Diesel (C10-C24)	2.00	1.65		mg/L	83	50 - 120	

TestAmerica Seattle

Page 9 of 15

Prep Batch: 279058

Prep Type: Total/NA

7/26/2018

### **QC Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78765-1

3

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: LCS 580-279058/2-B

Matrix: Water

Analysis Batch: 279178

Spike

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 279058
%Rec.

		Spike	LCS	LCS				%Rec.	
Analyte		Added	Result	Qualifier	Unit	D	%Rec	Limits	
Motor Oil (>C24-C36)		2.00	1.72		mg/L		86	64 - 120	
	LCS LCS								

 Surrogate
 %Recovery of the property
 Qualifier
 Limits

 o-Terphenyl
 89
 50 - 150

Lab Sample ID: LCSD 580-279058/3-B Client Sample ID: Lab Control Sample Dup

Matrix: Water

Analysis Batch: 279178

Prep Batch: 279058

Prep Batch: 279058

	Spike	LCSD	LCSD				%Rec.		RPD	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
#2 Diesel (C10-C24)	2.00	1.69		mg/L		84	50 - 120	2	26	
Motor Oil (>C24-C36)	2.00	1.72		mg/L		86	64 - 120	0	24	

7/26/2018

### **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Collected: 07/11/18 08:15

Date Received: 07/11/18 11:55

Client Sample ID: Outfall #002

TestAmerica Job ID: 580-78765-1

Lab Sample ID: 580-78765-1

Matrix: Water

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	279121	07/16/18 19:48	CJ	TAL SEA
Total/NA	Prep	3510C			279060	07/15/18 11:18	JCM	TAL SEA
Total/NA	Analysis	8270C SIM		5	279306	07/18/18 02:18	ERB	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	280047	07/25/18 20:56	RSB	TAL SEA
Total/NA	Prep	3510C			279058	07/15/18 11:10	JCM	TAL SEA
Total/NA	Cleanup	3630C			279091	07/16/18 09:42	JCM	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	279178	07/16/18 23:10	AEK	TAL SEA

Client Sample ID: Trip Blank Lab Sample ID: 580-78765-2

Date Collected: 07/11/18 00:00 Matrix: Water

Date Received: 07/11/18 11:55

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	279121	07/16/18 16:58	CJ	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	280047	07/25/18 20:25	RSB	TAL SEA

#### Laboratory References:

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

### **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78765-1

### **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	<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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

### **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78765-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-78765-1	Outfall #002	Water	07/11/18 08:15	07/11/18 11:55
580-78765-2	Trip Blank	Water	07/11/18 00:00	07/11/18 11:55

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

	Short	Hold	
*****			

Rush

Chain of Custody Record

Client	Client Contact	ampbel	1					Dat	9/1	110	/	Chain of Cust	ody Number	7 F F A
Address	Telephone Number (Ar		*		·			Lab	// [   Numbel	/ '(J_			<u> </u>	<u> 7556</u>
1100 01100 01												Page	of /	i
City South State Zip Code WA 9800	Sampler  JALM Litil		Contact	Walh	. /		<u>ک</u> کر پیجرچو	Analysis nore spa	(Attach i ce is nee	list if eded)			+	· · · · · · · · · · · · · · · · · · ·
Project Name and Location (State)	Billing Contact		<u>-</u>		رب و ب	×	2 / K						Loc: 580 78765	5 ,
Contract/Purchase Order/Quote No.	Matrix	,	Com	ainers &	<u>(5</u>	Š	9					S C		1†
0			·	ervatives	Š	E	1817 AHC							<b>~1</b>
Sample I.D. and Location/Description (Containers for each sample may be combined on one line)  Date	Aqueous Sed.	Soil Unpres.	H2S04 HN03	HCI NaOH ZnAc/	Bonzing	Nwith	CPAHC PL							
	815 X	2		8	X		$\times \times$					PH =	7.46	
trip Blank				6	X									
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				herm. ID:	AZ	_Cor:	<i>0</i> . 4	'      ' _°      Unc:	0.3			A USC S	looded s	ilion
580-78765 Chain of C	ustody		F	herm. ID: ooler Dsc: acking:	Bubble Bubble	Blnc :	Fed	Ex:	*****			gel	Cleary	
				ust. Seal:	Yes	No_>	_ UP:	S: Cour:_	~			/		
			@	et/Packs/l	Dry Ice/N	one	Oth							
O. d.														
Cooler Possible Hazard Identification  ☐ Yes ☐ No Cooler Temp: ☐ Non-Hazard ☐ Flamma	ble 🗆 Skin Irritant	☐ Poison	в 🗆	Unknown	Sample D			□ Dispo □ Archiv			_ Months		e assessed if si longer than 1 n	
Turn Around Time Required (business days)  ☐ 24 Hours ☐ 48 Hours ☐ 25 Days ☐ 10 Days ☐ 15 Days	Other			ements (Spe								uro retamen	ionger man i n	ionun
1. Religiquished By Sign/Pylni	Date Time	?	1. Receive	By Sign/i	Print, 15				Mile Providence Communication and American Action Communication Communic			, Date ,	, Time	
2. Heyingushed By Sign/Print	Date Time	,	2 Passiva		/ /	141	261	500	Lu	ing.	<u>}-</u>	7/11/1	······································	
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3. Relinquished By Sign/Print	Date Time	•	3. Received	By Sign/F	Print						· · · · · · · · · · · · · · · · · · ·	Date	Time	
Comments										***************************************				

## Login Sample Receipt Checklist

Client: ARCADIS U.S. Inc Job Number: 580-78765-1

Login Number: 78765 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

Cleator. Hobbs, Refilletii F		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



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: 580-79184-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 8/8/2018 2:49:57 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

·····LINKS ·······

Review your project results through
Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Chevron Edmonds Terminal TestAmerica Job ID: 580-79184-1

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### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79184-1

Job ID: 580-79184-1

Laboratory: TestAmerica Seattle

Narrative

Job Narrative 580-79184-1

#### Receipt

Three samples were received on 7/27/2018 1:15 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 6.4° C.

#### **GC/MS VOA**

Method(s) 624: The matrix spike / matrix spike duplicate (MS/MSD) precision for analytical batch 580-280467 was outside control limits for Benzene. Sample matrix interference and/or non-homogeneity are suspected because the MS/MSD and associated laboratory control sample / laboratory control sample duplicate (LCS/LCSD) precision was within acceptance limits.

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

#### GC/MS Semi VOA

Method(s) 8270C SIM: The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for preparation batch 580-280563 and analytical batch 580-280719 recovered outside control limits for the following analytes: Benzo(b)fluoranthene, Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

Method(s) 8270C SIM: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 580-280563 and analytical batch 580-280719 were outside control limits for Dibenz(a,h)anthracene and Indeno(1,2,3-cd)pyrene. Spike recoveries were high, parent sample ND for affected targets, data is reported without concern for bias.

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

#### GC Semi VOA

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

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### **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79184-1

2

### **Qualifiers**

#### **GC/MS VOA**

Qualifier Qualifier Description

F2 MS/MSD RPD exceeds control limits

#### GC/MS Semi VOA

Qualifier Qualifier Description

\* LCS or LCSD is outside acceptance limits.

F1 MS and/or MSD Recovery is outside acceptance limits.

### **Glossary**

Abbreviation These commonly used abbreviations may or may not be present in this report.

Eisted 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)

TestAmerica Seattle

8/8/2018

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Project/Site: Chevron Edmonds Terminal

Client Sample ID: Outfall #002

Date Collected: 07/26/18 12:05 Date Received: 07/27/18 13:15

Lab Sample ID: 580-79184-1

**Matrix: Water** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND	F2	1.0	0.53	ug/L			07/31/18 19:42	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	107		74 - 123					07/31/18 19:42	1
Toluene-d8 (Surr)	101		79 - 122					07/31/18 19:42	1
4-Bromofluorobenzene (Surr)	102		78 - 119					07/31/18 19:42	1
Dibromofluoromethane (Surr)	97		70 - 120					07/31/18 19:42	1
1,2-Dichloroethane-d4 (Surr)	79		70 - 120					07/31/18 19:42	1

Method: 8270C SIM - Sen	nivolatile Organi	c Compou	inds (GC/MS	SIM)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.26	0.074	ug/L		08/01/18 09:57	08/02/18 17:36	5
Benzo[a]pyrene	ND		0.53	0.058	ug/L		08/01/18 09:57	08/02/18 17:36	5
Benzo[b]fluoranthene	ND	*	0.26	0.058	ug/L		08/01/18 09:57	08/02/18 17:36	5
Benzo[k]fluoranthene	ND		0.26	0.063	ug/L		08/01/18 09:57	08/02/18 17:36	5
Chrysene	ND		0.53	0.084	ug/L		08/01/18 09:57	08/02/18 17:36	5
Dibenz(a,h)anthracene	ND	F1 *	0.53	0.053	ug/L		08/01/18 09:57	08/02/18 17:36	5
Indeno[1,2,3-cd]pyrene	ND	F1 *	0.26	0.074	ug/L		08/01/18 09:57	08/02/18 17:36	5
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	88		53 - 120				08/01/18 09:57	08/02/18 17:36	5

Analyte	Result	Qualifier	RL	GC) MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			08/04/18 21:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	84		50 - 150					08/04/18 21:54	1
Trifluorotoluene (Surr)	116		50 - 150					08/04/18 21:54	1

Method: NWTPH-Dx - Se	emi-Volatile Petrole	eum Prod	ucts by NW1	PH with	Silica (	Gel Cle	eanup		
Analyte	Result (	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND ND		0.12	0.071	mg/L		07/31/18 10:17	08/01/18 13:04	1
Motor Oil (>C24-C36)	ND		0.38	0.10	mg/L		07/31/18 10:17	08/01/18 13:04	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	76		50 - 150				07/31/18 10:17	08/01/18 13:04	

### **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79184-1

Lab Sample ID: 580-79184-2

**Matrix: Water** 

Client Sample ID: Trip Blank Date Collected: 07/26/18 00:00 Date Received: 07/27/18 13:15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			07/31/18 15:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	107		74 - 123					07/31/18 15:46	1
Toluene-d8 (Surr)	99		79 - 122					07/31/18 15:46	1
4-Bromofluorobenzene (Surr)	100		78 - 119					07/31/18 15:46	1
Dibromofluoromethane (Surr)	99		70 - 120					07/31/18 15:46	1
1,2-Dichloroethane-d4 (Surr)	82		70 - 120					07/31/18 15:46	1

<b>Method: NWTPH-Gx - Nortl</b>	hwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			08/04/18 23:27	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	84		50 - 150			-		08/04/18 23:27	1
Trifluorotoluene (Surr)	117		50 - 150					08/04/18 23:27	1

8/8/2018

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Project/Site: Chevron Edmonds Terminal

Client Sample ID: Dup-1

Date Collected: 07/26/18 00:00 Date Received: 07/27/18 13:15

Lab Sample ID: 580-79184-3

Analyzed

Dil Fac

5

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5

5

5

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**Matrix: Water** 

Method: 624 - Volatile Orga Analyte	•	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L		-	07/31/18 21:00	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	108		74 - 123					07/31/18 21:00	1
Toluene-d8 (Surr)	100		79 - 122					07/31/18 21:00	1
4-Bromofluorobenzene (Surr)	101		78 - 119					07/31/18 21:00	1
Dibromofluoromethane (Surr)	98		70 - 120					07/31/18 21:00	1
1,2-Dichloroethane-d4 (Surr)	78		70 - 120					07/31/18 21:00	1

Method: 8270C SIM - Semivolatile Organic Compounds (GC/MS SIM) Analyte Result Qualifier RL **MDL** Unit D Prepared ND 0.27 Benzo[a]anthracene 0.075 ug/L ND 0.54 0.059 ug/L

08/01/18 09:57 08/02/18 18:42 Benzo[a]pyrene 08/01/18 09:57 08/02/18 18:42 Benzo[b]fluoranthene ND 0.059 ug/L 08/01/18 09:57 08/02/18 18:42 0.27 Benzo[k]fluoranthene ND 0.064 ug/L 08/01/18 09:57 08/02/18 18:42 0.27 Chrysene ND 0.54 0.086 ug/L 08/01/18 09:57 08/02/18 18:42 Dibenz(a,h)anthracene ND 0.54 0.054 ug/L 08/01/18 09:57 08/02/18 18:42 Indeno[1,2,3-cd]pyrene ND 0.27 0.075 ug/L 08/01/18 09:57 08/02/18 18:42

%Recovery Qualifier Dil Fac Surrogate Limits Prepared Analyzed 08/01/18 09:57 08/02/18 18:42 Terphenyl-d14 83 53 - 120 5

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC) Analyte Result Qualifier **MDL** Unit RL Prepared Analyzed Dil Fac ND Gasoline 0.25 0.10 mg/L 08/04/18 23:58 %Recovery Surrogate Qualifier Limits Prepared Analyzed Dil Fac

4-Bromofluorobenzene (Surr) 86 50 - 150 08/04/18 23:58 08/04/18 23:58 Trifluorotoluene (Surr) 119 50 - 150 Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Analyte Result Qualifier MDL Unit Prepared Analyzed Dil Fac RL #2 Diesel (C10-C24) ND 0.12 0.071 mg/L 07/31/18 10:17 08/01/18 14:09 Motor Oil (>C24-C36) ND 0.38 0.10 mg/L 07/31/18 10:17 08/01/18 14:09 Surrogate Qualifier Limits Prepared Analyzed Dil Fac %Recovery 50 - 150 o-Terphenyl 79 07/31/18 10:17 08/01/18 14:09

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79184-1

07/31/18 14:01

07/31/18 14:01

%Rec.

### Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-280467/5 **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA

Analysis Batch: 280467

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			07/31/18 14:01	1
	МВ	MB							
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	105		74 - 123					07/31/18 14:01	1
Toluene-d8 (Surr)	100		79 - 122					07/31/18 14:01	1
4-Bromofluorobenzene (Surr)	99		78 - 119					07/31/18 14:01	1

Lab Sample ID: LCS 580-280467/6 **Client Sample ID: Lab Control Sample Matrix: Water Prep Type: Total/NA** 

LCS LCS

LCCD LCCD

70 - 120

70 - 120

Dibromofluoromethane (Surr)

1,2-Dichloroethane-d4 (Surr)

Analysis Batch: 280467

Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzene	10.0	10.4		ug/L		104	37 - 151	

Spike

LCS	LCS	
%Recovery	Qualifier	Limits
107		74 - 123
100		79 - 122
98		78 - 119
97		70 - 120
79		70 - 120
	%Recovery 107 100 98	100 98 97

Lab Sample ID: LCSD 580-280467/7 **Client Sample ID: Lab Control Sample Dup Matrix: Water** Prep Type: Total/NA

Analysis Batch: 280467

	Spike	LCSD	LUSD			MRGC.		KFD
Analyte	Added	Result	Qualifier	Unit I	D %Rec	Limits	RPD	Limit
Benzene	10.0	10.7		ug/L	107	37 - 151	3	30

Snika

	LCSD	LCSD							
Surrogate	%Recovery	Qualifier	Limits						
Trifluorotoluene (Surr)	106		74 - 123						
Toluene-d8 (Surr)	101		79 - 122						
4-Bromofluorobenzene (Surr)	102		78 - 119						
Dibromofluoromethane (Surr)	97		70 - 120						
1,2-Dichloroethane-d4 (Surr)	80		70 - 120						

Lab Sample ID: 580-79184-1 MS Client Sample ID: Outfall #002 **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 280467

7 many one Date in 200 ioi										
	Sample	Sample	Spike	MS	MS				%Rec.	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzene	ND	F2	11.6	9.58		ug/L		82	37 - 151	

	MS	MS	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	108		74 - 123
Toluene-d8 (Surr)	100		79 - 122

TestAmerica Seattle

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% Doc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79184-1

Method: 624 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 580-79184-1 MS

**Matrix: Water** 

**Analysis Batch: 280467** 

Client Sample ID: Outfall #002 **Prep Type: Total/NA** 

MS MS %Recovery Qualifier Surrogate Limits 4-Bromofluorobenzene (Surr) 102 78 - 119 Dibromofluoromethane (Surr) 98 70 - 120 1,2-Dichloroethane-d4 (Surr) 78 70 - 120

Lab Sample ID: 580-79184-1 MSD Client Sample ID: Outfall #002 Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 280467

	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	ND	F2	11.6	13.7	F2	ug/L		118	37 - 151	35	30

	MSD	MSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	107		74 - 123
Toluene-d8 (Surr)	101		79 - 122
4-Bromofluorobenzene (Surr)	100		78 - 119
Dibromofluoromethane (Surr)	97		70 - 120
1,2-Dichloroethane-d4 (Surr)	77		70 - 120

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

Lab Sample ID: MB 580-280563/1-A **Client Sample ID: Method Blank Matrix: Water Prep Type: Total/NA Analysis Batch: 280719 Prep Batch: 280563** 

	MB I	MB							
Analyte	Result (	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050	0.014	ug/L		08/01/18 09:57	08/02/18 16:29	1
Benzo[a]pyrene	ND		0.10	0.011	ug/L		08/01/18 09:57	08/02/18 16:29	1
Benzo[b]fluoranthene	ND		0.050	0.011	ug/L		08/01/18 09:57	08/02/18 16:29	1
Benzo[k]fluoranthene	ND		0.050	0.012	ug/L		08/01/18 09:57	08/02/18 16:29	1
Chrysene	ND		0.10	0.016	ug/L		08/01/18 09:57	08/02/18 16:29	1
Dibenz(a,h)anthracene	ND		0.10	0.010	ug/L		08/01/18 09:57	08/02/18 16:29	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.014	ug/L		08/01/18 09:57	08/02/18 16:29	1

	MB	MB				
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenvl-d14	92		53 - 120	08/01/18 09:57	08/02/18 16:29	

Lab Sample ID: LCS 580-280563/2-A **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

Analysis Batch: 280719							<b>Prep Batch: 280563</b>
	Spike	LCS	LCS				%Rec.
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits
Benzo[a]anthracene	4.00	4.13		ug/L		103	61 - 120
Benzo[a]pyrene	4.00	4.61		ug/L		115	65 - 120
Benzo[b]fluoranthene	4.00	4.79		ug/L		120	58 - 120
Benzo[k]fluoranthene	4.00	4.33		ug/L		108	58 - 120
Chrysene	4.00	4.43		ug/L		111	58 - 120
Dibenz(a,h)anthracene	4.00	5.10	*	ug/L		128	60 - 125

TestAmerica Seattle

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TestAmerica Job ID: 580-79184-1

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

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

Lab Sample ID: LCS 580-280563/2-A **Client Sample ID: Lab Control Sample Matrix: Water Prep Type: Total/NA Prep Batch: 280563 Analysis Batch: 280719** Spike LCS LCS %Rec.

Added Result Qualifier Analyte Unit %Rec Limits Indeno[1,2,3-cd]pyrene 4.00 5.20 ug/L 130 56 - 120

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 53 - 120

Lab Sample ID: LCSD 580-280563/3-A Client Sample ID: Lab Control Sample Dup

**Matrix: Water** 

**Analysis Batch: 280719** 

Prep Batch: 280563 LCSD LCSD Spike %Rec. **RPD** Analyte Added Result Qualifier Unit D %Rec Limits **RPD** Limit 4.30 Benzo[a]anthracene 4.00 107 61 - 120 16 ug/L Benzo[a]pyrene 4.00 4.75 ug/L 119 65 - 120 3 17 Benzo[b]fluoranthene 4.00 4.86 \* ug/L 121 58 - 120 20 Benzo[k]fluoranthene 4.00 4.38 109 58 - 120 20 ug/L Chrysene 4.00 4.57 ug/L 114 58 - 120 3 16 5.23 \* Dibenz(a,h)anthracene 4.00 ug/L 131 60 - 125 3 15

5.37 \*

ug/L

134

56 - 120

LCSD LCSD

%Recovery Qualifier Limits Surrogate Terphenyl-d14 53 - 120 8.3

Lab Sample ID: 580-79184-1 MS Client Sample ID: Outfall #002

4.00

**Matrix: Water** 

Indeno[1,2,3-cd]pyrene

Analysis Batch: 280719

Analysis Datch. 2007 19	Sample	Sample	Spike	MS	MS				%Rec.	,
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	ND		4.28	4.20		ug/L		98	61 - 120	_
Benzo[a]pyrene	ND		4.28	4.57		ug/L		107	65 - 120	
Benzo[b]fluoranthene	ND	*	4.28	4.32		ug/L		101	58 - 120	
Benzo[k]fluoranthene	ND		4.28	4.79		ug/L		112	58 - 120	
Chrysene	ND		4.28	4.58		ug/L		107	58 - 120	
Dibenz(a,h)anthracene	ND	F1 *	4.28	5.51	F1	ug/L		129	60 - 125	
Indeno[1,2,3-cd]pyrene	ND	F1 *	4.28	5.71	F1	ug/L		133	56 - 120	

MS MS

Surrogate %Recovery Qualifier Limits 53 - 120 Terphenyl-d14 80

Lab Sample ID: 580-79184-1 MSD

**Matrix: Water** 

Analysis Batch: 280719									Prep Ba	itch: 28	30563
	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	ND		4.22	3.94		ug/L		93	61 - 120	6	16
Benzo[a]pyrene	ND		4.22	4.40		ug/L		104	65 - 120	4	17
Benzo[b]fluoranthene	ND	*	4.22	4.28		ug/L		101	58 - 120	1	20
Benzo[k]fluoranthene	ND		4.22	4.60		ug/L		109	58 - 120	4	20
Chrysene	ND		4.22	4.68		ug/L		111	58 - 120	2	16

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Prep Type: Total/NA

Prep Type: Total/NA

Prep Batch: 280563

Prep Type: Total/NA

TestAmerica Job ID: 580-79184-1

**Client Sample ID: Lab Control Sample** 

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

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

Lab Sample ID: 580-79184 Matrix: Water Analysis Batch: 280719	I-1 MSD						C	lient Sa	ample ID: Prep Tyl Prep Ba	pe: Tot	al/NA
	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Dibenz(a,h)anthracene	ND	F1 *	4.22	5.37	F1	ug/L		127	60 - 125	3	15
Indeno[1,2,3-cd]pyrene	ND	F1 *	4.22	5.55	F1	ug/L		132	56 - 120	3	15
	MSD	MSD									
Surrogate	%Recovery	Qualifier	Limits								
Terphenyl-d14	78		53 - 120								

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

Lab Sample ID: MB 580-280 Matrix: Water Analysis Batch: 280854	<b>0854/6</b>						Client Sam	ple ID: Method Prep Type: To	
	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			08/04/18 20:21	1
	MB	MB							
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	87		50 - 150			=		08/04/18 20:21	1
Trifluorotoluene (Surr)	92		50 - 150					08/04/18 20:21	1

Matrix: Water								<b>Prep Type: Tot</b>	al/NA
Analysis Batch: 280854									
•		Spike	LCS	LCS				%Rec.	
Analyte		Added	Result	Qualifier	Unit	D	%Rec	Limits	
Gasoline		1.00	1.19		mg/L		119	79 - 120	
	LCS LCS								

	_00		
Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	100		50 - 150
Trifluorotoluene (Surr)	140		50 - 150

Lab Sample ID: LCS 580-280854/7

Lab Sample ID: LCSD 580-280854/8 **Client Sample ID: Lab Control Sample Dup Matrix: Water** Prep Type: Total/NA Analysis Batch: 280854

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Gasoline	1.00	1.10		mg/L	_	110	79 - 120	8	10

	LCSD LCSD	
Surrogate	%Recovery Qualifie	er Limits
4-Bromofluorobenzene (Surr)	100	50 - 150
Trifluorotoluene (Surr)	138	50 - 150

Lab Sample ID: 580-79184-1 MS Client Sample ID: Outfall #002 Prep Type: Total/NA

**Matrix: Water** Analysis Ratch: 280854

Analysis Baton: 200004	Sample Sample	Spike	MS	MS				%Rec.	
Analyte	Result Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Gasoline	ND	1.00	1.13		mg/L		113	79 - 120	

TestAmerica Seattle

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8/8/2018

Limits

50 - 150

50 - 150

6

Dil Fac

Client Sample ID: Outfall #002

Prep Type: Total/NA

**Analysis Batch: 280854 RPD** Sample Sample Spike MSD MSD %Rec. Analyte Result Qualifier Added Result Qualifier Unit D %Rec Limits RPD Limit Gasoline ND 1.00 mg/L 79 - 120 n 10 1.13 113

MSD MSD Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 98 50 - 150 120 50 - 150 Trifluorotoluene (Surr)

%Recovery

100

120

Qualifier

### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-280454/1-B

**Matrix: Water** 

Analysis Batch: 280546

Client: ARCADIS U.S. Inc

4-Bromofluorobenzene (Surr)

Trifluorotoluene (Surr)

**Matrix: Water** 

Surrogate

Project/Site: Chevron Edmonds Terminal

Lab Sample ID: 580-79184-1 MSD

MB MB

Analyte Result Qualifier #2 Diesel (C10-C24)  $\overline{\mathsf{ND}}$ Motor Oil (>C24-C36) ND

MB MB Qualifier Surrogate %Recovery o-Terphenyl 104

Limits 50 - 150

Spike

Added

2.00

2.00

Limits

50 - 150

Spike

Added

2.00

2.00

RL

0.11

0.35

LCS LCS

LCSD LCSD

1.79

1.98

Result Qualifier

1.88

2.01

Result Qualifier

Unit

mg/L

mg/L

Unit

mg/L

mg/L

D

%Rec

90

99

**MDL** Unit

0.065 mg/L

0.096 mg/L

Prepared

%Rec

94

101

Prepared

D

07/31/18 10:17 08/01/18 11:59

Analyzed

**Client Sample ID: Method Blank** 

Analyzed Dil Fac

Prep Type: Total/NA Prep Batch: 280454

Lab Sample ID: LCS 580-280454/2-B **Matrix: Water** 

**Analysis Batch: 280546** 

Analyte #2 Diesel (C10-C24) Motor Oil (>C24-C36)

LCS LCS Surrogate %Recovery Qualifier 119 o-Terphenyl

Lab Sample ID: LCSD 580-280454/3-B

**Matrix: Water** 

#2 Diesel (C10-C24)

Motor Oil (>C24-C36)

**Analysis Batch: 280546** Analyte

LCSD LCSD Surrogate %Recovery Qualifier Limits o-Terphenyl 115 50 - 150 **Client Sample ID: Lab Control Sample** 

07/31/18 10:17 08/01/18 11:59

07/31/18 10:17 08/01/18 11:59

Prep Type: Total/NA

Prep Batch: 280454 %Rec.

Limits 50 - 120

Client Sample ID: Lab Control Sample Dup

64 - 120

Prep Type: Total/NA

Prep Batch: 280454 **RPD** %Rec.

Limits RPD Limit 50 - 120 26 64 - 120 24

TestAmerica Seattle

### **QC Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79184-1

Client Sample ID: Outfall #002

Prep Type: Total/NA

### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: 580-79184-1 MS Client Sample ID: Outfall #002

**Matrix: Water Prep Type: Total/NA** Analysis Batch: 280546 Prep Batch: 280454

Sample Sample Spike MS MS %Rec. Analyte Result Qualifier Added Result Qualifier Unit D %Rec Limits #2 Diesel (C10-C24) ND 2.09 1.62 mg/L 77 50 - 120 mg/L 97 64 - 120 2.02

Motor Oil (>C24-C36) ND 2.09 MS MS Surrogate %Recovery Qualifier Limits 102 50 - 150 o-Terphenyl

Lab Sample ID: 580-79184-1 MSD

**Matrix: Water** 

Analysis Batch: 280546									Prep Ba	atch: 2	30454
	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
#2 Diesel (C10-C24)	ND		2.17	1.69		mg/L		78	50 - 120	4	26
Motor Oil (>C24-C36)	ND		2.17	2.07		mg/L		95	64 - 120	2	24

MSD MSD %Recovery Qualifier Limits Surrogate 50 - 150 o-Terphenyl 96

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Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Client Sample ID: Outfall #002

Date Collected: 07/26/18 12:05 Date Received: 07/27/18 13:15 Lab Sample ID: 580-79184-1

**Matrix: Water** 

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			280467	07/31/18 19:42	T1W	TAL SEA
Total/NA	Prep	3510C			280563	08/01/18 09:57	JCM	TAL SEA
Total/NA	Analysis	8270C SIM		5	280719	08/02/18 17:36	W1T	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	280854	08/04/18 21:54	W1T	TAL SEA
Total/NA	Prep	3510C			280454	07/31/18 10:17	JCM	TAL SEA
Total/NA	Cleanup	3630C			280550	08/01/18 08:45	JCM	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	280546	08/01/18 13:04	T1W	TAL SEA

**Client Sample ID: Trip Blank** 

Date Collected: 07/26/18 00:00 Date Received: 07/27/18 13:15 Lab Sample ID: 580-79184-2

Matrix: Water

Batch Batch **Dilution** Batch Prepared **Prep Type** Method Factor Number or Analyzed Analyst Type Run Lab Total/NA 624 280467 07/31/18 15:46 T1W TAL SEA Analysis Total/NA NWTPH-Gx 280854 08/04/18 23:27 W1T TAL SEA Analysis 1

Client Sample ID: Dup-1

Date Collected: 07/26/18 00:00

Date Received: 07/27/18 13:15

·	Matrix: Wat

Lab Sample ID: 580-79184-3

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			280467	07/31/18 21:00	T1W	TAL SEA
Total/NA	Prep	3510C			280563	08/01/18 09:57	JCM	TAL SEA
Total/NA	Analysis	8270C SIM		5	280719	08/02/18 18:42	W1T	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	280854	08/04/18 23:58	W1T	TAL SEA
Total/NA	Prep	3510C			280454	07/31/18 10:17	JCM	TAL SEA
Total/NA	Cleanup	3630C			280550	08/01/18 08:45	JCM	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	280546	08/01/18 14:09	T1W	TAL SEA

#### **Laboratory References:**

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

### **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-79184-1

Project/Site: Chevron Edmonds Terminal

### **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
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

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## **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79184-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-79184-1	Outfall #002	Water	07/26/18 12:05	07/27/18 13:15
580-79184-2	Trip Blank	Water	07/26/18 00:00	07/27/18 13:15
580-79184-3	Dup-1	Water	07/26/18 00:00 (	07/27/18 13:15

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limit

Loc: 580

79184

Consultant Project Mgr. Peter Canpbell  Consultant Phone #  Sampler Just 1 Fittle	Colle	ected	Grab ©	Composite	es Des	Water NPDES S	□ Air □	Total Number of Container	+ MTBE	8260 full scan	Oxygenates	NWTPH GX	NWTPH DX Silica Gel Ch	2	wavpн	J	PAMS 827051m				corr  8021 INT DE CON Confirm MTBE + Confirm highest i Confirm all hits b Run oxyst Run oxyst	Naphthalene nit by 8260 y 8260 s on highest hit
Sample Identification	Date	Time		ပိ	Soil		ō	ို	BTEX	826			⋛	Lead	Χ×	57	U \				6) Rema	rks
purfoll # 202 trip Black 0-tfoll # 202 MS/MSD DVF-1	7/21/18 -7/21/18 7/20/18	ILIS	× × × 79184	Chain	of Cu	X X Stody		0 0 0			Therr Coole Packi Cust.	m. ID:	Figure 1	Confe Grant No.	7: £ .	Y of the UPS Lab Other	\(\times\)	:: <u>6</u> , 3	3 0		ATTN. Elain Wally Was Stand Sog C. * Bright Lev Quertisorm OF 10 PH-815	Asge CIAH Linir
	(please cir 4 day 24 hour	cie)	Relinqu Relinqu	ron	Lit	in [f	n		Date 7/2 Date	8/i	8	ime 13 l	5		Receive	- Dien -					PH-8.15 Date 7.2718 Date	Time 9
Data Package Options (please circ	_	· 1		PS_		Commerio Fe rature U	dEx			Oth	er	°(		F	Cus		y Se	als li	ntact	?	Date Yes	Time No
The white co		r Laboratoi														tha	- -liost					40 Management

Chevron Northwest Region Analysis Request/Chain of Custody

Naphth

Group #

Matrix

Ground

For Lancaster Laboratories use only

instructions on reverse side correspond with circled numbers.

**Analyses Requested** 

el Cleanup

eurofins

Edmonds

1720 UNOCO

Consultant/Office

2)

Lancaster

Laboratories

termina)

Client Information

Lead Consultant

Arredis

Job Number: 580-79184-1

Login Number: 79184 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

oreator. Hobbs, Neimeth i		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
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	



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: 580-79422-1

Client Project/Site: Chevron Edmonds Terminal Sampling Event: Chevron Edmonds Terminal

### For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

Shui Lerry

Authorized for release by: 8/17/2018 5:19:23 PM Sheri Cruz, Project Manager I (253)922-2310 sheri.cruz@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

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**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79422-1

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## **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79422-1

Job ID: 580-79422-1

**Laboratory: TestAmerica Seattle** 

Narrative

Job Narrative 580-79422-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 8/7/2018 12:05 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.5° C.

#### **GC/MS VOA**

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

#### GC/MS Semi VOA

Method(s) 8270C SIM: The laboratory control sample duplicate (LCSD) for preparation batch 580-281306 and analytical batch 580-281586 recovered outside control limits for the following analytes: Indeno[1,2,3-cd]pyrene. These analytes were biased high in the LCSD and were not detected in the associated samples; therefore, the data have been reported.

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

#### GC Semi VOA

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

#### **Organic Prep**

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

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## **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79422-1

### **Qualifiers**

### **GC/MS Semi VOA**

Qualifier **Qualifier Description** 

LCS or LCSD is outside acceptance limits.

#### GC Semi VOA

Qualifier **Qualifier Description** 

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

## **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 MLMinimum Level (Dioxin) NC Not Calculated

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

**PQL Practical Quantitation Limit** 

**Quality Control** QC

Relative Error Ratio (Radiochemistry) **RER** 

Reporting Limit or Requested Limit (Radiochemistry) RL

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

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

TestAmerica Job ID: 580-79422-1

Client Sample ID: Outfall #002

Date Collected: 08/07/18 10:30 Date Received: 08/07/18 12:05 Lab Sample ID: 580-79422-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			08/15/18 04:49	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123					08/15/18 04:49	1
Toluene-d8 (Surr)	107		79 - 122					08/15/18 04:49	1
4-Bromofluorobenzene (Surr)	97		78 - 119					08/15/18 04:49	1
Dibromofluoromethane (Surr)	95		70 - 120					08/15/18 04:49	1
1,2-Dichloroethane-d4 (Surr)	96		70 - 120					08/15/18 04:49	1

Method: 8270C SIM - Semivo	latile Organic Comp	ounds (GC/MS SI	M)					
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND	0.26	0.072	ug/L		08/10/18 11:14	08/14/18 21:37	5
Benzo[a]pyrene	ND	0.51	0.056	ug/L		08/10/18 11:14	08/14/18 21:37	5
Benzo[b]fluoranthene	ND	0.26	0.056	ug/L		08/10/18 11:14	08/14/18 21:37	5
Benzo[k]fluoranthene	ND	0.26	0.062	ug/L		08/10/18 11:14	08/14/18 21:37	5
Chrysene	ND	0.51	0.082	ug/L		08/10/18 11:14	08/14/18 21:37	5
Dibenz(a,h)anthracene	ND	0.51	0.051	ug/L		08/10/18 11:14	08/14/18 21:37	5
Indeno[1,2,3-cd]pyrene	ND *	0.26	0.072	ug/L		08/10/18 11:14	08/14/18 21:37	5
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	95	53 - 120				08/10/18 11:14	08/14/18 21:37	5

Method: NWTPH-Gx - Nortl	hwest - Volatile	Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			08/10/18 01:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		50 - 150					08/10/18 01:13	1
Trifluorotoluene (Surr)	113		50 - 150					08/10/18 01:13	1

Method: NWTPH-Dx - Semi-V	olatile Petro	leum Prod	ucts by NWT	PH with	Silica G	el Cle	anup		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11	0.065	mg/L		08/08/18 09:57	08/08/18 23:01	1
Motor Oil (>C24-C36)	0.19	J	0.35	0.096	mg/L		08/08/18 09:57	08/08/18 23:01	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	88		50 - 150				08/08/18 09:57	08/08/18 23:01	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79422-1

Lab Sample ID: 580-79422-2

Matrix: Water

Client Sample ID: Trip Blank - 2 Date Collected: 08/07/18 00:00

Date Received: 08/07/18 12:05

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			08/15/18 00:01	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	99		74 - 123					08/15/18 00:01	1
Toluene-d8 (Surr)	107		79 - 122					08/15/18 00:01	1
4-Bromofluorobenzene (Surr)	98		78 - 119					08/15/18 00:01	1
Dibromofluoromethane (Surr)	96		70 - 120					08/15/18 00:01	1
1,2-Dichloroethane-d4 (Surr)	95		70 - 120					08/15/18 00:01	1

Method: NWTPH-Gx - Nort	hwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			08/10/18 01:43	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		50 - 150			-		08/10/18 01:43	1

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8/17/2018

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79422-1

## Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-281535/5 **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA

Analysis Batch: 281535									
-	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			08/14/18 22:16	1
	МВ	MB							
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	98		74 - 123			-		08/14/18 22:16	1
Toluene-d8 (Surr)	105		79 - 122					08/14/18 22:16	1
4-Bromofluorobenzene (Surr)	96		78 - 119					08/14/18 22:16	1
Dibromofluoromethane (Surr)	94		70 - 120					08/14/18 22:16	1
1,2-Dichloroethane-d4 (Surr)	92		70 - 120					08/14/18 22:16	1

Lab Sample ID: LCS 580-281535/6 **Client Sample ID: Lab Control Sample Matrix: Water Prep Type: Total/NA** 

**Analysis Batch: 281535** 

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzene 10.0 10.2 ug/L 102 37 - 151

LCS LCS Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 97 74 - 123 Toluene-d8 (Surr) 106 79 - 122 4-Bromofluorobenzene (Surr) 98 78 - 119 Dibromofluoromethane (Surr) 95 70 - 120 1,2-Dichloroethane-d4 (Surr) 92 70 - 120

Lab Sample ID: LCSD 580-281535/7 **Client Sample ID: Lab Control Sample Dup** Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 281535** 

	Spike	LCSD	LCSD			%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D %Re	c Limits	RPD	Limit
Benzene	10.0	10.3		ug/L	10	37 - 151	1	30

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	97		74 - 123
Toluene-d8 (Surr)	106		79 - 122
4-Bromofluorobenzene (Surr)	97		78 - 119
Dibromofluoromethane (Surr)	94		70 - 120
1,2-Dichloroethane-d4 (Surr)	92		70 - 120

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

Lab Sample ID: MB 580-281306/1-A **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA **Analysis Batch: 281586** Prep Batch: 281306

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050	0.014	ug/L		08/10/18 11:14	08/14/18 17:53	1
Benzo[a]pyrene	ND		0.10	0.011	ug/L		08/10/18 11:14	08/14/18 17:53	1
Benzo[b]fluoranthene	ND		0.050	0.011	ug/L		08/10/18 11:14	08/14/18 17:53	1

TestAmerica Seattle

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TestAmerica Job ID: 580-79422-1

Client: ARCADIS U.S. Inc Project/Site: Chevron Edmonds Terminal

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

Lab Sample ID: MB 580-281306/1-A

Lab Sample ID: LCS 580-281306/2-A

**Matrix: Water** 

**Matrix: Water** 

Analysis Batch: 281586

**Analysis Batch: 281586** 

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

**Prep Batch: 281306** 

Analyte	Result (	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.050	0.012	ug/L		08/10/18 11:14	08/14/18 17:53	1
Chrysene	ND		0.10	0.016	ug/L		08/10/18 11:14	08/14/18 17:53	1
Dibenz(a,h)anthracene	ND		0.10	0.010	ug/L		08/10/18 11:14	08/14/18 17:53	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.014	ug/L		08/10/18 11:14	08/14/18 17:53	1

MB MB

мв мв

%Recovery Qualifier Limits Surrogate Prepared Analyzed Dil Fac 53 - 120 08/10/18 11:14 08/14/18 17:53 Terphenyl-d14 100

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA Prep Batch: 281306

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzo[a]anthracene 4.00 3.94 ug/L 99 61 - 120 4.00 Benzo[a]pyrene 4.36 ug/L 109 65 - 120 4.00 4.20 Benzo[b]fluoranthene ug/L 105 58 - 120 Benzo[k]fluoranthene 4.00 4.35 109 58 - 120 ug/L Chrysene 4.00 4.40 ug/L 110 58 - 120 Dibenz(a,h)anthracene 4.00 4.56 ug/L 114 60 - 125 Indeno[1,2,3-cd]pyrene 4.00 4.65 ug/L 116 56 - 120

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 86 53 - 120

Lab Sample ID: LCSD 580-281306/3-A

**Matrix: Water** 

**Analysis Batch: 281586** 

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

Prep Batch: 281306

, , , , , , , , , , , , , , , , , , , ,	Spike	LCCD	LCSD				%Rec.		RPD
	Spike	LCSD	LCSD				%Rec.		KPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	4.07		ug/L		102	61 - 120	3	16
Benzo[a]pyrene	4.00	4.52		ug/L		113	65 - 120	4	17
Benzo[b]fluoranthene	4.00	4.19		ug/L		105	58 - 120	0	20
Benzo[k]fluoranthene	4.00	4.73		ug/L		118	58 - 120	9	20
Chrysene	4.00	4.60		ug/L		115	58 - 120	4	16
Dibenz(a,h)anthracene	4.00	4.82		ug/L		121	60 - 125	6	15
Indeno[1,2,3-cd]pyrene	4.00	4.83	*	ug/L		121	56 <sub>-</sub> 120	4	15

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 93 53 - 120

TestAmerica Seattle

8/17/2018

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79422-1

Client Sample ID: Method Blank

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

Lab Sample ID: MB 580-281260/5

**Matrix: Water** 

Analyte

Gasoline

**Analysis Batch: 281260** 

MB MB Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 0.25  $\overline{\mathsf{ND}}$ 0.10 mg/L 08/09/18 17:13

MB MB Surrogate

%Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 101 50 - 150 Trifluorotoluene (Surr) 61 50 - 150 Prepared

Analyzed Dil Fac 08/09/18 17:13 08/09/18 17:13

**Prep Type: Total/NA** 

Lab Sample ID: LCS 580-281260/6

**Matrix: Water** 

**Analysis Batch: 281260** 

**Client Sample ID: Lab Control Sample** 

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Type: Total/NA

LCS LCS Spike %Rec. **Analyte** Added Result Qualifier Limits Unit D %Rec Gasoline 1.00 0.972 97 79 - 120 mg/L

LCS LCS

Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 106 50 - 150 125 50 - 150 Trifluorotoluene (Surr)

Lab Sample ID: LCSD 580-281260/7

**Matrix: Water** 

**Analysis Batch: 281260** 

RPD Spike LCSD LCSD %Rec. Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Gasoline 1.00 1.00 mg/L 100 79 - 120

LCSD LCSD

%Recovery Qualifier Surrogate I imits 4-Bromofluorobenzene (Surr) 103 50 - 150 Trifluorotoluene (Surr) 129 50 - 150

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-281116/1-B

**Matrix: Water** 

**Analysis Batch: 281100** 

Client Sample ID: Method Blank Prep Type: Total/NA **Prep Batch: 281116** 

**Client Sample ID: Lab Control Sample** 

MB MB

Analyte Result Qualifier RL **MDL** Unit Prepared Dil Fac Analyzed #2 Diesel (C10-C24) ND 0.11 08/08/18 09:57 08/08/18 21:30 0.065 mg/L Motor Oil (>C24-C36) ND 0.35 08/08/18 09:57 08/08/18 21:30 0.096 mg/L

MB MB

Qualifier Limits Dil Fac Surrogate %Recovery Prepared Analyzed 50 - 150 08/08/18 09:57 08/08/18 21:30 o-Terphenyl 90

Lab Sample ID: LCS 580-281116/2-B

**Matrix: Water** 

Prep Type: Total/NA **Analysis Batch: 281100 Prep Batch: 281116** Spike LCS LCS %Rec. Added Analyte Result Qualifier Unit D %Rec Limits #2 Diesel (C10-C24) 2.00 1.72 mg/L 86 50 - 120

TestAmerica Seattle

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8/17/2018

# **QC Sample Results**

Client: ARCADIS U.S. Inc

Surrogate

o-Terphenyl

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79422-1

# Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: LCS 580-2 Matrix: Water Analysis Batch: 281100	281116/2-B					Clie	nt Sa	mple ID	Prep Type: Total/NA Prep Batch: 281116
			Spike	LCS	LCS				%Rec.
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits
Motor Oil (>C24-C36)			2.00	1.69		mg/L		85	64 - 120
	LCS	LCS							
Surrogate	%Recovery	Qualifier	Limits						
o-Terphenyl	110		50 - 150						

Lab Sample ID: LCSD 580-281116/3-B			Client Sample ID: Lab Control Sample Dup												
Matrix: Water						Prep Ty	e: Tot	al/NA							
Analysis Batch: 281100						Prep Ba	itch: 28	31116							
	Spike	LCSD	LCSD			%Rec.		RPD							
Analyte	Added	Result	Qualifier	Unit D	%Rec	Limits	RPD	Limit							
#2 Diesel (C10-C24)	2.00	1.65		mg/L	83	50 - 120	4	26							
Motor Oil (>C24-C36)	2.00	1.60		mg/L	80	64 - 120	6	24							
I CSD. I	CSD														

Limits

50 - 150

%Recovery Qualifier

103

TestAmerica Seattle

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## **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79422-1

Lab Sample ID: 580-79422-1

Matrix: Water

Client Sample ID: Outfall #002 Date Collected: 08/07/18 10:30

Date Received: 08/07/18 12:05

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			281535	08/15/18 04:49	RSB	TAL SEA
Total/NA	Prep	3510C			281306	08/10/18 11:14	JCM	TAL SEA
Total/NA	Analysis	8270C SIM		5	281586	08/14/18 21:37	W1T	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	281260	08/10/18 01:13	JSM	TAL SEA
Total/NA	Prep	3510C			281116	08/08/18 09:57	JCM	TAL SEA
Total/NA	Cleanup	3630C			281132	08/08/18 11:20	JCM	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	281100	08/08/18 23:01	T1W	TAL SEA

Client Sample ID: Trip Blank - 2

Date Collected: 08/07/18 00:00 Date Received: 08/07/18 12:05 Lab Sample ID: 580-79422-2

Matrix: Water

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	281535	08/15/18 00:01	RSB	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	281260	08/10/18 01:43	JSM	TAL SEA

### **Laboratory References:**

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

TestAmerica Seattle

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# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-79422-1

Project/Site: Chevron Edmonds Terminal

# **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
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

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# **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79422-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-79422-1	Outfall #002	Water	08/07/18 10:30	08/07/18 12:05
580-79422-2	Trip Blank - 2	Water	08/07/18 00:00	08/07/18 12:05

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

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Chain of Custody Record

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# **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 580-79422-1

Login Number: 79422 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

Creator. Hobbs, Kermeth F		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a meter.</td <td>survey N/A</td> <td></td>	survey N/A	
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 imme HTs)	ediate 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").	s True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



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: 580-79614-1 Client Project/Site: Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

Kristiene D. allen

Authorized for release by: 8/29/2018 2:51:48 PM

Kristine Allen, Manager of Project Management (253)248-4970

kristine.allen@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

·····LINKS ·······

Review your project results through

Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79614-1

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## **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79614-1

Job ID: 580-79614-1

**Laboratory: TestAmerica Seattle** 

**Narrative** 

Job Narrative 580-79614-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 8/15/2018 11:54 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 9.6° C.

#### **GC/MS VOA**

Method(s) 624: The surrogate recovery for the blank associated with analytical batch 580-281748 was outside the upper control limits. The associated sample(s) did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

Method(s) 624: Surrogate recovery for the following sample was outside the upper control limit: Trip Blank (580-79614-2). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

Method(s) NWTPH-Gx: Surrogate drift for Trifluorotoluene is high but is within acceptable recovery limits. All samples pass for TFT and have been reported. (CCV 580-282651/27)

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

#### GC/MS Semi VOA

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

### GC Semi VOA

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

#### **Organic Pres**

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

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## **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79614-1

### **Qualifiers**

## **GC/MS VOA**

Qualifier	Qualifier Description

Surrogate is outside control limits

## **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)
DI 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) Minimum Detectable Concentration (Radiochemistry) MDC

MDL Method Detection Limit Minimum Level (Dioxin) ML NC Not Calculated

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

PQL **Practical Quantitation Limit** 

QC **Quality Control** 

Relative Error Ratio (Radiochemistry) RER

RLReporting 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 Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Collected: 08/15/18 10:00

Client Sample ID: Outfall #002

TestAmerica Job ID: 580-79614-1

Lab Sample ID: 580-79614-1 Matrix: Water

Method: 624 - Volatile Organic									
Analyte		Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fa
Benzene	ND		1.0	0.53	ug/L			08/16/18 23:28	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
Trifluorotoluene (Surr)	94		74 - 123					08/16/18 23:28	
Toluene-d8 (Surr)	106		79 - 122					08/16/18 23:28	
4-Bromofluorobenzene (Surr)	101		78 - 119					08/16/18 23:28	
Dibromofluoromethane (Surr)	101		70 - 120					08/16/18 23:28	
1,2-Dichloroethane-d4 (Surr)	114		70 - 120					08/16/18 23:28	
Method: 8270C SIM - Semivola	atile Organic Con	pounds (G	C/MS SIM)						
Analyte	_	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Benzo[a]anthracene	ND	-	0.053	0.015	ug/L		08/17/18 13:42	08/21/18 00:37	
Benzo[a]pyrene	ND		0.11	0.012	ug/L		08/17/18 13:42	08/21/18 00:37	
Benzo[b]fluoranthene	ND		0.053	0.012	ug/L		08/17/18 13:42	08/21/18 00:37	
Benzo[k]fluoranthene	ND		0.053	0.013	ug/L		08/17/18 13:42	08/21/18 00:37	
Chrysene	ND		0.11	0.017	ug/L		08/17/18 13:42	08/21/18 00:37	
Dibenz(a,h)anthracene	ND		0.11	0.011	ug/L		08/17/18 13:42	08/21/18 00:37	
Indeno[1,2,3-cd]pyrene	ND		0.053	0.015	ug/L		08/17/18 13:42	08/21/18 00:37	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
Terphenyl-d14	65		53 - 120				08/17/18 13:42	08/21/18 00:37	
Method: NWTPH-Gx - Northwe	est - Volatile Petro	oleum Prod	ucts (GC)						
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Gasoline	ND		0.25	0.10	mg/L			08/27/18 19:18	
-	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
Surrogate								08/27/18 19:18	
Surrogate 4-Bromofluorobenzene (Surr)	108		50 - 150						
	108 124		50 - 150 50 - 150					08/27/18 19:18	
4-Bromofluorobenzene (Surr) Trifluorotoluene (Surr)	124	Products by	50 <sub>-</sub> 150	Silion Go	Cleanun			08/27/18 19:18	
4-Bromofluorobenzene (Surr) Trifluorotoluene (Surr)  Method: NWTPH-Dx - Semi-Vo	124 Diatile Petroleum	Products by Qualifier	50 <sub>-</sub> 150		l Cleanup Unit	D	Prepared		
4-Bromofluorobenzene (Surr) Trifluorotoluene (Surr)  Method: NWTPH-Dx - Semi-Vo Analyte	124 Diatile Petroleum		50 <sub>-</sub> 150  y NWTPH with	MDL	Unit	<u>D</u>	Prepared 08/26/18 14:00	Analyzed	Dil Fa
4-Bromofluorobenzene (Surr)	olatile Petroleum Result		50 - 150 y NWTPH with RL	MDL 0.073	Unit	D_			Dil Fa
4-Bromofluorobenzene (Surr) Trifluorotoluene (Surr)  Method: NWTPH-Dx - Semi-Vo Analyte #2 Diesel (C10-C24)	platile Petroleum Result ND	Qualifier	50 - 150  / NWTPH with  RL  0.12	MDL 0.073	Unit mg/L	<u>D</u>	08/26/18 14:00	Analyzed 08/27/18 14:28	Dil Fa

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

**Client Sample ID: Trip Blank** 

TestAmerica Job ID: 580-79614-1

Lab Sample ID: 580-79614-2

Matrix: Water

Date Collected: 08/15/18 10:00 Date Received: 08/15/18 11:54

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			08/16/18 17:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	96		74 - 123			-		08/16/18 17:46	1
Toluene-d8 (Surr)	104		79 - 122					08/16/18 17:46	1
4-Bromofluorobenzene (Surr)	101		78 - 119					08/16/18 17:46	1
Dibromofluoromethane (Surr)	101		70 - 120					08/16/18 17:46	1
1,2-Dichloroethane-d4 (Surr)	122	X	70 - 120					08/16/18 17:46	1

Method: NWTPH-Gx - Northwe			` '				_		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			08/27/18 20:19	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	107		50 - 150			-		08/27/18 20:19	1
Trifluorotoluene (Surr)	123		50 - 150					08/27/18 20:19	1

8/29/2018

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79614-1

Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-281748/5

**Matrix: Water** 

Analyte

Benzene

Analysis Batch: 281748

Client Sample ID: Method Blank

Prep Type: Total/NA

мв мв Result Qualifier RL MDL Unit D Prepared Analyzed Dil Fac 1.0 ND 0.53 ug/L 08/16/18 15:36

MB MB Qualifier Limits Prepared Analyzed Dil Fac Surrogate %Recovery Trifluorotoluene (Surr) 74 - 123 95 08/16/18 15:36 Toluene-d8 (Surr) 106 79 - 122 08/16/18 15:36 100 78 - 119 08/16/18 15:36 4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr) 103 70 - 120 08/16/18 15:36 70 - 120 1,2-Dichloroethane-d4 (Surr) 122 X 08/16/18 15:36

Lab Sample ID: LCS 580-281748/6

**Matrix: Water** 

Analysis Batch: 281748

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

-	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzene	 10.0	9.24		ug/L		92	37 _ 151	

LUS	LUS	
%Recovery	Qualifier	Limits
95		74 - 123
104		79 - 122
101		78 - 119
101		70 - 120
120		70 - 120
	%Recovery 95 104 101	95 104 101 101

100 100

Lab Sample ID: LCSD 580-281748/7

**Matrix: Water** 

Analysis Batch: 281748

Client Sample ID: Lab	<b>Control Sample Dup</b>
	Pron Type: Total/NA

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	10.0	9.68		ug/L		97	37 _ 151	5	30

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	93		74 - 123
Toluene-d8 (Surr)	104		79 - 122
4-Bromofluorobenzene (Surr)	100		78 - 119
Dibromofluoromethane (Surr)	102		70 - 120
1,2-Dichloroethane-d4 (Surr)	120		70 - 120

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

Lab Sample ID: MB 580-281829/1-A

**Matrix: Water** 

Analysis Batch: 282033

Client Sample ID: Method Blank

Prep Type: Total/NA **Prep Batch: 281829** 

MB MB Result Qualifier Analyte RL MDL Unit Prepared Analyzed Dil Fac Benzo[a]anthracene ND 0.050 0.014 ug/L 08/17/18 10:14 08/20/18 18:17 Benzo[a]pyrene ND 0.10 0.011 ug/L 08/17/18 10:14 08/20/18 18:17 08/17/18 10:14 Benzo[b]fluoranthene ND 0.050 0.011 ug/L 08/20/18 18:17

TestAmerica Seattle

8/29/2018

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TestAmerica Job ID: 580-79614-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-281829/1-A

**Matrix: Water** 

Analysis Batch: 282033

Client Sample ID: Method Blank Prep Type: Total/NA

**Prep Batch: 281829** 

-	MB	MB						-	
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.050	0.012	ug/L		08/17/18 10:14	08/20/18 18:17	1
Chrysene	ND		0.10	0.016	ug/L		08/17/18 10:14	08/20/18 18:17	1
Dibenz(a,h)anthracene	ND		0.10	0.010	ug/L		08/17/18 10:14	08/20/18 18:17	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.014	ug/L		08/17/18 10:14	08/20/18 18:17	1

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac 08/17/18 10:14 Terphenyl-d14 53 - 120 08/20/18 18:17 79

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA **Prep Batch: 281829** 

Lab Sample ID: LCS 580-281829/2-A **Matrix: Water** 

Analysis Batch: 282033

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	3.02		ug/L		76	61 - 120	
Benzo[a]pyrene	4.00	3.24		ug/L		81	65 - 120	
Benzo[b]fluoranthene	4.00	3.11		ug/L		78	58 - 120	
Benzo[k]fluoranthene	4.00	3.21		ug/L		80	58 - 120	
Chrysene	4.00	3.30		ug/L		83	58 - 120	
Dibenz(a,h)anthracene	4.00	3.60		ug/L		90	60 _ 125	
Indeno[1,2,3-cd]pyrene	4.00	3.62		ug/L		91	56 - 120	

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 70 53 - 120

Lab Sample ID: LCSD 580-281829/3-A

**Matrix: Water** 

Analysis Batch: 282033

Client	Sample	ID: Lah	Control	Sample	Dun
OHEHL	Sample	ID. Lab	COILLIO	Sample	Dup

Prep Type: Total/NA

**Prep Batch: 281829** 

7									
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	2.95		ug/L		74	61 - 120	2	16
Benzo[a]pyrene	4.00	3.23		ug/L		81	65 - 120	0	17
Benzo[b]fluoranthene	4.00	3.09		ug/L		77	58 - 120	0	20
Benzo[k]fluoranthene	4.00	3.13		ug/L		78	58 - 120	2	20
Chrysene	4.00	3.23		ug/L		81	58 - 120	2	16
Dibenz(a,h)anthracene	4.00	3.58		ug/L		90	60 - 125	1	15
Indeno[1,2,3-cd]pyrene	4.00	3.56		ug/L		89	56 - 120	2	15

LCSD LCSD

Surrogate	%Recovery Qualifier	Limits
Terphenyl-d14	70	53 _ 120

TestAmerica Seattle

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79614-1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-282651/6

**Matrix: Water** 

Analyte

Gasoline

Analysis Batch: 282651

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB RL Result Qualifier MDL Unit D Analyzed Dil Fac Prepared 0.25 ND 0.10 mg/L 08/27/18 14:45

MB MB

Dil Fac Surrogate %Recovery Qualifier Prepared Analyzed 50 - 150 4-Bromofluorobenzene (Surr) 98 08/27/18 14:45 Trifluorotoluene (Surr) 59 50 - 150 08/27/18 14:45

Lab Sample ID: LCS 580-282651/7 Client Sample ID: Lab Control Sample Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 282651

LCS LCS %Rec. Spike Analyte Added Result Qualifier Unit D %Rec Limits Gasoline 1.00 0.916 mg/L 79 - 120

LCS LCS

%Recovery Qualifier Limits Surrogate 50 - 150 4-Bromofluorobenzene (Surr) 110 107 Trifluorotoluene (Surr) 50 - 150

Lab Sample ID: LCSD 580-282651/8

**Matrix: Water** 

Analysis Batch: 282651

LCSD LCSD RPD Spike %Rec. Added Result Qualifier RPD Limit Analyte Unit %Rec Gasoline 1.00 0.957 mg/L 96 79 - 120 10

LCSD LCSD

%Recovery Qualifier I imits Surrogate 4-Bromofluorobenzene (Surr) 105 50 - 150 112 50 - 150 Trifluorotoluene (Surr)

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-282502/1-B

**Matrix: Water** 

Analysis Batch: 282534

Prep Type: Total/NA

Prep Batch: 282502 мв мв

Result Qualifier

RL Analyte MDL Unit D Prepared #2 Diesel (C10-C24) 0.11 08/26/18 14:00 ND 0.065 mg/L 08/27/18 13:06 Motor Oil (>C24-C36) ND 0.35 0.096 mg/L 08/26/18 14:00 08/27/18 13:06

MB MB

%Recovery Limits Surrogate Qualifier Prepared Analyzed o-Terphenyl 79 50 - 150 08/26/18 14:00 08/27/18 13:06

Lab Sample ID: LCS 580-282502/2-B

**Matrix: Water** 

Analysis Batch: 282534

LCS LCS Spike %Rec. Added Result Qualifier Limits Analyte Unit %Rec #2 Diesel (C10-C24) 2.00 1.46 mg/L 73 50 - 120

TestAmerica Seattle

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Prep Type: Total/NA

Analyzed

Client Sample ID: Method Blank

Client Sample ID: Lab Control Sample Dup

Dil Fac

Dil Fac

Client Sample ID: Lab Control Sample Prep Type: Total/NA

**Prep Batch: 282502** 

8/29/2018

## **QC Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Surrogate

o-Terphenyl

Motor Oil (>C24-C36)

TestAmerica Job ID: 580-79614-1

93

64 - 120

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: LCS 580-282502/2-B Client Sample ID: Lab Control Sample **Matrix: Water** Prep Type: Total/NA Analysis Batch: 282534 **Prep Batch: 282502** Spike LCS LCS %Rec. Added Result Qualifier Unit %Rec Limits Motor Oil (>C24-C36) 2.00 1.76 mg/L 64 - 120 LCS LCS

Limits

50 - 150

2.00

Client Sample ID: Lab Control Sample Dup Lab Sample ID: LCSD 580-282502/3-B **Matrix: Water** Prep Type: Total/NA Analysis Batch: 282534 **Prep Batch: 282502** LCSD LCSD RPD Spike %Rec. Limit Result Qualifier Analyte Added Unit Limits RPD %Rec #2 Diesel (C10-C24) 2.00 1.54 mg/L 77 50 - 120 6 26

1.85

mg/L

 Surrogate
 %Recovery o-Terphenyl
 Qualifier
 Limits

 50 - 150

%Recovery Qualifier

81

TestAmerica Seattle

8

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24

## **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79614-1

Lab Sample ID: 580-79614-1

Matrix: Water

Client Sample ID: Outfall #002 Date Collected: 08/15/18 10:00

Date Received: 08/15/18 11:54

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			281748	08/16/18 23:28	CJ	TAL SEA
Total/NA	Prep	3510C			281829	08/17/18 13:42	JCM	TAL SEA
Total/NA	Analysis	8270C SIM		1	282033	08/21/18 00:37	CJ	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	282651	08/27/18 19:18	RSB	TAL SEA
Total/NA	Prep	3510C			282502	08/26/18 14:00	JCM	TAL SEA
Total/NA	Cleanup	3630C			282526	08/26/18 20:15	JCM	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	282534	08/27/18 14:28	CJ	TAL SEA

**Client Sample ID: Trip Blank** 

Lab Sample ID: 580-79614-2 Date Collected: 08/15/18 10:00

Matrix: Water

Date Received: 08/15/18 11:54

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	281748	08/16/18 17:46	CJ	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	282651	08/27/18 20:19	RSB	TAL SEA

#### Laboratory References:

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

TestAmerica Seattle

# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79614-1

## **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	<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
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

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# **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79614-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-79614-1	Outfall #002	Water	08/15/18 10:00	08/15/18 11:54
580-79614-2	Trip Blank	Water	08/15/18 10:00	08/15/18 11:54

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THE LEAD	ER IN EN	VIRONMENT	AL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

	Rush	
$\neg$	Short Hold	

Chain of Custody Record

Client Arce (C		Client Cor.	Det	V	(a.	mpl	011						Date	(\S)	18	(	Chain of Custody I	Vumber 374	87
Address 100 OINC WOY SV	1te 800	Telephone					r	······				25	Lab Nu	imber 1	<i>-</i>		Page	of	
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Project Name and Location (State)		Billing Con	tact							EPA.	<u>ن</u>	CAMILS 82700	***************************************				Spe	79614	
Contract/Purchase Order/Quote No.				itrix			Containe Preserva			) W	E.	15.1					Con		
Sample I.D. and Location/Description (Containers for each sample may be combined on one line)	Date	Time \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Aqueous	sea. Soii	Unpres.	H2S04	HCI	NaOH ZnAc/	МаОН	Day 2 m	₹ :	₹ <u>₹</u>							
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☐ Yes ☐ No Cooler Temp: ☐ Non-Ha.  Turn Around Time Required (business days)			kin Irrita		Poiso			nknown ents (Sp	<u> </u>	etum i	io Cii	iient L	Archive	FOr	<i>N</i>	ionths	are retained ion	nger than 1 mont	th)
☐ 24 Hours ☐ 48 Hours ☐ 5 Days ☐ 10 Day  1. Relinquished By Sign/Print	rs 🗌 15 Days	Other _ Date	Sto	r êla Tima	<u>C</u>	1 Rec	eived F	N Sian	/Prim	***********							Date	, Time	
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Comments						· · · · · · · · · · · · · · · · · · ·						······································				1			

## **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 580-79614-1

Login Number: 79614 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

Creator: Hobbs, Kenneth F		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



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# **ANALYTICAL REPORT**

TestAmerica Laboratories, Inc.

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

TestAmerica Job ID: 580-79751-1 Client Project/Site: Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

Kristine D. allen

Authorized for release by: 8/29/2018 3:35:05 PM

Kristine Allen, Manager of Project Management (253)248-4970

kristine.allen@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

·····LINKS ·······

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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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79751-1

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## **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79751-1

Job ID: 580-79751-1

**Laboratory: TestAmerica Seattle** 

Narrative

Job Narrative 580-79751-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 8/21/2018 10:35 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.2° C.

#### **GC/MS VOA**

Method(s) NWTPH-Gx: Surrogate drift for Trifluorotoluene is high but is within acceptable recovery limits. All samples pass for TFT and have been reported. (CCV 580-282651/27)

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

#### GC/MS Semi VOA

Method(s) 8270C SIM, 8270D SIM: The continuing calibration verification (CCV) associated with batch 580-282485 recovered above the upper control limit for Benzo[k]fluoranthene. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: Outfall #002 (580-79751-1) and (CCVIS 580-282485/3).

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

#### GC Semi VOA

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

### **Organic Prep**

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

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## **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79751-1

### **Qualifiers**

### **GC Semi VOA**

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

## **Glossary**

Abbreviation	These commonly used abbreviations may or may not be present in this report.
п	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)

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)

TestAmerica Seattle

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79751-1

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Client Sample ID: Outfall #002

Lab Sample ID: 580-79751-1

Matrix: Water

Date Collected: 08/21/18 10:30 Date Received: 08/21/18 10:35

Motor Oil (>C24-C36)

Surrogate

o-Terphenyl

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			08/22/18 23:21	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	97		74 - 123					08/22/18 23:21	1
Toluene-d8 (Surr)	107		79 - 122					08/22/18 23:21	1
4-Bromofluorobenzene (Surr)	97		78 - 119					08/22/18 23:21	1
Dibromofluoromethane (Surr)	95		70 - 120					08/22/18 23:21	1
1,2-Dichloroethane-d4 (Surr)	90		70 - 120					08/22/18 23:21	1
Method: 8270C SIM - Semivolat	•		C/MS SIM)						
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.057	0.016	ug/L		08/23/18 09:46	08/25/18 20:41	1
Benzo[a]pyrene	ND		0.11	0.013	ug/L		08/23/18 09:46	08/25/18 20:41	1
Benzo[b]fluoranthene	ND		0.057	0.013	ug/L		08/23/18 09:46	08/25/18 20:41	1
Benzo[k]fluoranthene	ND		0.057	0.014	ug/L		08/23/18 09:46	08/25/18 20:41	1
Chrysene	ND		0.11	0.018	ug/L		08/23/18 09:46	08/25/18 20:41	1
Dibenz(a,h)anthracene	ND		0.11	0.011	ug/L		08/23/18 09:46	08/25/18 20:41	1
Indeno[1,2,3-cd]pyrene	ND		0.057	0.016	ug/L		08/23/18 09:46	08/25/18 20:41	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	89		53 - 120				08/23/18 09:46	08/25/18 20:41	1
Method: NWTPH-Gx - Northwes	st - Volatile Petro	oleum Prod	ucts (GC)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			08/28/18 00:22	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)			50 - 150					08/28/18 00:22	1
/	122		50 - 150					08/28/18 00:22	1
Trifluorotoluene (Surr)	122								
, ,		Products by	y NWTPH with S	Silica Ge	Cleanup	)			

0.40

Limits

50 - 150

0.12 J

%Recovery Qualifier

81

0.11 mg/L

08/26/18 14:00

Prepared

08/27/18 15:23

Analyzed

Dil Fac

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79751-1

Lab Sample ID: 580-79751-2

Matrix: Water

Date Collected: 08/21/18 00:00 Date Received: 08/21/18 10:35

**Client Sample ID: Trip Blank** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			08/22/18 18:09	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	98		74 - 123			-		08/22/18 18:09	1
Toluene-d8 (Surr)	104		79 - 122					08/22/18 18:09	1
4-Bromofluorobenzene (Surr)	101		78 - 119					08/22/18 18:09	1
Dibromofluoromethane (Surr)	99		70 - 120					08/22/18 18:09	1
1,2-Dichloroethane-d4 (Surr)	108		70 - 120					08/22/18 18:09	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND ND		0.25	0.10	mg/L			08/28/18 00:52	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	108	-	50 - 150			=		08/28/18 00:52	1
Trifluorotoluene (Surr)	122		50 - 150					08/28/18 00:52	

8/29/2018

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79751-1

## Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-282181/5

**Matrix: Water** 

Analysis Batch: 282181

Client Sample ID: Method Blank

Prep Type: Total/NA

Result Qualifier RL Analyte MDL Unit D Prepared Analyzed Dil Fac 1.0 0.53 ug/L 08/22/18 14:14 Benzene ND

MB	МВ				
%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
95		74 - 123		08/22/18 14:14	1
104		79 - 122		08/22/18 14:14	1
99		78 - 119		08/22/18 14:14	1
99		70 - 120		08/22/18 14:14	1
109		70 - 120		08/22/18 14:14	1
	%Recovery 95 104 99 99	104 99 99	%Recovery         Qualifier         Limits           95         74 - 123           104         79 - 122           99         78 - 119           99         70 - 120	%Recovery         Qualifier         Limits         Prepared           95         74 - 123           104         79 - 122           99         78 - 119           99         70 - 120	%Recovery         Qualifier         Limits         Prepared         Analyzed           95         74 - 123         08/22/18 14:14           104         79 - 122         08/22/18 14:14           99         78 - 119         08/22/18 14:14           99         70 - 120         08/22/18 14:14

Lab Sample ID: LCS 580-282181/6

**Matrix: Water** 

Analysis Batch: 282181

Client Sample ID: Lab Control Sample Prep Type: Total/NA

	Spike	LCS LCS			%Rec.	
Analyte	Added	Result Qualifier	Unit D	%Rec	Limits	
Benzene	10.0	9.40	ug/L	94	37 - 151	

	LCS	LCS		
Surrogate	%Recovery	Qualifier	Limits	
Trifluorotoluene (Surr)	96		74 - 123	
Toluene-d8 (Surr)	105		79 - 122	
4-Bromofluorobenzene (Surr)	97		78 - 119	
Dibromofluoromethane (Surr)	99		70 - 120	
1,2-Dichloroethane-d4 (Surr)	108		70 - 120	
	Trifluorotoluene (Surr) Toluene-d8 (Surr) 4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr)	Surrogate         %Recovery           Trifluorotoluene (Surr)         96           Toluene-d8 (Surr)         105           4-Bromofluorobenzene (Surr)         97           Dibromofluoromethane (Surr)         99	Trifluorotoluene (Surr)         96           Toluene-d8 (Surr)         105           4-Bromofluorobenzene (Surr)         97           Dibromofluoromethane (Surr)         99	Surrogate         %Recovery         Qualifier         Limits           Trifluorotoluene (Surr)         96         74 - 123           Toluene-d8 (Surr)         105         79 - 122           4-Bromofluorobenzene (Surr)         97         78 - 119           Dibromofluoromethane (Surr)         99         70 - 120

мв мв

Lab Sample ID: LCSD 580-282181/7

**Matrix: Water** 

Analysis Batch: 282181

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

08/23/18 09:46

RPD %Rec.

-	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	 10.0	9.51		ug/L		95	37 _ 151	1	30

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	96		74 - 123
Toluene-d8 (Surr)	105		79 - 122
4-Bromofluorobenzene (Surr)	102		78 - 119
Dibromofluoromethane (Surr)	98		70 - 120
1,2-Dichloroethane-d4 (Surr)	109		70 - 120

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

ND

Lab Sample ID: MB 580-282259/1-A Client Sample ID: Method Blank

**Matrix: Water** 

Benzo[b]fluoranthene

Analysis Batch: 282485

MB MB Analyte Result Qualifier RL MDL Unit Prepared Analyzed Dil Fac Benzo[a]anthracene ND 0.050 0.014 ug/L 08/23/18 09:46 08/25/18 18:37 Benzo[a]pyrene ND 0.10 0.011 ug/L 08/23/18 09:46 08/25/18 18:37

0.050

0.011 ug/L

TestAmerica Seattle

8/29/2018

08/25/18 18:37

Prep Type: Total/NA

Prep Batch: 282259

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TestAmerica Job ID: 580-79751-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-282259/1-A **Matrix: Water** 

**Analysis Batch: 282485** 

Benzo[k]fluoranthene

Dibenz(a,h)anthracene

Indeno[1,2,3-cd]pyrene

Client Sample ID: Method Blank Prep Type: Total/NA

08/25/18 18:37

**Prep Batch: 282259** 

MB MB Result Qualifier RL MDL Unit D Dil Fac Prepared Analyzed 0.050 08/25/18 18:37 ND 0.012 ug/L 08/23/18 09:46 ND 0.10 0.016 ug/L 08/23/18 09:46 08/25/18 18:37 ND 0.10 0.010 ug/L 08/23/18 09:46 08/25/18 18:37

0.014 ug/L

MB MB

ND

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Terphenyl-d14 53 - 120 08/23/18 09:46 08/25/18 18:37 90

0.050

Client Sample ID: Lab Control Sample

08/23/18 09:46

Prep Type: Total/NA

Prep Batch: 282259

Lab Sample ID: LCS 580-282259/2-A

**Matrix: Water** 

Analyte

Chrysene

Analysis Batch: 282485

Spike LCS LCS %Rec. Analyte Added Result Qualifier %Rec Limits Unit D Benzo[a]anthracene 4.00 4.07 ug/L 102 61 - 120 4.00 4.35 65 - 120 Benzo[a]pyrene ug/L 109 Benzo[b]fluoranthene 4.00 4.77 ug/L 119 58 - 120 4.31 58 - 120 Benzo[k]fluoranthene 4.00 ug/L 108 58 - 120 Chrysene 4.00 3.65 ug/L 91 Dibenz(a,h)anthracene 4.00 4.17 ug/L 104 60 - 125 Indeno[1,2,3-cd]pyrene 4.00 4.37 ug/L 109 56 - 120

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 95 53 - 120

Lab Sample ID: LCSD 580-282259/3-A

**Matrix: Water** 

Analysis Batch: 282485

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 282259

	Spike	LCSD	LCSD				%Rec.		RPD			
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit			
Benzo[a]anthracene	4.00	4.11		ug/L		103	61 - 120	1	16			
Benzo[a]pyrene	4.00	4.38		ug/L		110	65 - 120	1	17			
Benzo[b]fluoranthene	4.00	4.69		ug/L		117	58 - 120	2	20			
Benzo[k]fluoranthene	4.00	4.46		ug/L		112	58 - 120	4	20			
Chrysene	4.00	3.74		ug/L		93	58 - 120	2	16			
Dibenz(a,h)anthracene	4.00	4.23		ug/L		106	60 - 125	1	15			
Indeno[1,2,3-cd]pyrene	4.00	4.36		ug/L		109	56 - 120	0	15			

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 53 - 120 90

TestAmerica Seattle

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79751-1

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-282651/6

**Matrix: Water** 

Analyte

Gasoline

Analysis Batch: 282651

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB RL Result Qualifier MDL Unit D Analyzed Dil Fac Prepared 0.25 ND 0.10 mg/L 08/27/18 14:45

MB MB Qualifier Dil Fac Surrogate %Recovery Prepared Analyzed 50 - 150 4-Bromofluorobenzene (Surr) 98 08/27/18 14:45 Trifluorotoluene (Surr) 59 50 - 150 08/27/18 14:45

Lab Sample ID: LCS 580-282651/7 Client Sample ID: Lab Control Sample Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 282651

LCS LCS %Rec. Spike Analyte Added Result Qualifier Unit D %Rec Limits Gasoline 1.00 0.916 mg/L 79 - 120

LCS LCS %Recovery Qualifier Limits Surrogate 50 - 150 4-Bromofluorobenzene (Surr) 110 107 Trifluorotoluene (Surr) 50 - 150

Lab Sample ID: LCSD 580-282651/8

**Matrix: Water** 

Analysis Batch: 282651

LCSD LCSD RPD Spike %Rec. Analyte Added Result Qualifier RPD Limit Unit %Rec Gasoline 1.00 0.957 mg/L 96 79 - 120 10

LCSD LCSD %Recovery Qualifier I imits Surrogate 4-Bromofluorobenzene (Surr) 105 50 - 150 112 50 - 150 Trifluorotoluene (Surr)

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-282502/1-B Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 282534

мв мв

Analyte Result Qualifier RL MDL Unit D Prepared Dil Fac Analyzed #2 Diesel (C10-C24) 0.11 ND 0.065 mg/L 08/26/18 14:00 08/27/18 13:06 Motor Oil (>C24-C36) ND 0.35 0.096 mg/L 08/26/18 14:00 08/27/18 13:06

MB MB Surrogate %Recovery Qualifier

Limits Prepared o-Terphenyl 79 50 - 150 08/26/18 14:00 08/27/18 13:06

Lab Sample ID: LCS 580-282502/2-B

**Matrix: Water** 

Analysis Batch: 282534							Prep E	3atcn: 282502
	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
#2 Diesel (C10-C24)	2.00	1.46		mg/L		73	50 - 120	

TestAmerica Seattle

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Prep Batch: 282502

Dil Fac Analyzed

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

8/29/2018

# **QC Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Lab Sample ID: LCSD 580-282502/3-B

TestAmerica Job ID: 580-79751-1

Client Sample ID: Lab Control Sample Dup

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by N	IWTPH with Si	lica Gel Cleanup
(Continued)		

Lab Sample ID: LCS 580-282 Matrix: Water Analysis Batch: 282534	?502/2-B						Client	Sample		ntrol Sample pe: Total/NA atch: 282502
/ maryone Datem 20200 :			Spike	LCS	LCS				%Rec.	
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits	
Motor Oil (>C24-C36)			2.00	1.76		mg/L		88	64 - 120	
	LCS	LCS								
Surrogate	%Recovery	Qualifier	Limits							
o-Terphenyl	81		50 - 150							

Matrix: Water							Prep T	rep Type: Total/NA	
Analysis Batch: 282534		Prep Batch: 282							
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
#2 Diesel (C10-C24)	2.00	1.54		mg/L		77	50 - 120	6	26
Motor Oil (>C24-C36)	2.00	1.85		mg/L		93	64 - 120	5	24

### **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79751-1

Lab Sample ID: 580-79751-1

Matrix: Water

Client Sample ID: Outfall #002 Date Collected: 08/21/18 10:30 Date Received: 08/21/18 10:35

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			282181	08/22/18 23:21	TL1	TAL SEA
Total/NA	Prep	3510C			282259	08/23/18 09:46	JCM	TAL SEA
Total/NA	Analysis	8270C SIM		1	282485	08/25/18 20:41	W1T	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	282651	08/28/18 00:22	RSB	TAL SEA
Total/NA	Prep	3510C			282502	08/26/18 14:00	JCM	TAL SEA
Total/NA	Cleanup	3630C			282526	08/26/18 20:15	JCM	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	282534	08/27/18 15:23	CJ	TAL SEA

**Client Sample ID: Trip Blank** 

Lab Sample ID: 580-79751-2 Date Collected: 08/21/18 00:00

Matrix: Water

Date Received: 08/21/18 10:35

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	282181	08/22/18 18:09	TL1	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	282651	08/28/18 00:52	RSB	TAL SEA

### Laboratory References:

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

TestAmerica Seattle

# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79751-1

### **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
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

# **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-79751-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-79751-1	Outfall #002	Water	08/21/18 10:30	08/21/18 10:35
580-79751-2	Trip Blank	Water	08/21/18 00:00	08/21/18 10:35

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**TestAmerica** 

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Ared)		Client Contact	tu la	nebell	Date S S S S S S S S S S S S S S S S S S S	Chain of Custody Nu	37489
Address 100 Olive Local Sct 90	89)	,	ber (Area Code)/Fax	<del></del>	5	Page	of
City C State Zip	Code 1810	Sampler Just n	VNIY La	ab Contact	Analysis (Attach list if more space is needed)	Loc: 580 <b>7975</b>	
Project Name and Location (State)		Billing Contact			X 2 27 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1915	ictions/
Contract/Purchase Order/Quote No.			Matrix	Containers & Preservatives	2115	· I	Receipt
Sample I.D. and Location/Description (Containers for each sample may be combined on one line)		Time Valueous			Buzae Mutil CPAHS		
Ortfe!! #002	8/21/18 10	30 ×	2	<del></del>	XXXX	Person t	- CTPHU
Trip Val		~ X			X X	hove que	HITCHL
·					110000000000000000000000000000000000000	hove que	stan
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-							
				580-79751 Chain	of Custody	Tuse sta	ident sqc
				Therm	. ID: 42 Cor: 2.1 ° Unc: 2.1 °	-BH-8	.80
				Cooler	Dsc: Med Blaz FedEx: g: Banble IPS:		
				Cust. S	Seal: YesNo_X_ Lab Cour: X		
				(Yel/Pa	acks/Dry lce/None Other:		
Cooler Possible Ha	nzard Identification zard	ole 🗆 Skin Iri	ritant 🗆 Poiso	,	ple Disposal		sessed if samples er than 1 month)
Turn Around Time Required (business days)		Dother Star	nderd	QC Requirements (Specify)			
24 Hours 48 Hours 5 Days 10 Day  1. Relinquished By Sign/Print	ys □ 15 Days 	Date \$121/18	1035	1. Received By Sign/Print	Francisco Lung, Ir	Date 8/21/18	Time ) <b>U 3</b> 5
2. Relinquished By Sign/Print		Date	Time	2. Received By Sign/Print	· · · · · · · · · · · · · · · · · · ·	Date	Time
3. Relinquished By Sign/Print		Date	Time	3. Received By Sign/Print		Date	Time
Comments			1	1		1	

### **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 580-79751-1

Login Number: 79751 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

Cleator. Hobbs, Refilletii F		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



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# **ANALYTICAL REPORT**

TestAmerica Laboratories, Inc.

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

TestAmerica Job ID: 580-81046-1 Client Project/Site: Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 10/22/2018 4:28:33 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

·····LINKS ·······

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**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81046-1

# **Table of Contents**

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### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81046-1

Job ID: 580-81046-1

**Laboratory: TestAmerica Seattle** 

**Narrative** 

Job Narrative 580-81046-1

### Receipt

Two samples were received on 10/10/2018 10:56 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 6.6° C.

### **GC/MS VOA**

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

### GC/MS Semi VOA

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

#### GC Semi VOA

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

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# **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Minimum Level (Dioxin)

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)
Toxicity Equivalent Quotient (Dioxin)

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)

Not Calculated

**Quality Control** 

TestAmerica Job ID: 580-81046-1

## Glossary

ML

NC

ND

**PQL** 

QC

RER

RL RPD

TEF

TEQ

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

10/22/2018

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# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Received: 10/10/18 10:56

TestAmerica Job ID: 580-81046-1

Client Sample ID: Outfall #002 Lab Sample ID: 580-81046-1 Date Collected: 10/10/18 09:00

**Matrix: Water** 

Method: 624 - Volatile Organ	nic Compoun	ds (GC/MS	5)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			10/16/18 14:09	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	97		74 - 123			-		10/16/18 14:09	1
Toluene-d8 (Surr)	100		79 - 122					10/16/18 14:09	1
4-Bromofluorobenzene (Surr)	101		78 - 119					10/16/18 14:09	1
Dibromofluoromethane (Surr)	97		70 - 120					10/16/18 14:09	1
1,2-Dichloroethane-d4 (Surr)	97		70 - 120					10/16/18 14:09	1

Method: 8270C SIM - Sen	ethod: 8270C SIM - Semivolatile Organic Compounds (GC/MS SIM)											
Analyte	Result (	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac			
Benzo[a]anthracene	ND		0.050	0.014	ug/L		10/15/18 09:21	10/17/18 18:51	1			
Benzo[a]pyrene	ND		0.10	0.011	ug/L		10/15/18 09:21	10/17/18 18:51	1			
Benzo[b]fluoranthene	ND		0.050	0.011	ug/L		10/15/18 09:21	10/17/18 18:51	1			
Benzo[k]fluoranthene	ND		0.050	0.012	ug/L		10/15/18 09:21	10/17/18 18:51	1			
Chrysene	ND		0.10	0.016	ug/L		10/15/18 09:21	10/17/18 18:51	1			
Dibenz(a,h)anthracene	ND		0.10	0.010	ug/L		10/15/18 09:21	10/17/18 18:51	1			
Indeno[1,2,3-cd]pyrene	ND		0.050	0.014	ug/L		10/15/18 09:21	10/17/18 18:51	1			
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac			
Terphenyl-d14	68		53 - 120				10/15/18 09:21	10/17/18 18:51	1			

Method: NWTPH-Gx - Northw	est - Volatile	Petroleur	n Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			10/18/18 02:27	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	84		50 - 150					10/18/18 02:27	1
Trifluorotoluene (Surr)	96		50 <sub>-</sub> 150					10/18/18 02:27	1

Method: NWTPH-Dx - Se	emi-Volatile Petroleum Pro	ducts by NW	TPH with	Silica G	iel Cle	anup		
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND	0.11	0.066	mg/L		10/17/18 13:44	10/21/18 17:45	1
Motor Oil (>C24-C36)	ND	0.35	0.097	mg/L		10/17/18 13:44	10/21/18 17:45	1
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	87	50 - 150				10/17/18 13:44	10/21/18 17:45	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81046-1

2

Client Sample ID: Trip Blank

Date Collected: 10/10/18 00:00 Date Received: 10/10/18 10:56 Lab Sample ID: 580-81046-2

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			10/16/18 14:36	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	99		74 - 123			-		10/16/18 14:36	1
Toluene-d8 (Surr)	106		79 - 122					10/16/18 14:36	1
4-Bromofluorobenzene (Surr)	104		78 - 119					10/16/18 14:36	1
Dibromofluoromethane (Surr)	95		70 - 120					10/16/18 14:36	1
1,2-Dichloroethane-d4 (Surr)	95		70 - 120					10/16/18 14:36	1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)											
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac		
Gasoline	ND		0.25	0.10	mg/L			10/17/18 20:35	1		
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac		
4-Bromofluorobenzene (Surr)	88	-	50 - 150			•		10/17/18 20:35	1		
Trifluorotoluene (Surr)	96		50 - 150					10/17/18 20:35	1		

-

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81046-1

Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-286583/5

**Matrix: Water** 

**Analysis Batch: 286583** 

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB

AnalyteResultQualifierRLMDLUnitDPreparedAnalyzedDil FacBenzeneND1.00.53ug/L0.5310/16/18 08:281

MB MB Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Trifluorotoluene (Surr) 97 74 - 123 10/16/18 08:28 Toluene-d8 (Surr) 105 79 - 122 10/16/18 08:28 4-Bromofluorobenzene (Surr) 103 78 - 119 10/16/18 08:28 105 70 - 120 Dibromofluoromethane (Surr) 10/16/18 08:28 70 - 120 1,2-Dichloroethane-d4 (Surr) 100 10/16/18 08:28

Lab Sample ID: LCS 580-286583/6

**Matrix: Water** 

**Analysis Batch: 286583** 

Client Sample ID: Lab Control Sample Prep Type: Total/NA

 Analyte
 Added Benzene
 Result 10.0
 Qualifier 11.1
 Unit ug/L
 D with 11.1
 MRec Limits 237 - 151

LCS LCS Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 97 74 - 123 102 79 - 122 Toluene-d8 (Surr) 4-Bromofluorobenzene (Surr) 101 78 - 119 103 70 - 120 Dibromofluoromethane (Surr) 1,2-Dichloroethane-d4 (Surr) 99 70 - 120

Lab Sample ID: LCSD 580-286583/7

**Matrix: Water** 

**Analysis Batch: 286583** 

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

LCSD LCSD RPD Spike %Rec. **Analyte** Added Result Qualifier Unit D %Rec Limits **RPD** Limit Benzene 10.0 10.3 ug/L 103 37 - 151

LCSD LCSD Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 99 74 - 123 Toluene-d8 (Surr) 102 79 - 122 101 78 - 119 4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr) 97 70 - 120 97 70 - 120 1,2-Dichloroethane-d4 (Surr)

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

Lab Sample ID: MB 580-286503/1-A

**Matrix: Water** 

**Analysis Batch: 286695** 

Client Sample ID: Method Blank Prep Type: Total/NA Prep Batch: 286503

•	MB	MB						•	
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050	0.014	ug/L		10/15/18 09:21	10/17/18 09:38	1
Benzo[a]pyrene	ND		0.10	0.011	ug/L		10/15/18 09:21	10/17/18 09:38	1
Benzo[b]fluoranthene	ND		0.050	0.011	ug/L		10/15/18 09:21	10/17/18 09:38	1

TestAmerica Seattle

10/22/2018

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TestAmerica Job ID: 580-81046-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-286503/1-A

**Matrix: Water** 

**Analysis Batch: 286695** 

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

**Prep Batch: 286503** 

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.050	0.012	ug/L		10/15/18 09:21	10/17/18 09:38	1
Chrysene	ND		0.10	0.016	ug/L		10/15/18 09:21	10/17/18 09:38	1
Dibenz(a,h)anthracene	ND		0.10	0.010	ug/L		10/15/18 09:21	10/17/18 09:38	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.014	ug/L		10/15/18 09:21	10/17/18 09:38	1

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Terphenyl-d14 53 - 120 10/15/18 09:21 10/17/18 09:38 86

Lab Sample ID: LCS 580-286503/2-A

**Matrix: Water** 

Analysis Batch: 286695

Client Sample ID: Lab Control Sample Prep Type: Total/NA

**Prep Batch: 286503** 

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	4.04		ug/L		101	61 - 120	
Benzo[a]pyrene	4.00	3.82		ug/L		95	65 - 120	
Benzo[b]fluoranthene	4.00	3.99		ug/L		100	58 - 120	
Benzo[k]fluoranthene	4.00	3.73		ug/L		93	58 - 120	
Chrysene	4.00	3.81		ug/L		95	58 - 120	
Dibenz(a,h)anthracene	4.00	3.60		ug/L		90	60 - 125	
Indeno[1,2,3-cd]pyrene	4.00	3.79		ug/L		95	56 - 120	

LCS LCS

Surrogate %Recovery Qualifier Limits 53 - 120 Terphenyl-d14 76

Lab Sample ID: LCSD 580-286503/3-A

**Matrix: Water** 

Analysis Batch: 286695

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

**Prep Type: Total/NA Prep Batch: 286503** 

7									
•	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	3.85		ug/L		96	61 - 120	5	16
Benzo[a]pyrene	4.00	3.77		ug/L		94	65 - 120	1	17
Benzo[b]fluoranthene	4.00	3.87		ug/L		97	58 - 120	3	20
Benzo[k]fluoranthene	4.00	3.66		ug/L		92	58 - 120	2	20
Chrysene	4.00	3.62		ug/L		91	58 - 120	5	16
Dibenz(a,h)anthracene	4.00	3.36		ug/L		84	60 - 125	7	15
Indeno[1,2,3-cd]pyrene	4.00	3.78		ug/L		94	56 - 120	0	15

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 75 53 - 120

TestAmerica Seattle

TestAmerica Job ID: 580-81046-1

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-286768/6 **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 286768** 

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			10/17/18 19:14	1
	МВ	МВ							
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac

4-Bromofluorobenzene (Surr) 86 50 - 150 10/17/18 19:14 Trifluorotoluene (Surr) 100 50 - 150 10/17/18 19:14

Lab Sample ID: LCS 580-286768/7

**Matrix: Water** 

Analysis Batch: 286768

Alialysis Datcil. 200700								
	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Gasoline	1.00	0.947		mg/L		95	79 - 120	 _

LCS LCS %Recovery Qualifier Limits Surrogate 4-Bromofluorobenzene (Surr) 50 - 150 91 Trifluorotoluene (Surr) 107 50 - 150

Lab Sample ID: LCSD 580-286768/8 **Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA** 

**Matrix: Water** 

**Analysis Batch: 286768** 

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Gasoline	1.00	0.910		ma/L		91	79 - 120	4	10

LCSD LCSD %Recovery Qualifier Surrogate Limits 4-Bromofluorobenzene (Surr) 91 50 - 150 Trifluorotoluene (Surr) 100 50 - 150

TestAmerica Seattle

### **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81046-1

Lab Sample ID: 580-81046-1

Matrix: Water

Client Sample ID: Outfall #002 Date Collected: 10/10/18 09:00

Date Received: 10/10/18 10:56

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			286583	10/16/18 14:09	TL1	TAL SEA
Total/NA	Prep	3510C			286503	10/15/18 09:21	KO	TAL SEA
Total/NA	Analysis	8270C SIM		1	286695	10/17/18 18:51	CJ	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	286768	10/18/18 02:27	W1T	TAL SEA
Total/NA	Prep	3510C			286734	10/17/18 13:44	KO	TAL SEA
Total/NA	Cleanup	3630C			286966	10/19/18 14:07	KO	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	287044	10/21/18 17:45	TL1	TAL SEA

Client Sample ID: Trip Blank Lab Sample ID: 580-81046-2

Date Collected: 10/10/18 00:00 Matrix: Water

Date Received: 10/10/18 10:56

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	286583	10/16/18 14:36	TL1	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	286768	10/17/18 20:35	W1T	TAL SEA

### **Laboratory References:**

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

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# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-81046-1

Project/Site: Edmonds Terminal

## **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

# **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81046-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-81046-1	Outfall #002	Water	10/10/18 09:00	10/10/18 10:56
580-81046-2	Trip Blank	Water	10/10/18 00:00	10/10/18 10:56

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047

Rush	
Short Hold	

Chain of Custody Record

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Client: ARCADIS U.S. Inc

Job Number: 580-81046-1

Login Number: 81046 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

Creator: Hobbs, Kenneth F		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
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	



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: 580-81239-1 Client Project/Site: Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 11/2/2018 2:51:18 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

·····LINKS ·······

Review your project results through
Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81239-1

# **Table of Contents**

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### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81239-1

Job ID: 580-81239-1

**Laboratory: TestAmerica Seattle** 

**Narrative** 

Job Narrative 580-81239-1

#### Receipt

Two samples were received on 10/20/2018 12:45 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 6.2° C.

#### **GC/MS VOA**

Method(s) NWTPH-Gx: The method blank for analytical batch 287337 contained gasoline above the reporting limit (RL). The samples associated with this method blank were ND for the target compound; therefore, re-extraction and/or re-analysis of samples were not performed.

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

### GC/MS Semi VOA

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

#### GC Semi VOA

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

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# **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

> Method Detection Limit Minimum Level (Dioxin)

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)
Toxicity Equivalent Quotient (Dioxin)

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)

Not Calculated

**Quality Control** 

TestAmerica Job ID: 580-81239-1

## Glossary

MDL

ML NC

ND

**PQL** 

QC

RER

RL RPD

TEF

TEQ

Abbreviation	These commonly used abbreviations may or may not be present in this report.
n	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)

### Client Sample Results

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81239-1

Client Sample ID: Outfall #002

ND

ND

Date Collected: 10/18/18 13:30 Date Received: 10/20/18 12:45

Dibenz(a,h)anthracene

Indeno[1,2,3-cd]pyrene

Lab Sample ID: 580-81239-1

10/24/18 12:04 10/25/18 21:54

10/24/18 12:04 10/25/18 21:54

**Matrix: Water** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			10/31/18 03:15	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123					10/31/18 03:15	1
Toluene-d8 (Surr)	105		79 - 122					10/31/18 03:15	1
4-Bromofluorobenzene (Surr)	99		78 - 119					10/31/18 03:15	1
Dibromofluoromethane (Surr)	99		70 - 120					10/31/18 03:15	1
1,2-Dichloroethane-d4 (Surr)	97		70 - 120					10/31/18 03:15	1

Method: 8270C SIM - Semivolatile Organic Compounds (GC/MS SIM) Analyte Result Qualifier RL **MDL** Unit D Prepared Analyzed Benzo[a]anthracene ND 0.014 ug/L 10/24/18 12:04 10/25/18 21:54 0.051 Benzo[a]pyrene ND 0.10 0.011 ug/L 10/24/18 12:04 10/25/18 21:54 Benzo[b]fluoranthene ND 0.051 0.011 ug/L 10/24/18 12:04 10/25/18 21:54 Benzo[k]fluoranthene ND 0.012 ug/L 10/24/18 12:04 10/25/18 21:54 0.051 0.016 ug/L Chrysene ND 0.10 10/24/18 12:04 10/25/18 21:54

0.051 %Recovery Qualifier Dil Fac Surrogate Limits Prepared Analyzed 10/24/18 12:04 10/25/18 21:54 Terphenyl-d14 62 53 - 120

0.10

0.010 ug/L

0.014 ug/L

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC) Analyte Result Qualifier **MDL** Unit RL Prepared Analyzed Dil Fac ND Gasoline 0.25 0.10 mg/L 10/25/18 02:36 %Recovery Surrogate Qualifier Limits Prepared Analyzed Dil Fac 4-Bromofluorobenzene (Surr) 91 50 - 150 10/25/18 02:36 10/25/18 02:36 Trifluorotoluene (Surr) 94 50 - 150

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup Analyte Result Qualifier MDL Unit Prepared Analyzed Dil Fac RL #2 Diesel (C10-C24) ND 0.11 0.066 mg/L 10/31/18 09:46 10/31/18 20:19 Motor Oil (>C24-C36) ND 0.36 0.098 mg/L 10/31/18 09:46 10/31/18 20:19 %Recovery Surrogate Qualifier Limits Prepared Analyzed Dil Fac <u>10/31/18 09:46</u> <u>10/31/18 20:19</u> 88 50 - 150 o-Terphenyl

Dil Fac

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Collected: 10/18/18 00:00

Date Received: 10/20/18 12:45

Surrogate

4-Bromofluorobenzene (Surr)

Trifluorotoluene (Surr)

**Client Sample ID: Trip Blank** 

TestAmerica Job ID: 580-81239-1

Prepared

Lab Sample ID: 580-81239-2 **Matrix: Water** 

Dil Fac

Analyzed

10/25/18 03:03

10/25/18 03:03

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			10/31/18 03:39	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	103		74 - 123					10/31/18 03:39	1
Toluene-d8 (Surr)	105		79 - 122					10/31/18 03:39	1
4-Bromofluorobenzene (Surr)	96		78 - 119					10/31/18 03:39	1
Dibromofluoromethane (Surr)	104		70 - 120					10/31/18 03:39	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 120					10/31/18 03:39	1
Method: NWTPH-Gx - Nortl	hwest - Volatile	e Petroleu	m Products (	GC)					
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND	-	0.25	0.10	mg/L			10/25/18 03:03	1

Limits

50 - 150

50 - 150

%Recovery Qualifier

97

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81239-1

### Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-287822/5

**Matrix: Water** 

**Analysis Batch: 287822** 

Client Sample ID: Method Blank Prep Type: Total/NA

**Client Sample ID: Lab Control Sample** 

MB MB

Analyte Result Qualifier RL **MDL** Unit D Prepared Analyzed Dil Fac 1.0 Benzene ND 0.53 ug/L 10/31/18 01:37

	MB	MB				
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123		10/31/18 01:37	1
Toluene-d8 (Surr)	109		79 - 122		10/31/18 01:37	1
4-Bromofluorobenzene (Surr)	100		78 - 119		10/31/18 01:37	1
Dibromofluoromethane (Surr)	100		70 - 120		10/31/18 01:37	1
1,2-Dichloroethane-d4 (Surr)	97		70 - 120		10/31/18 01:37	1

Lab Sample ID: LCS 580-287822/6

**Matrix: Water** 

**Analysis Batch: 287822** 

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzene 10.0 9.60 ug/L 96 37 - 151

	LCS LCS					
Surrogate	%Recovery	Qualifier	Limits			
Trifluorotoluene (Surr)	99		74 - 123			
Toluene-d8 (Surr)	97		79 - 122			
4-Bromofluorobenzene (Surr)	99		78 - 119			
Dibromofluoromethane (Surr)	103		70 - 120			
1,2-Dichloroethane-d4 (Surr)	100		70 - 120			

Lab Sample ID: LCSD 580-287822/7

**Matrix: Water** 

**Analysis Batch: 287822** 

Spike LCSD LCSD %Rec. Analyte Added Result Qualifier Limits Unit D %Rec RPD Limit Benzene 10.0 9.93 ug/L 99 37 - 151

LCSD LCSD Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 100 74 - 123 Toluene-d8 (Surr) 101 79 - 122 4-Bromofluorobenzene (Surr) 98 78 - 119 Dibromofluoromethane (Surr) 105 70 - 120 1,2-Dichloroethane-d4 (Surr) 97 70 - 120

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

Lab Sample ID: MB 580-287279/1-A **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA **Analysis Batch: 287465** Prep Batch: 287279 MR MR

	IAID	IAID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050	0.014	ug/L		10/24/18 12:04	10/25/18 19:19	1
Benzo[a]pyrene	ND		0.10	0.011	ug/L		10/24/18 12:04	10/25/18 19:19	1
Benzo[b]fluoranthene	ND		0.050	0.011	ug/L		10/24/18 12:04	10/25/18 19:19	1

TestAmerica Seattle

Page 7 of 15

RPD

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

Prep Type: Total/NA

TestAmerica Job ID: 580-81239-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

2

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

Lab Sample ID: MB 580-287279/1-A

**Matrix: Water** 

**Analysis Batch: 287465** 

Client Sample ID: Method Blank
Prep Type: Total/NA

**Prep Batch: 287279** 

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.050	0.012	ug/L		10/24/18 12:04	10/25/18 19:19	1
Chrysene	ND		0.10	0.016	ug/L		10/24/18 12:04	10/25/18 19:19	1
Dibenz(a,h)anthracene	ND		0.10	0.010	ug/L		10/24/18 12:04	10/25/18 19:19	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.014	ug/L		10/24/18 12:04	10/25/18 19:19	1

MB MB

 Surrogate
 %Recovery
 Qualifier
 Limits
 Prepared
 Analyzed
 Dil Fac

 Terphenyl-d14
 102
 53 - 120
 10/24/18 12:04
 10/25/18 19:19
 1

Client Sample ID: Lab Control Sample

Prep Type: Total/NA Prep Batch: 287279

Lab Sample ID: LCS 580-287279/2-A Matrix: Water

Matrix: Water

**Analysis Batch: 287465** 

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	3.63		ug/L		91	61 - 120	
Benzo[a]pyrene	4.00	3.74		ug/L		93	65 - 120	
Benzo[b]fluoranthene	4.00	3.61		ug/L		90	58 - 120	
Benzo[k]fluoranthene	4.00	3.32		ug/L		83	58 - 120	
Chrysene	4.00	3.23		ug/L		81	58 - 120	
Dibenz(a,h)anthracene	4.00	3.94		ug/L		99	60 - 125	
Indeno[1,2,3-cd]pyrene	4.00	4.45		ug/L		111	56 - 120	

LCS LCS

Lab Sample ID: LCSD 580-287279/3-A

**Matrix: Water** 

**Analysis Batch: 287465** 

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

Prep Batch: 287279

•	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	3.55		ug/L		89	61 - 120	2	16
Benzo[a]pyrene	4.00	3.57		ug/L		89	65 - 120	4	17
Benzo[b]fluoranthene	4.00	3.45		ug/L		86	58 - 120	4	20
Benzo[k]fluoranthene	4.00	3.12		ug/L		78	58 - 120	6	20
Chrysene	4.00	3.21		ug/L		80	58 - 120	1	16
Dibenz(a,h)anthracene	4.00	3.77		ug/L		94	60 - 125	4	15
Indeno[1,2,3-cd]pyrene	4.00	4.25		ug/L		106	56 - 120	5	15

LCSD LCSD

TestAmerica Seattle

11/2/2018

Client: ARCADIS U.S. Inc

TestAmerica Job ID: 580-81239-1 Project/Site: Edmonds Terminal

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-287337/6

**Matrix: Water** 

Analyte

Gasoline

**Analysis Batch: 287337** 

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

MB MB Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 0.25  $\overline{\mathsf{ND}}$ 0.10 mg/L 10/24/18 19:21

MB MB %Recovery Surrogate Qualifier

Limits 4-Bromofluorobenzene (Surr) 95 50 - 150 Trifluorotoluene (Surr) 100 50 - 150

**Client Sample ID: Lab Control Sample** 

Analyzed

10/24/18 19:21

10/24/18 19:21

Prepared

Lab Sample ID: LCS 580-287337/7 **Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 287337** 

LCS LCS Spike %Rec. **Analyte** Added Result Qualifier Limits Unit D %Rec Gasoline 1.00 1.06 106 79 - 120 mg/L

LCS LCS Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 50 - 150 96 115 50 - 150 Trifluorotoluene (Surr)

Lab Sample ID: LCSD 580-287337/8 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 287337** 

LCSD LCSD RPD Spike %Rec. Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Gasoline 1.00 1.03 mg/L 103 79 - 120

LCSD LCSD %Recovery Qualifier Surrogate I imits 4-Bromofluorobenzene (Surr) 98 50 - 150 Trifluorotoluene (Surr) 112 50 - 150

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-287842/1-B **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA **Analysis Batch: 287861** 

MB MB

Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac #2 Diesel (C10-C24) ND 0.11 10/31/18 09:46 10/31/18 18:59 0.065 mg/L Motor Oil (>C24-C36) ND 0.35 10/31/18 09:46 10/31/18 18:59 0.096 mg/L MB MB

Qualifier Limits Dil Fac Surrogate %Recovery Prepared Analyzed <u>10/31/18 09:46</u> <u>10/31/18 18:59</u> 50 - 150 o-Terphenyl 92

Lab Sample ID: LCS 580-287842/2-B

**Matrix: Water** 

Prep Type: Total/NA **Analysis Batch: 287861 Prep Batch: 287842** Spike LCS LCS %Rec. Added Analyte Result Qualifier Unit D %Rec Limits #2 Diesel (C10-C24) 2.00 1.57 mg/L 78 50 - 120

TestAmerica Seattle

Page 9 of 15

Dil Fac

**Client Sample ID: Lab Control Sample** 

Prep Batch: 287842

# **QC Sample Results**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-81239-1 Project/Site: Edmonds Terminal

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: LCS 580-2 Matrix: Water Analysis Batch: 287861					Clie	nt Sa	mple ID	: Lab Control Sample Prep Type: Total/NA Prep Batch: 287842	
, , , , , , , , , , , , , , , , , , , ,			Spike	LCS	LCS				%Rec.
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits
Motor Oil (>C24-C36)			2.00	1.92		mg/L		96	64 - 120
	LCS	LCS							
Surrogate	%Recovery	Qualifier	Limits						
o-Terphenyl	97		50 - 150						

Lab Sample ID: LCSD 580-287842/3-B			(	Client Sam	ple	ID: Lat	Control :	Sample	<b>Dup</b>
Matrix: Water							Prep Typ	e: Tot	al/NA
Analysis Batch: 287861							Prep Ba	itch: 28	37842
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
#2 Diesel (C10-C24)	2.00	1.38		mg/L	_	69	50 - 120	13	26
Motor Oil (>C24-C36)	2.00	1.71		mg/L		86	64 - 120	11	24

LCSD LCSD %Recovery Qualifier Limits Surrogate o-Terphenyl 50 - 150 87

11/2/2018

### **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81239-1

Lab Sample ID: 580-81239-1

Matrix: Water

Date Collected: 10/18/18 13:30 Date Received: 10/20/18 12:45

Client Sample ID: Outfall #002

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	287822	10/31/18 03:15	TL1	TAL SEA
Total/NA	Prep	3510C			287279	10/24/18 12:04	KO	TAL SEA
Total/NA	Analysis	8270C SIM		1	287465	10/25/18 21:54	CJ	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	287337	10/25/18 02:36	Z1R	TAL SEA
Total/NA	Prep	3510C			287842	10/31/18 09:46	KO	TAL SEA
Total/NA	Cleanup	3630C			287921	10/31/18 18:44	JCM	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	287861	10/31/18 20:19	W1T	TAL SEA

Client Sample ID: Trip Blank Lab Sample ID: 580-81239-2

Date Collected: 10/18/18 00:00 Matrix: Water

Date Received: 10/20/18 12:45

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	287822	10/31/18 03:39	TL1	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	287337	10/25/18 03:03	Z1R	TAL SEA

### **Laboratory References:**

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

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# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-81239-1

Project/Site: Edmonds Terminal

# **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	<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	11-05-19
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

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# **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81239-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-81239-1	Outfall #002	Water	10/18/18 13:30	10/20/18 12:45
580-81239-2	Trip Blank	Water	10/18/18 00:00	10/20/18 12:45

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THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

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☐ Yes ☐ No Cooler Temp:	☐ Non-Ha.	zard 🗌 Flam	mable 🗀	Skin	Irritant		Poison			nknown		eturn	To Clie	nt	$\Box$ A	Irchive	For		Month		nger than 1 month)
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Client: ARCADIS U.S. Inc

Job Number: 580-81239-1

Login Number: 81239 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

Creator: Hobbs, Kenneth F		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
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").	False	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



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: 580-81378-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

Kristine D. allen

Authorized for release by: 11/14/2018 2:23:28 PM Kristine Allen, Manager of Project

Kristine Allen, Manager of Project Management (253)248-4970

kristine.allen@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

·····LINKS ·······

Review your project results through

Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-81378-1

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#### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-81378-1

Job ID: 580-81378-1

**Laboratory: TestAmerica Seattle** 

**Narrative** 

Job Narrative 580-81378-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 10/26/2018 12:45 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 7.3° C.

#### **GC/MS VOA**

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

#### GC/MS Semi VOA

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

#### GC Semi VOA

Method(s) NWTPH-Dx: Continuing calibration verification (CCV) standard associated with batch 580-288658 recovered outside %Drift acceptance criteria for o-Terphenyl surrogate. The %Recovery is within acceptance criteria for the surrogate in the CCV and associated samples; therefore, the data are qualified and reported. The following samples are impacted: Outfall #002 (580-81378-1), (CCV 580-288658/27) and (CCVRT 580-288658/3)

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

#### **Organic Prep**

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

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## **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

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)

Practical Quantitation Limit

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin)

Toxicity Equivalent Quotient (Dioxin)

**Quality Control** 

TestAmerica Job ID: 580-81378-1

#### **Glossary**

ND

PQL

QC

RER

RPD TEF

TEQ

RL

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

## **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Client Sample ID: Outfall #002

Date Collected: 10/26/18 09:00

Date Received: 10/26/18 12:45

Indeno[1,2,3-cd]pyrene

Surrogate

Terphenyl-d14

TestAmerica Job ID: 580-81378-1

Lab Sample ID: 580-81378-1

11/03/18 06:15

Analyzed

11/03/18 06:15

11/01/18 10:44

Prepared

11/01/18 10:44

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			11/01/18 23:27	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123					11/01/18 23:27	1
Toluene-d8 (Surr)	121		79 - 122					11/01/18 23:27	1
4-Bromofluorobenzene (Surr)	119		78 - 119					11/01/18 23:27	1
Dibromofluoromethane (Surr)	104		70 - 120					11/01/18 23:27	1
1,2-Dichloroethane-d4 (Surr)	105		70 - 120					11/01/18 23:27	1
Method: 8270C SIM - Semivol	atile Organic Con	npounds (G	C/MS SIM)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050	0.014	ug/L		11/01/18 10:44	11/03/18 06:15	1
Benzo[a]pyrene	ND		0.10	0.011	ug/L		11/01/18 10:44	11/03/18 06:15	1
Benzo[b]fluoranthene	ND		0.050	0.011	ug/L		11/01/18 10:44	11/03/18 06:15	1
Benzo[k]fluoranthene	ND		0.050	0.012	ug/L		11/01/18 10:44	11/03/18 06:15	1
Chrysene	ND		0.10	0.016	ug/L		11/01/18 10:44	11/03/18 06:15	1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)										
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
Gasoline	ND		0.25	0.10	mg/L			11/06/18 03:30	1	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac	
4-Bromofluorobenzene (Surr)	93		50 - 150			_		11/06/18 03:30	1	
Trifluorotoluene (Surr)	108		50 - 150					11/06/18 03:30	1	

0.050

Limits

53 - 120

0.014 ug/L

ND

%Recovery Qualifier

98

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.13		0.11	0.067	mg/L		11/08/18 08:17	11/12/18 21:57	1
Motor Oil (>C24-C36)	ND		0.36	0.099	mg/L		11/08/18 08:17	11/12/18 21:57	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	127		50 - 150				11/08/18 08:17	11/12/18 21:57	1

11/14/2018

Dil Fac

## **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-81378-1

Lab Sample ID: 580-81378-2

Matrix: Water

Date Col	lected:	10/26/18	09:00
Date Rec	oivod:	10/26/18	12.45

**Client Sample ID: Trip Blank** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			11/01/18 23:53	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	106		74 - 123			-		11/01/18 23:53	1
Toluene-d8 (Surr)	99		79 - 122					11/01/18 23:53	1
4-Bromofluorobenzene (Surr)	100		78 - 119					11/01/18 23:53	1
Dibromofluoromethane (Surr)	103		70 - 120					11/01/18 23:53	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 120					11/01/18 23:53	1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			11/05/18 19:21	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		50 - 150			<del>-</del>		11/05/18 19:21	1
Trifluorotoluene (Surr)	114		50 - 150					11/05/18 19:21	1

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-81378-1

### Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-288000/5

**Matrix: Water** 

Analyte

Benzene

Analysis Batch: 288000

Client Sample ID: Method Blank

Prep Type: Total/NA

MB MB Result Qualifier RLMDL Unit D Dil Fac Prepared Analyzed ND 1.0 0.53 ug/L 11/01/18 16:03

MB MB Dil Fac Surrogate %Recovery Qualifier Limits Prepared Analyzed Trifluorotoluene (Surr) 101 74 123 11/01/18 16:03 Toluene-d8 (Surr) 101 79 - 122 11/01/18 16:03 97 78 - 119 11/01/18 16:03 4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr) 102 70 - 120 11/01/18 16:03 1,2-Dichloroethane-d4 (Surr) 102 70 - 120 11/01/18 16:03

Lab Sample ID: LCS 580-288000/6

**Matrix: Water** 

**Analysis Batch: 288000** 

Client Sample ID: Lab Control Sample Prep Type: Total/NA

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit %Rec Limits 10.0 Benzene 8.77 ug/L 88 37 151

LCS LCS Surrogate %Recovery Qualifier Limits 74 - 123 Trifluorotoluene (Surr) 99 98 79 - 122 Toluene-d8 (Surr) 4-Bromofluorobenzene (Surr) 98 78 - 119 70 - 120 Dibromofluoromethane (Surr) 101 1,2-Dichloroethane-d4 (Surr) 100 70 - 120

Lab Sample ID: LCSD 580-288000/7

**Matrix: Water** 

Analysis Batch: 288000

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

> RPD %Rec.

LCSD LCSD Spike Analyte Added Result Qualifier Unit D %Rec Limits RPD Limit Benzene 10.0 9.79 ug/L 98 37 - 151

LCSD LCSD Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 98 74 - 123 Toluene-d8 (Surr) 102 79 - 122 4-Bromofluorobenzene (Surr) 99 78 - 119 101 70 - 120 Dibromofluoromethane (Surr) 70 - 120 1,2-Dichloroethane-d4 (Surr) 99

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

Lab Sample ID: MB 580-287953/1-A

**Matrix: Water** 

**Analysis Batch: 288108** 

Client Sample ID: Method Blank

Prep Type: Total/NA Prep Batch: 287953

MB MB Dil Fac Analyte Result Qualifier RL MDL Unit Prepared Analyzed Benzo[a]anthracene ND 0.050 0.014 ug/L 11/01/18 10:44 11/03/18 02:24 Benzo[a]pyrene ND 0.10 0.011 ug/L 11/01/18 10:44 11/03/18 02:24 Benzo[b]fluoranthene ND 0.050 0.011 ug/L 11/01/18 10:44 11/03/18 02:24

TestAmerica Job ID: 580-81378-1

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

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

Lab Sample ID: MB 580-287953/1-A

**Matrix: Water** 

Analysis Batch: 288108

Client Sample ID: Method Blank Prep Type: Total/NA

**Prep Batch: 287953** 

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.050	0.012	ug/L		11/01/18 10:44	11/03/18 02:24	1
Chrysene	ND		0.10	0.016	ug/L		11/01/18 10:44	11/03/18 02:24	1
Dibenz(a,h)anthracene	ND		0.10	0.010	ug/L		11/01/18 10:44	11/03/18 02:24	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.014	ug/L		11/01/18 10:44	11/03/18 02:24	1

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac 53 - 120 Terphenyl-d14 11/01/18 10:44 11/03/18 02:24 93

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

**Prep Batch: 287953** 

Lab Sample ID: LCS 580-287953/2-A

**Matrix: Water** 

Analysis Batch: 288108

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	8.00	7.22		ug/L		90	61 - 120	
Benzo[a]pyrene	8.00	7.53		ug/L		94	65 - 120	
Benzo[b]fluoranthene	8.00	7.15		ug/L		89	58 - 120	
Benzo[k]fluoranthene	8.00	7.59		ug/L		95	58 - 120	
Chrysene	8.00	6.97		ug/L		87	58 - 120	
Dibenz(a,h)anthracene	8.00	7.98		ug/L		100	60 - 125	
Indeno[1,2,3-cd]pyrene	8.00	7.61		ug/L		95	56 - 120	

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 98 53 - 120

Lab Sample ID: LCSD 580-287953/3-A

**Matrix: Water** 

Analysis Batch: 288108

Client	Sample	ID: Lab	Control	Sample	Dun
Ollelit	Januare	ID. Lab	COLLIGOR	Jailible	Dub

Prep Type: Total/NA

**Prep Batch: 287953** 

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	8.00	7.12		ug/L		89	61 - 120	1	16
Benzo[a]pyrene	8.00	7.12		ug/L		89	65 - 120	6	17
Benzo[b]fluoranthene	8.00	7.03		ug/L		88	58 - 120	2	20
Benzo[k]fluoranthene	8.00	7.21		ug/L		90	58 - 120	5	20
Chrysene	8.00	6.76		ug/L		85	58 - 120	3	16
Dibenz(a,h)anthracene	8.00	7.68		ug/L		96	60 - 125	4	15
Indeno[1,2,3-cd]pyrene	8.00	7.38		ug/L		92	56 - 120	3	15

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 98 53 - 120

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-81378-1

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 288404

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

Lab Sample ID: MB 580-288201/6

**Matrix: Water** 

Analyte

Analysis Batch: 288201

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB RL Result Qualifier MDL Unit D Analyzed Dil Fac Prepared 0.25 ND 0.10 mg/L 11/05/18 17:33

Gasoline MB MB

Qualifier Dil Fac Surrogate %Recovery Prepared Analyzed 50 - 150 4-Bromofluorobenzene (Surr) 98 11/05/18 17:33 Trifluorotoluene (Surr) 113 50 - 150 11/05/18 17:33

Lab Sample ID: LCS 580-288201/7 Client Sample ID: Lab Control Sample Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 288201

LCS LCS %Rec. Spike Analyte Added Result Qualifier Unit D %Rec Limits Gasoline 1.00 0.978 mg/L 79 - 120

LCS LCS Surrogate %Recovery Qualifier Limits 50 - 150 4-Bromofluorobenzene (Surr) 112 Trifluorotoluene (Surr) 110 50 - 150

Lab Sample ID: LCSD 580-288201/8

**Matrix: Water** 

Analysis Batch: 288201

LCSD LCSD RPD Spike %Rec. Analyte Added Result Qualifier RPD Limit Unit %Rec Gasoline 1.00 0.951 95 mg/L 79 - 120 10

LCSD LCSD %Recovery Qualifier I imits Surrogate 4-Bromofluorobenzene (Surr) 97 50 - 150 105 50 - 150 Trifluorotoluene (Surr)

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-288404/1-B Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 288658

мв мв Analyte Result Qualifier RL MDL Unit D Prepared Dil Fac Analyzed #2 Diesel (C10-C24) 0.11 11/08/18 08:17 ND 0.065 mg/L 11/12/18 14:55 Motor Oil (>C24-C36) ND 0.35 0.096 mg/L 11/08/18 08:17 11/12/18 14:55

MB MB %Recovery Limits Dil Fac Surrogate Qualifier Prepared Analyzed o-Terphenyl 91 50 - 150 11/08/18 08:17 11/12/18 14:55

Lab Sample ID: LCS 580-288404/2-B

**Matrix: Water** 

Analysis Batch: 288658							Prep i	Batcn: 288404
	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
#2 Diesel (C10-C24)	2.00	1.77		mg/L		88	50 - 120	

TestAmerica Seattle

Prep Type: Total/NA

Client Sample ID: Lab Control Sample

Page 9 of 15

11/14/2018

## **QC Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-81378-1

# Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: LCS 580-2884	104/2-B						Client Sample ID: Lab Control Sa						
Matrix: Water									Prep Ty	pe: Total/NA			
Analysis Batch: 288658									Prep B	atch: 288404			
			Spike	LCS	LCS				%Rec.				
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits				
Motor Oil (>C24-C36)			2.00	2.13		mg/L		107	64 - 120				
	LCS	LCS											
Surrogate	%Recovery	Qualifier	Limits										
o-Terphenyl	104		50 - 150										
_													

Lab Sample ID: LCSD 580-288404/3-B			Client Sample ID: Lab Control Sample Dup										
Matrix: Water							Prep T	ype: Tot	tal/NA				
Analysis Batch: 288658							Prep I	Batch: 2	88404				
	Spike	LCSD	LCSD				%Rec.		RPD				
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit				
#2 Diesel (C10-C24)	2.00	1.64		mg/L		82	50 - 120	7	26				
Motor Oil (>C24-C36)	2.00	1.98		mg/L		99	64 - 120	7	24				

TestAmerica Seattle

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#### **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-81378-1

Lab Sample ID: 580-81378-1

Matrix: Water

Client Sample ID: Outfall #002 Date Collected: 10/26/18 09:00

Date Received: 10/26/18 12:45

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			288000	11/01/18 23:27	W1T	TAL SEA
Total/NA	Prep	3510C			287953	11/01/18 10:44	KO	TAL SEA
Total/NA	Analysis	8270C SIM		1	288108	11/03/18 06:15	ERB	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	288201	11/06/18 03:30	CJ	TAL SEA
Total/NA	Prep	3510C			288404	11/08/18 08:17	KO	TAL SEA
Total/NA	Cleanup	3630C			288511	11/09/18 10:48	KO	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	288658	11/12/18 21:57	Z1R	TAL SEA

**Client Sample ID: Trip Blank** Lab Sample ID: 580-81378-2

Date Collected: 10/26/18 09:00 Matrix: Water

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	288000	11/01/18 23:53	W1T	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	288201	11/05/18 19:21	CJ	TAL SEA

#### Laboratory References:

Date Received: 10/26/18 12:45

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

## **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-81378-1

#### **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	<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
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

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## **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-81378-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-81378-1	Outfall #002	Water	10/26/18 09:00	10/26/18 12:45
580-81378-2	Trip Blank	Water	10/26/18 09:00	10/26/18 12:45

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Short	Hold	

Rush

Chain of Custody Record

Client Arcadis			Client Contact  Deter County bell  Telephone Number (Area Code)/Fax Number  Lab Number							<i>,</i>	Chain of Custody Number 36992																
Address 1100 office way,		it e 800	Telep	hone Nu	ımber (i	Area Coo	le)/Fax I	Vumbe	er t								Lab Nu	ımber		•		Page			of	1	
	State W.A	Zip Code 48101	1	Wor	. •	tie		Conta		w	)હ્યા	Ler	624			more	/sis (At space	tach lis is need	st if ded)	7							
Project Name and Location (State) Edmonds Tev	win	al	Billing	g Contac	ct								Ex.	Š.	3	* C+CC S(m			L.	°c: 58 137	0		Spec	ial In	structi	ions/	
Contract/Purchase Order/Quote No.					Matr	ix			Contain Preserv				SE C	1		\$ \$				137	8		Cond	litions	of Re	ceipt	
Sample I.D. and Location/Descript (Containers for each sample may be combined	tion on one lin	e) Date	Time	Air	Aqueous Sed.	Sail	Unpres.	H2S04	HCI	МаОН	ZnAc/ NaOH		Beritanc	A WITCH	North to San Annual Property of the San Annual P	CF #5		ı	F								
Outfall #002	-	10/26/18	0900		Χ,		2		8				$\langle \rangle$	$\langle \rangle$	$\langle \rangle$						_	1	>H =	7.	<b>55</b>		
Trip Blank				$  \downarrow \downarrow \rangle$	X				۵	-		>	$\langle \rangle$	Υ_		_						<b>↓</b> `					
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								+	-	T	herm	ı. ID:	AZ	C	or:_	7.3	_ ° U	nc:_7	1.0	- 1	-				tha	<u>u 1</u>	
		580-8137	8 Chain of	Custoc	<b>i</b> IIIII <b>IIII</b> Jy			+			Tooler Tackin										-	14	9/1				
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										-				1	[							+					
Cooler  Yes  No Cooler Temp:	Possible	Hazard Identification Hazard □ Flan		] Skin	Irritant		Poison	В		nknoi	s wn [	Sample Ret	,		nt		Disposa Archive		<u></u> L	Ma	nths		ee may b retained				
Turn Around Time Required (business days)  ☐ 24 Hours ☐ 48 Hours  ☐ 5 Days	☐ 10 L		□ Oth	************							(Speci										11110	arc	ctamed	ionya	tricari i	mornin)	
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Comments																	***************************************					L					

## **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 580-81378-1

Login Number: 81378 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

Creator: Hobbs, Kenneth F		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



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: 580-81704-1

Client Project/Site: Edmonds Terminal

Revision: 1

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elaine Walker

Authorized for release by: 1/9/2019 3:34:59 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

·····LINKS ······

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Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81704-1

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#### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81704-1

Job ID: 580-81704-1

**Laboratory: TestAmerica Seattle** 

Narrative

Job Narrative 580-81704-1

#### Revision 1: January 9, 2019

Per request from the client, additional information has been included in the GC Semi VOA section to detail that spike compounds were not added to the MS/MSD samples. See **BOLD** type below.

#### Receipt

Three samples were received on 11/7/2018 12:25 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.5° C and 3.1° C.

#### **GC/MS VOA**

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

#### GC/MS Semi VOA

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

#### GC Semi VOA

Method(s) NWTPH-Dx: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 580-289086 and 580-289145 and analytical batch 580-289151 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits. It should be noted that spike compounds were inadvertently omitted during the extraction process for the matrix spike/matrix spike duplicate (MS/MSD).

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

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## **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81704-1

#### **Qualifiers**

#### **GC Semi VOA**

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

## **Glossary**

<u> </u>	
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
М	Minimum Level (Diovin)

NC

Minimum Level (Dioxin) Not Calculated

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

**PQL** Practical Quantitation Limit

**Quality Control** QC

**RER** Relative Error Ratio (Radiochemistry)

RL Reporting Limit or Requested Limit (Radiochemistry)

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

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

Analyte

Client Sample ID: Outfall #002

Lab Sample ID: 580-81704-1

Date Collected: 11/07/18 09:30 Ma Date Received: 11/07/18 12:25

atrix: Water	
--------------	--

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			11/19/18 20:27	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	98		74 - 123					11/19/18 20:27	1
Toluene-d8 (Surr)	103		79 - 122					11/19/18 20:27	1
4-Bromofluorobenzene (Surr)	97		78 - 119					11/19/18 20:27	1
Dibromofluoromethane (Surr)	98		70 - 120					11/19/18 20:27	1
1,2-Dichloroethane-d4 (Surr)	94		70 - 120					11/19/18 20:27	1

Mothod: 9270C SIM Somivolati	lo Organio Com	nounde (CC/MS SIM)
Method: 8270C SIM - Semivolati	ne Organic Com	pourius (GC/M3 3IM)

Method: 027 00 Olivi - Och	involatile Organic Compo		Olivi)					
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND ND	0.052	0.015	ug/L		11/13/18 13:58	11/17/18 19:21	1
Benzo[a]pyrene	ND	0.10	0.011	ug/L		11/13/18 13:58	11/17/18 19:21	1
Benzo[b]fluoranthene	ND	0.052	0.011	ug/L		11/13/18 13:58	11/17/18 19:21	1
Benzo[k]fluoranthene	ND	0.052	0.012	ug/L		11/13/18 13:58	11/17/18 19:21	1
Chrysene	ND	0.10	0.017	ug/L		11/13/18 13:58	11/17/18 19:21	1
Dibenz(a,h)anthracene	ND	0.10	0.010	ug/L		11/13/18 13:58	11/17/18 19:21	1
Indeno[1,2,3-cd]pyrene	ND	0.052	0.015	ug/L		11/13/18 13:58	11/17/18 19:21	1
Surrogata	% Boowery Ouglifier	Limito				Droporod	Anglyzad	Dil Ess

Surrogate	%Recovery	Qualifier	Limits	Prepared Analyzed	Dil Fac
Terphenyl-d14	74		53 - 120	11/13/18 13:58 11/17/18 19:21	1

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

Analyte	Result Qualifier	RL	MDL Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND ND	0.25	0.10 mg/L			11/18/18 03:26	1
Surrogate	%Recovery Qualifier	Limits			Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92	50 - 150				11/18/18 03:26	1
Trifluorotoluene (Surr)	109	50 - 150				11/18/18 03:26	1

Method: NWTPH-Dx - Semi-Volatile	Potroloum Producte k	W NWTDH with Silica	Gol Cleanup
wethou: NW IPH-DX - Semi-Volatile	Petroleum Products t	ov invv i Pri with Silica	Gei Cleanub

Result Qualifier

#2 Diesel (C10-C24)	0.076	J F1	0.11	0.067	mg/L	 11/16/18 10:14	11/17/18 03:53	1
Motor Oil (>C24-C36)	ND	F1	0.36	0.099	mg/L	11/16/18 10:14	11/17/18 03:53	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
o-Terphenyl	96		50 - 150			11/16/18 10:14	11/17/18 03:53	1

RL

MDL Unit

Prepared

Analyzed

Dil Fac

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

**Client Sample ID: Dup-1** 

Lab Sample ID: 580-81704-2

**Matrix: Water** 

Date Collected: 11/07/18 00:01 Date Received: 11/07/18 12:25

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			11/19/18 21:41	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	95		74 - 123					11/19/18 21:41	1
Toluene-d8 (Surr)	103		79 - 122					11/19/18 21:41	1
4-Bromofluorobenzene (Surr)	103		78 - 119					11/19/18 21:41	1
Dibromofluoromethane (Surr)	97		70 - 120					11/19/18 21:41	1
1,2-Dichloroethane-d4 (Surr)	89		70 - 120					11/19/18 21:41	1

Method: 8270C SIM - Sen Analyte	Result Qualifier	•	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND ND	0.051	0.014	ug/L		11/13/18 13:58	11/17/18 20:34	1
Benzo[a]pyrene	ND	0.10	0.011	ug/L		11/13/18 13:58	11/17/18 20:34	1
Benzo[b]fluoranthene	ND	0.051	0.011	ug/L		11/13/18 13:58	11/17/18 20:34	1
Benzo[k]fluoranthene	ND	0.051	0.012	ug/L		11/13/18 13:58	11/17/18 20:34	1
Chrysene	ND	0.10	0.016	ug/L		11/13/18 13:58	11/17/18 20:34	1
Dibenz(a,h)anthracene	ND	0.10	0.010	ug/L		11/13/18 13:58	11/17/18 20:34	1
Indeno[1,2,3-cd]pyrene	ND	0.051	0.014	ug/L		11/13/18 13:58	11/17/18 20:34	1
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	70	53 - 120				11/13/18 13:58	11/17/18 20:34	1

 Method: NWTPH-Gx - North			•	•					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			11/17/18 03:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		50 - 150			-		11/17/18 03:38	1
Trifluorotoluene (Surr)	125		50 - 150					11/17/18 03:38	1

Method: NWTPH-Dx - Semi-Vo	olatile Petro	leum Prod	lucts by NW I	PH with	i Silica G	jei Cle	anup		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.067	J	0.11	0.066	mg/L		11/16/18 10:14	11/17/18 04:53	1
Motor Oil (>C24-C36)	0.18	J	0.35	0.097	mg/L		11/16/18 10:14	11/17/18 04:53	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	87		50 - 150				11/16/18 10:14	11/17/18 04:53	1

## **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81704-1

2

**Client Sample ID: Trip Blank** 

Date Collected: 11/07/18 00:01 Date Received: 11/07/18 12:25 Lab Sample ID: 580-81704-3

Matrix: Water

Method: 624 - Volatile Orga	nic Compoun	ds (GC/MS	<b>5</b> )						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND ND		1.0	0.53	ug/L			11/19/18 22:23	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	97		74 - 123					11/19/18 22:23	1
Toluene-d8 (Surr)	102		79 - 122					11/19/18 22:23	1
4-Bromofluorobenzene (Surr)	102		78 - 119					11/19/18 22:23	1
Dibromofluoromethane (Surr)	98		70 - 120					11/19/18 22:23	1
1,2-Dichloroethane-d4 (Surr)	93		70 - 120					11/19/18 22:23	1

Method: NWTPH-Gx - Nort	hwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			11/18/18 00:45	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		50 - 150			=		11/18/18 00:45	1
Trifluorotoluene (Surr)	109		50 - 150					11/18/18 00:45	1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81704-1

11/19/18 18:24

%Rec.

Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-289246/23 **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA

Analysis Batch: 289246

Analysis Baton, 2002-10									
	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			11/19/18 18:24	1
	МВ	MB							
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	96		74 - 123			-		11/19/18 18:24	1
Toluene-d8 (Surr)	101		79 - 122					11/19/18 18:24	1
4-Bromofluorobenzene (Surr)	97		78 - 119					11/19/18 18:24	1
Dibromofluoromethane (Surr)	95		70 - 120					11/19/18 18:24	1

Lab Sample ID: LCS 580-289246/24 Client Sample ID: Lab Control Sample **Matrix: Water Prep Type: Total/NA** 

70 - 120

Analysis Batch: 289246

1,2-Dichloroethane-d4 (Surr)

Spike LCS LCS Analyte Added Result Qualifier Unit

D %Rec Limits Benzene 10.0 10.1 ug/L 101 37 - 151 LCS LCS

Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	95		74 - 123
Toluene-d8 (Surr)	98		79 - 122
4-Bromofluorobenzene (Surr)	97		78 - 119
Dibromofluoromethane (Surr)	97		70 - 120
1,2-Dichloroethane-d4 (Surr)	84		70 - 120

Lab Sample ID: LCSD 580-289246/25 **Client Sample ID: Lab Control Sample Dup** Prep Type: Total/NA **Matrix: Water** 

Analysis Batch: 289246

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	10.0	9.58		ug/L		96	37 - 151	5	30

	LCSD	LCSD		
Surrogate	%Recovery	Qualifier	Limits	
Trifluorotoluene (Surr)	94		74 - 123	
Toluene-d8 (Surr)	100		79 - 122	
4-Bromofluorobenzene (Surr)	100		78 - 119	
Dibromofluoromethane (Surr)	95		70 - 120	
1,2-Dichloroethane-d4 (Surr)	84		70 - 120	
<u></u>				

Lab Sample ID: 580-81704-1 MS Client Sample ID: Outfall #002 **Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 289246** 

	Sample	Sample	Spike	MS	MS				%Rec.	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Renzene	ND		11.6	12.3		ua/l		105	37 151	

Benzene	ND		11.6	12.3	ug/L	 105	37 - 151	
	MS	MS						
Surrogate	%Recovery	Qualifier	Limits					
Trifluorotoluene (Surr)	98		74 - 123	-				
Toluene-d8 (Surr)	104		79 - 122					

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81704-1

## Method: 624 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 580-81704-1 MS

**Matrix: Water** 

**Analysis Batch: 289246** 

Client Sample ID: Outfall #002 Prep Type: Total/NA

MS MS %Recovery Qualifier Surrogate Limits 4-Bromofluorobenzene (Surr) 103 78 - 119 Dibromofluoromethane (Surr) 100 70 - 120 1,2-Dichloroethane-d4 (Surr) 89 70 - 120

Lab Sample ID: 580-81704-1 MSD

**Matrix: Water** 

**Analysis Batch: 289246** 

Client Sample ID: Outfall #002 **Prep Type: Total/NA** 

Prep Batch: 288778

	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	ND		11.6	12.4		ug/L		107	37 - 151	1	30

MSD MSD Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 74 - 123 98 Toluene-d8 (Surr) 100 79 - 122 100 78 - 119 4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr) 100 70 - 120 1,2-Dichloroethane-d4 (Surr) 91 70 - 120

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

Lab Sample ID: MB 580-288778/1-A Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 289188** 

MB MB Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac Benzo[a]anthracene 0.050 0.014 ug/L 11/13/18 13:58 11/17/18 13:13 ND ND Benzo[a]pyrene 0.10 0.011 ug/L 11/13/18 13:58 11/17/18 13:13 ND 0.011 ug/L Benzo[b]fluoranthene 0.050 11/13/18 13:58 11/17/18 13:13 Benzo[k]fluoranthene ND 0.050 0.012 ug/L 11/13/18 13:58 11/17/18 13:13 Chrysene ND 0.016 ug/L 11/13/18 13:58 11/17/18 13:13 0.10 ND 0.10 0.010 ug/L 11/13/18 13:58 11/17/18 13:13 Dibenz(a,h)anthracene ND 0.050 Indeno[1,2,3-cd]pyrene 0.014 ug/L 11/13/18 13:58 11/17/18 13:13

MB MB Limits Surrogate Qualifier Prepared Dil Fac %Recovery Analyzed Terphenyl-d14 84 53 - 120 <u>11/13/18 13:58</u> <u>11/17/18 13:13</u>

Lab Sample ID: LCS 580-288778/2-A

**Matrix: Water** 

**Analysis Batch: 289188** 

Client Sample ID: Lab Control Sample Prep Type: Total/NA Prep Batch: 288778

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	3.53		ug/L		88	61 - 120	
Benzo[a]pyrene	4.00	3.47		ug/L		87	65 - 120	
Benzo[b]fluoranthene	4.00	3.62		ug/L		90	58 - 120	
Benzo[k]fluoranthene	4.00	3.67		ug/L		92	58 - 120	
Chrysene	4.00	3.35		ug/L		84	58 - 120	
Dibenz(a,h)anthracene	4.00	3.84		ug/L		96	60 - 125	

TestAmerica Job ID: 580-81704-1

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

56 - 120

Client Sample ID: Outfall #002

Client Sample ID: Outfall #002

Prep Type: Total/NA

Prep Type: Total/NA

**Prep Type: Total/NA** 

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: LCS 580-288778/2-A **Client Sample ID: Lab Control Sample Matrix: Water Prep Type: Total/NA Prep Batch: 288778 Analysis Batch: 289188** LCS LCS Spike %Rec. Added Result Qualifier Limits Analyte Unit D %Rec Indeno[1,2,3-cd]pyrene 4.00 3.80 ug/L 95 56 - 120 LCS LCS Surrogate %Recovery Qualifier Limits

53 - 120

Lab Sample ID: LCSD 580-288778/3-A

**Matrix: Water** 

Analysis Batch: 289188							Prep Ba	tch: 28	88778
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	3.61		ug/L		90	61 - 120	2	16
Benzo[a]pyrene	4.00	3.47		ug/L		87	65 - 120	0	17
Benzo[b]fluoranthene	4.00	3.82		ug/L		96	58 - 120	6	20
Benzo[k]fluoranthene	4.00	3.81		ug/L		95	58 - 120	4	20
Chrysene	4.00	3.44		ug/L		86	58 - 120	3	16
Dibenz(a,h)anthracene	4.00	3.99		ug/L		100	60 - 125	4	15

3.93

ug/L

4.00

LCSD LCSD Surrogate %Recovery Qualifier Limits Terphenyl-d14 83 53 - 120

Lab Sample ID: 580-81704-1 MS

**Matrix: Water** 

Indeno[1,2,3-cd]pyrene

Terphenyl-d14

Analysis Batch: 289188	Sample	Sample	Spike	MS	MS				Prep Batch: 288778 %Rec.
Analyte	•	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits
Benzo[a]anthracene	ND		4.08	3.22		ug/L		79	61 - 120
Benzo[a]pyrene	ND		4.08	3.18		ug/L		78	65 - 120
Benzo[b]fluoranthene	ND		4.08	3.57		ug/L		87	58 - 120
Benzo[k]fluoranthene	ND		4.08	3.16		ug/L		77	58 - 120
Chrysene	ND		4.08	3.11		ug/L		76	58 - 120
Dibenz(a,h)anthracene	ND		4.08	3.51		ug/L		86	60 - 125
Indeno[1,2,3-cd]pyrene	ND		4.08	3.52		ug/L		86	56 - 120

MS MS Surrogate %Recovery Qualifier Limits 53 - 120 Terphenyl-d14 63

Lab Sample ID: 580-81704-1 MSD

**Matrix: Water** 

Analysis Batch: 289188									Prep Ba	tch: 28	38778
	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	ND		4.01	3.54		ug/L		88	61 - 120	9	16
Benzo[a]pyrene	ND		4.01	3.42		ug/L		85	65 - 120	7	17
Benzo[b]fluoranthene	ND		4.01	3.82		ug/L		95	58 - 120	7	20
Benzo[k]fluoranthene	ND		4.01	3.41		ug/L		85	58 - 120	8	20
Chrysene	ND		4.01	3.39		ug/L		84	58 - 120	9	16

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

Lab Sample ID: 580-81704 Matrix: Water Analysis Batch: 289188	I-1 MSD						С	lient Sa	ample ID: Outfall #0 Prep Type: Total/ Prep Batch: 2887			
•	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Dibenz(a,h)anthracene	ND		4.01	3.70		ug/L		92	60 - 125	5	15	
Indeno[1,2,3-cd]pyrene	ND		4.01	3.70		ug/L		92	56 - 120	5	15	
	MSD	MSD										
Surrogate	%Recovery	Qualifier	Limits									
Terphenyl-d14	70		53 - 120									

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

Lab Sample ID: MB 580-289 Matrix: Water Analysis Batch: 289142	142/6						Client Sam	ple ID: Method Prep Type: To	
	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			11/16/18 17:43	1
	MB	MB							
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		50 - 150			=		11/16/18 17:43	1
Trifluorotoluene (Surr)	120		50 - 150					11/16/18 17:43	1

Lab Sample ID: LCS 580- Matrix: Water Analysis Batch: 289142	289142/7					Clie	nt Sa	mple ID	: Lab Contro Prep Type:	•
			Spike	LCS	LCS				%Rec.	
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits	
Gasoline			1.00	0.925		mg/L		93	79 - 120	
	LCS	LCS								
Surrogate	%Recovery	Qualifier	Limits							
4-Bromofluorobenzene (Surr)	96		50 - 150							
Trifluorotoluene (Surr)	113		50 - 150							

Tillidorololiderie (Surr)	113	30 - 730	
Lab Sample ID: LCSD 580-28 Matrix: Water Analysis Batch: 289142	9142/8		Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Gasoline	 1.00	0.884		mg/L		88	79 - 120	5	10

Gasonile			1.00	0.004	mg/L	00
	LCSD	LCSD				
Surrogate	%Recovery	Qualifier	Limits			
4-Bromofluorobenzene (Surr)	93		50 - 150			
Trifluorotoluene (Surr)	110		50 - 150			

Lab Sample ID: MB 580-289216/6	Client Sample ID: Method Blank
Matrix: Water	Prep Type: Total/NA
Analysis Patch: 289216	

_	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			11/17/18 19:19	1

6

TestAmerica Job ID: 580-81704-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

	MB	MB				
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		50 - 150		11/17/18 19:19	1
Trifluorotoluene (Surr)	110		50 - 150		11/17/18 19:19	1

Lab Sample ID: LCS 580-289216/7 **Client Sample ID: Lab Control Sample Matrix: Water Prep Type: Total/NA Analysis Batch: 289216** Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Gasoline 1.00 0.938 mg/L 79 - 120 94 LCS LCS Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 50 - 150 94 Trifluorotoluene (Surr) 98 50 - 150

Lab Sample ID: LCSD 580-289216/8 **Client Sample ID: Lab Control Sample Dup Matrix: Water Prep Type: Total/NA Analysis Batch: 289216** Spike LCSD LCSD %Rec. **RPD** Added Result Qualifier Unit Limits RPD Limit **Analyte** D %Rec Gasoline 1.00 0.915 mg/L 91 79 - 120 LCSD LCSD

Trifluorotoluene (Surr) 97 50 - 150

Lab Sample ID: 580-81704-1 MS
Matrix: Water Client Sample ID: Outfall #002
Prep Type: Total/NA

Limits

50 - 150

Analysis Batch: 289216

4-Bromofluorobenzene (Surr)

Surrogate

	Sample	Sample	Spike	MS	MS				%Rec.	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Gasoline	ND		1.00	0.859		mg/L		86	79 - 120	
	MS	MS								
Currente	0/ Daggyamy	Ouglifier	Limito							

 Surrogate
 %Recovery
 Qualifier
 Limits

 4-Bromofluorobenzene (Surr)
 96
 50 - 150

 Trifluorotoluene (Surr)
 111
 50 - 150

%Recovery Qualifier

95

Lab Sample ID: 580-81704-1 MSD

Matrix: Water

Client Sample ID: Outfall #002

Prep Type: Total/NA

Analysis Batch: 289216

Analysis Duton. 2002 10												
	Sample	Sample	Spike	MSD	MSD				%Rec.		RPD	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Gasoline	ND		1.00	0.854		mg/L		85	79 - 120	0	10	

	MSD	MSD	
Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	91		50 - 150
Trifluorotoluene (Surr)	114		50 - 150

Client: ARCADIS U.S. Inc

TestAmerica Job ID: 580-81704-1

Project/Site: Edmonds Terminal

## Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-289086/1-B

**Matrix: Water** 

**Analysis Batch: 289151** 

Client Sample ID: Method Blank Prep Type: Total/NA

Prep Batch: 289086

MB MB Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac #2 Diesel (C10-C24)  $\overline{\mathsf{ND}}$ 0.11 0.065 mg/L 11/16/18 10:14 11/17/18 02:53 Motor Oil (>C24-C36) ND 0.35 11/16/18 10:14 11/17/18 02:53 0.096 mg/L

MB MB

%Recovery Qualifier Limits Surrogate Prepared Analyzed Dil Fac o-Terphenyl 89 50 - 150 <u>11/16/18 10:14</u> <u>11/17/18 02:53</u>

**Client Sample ID: Lab Control Sample** 

Lab Sample ID: LCS 580-289086/2-B

Analysis Batch: 289151

**Matrix: Water** Prep Type: Total/NA Prep Batch: 289086

%Rec.

LCS LCS Spike Limits **Analyte** Added Result Qualifier Unit D %Rec #2 Diesel (C10-C24) 2.00 1.46 73 50 - 120 mg/L Motor Oil (>C24-C36) 2.00 1.62 81 64 - 120 mg/L

LCS LCS

%Recovery Qualifier Limits Surrogate o-Terphenyl 50 - 150 95

Lab Sample ID: LCSD 580-289086/3-B

**Matrix: Water** 

**Analysis Batch: 289151** 

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA Prep Batch: 289086

Spike LCSD LCSD %Rec. **RPD** Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit #2 Diesel (C10-C24) 2.00 1.68 mg/L 84 50 - 120 14 26 2.00 Motor Oil (>C24-C36) 1.78 89 64 - 120mg/L 9 24

LCSD LCSD

Surrogate %Recovery Qualifier Limits o-Terphenyl 107 50 - 150

Lab Sample ID: 580-81704-1 MS

**Matrix: Water** 

**Analysis Batch: 289151** 

Client Sample ID: Outfall #002 Prep Type: Total/NA

Prep Batch: 289086

%Rec.

MS MS Sample Sample Spike Analyte Result Qualifier Added Result Qualifier Unit %Rec Limits #2 Diesel (C10-C24) 0.076 JF1 2.05 0.0695 J F1 mg/L -0.3 50 - 120 Motor Oil (>C24-C36) ND F1 2.05 ND F1 mg/L 0 64 - 120

MS MS

Limits Surrogate %Recovery Qualifier 98 50 - 150 o-Terphenyl

Lab Sample ID: 580-81704-1 MSD

**Matrix: Water** 

**Analysis Batch: 289151** 

Client Sample ID: Outfall #002 Prep Type: Total/NA

**Prep Batch: 289086** 

Sample Sample Spike MSD MSD %Rec. **RPD** Result Qualifier Added Result Qualifier Unit %Rec Limits **RPD** Limit Analyte D 0.076 JF1 ND F1 #2 Diesel (C10-C24) 2.03 mg/L 0 50 - 120 NC 26 Motor Oil (>C24-C36) ND F1 2.03 ND F1 mg/L 0 64 - 120 NC 24

## **QC Sample Results**

Client: ARCADIS U.S. Inc
Project/Site: Edmonds Terminal

TestAmerica Job ID: 580-81704-1

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: 580-81704-1 MSD Client Sample ID: Outfall #002

Matrix: Water Prep Type: Total/NA Analysis Batch: 289151 Prep Batch: 289086

MSD MSD

 4

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5

6

8

9

10

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Lab Sample ID: 580-81704-1

**Matrix: Water** 

Client Sample ID: Outfall #002 Date Collected: 11/07/18 09:30

Date Received: 11/07/18 12:25

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			289246	11/19/18 20:27	E1L	TAL SEA
Total/NA	Prep	3510C			288778	11/13/18 13:58	JSM	TAL SEA
Total/NA	Analysis	8270C SIM		1	289188	11/17/18 19:21	W1T	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	289216	11/18/18 03:26	T1W	TAL SEA
Total/NA	Prep	3510C			289086	11/16/18 10:14	KO	TAL SEA
Total/NA	Cleanup	3630C			289145	11/16/18 15:17	KO	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	289151	11/17/18 03:53	TL1	TAL SEA

Lab Sample ID: 580-81704-2 **Client Sample ID: Dup-1** 

Date Collected: 11/07/18 00:01 **Matrix: Water** 

Date Received: 11/07/18 12:25

_	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			289246	11/19/18 21:41	E1L	TAL SEA
Total/NA	Prep	3510C			288778	11/13/18 13:58	JSM	TAL SEA
Total/NA	Analysis	8270C SIM		1	289188	11/17/18 20:34	W1T	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	289142	11/17/18 03:38	CJB	TAL SEA
Total/NA	Prep	3510C			289086	11/16/18 10:14	KO	TAL SEA
Total/NA	Cleanup	3630C			289145	11/16/18 15:17	KO	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	289151	11/17/18 04:53	TL1	TAL SEA

Lab Sample ID: 580-81704-3 **Client Sample ID: Trip Blank** Date Collected: 11/07/18 00:01

Date Received: 11/07/18 12:25

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			289246	11/19/18 22:23	E1L	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	289216	11/18/18 00:45	T1W	TAL SEA

#### **Laboratory References:**

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

TestAmerica Seattle

**Matrix: Water** 

## **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc
Project/Site: Edmonds Terminal

TestAmerica Job ID: 580-81704-1

## **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	<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	11-05-19
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

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## **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81704-1

Lab Sample ID	Client Sample ID	Matrix	Collected Received
580-81704-1	Outfall #002	Water	11/07/18 09:30 11/07/18 12:25
580-81704-2	Dup-1	Water	11/07/18 00:01 11/07/18 12:25
580-81704-3	Trip Blank	Water	11/07/18 00:01 11/07/18 12:25

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THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com Loc: 580 81704

Short Hold

Rush

Chain of **Custody Record** 

Client Avcadis		Client Contact	Peter	Camp	obell		Date 11/7/1	8	Chain of Custody N	<sup>umber</sup> 36991
Address (100 olive way, Svite	800	Telephone Nun	nber (Area Code)/I	Fax Number			Lab Number		Page	of \
Seattle State Zip C		Sampler TUSUN	Little	Lab Contact Eluine	waike	A S S	nalysis (Attach list if ore space is needed)			
Project Name and Location (State) Edmonds Terming1		Billing Contact				\$ x 3 0			Special	Instructions/
Contract/Purchase Order/Quote No.			Matrix	Containe Preserva		Benzene Ei JWTPH-G NWTPH-DX OPAHS 827			Condition	ns of Receipt
Sample I.D. and Location/Description (Containers for each sample may be combined on one line)	Date 1	ime Aric	Sed.	Unpres. HZS04 HNO3 HCI	NaOH ZnAc/ NaOH	Benzene NWTPH- NWTPH-F				
	117/18 09	30 X	<del>/</del>	2 8		XXXX			PH = =	1.8
Dup-1		$\neg \mid X$		2 8		XXXX			PH	
outfall #002 MS	09	35 X		2 8		XXXX			pit	
outfair # OOZ MSD	4 09	40 X	d :	2 8		XXXX			DH	
Trip Blank		$\neg \mid X$		0		XX			1	
									* cese	Standard
									566	
580-81704 Chain of Custody	Cooler Packin Cust. S	DSC: Note of Seal: Ves_None,	FedEx UPS:_ 0_\frac{1}{2} Lab C	x:	Cooler Ds Packing:_ Cust. Seal	c: Med Blue	FedEx: UPS: Lab Cour:  Other:		w/ qua	ene & CPAH Attative SStham
Cooler Possible Haza  ☐ Yes ☐ No Cooler Temp: ☐ Non-Haza.	ard Identification rd 🏻 Flammabl	- C (i)		D	1		Disposal By Lab		(A fee may be as	sessed if samples
Turn Around Time Required (business days)  24 Hours 48 Hours 5 Days 10 Days	***************************************	e □ Skin li □ Other	ritant 🗆 Pol	QC Requireme	known 🗀 Re ents (Specify)	num 10 Cilent L	Archive For	Months	are retained long	er than 1 month)
1. Relinquished By Sign/Print Evic Vvuege	1 (	Date 1/7/18	Time 1ZZS	1. Received By	11/5	rancisco	Luna, Jr.	,	Date 11/7/18	Time 1225
2. Relinquished By Sign/Pron	1	Date	Time	2. Received By	/ Sign/Print		/		Date	Time
3. Relinquished By Sign/Print	L	Pate	Time	3. Received By	Sign/Print				Date	Time
Comments										

Client: ARCADIS U.S. Inc

Job Number: 580-81704-1

Login Number: 81704 List Source: TestAmerica Seattle

List Number: 1

Creator: Gall, Brandon A

Creator. Gail, Brandon A		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td>Lab does not accept radioactive samples.</td>	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	N/A	
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	
OC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
the Field Sampler's name present on COC?	True	
here are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate ITs)	True	
ample containers have legible labels.	True	
Containers are not broken or leaking.	True	
ample collection date/times are provided.	True	
ppropriate sample containers are used.	True	
sample bottles are completely filled.	True	
ample 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	
fultiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



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: 580-81805-1 Client Project/Site: Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

Knistène D. allen

Authorized for release by: 12/3/2018 3:31:12 PM

Kristine Allen, Manager of Project Management

(253)248-4970

kristine.allen@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

·····LINKS ······

Review your project results through
Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81805-1

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#### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81805-1

Job ID: 580-81805-1

Laboratory: TestAmerica Seattle

Narrative

Job Narrative 580-81805-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 11/13/2018 11:58 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was  $0.6^{\circ}$  C.

#### GC/MS VOA

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

#### GC/MS Semi VOA

Method(s) 8270C SIM, 8270D SIM: The following sample was diluted due to the nature of the sample matrix: Outfall #002 (580-81805-1). Elevated reporting limits (RLs) are provided.

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

#### **GC VOA**

Method(s) NWTPH-Gx: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batch 490-559784.

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

#### GC Semi VOA

Method(s) NWTPH-Dx: The method blank for preparation batch 580-289897 and analytical batch 580-289986 contained #2 Diesel (C10-C24) above the method detection limit. This target analyte concentration was less than the reporting limit (RL); therefore, re-extraction and/or re-analysis of samples was not performed.

Method(s) NWTPH-Dx: The following sample was prepared outside of preparation holding time due to LCS high: Outfall #002 (580-81805-1) due to a high LCS in the original analysis.

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

#### **Organic Prep**

Method(s) 3510C: The following sample was prepared outside of preparation holding time due to LCS high: Outfall #002 (580-81805-1).

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

#### **VOA Prep**

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

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### **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81805-1

#### **Qualifiers**

#### **GC Semi VOA**

Qualifier	Qualifier Description
В	Compound was found in the blank and sample.
Н	Sample was prepped or analyzed beyond the specified holding time
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

#### **Glossary**

LOQ

MDA

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)

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)

Limit of Quantitation (DoD/DOE)

Minimum Detectable Activity (Radiochemistry)

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)

12/3/2018

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### **Client Sample Results**

RL

1.0

MDL Unit

0.53 ug/L

D

Prepared

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Collected: 11/13/18 10:00

Date Received: 11/13/18 11:58

Analyte

Benzene

Client Sample ID: Outfall #002

Method: 624 - Volatile Organic Compounds (GC/MS)

ND

TestAmerica Job ID: 580-81805-1

Lab Sample ID: 580-81805-1

Matrix: Water

	Г	_

Analyzed	Dil Fac	
11/21/18 15:30	1	
Analyzed	Dil Fac	
11/21/18 15:30	1	

Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
Trifluorotoluene (Surr)	101		74 - 123					11/21/18 15:30	1
Toluene-d8 (Surr)	106		79 - 122					11/21/18 15:30	1
4-Bromofluorobenzene (Surr)	99		78 - 119					11/21/18 15:30	1
Dibromofluoromethane (Surr)	101		70 - 120					11/21/18 15:30	1
1,2-Dichloroethane-d4 (Surr)	89		70 - 120					11/21/18 15:30	1
- Method: 8270C SIM - Semivola	itile Organic Con	npounds (G	C/MS SIM)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.26	0.072	ug/L		11/19/18 08:39	11/22/18 02:17	5
Benzo[a]pyrene	ND		0.51	0.056	ug/L		11/19/18 08:39	11/22/18 02:17	5
Benzo[b]fluoranthene	ND		0.26	0.056	ug/L		11/19/18 08:39	11/22/18 02:17	5
Benzo[k]fluoranthene	ND		0.26	0.062	ug/L		11/19/18 08:39	11/22/18 02:17	5
Chrysene	ND		0.51	0.082	ug/L		11/19/18 08:39	11/22/18 02:17	5
Dibenz(a,h)anthracene	ND		0.51	0.051	ug/L		11/19/18 08:39	11/22/18 02:17	5
Indeno[1,2,3-cd]pyrene	ND		0.26	0.072	ug/L		11/19/18 08:39	11/22/18 02:17	5
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	84		53 - 120				11/19/18 08:39	11/22/18 02:17	5
- Method: NWTPH-Gx - Northwe	st - Volatile Petro	oleum Prod	ucts (GC)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO)	ND		100	55	ug/L			11/27/18 12:58	1
-C6-C12									
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene	91		50 - 150					11/27/18 12:58	1
Method: NWTPH-Dx - Semi-Vo	latile Petroleum	Products by	v NWTPH with	Silica Ge	l Cleanun	1			
Analyte		Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.25	H B	0.11	0.066	mg/L		11/29/18 09:06	11/30/18 20:07	1
Motor Oil (>C24-C36)	0.42	Н	0.35	0.097	mg/L		11/29/18 09:06	11/30/18 20:07	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	97		50 - 150				11/29/18 09:06	11/30/18 20:07	1

### **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81805-1

Lab Sample ID: 580-81805-2

Matrix: Water

Client Sample ID: Trip Blank - 2

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Date Collected: 11/13/18 00:00 Date Received: 11/13/18 11:58

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			11/21/18 15:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	98		74 - 123			-		11/21/18 15:54	1
Toluene-d8 (Surr)	101		79 - 122					11/21/18 15:54	1
4-Bromofluorobenzene (Surr)	98		78 - 119					11/21/18 15:54	1
Dibromofluoromethane (Surr)	100		70 - 120					11/21/18 15:54	1
1,2-Dichloroethane-d4 (Surr)	93		70 - 120					11/21/18 15:54	1

An	alyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	soline Range Organics (GRO) 6-C12	ND		100	55	ug/L			11/27/18 11:47	1
Su	rrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
a,a	a,a-Trifluorotoluene	94		50 - 150					11/27/18 11:47	1

12/3/2018

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Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81805-1

#### Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-289432/5

**Matrix: Water** 

Analyte

Benzene

Analysis Batch: 289432

Client Sample ID: Method Blank

Prep Type: Total/NA

мв мв Result Qualifier RL MDL Unit D Prepared Analyzed Dil Fac 1.0 ND 0.53 ug/L 11/21/18 10:56

MB MB Qualifier Limits Prepared Analyzed Dil Fac Surrogate %Recovery Trifluorotoluene (Surr) 74 - 123 98 11/21/18 10:56 Toluene-d8 (Surr) 101 79 - 122 11/21/18 10:56 100 78 - 119 11/21/18 10:56 4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr) 97 70 - 120 11/21/18 10:56 70 - 120 1,2-Dichloroethane-d4 (Surr) 95 11/21/18 10:56

Lab Sample ID: LCS 580-289432/6

**Matrix: Water** 

Analysis Batch: 289432

Client Sample ID: Lab Control Sample Prep Type: Total/NA

LCS LCS Spike %Rec. Analyte Added Result Qualifier %Rec Unit Limits Benzene 10.0 95 37 - 151 9.52 ug/L

	LCS	LCS	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	99		74 - 123
Toluene-d8 (Surr)	99		79 - 122
4-Bromofluorobenzene (Surr)	102		78 - 119
Dibromofluoromethane (Surr)	102		70 - 120
1,2-Dichloroethane-d4 (Surr)	93		70 - 120

Lab Sample ID: LCSD 580-289432/7

**Matrix: Water** 

Analysis Batch: 289432

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

> %Rec. RPD

Spike LCSD LCSD Analyte Added Result Qualifier Unit D %Rec Limits RPD Limit Benzene 10.0 9.40 ug/L 94 37 - 151

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	96		74 - 123
Toluene-d8 (Surr)	99		79 - 122
4-Bromofluorobenzene (Surr)	99		78 - 119
Dibromofluoromethane (Surr)	101		70 - 120
1,2-Dichloroethane-d4 (Surr)	94		70 - 120
Toluene-d8 (Surr) 4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr)	99 99 101		79 - 122 78 - 119 70 - 120

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

Lab Sample ID: MB 580-289242/1-A Client Sample ID: Method Blank

**Matrix: Water** 

Analysis Batch: 289472

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050	0.014	ug/L		11/19/18 08:39	11/21/18 17:12	1
Benzo[a]pyrene	ND		0.10	0.011	ug/L		11/19/18 08:39	11/21/18 17:12	1
Benzo[b]fluoranthene	ND		0.050	0.011	ua/L		11/19/18 08:39	11/21/18 17:12	1

TestAmerica Seattle

Prep Type: Total/NA

Prep Batch: 289242

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TestAmerica Job ID: 580-81805-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

MR MR

Lab Sample ID: MB 580-289242/1-A

Lab Sample ID: LCS 580-289242/2-A

**Matrix: Water** 

**Matrix: Water** 

**Analysis Batch: 289472** 

Client Sample ID: Method Blank Prep Type: Total/NA

Prep Batch: 289242

	IVID	MID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.050	0.012	ug/L		11/19/18 08:39	11/21/18 17:12	1
Chrysene	ND		0.10	0.016	ug/L		11/19/18 08:39	11/21/18 17:12	1
Dibenz(a,h)anthracene	ND		0.10	0.010	ug/L		11/19/18 08:39	11/21/18 17:12	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.014	ug/L		11/19/18 08:39	11/21/18 17:12	1
1									

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Terphenyl-d14 53 - 120 11/19/18 08:39 11/21/18 17:12 83

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

**Prep Batch: 289242** 

Analysis Batch: 289472 Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit %Rec Limits D Benzo[a]anthracene 4.00 3.87 ug/L 97 61 - 120 4.00 3.42 85 65 - 120 Benzo[a]pyrene ug/L Benzo[b]fluoranthene 4.00 2.99 75 58 - 120 ug/L Benzo[k]fluoranthene 4.00 3.33 58 - 120 ug/L Chrysene 4.00 3.03 ug/L 76 58 - 120 Dibenz(a,h)anthracene 4.00 3.35 ug/L 60 - 125 Indeno[1,2,3-cd]pyrene 4.00 3.22 ug/L 81 56 - 120

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 93 53 - 120

Lab Sample ID: LCSD 580-289242/3-A

**Matrix: Water** 

**Analysis Batch: 289472** 

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 289242

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	3.46		ug/L		87	61 - 120	11	16
Benzo[a]pyrene	4.00	2.89		ug/L		72	65 - 120	17	17
Benzo[b]fluoranthene	4.00	2.66		ug/L		66	58 - 120	12	20
Benzo[k]fluoranthene	4.00	2.84		ug/L		71	58 - 120	16	20
Chrysene	4.00	2.73		ug/L		68	58 - 120	11	16
Dibenz(a,h)anthracene	4.00	2.92		ug/L		73	60 - 125	14	15
Indeno[1,2,3-cd]pyrene	4.00	2.84		ug/L		71	56 - 120	13	15

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 53 - 120 85

TestAmerica Seattle

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81805-1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 490-559784/7

**Matrix: Water** 

Analyte

-C6-C12

Analysis Batch: 559784

Gasoline Range Organics (GRO)

Client Sample ID: Method Blank Prep Type: Total/NA

мв мв RL Result Qualifier MDL Unit D Analyzed Dil Fac Prepared 100 ND 55 ug/L 11/27/18 09:48

MB MB Qualifier Surrogate Limits Prepared Dil Fac %Recovery Analyzed 50 - 150 a,a,a-Trifluorotoluene 90 11/27/18 09:48

Lab Sample ID: LCS 490-559784/5

Analysis Batch: 559784

Client Sample ID: Lab Control Sample **Matrix: Water** Prep Type: Total/NA

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Gasoline Range Organics (GRO) 1000 934 ug/L 93 39 - 143

-C6-C12

LCS LCS %Recovery Qualifier I imits Surrogate a,a,a-Trifluorotoluene 86 50 - 150

Lab Sample ID: LCSD 490-559784/6

**Matrix: Water** 

Analysis Batch: 559784

LCSD LCSD %Rec. RPD Spike Analyte Added Result Qualifier Unit D %Rec Limits RPD Limit 1000 Gasoline Range Organics (GRO) 950 ug/L 39 - 143 18

-C6-C12

LCSD LCSD

Surrogate %Recovery Qualifier Limits a,a,a-Trifluorotoluene 82 50 - 150

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

MB MB

MB MB

Lab Sample ID: MB 580-289897/1-B

**Matrix: Water** 

#2 Diesel (C10-C24)

Analysis Batch: 289986

Client Sample ID: Method Blank Prep Type: Total/NA

mg/L

Analyte Result Qualifier RL MDL Unit Prepared Analyzed #2 Diesel (C10-C24) 0.0687 0.11 0.065 mg/L 11/29/18 09:06 11/30/18 16:50 Motor Oil (>C24-C36) ND 0.35 0.096 mg/L 11/29/18 09:06 11/30/18 16:50

Dil Fac Surrogate %Recovery Qualifier Limits Prepared Analyzed o-Terphenyl 50 - 150 11/29/18 09:06 11/30/18 16:50 94

Lab Sample ID: LCS 580-289897/2-B

**Matrix: Water** 

Analysis Batch: 289986 Spike LCS LCS %Rec. Added Qualifier Limits Analyte Result Unit %Rec

2.04

2.00

TestAmerica Seattle

Page 9 of 18

Prep Type: Total/NA

Client Sample ID: Lab Control Sample Dup

**Prep Batch: 289897** 

**Prep Batch: 289897** 

102

50 - 120

### **QC Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Lab Sample ID: LCSD 580-289897/3-B

Surrogate

o-Terphenyl

TestAmerica Job ID: 580-81805-1

Client Sample ID: Lab Control Sample Dup

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Clea	nup
(Continued)	

%Recovery Qualifier

93

Lab Sample ID: LCS 580-28	9897/2-B						Client	Sample	ID: Lab Cor	trol Sample
Matrix: Water									Prep Ty	pe: Total/NA
Analysis Batch: 289986									Prep Ba	tch: 289897
			Spike	LCS	LCS				%Rec.	
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits	
Motor Oil (>C24-C36)			2.00	2.30		mg/L		115	64 - 120	
	LCS	LCS								
Surrogate	%Recovery	Qualifier	Limits							
o-Terphenyl	88		50 - 150							

Matrix: Water							Prep T	ype: Tot	al/NA
Analysis Batch: 289986							Prep I	Batch: 2	89897
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
#2 Diesel (C10-C24)	2.00	2.01	-	mg/L		101	50 - 120	1	26
Motor Oil (>C24-C36)	2.00	2.27		mg/L		113	64 - 120	1	24
LCS	SD LCSD								

Limits

50 - 150

#### **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Collected: 11/13/18 10:00

Date Received: 11/13/18 11:58

Client Sample ID: Outfall #002

TestAmerica Job ID: 580-81805-1

Lab Sample ID: 580-81805-1

Matrix: Water

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	289432	11/21/18 15:30	W1T	TAL SEA
Total/NA	Prep	3510C			289242	11/19/18 08:39	ко	TAL SEA
Total/NA	Analysis	8270C SIM		5	289472	11/22/18 02:17	T1W	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	559784	11/27/18 12:58	GWM	TAL NSH
Total/NA	Prep	3510C			289897	11/29/18 09:06	KO	TAL SEA
Total/NA	Cleanup	3630C			289951	11/29/18 15:16	KO	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	289986	11/30/18 20:07	TL1	TAL SEA

Client Sample ID: Trip Blank - 2

Lab Sample ID: 580-81805-2 Date Collected: 11/13/18 00:00 **Matrix: Water** 

Date Received: 11/13/18 11:58

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	289432	11/21/18 15:54	W1T	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	559784	11/27/18 11:47	GWM	TAL NSH

#### Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

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

### **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81805-1

#### **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	<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
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

#### Laboratory: TestAmerica Nashville

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
A2LA	ISO/IEC 17025		0453.07	12-31-19
Alaska (UST)	State Program	10	UST-087	06-30-19
Arizona	State Program	9	AZ0473	05-05-19
Arkansas DEQ	State Program	6	88-0737	04-25-19
California	State Program	9	2938	10-31-18 *
Connecticut	State Program	1	PH-0220	12-31-19
Florida	NELAP	4	E87358	06-30-19
Georgia	State Program	4	NA: NELAP & A2LA	12-31-19
Illinois	NELAP	5	200010	12-09-18
lowa	State Program	7	131	04-01-20
Kansas	NELAP	7	E-10229	10-31-18 *
Kentucky (UST)	State Program	4	19	06-30-19
Kentucky (WW)	State Program	4	90038	12-31-18
Louisiana	NELAP	6	30613	06-30-19
Maine	State Program	1	TN00032	11-03-19
Maryland	State Program	3	316	03-31-19
Massachusetts	State Program	1	M-TN032	06-30-19
Minnesota	NELAP	5	047-999-345	12-31-18
Mississippi	State Program	4	N/A	06-30-19
Montana (UST)	State Program	8	NA	02-24-20
Nevada	State Program	9	TN00032	07-31-19
New Hampshire	NELAP	1	2963	10-09-19
New Jersey	NELAP	2	TN965	06-30-19
New York	NELAP	2	11342	03-31-19
North Carolina (WW/SW)	State Program	4	387	12-31-18
North Dakota	State Program	8	R-146	06-30-19
Ohio VAP	State Program	5	CL0033	07-06-19
Oklahoma	State Program	6	9412	08-31-19
Oregon	NELAP	10	TN200001	04-26-19
Pennsylvania	NELAP	3	68-00585	07-31-19
Rhode Island	State Program	1	LAO00268	12-30-18
South Carolina	State Program	4	84009 (001)	02-28-19
Tennessee	State Program	4	2008	02-23-20
Texas	NELAP	6	T104704077	08-31-19
USDA	Federal		P330-13-00306	12-01-19
Utah	NELAP	8	TN00032	07-31-19

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Seattle

### **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81805-1

#### Laboratory: TestAmerica Nashville (Continued)

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

Authority	Program	EPA Region	Identification Number	<b>Expiration Date</b>
Virginia	NELAP	3	460152	06-14-19
Washington	State Program	10	C789	07-19-19
West Virginia DEP	State Program	3	219	02-28-19
Wisconsin	State Program	5	998020430	08-31-19
Wyoming (UST)	A2LA	8	453.07	12-31-19

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### **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-81805-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-81805-1	Outfall #002	Water	11/13/18 10:00	11/13/18 11:58
580-81805-2	Trip Blank - 2	Water	11/13/18 00:00	11/13/18 11:58

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710/2/1/12/E			

THE LEADER IN ENVIRONMENTAL TESTING

**TestAmerica Seattle** 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Rush	
Short	Hold

Chain of Custody Record

Client Arcadis		Client Conta	Des	tev	$\alpha$	LWÍ	mai				Date	11/13	5/18	C	hain of Custo		4920
1100 Olive way, Sui	te 800	Telephone N	lumber (Area Code	e)/Fax I	Number						Lab Nu			P	age	nf	
City Scattle WA	Zip Code 9810 (		Little	Lab	Contact		wan	4.5	\$3.5	Ana Anore	lysis (Att	tach list i is needed	f i) 			Loc: 580 8180	
Project Name and Location (State) Edmonds Termina	n I	Billing Conta	ect	- <b>-</b>			····	₹.		أذبيات							3/
Contract/Purchase Order/Quote No.			Matrix			ntainer eservat		Conc	NWYKH-GX	CZ+H5 8230					(		ipt
Sample I.D. and Location/Description (Containers for each sample may be combined on one lin	ne) Date	Time '₹	Aqueous Sed. Soil	Unpres.	H2S04 HN03		NaOH ZnAc/ NaOH	Benzene	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	CA							
Outfair # 002	11/13/18 1	000	X	2		8		$\langle \chi \rangle$	X	X					PH=	8.66	7
Trip Blank		/	X	3 1		6		Y	4						مر، خلد	e c L 2.	ام ده ۱ و د
															7 us 59		<u>ndavd</u>
															* Bev	17ene	s crans
	580-81805 Cha	ain of Custody					Coo Pac Cus	oler Dsc king: st. Seal:	:_fh Bo Yes_	6	I	• Unc: FedEx:_ TPS:_ Lab Cou			way	ventit	utive
							Blue	e Ice, V	િલ, Di	ry, None	•	Other:					
☐ Yes ☐ No Cooler Temp: ☐ Non	e Hazard Identification -Hazard 🗀 Flamma	ble □ Skii	n Irritant 🗆 I	Poison			nown 🗆 i	nple Disp Return Ti			Disposa: Archive		Mo	onths	(A fee may L are retained		
Turn Around Time Required (business days)  24 Hours	Days 🗌 15 Days	☐ Other			QC Requ	iiremei	ts (Specify)										
1. Relinguished By Sign/Print  2. Helinguished By Sign/Print		Date	Time				Sign/Prin Sign/Prin	Fra	nlil	ee l	uni	y Jr			Date     /{3/i3 Date	Time	8
3. Relinquished By Sign/Print		Date	Time		3. Recei	ved By	Sign/Print	!		<del></del>					Date	Time	
Comments											·····				·····		······································



### **COOLER RECEIPT FORM**



Cooler Received/Opened On11/27/2018@_0925	
Time Samples Removed From Cooler 10 - 53 Time Samples Placed In Storage 1. Tracking # 7469 (last 4 digits, FedEx) Courier: FedEx	(2 Hour Window)
	-
IR Gun ID_31470368 pH Strip Lot Chlorine Strip Lot	
2. Temperature of rep. sample or temp blank when opened:	-
3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen?	YES NONA
4. Were custody seals on outside of cooler?  If yes, how many and where:	YESNONA
If yes, how many and where:	<del></del>
5. Were the seals intact, signed, and dated correctly?	ESNONA
6. Were custody papers inside cooler?	MESNONA
I certify that I opened the cooler and answered questions 1-6 (initial)	
7. Were custody seals on containers: YES NO and Intact	YESNONA
Were these signed and dated correctly?	YESNO.
8. Packing mat'l used? Bubblewap Plastic bag Peanuts Vermiculite Foam Insert Pape	er Other None
9. Cooling process: Ice lice-pack lice (direct contact) Dry ice	Other None
10. Did all containers arrive in good condition (unbroken)?	€\$NONA
11. Were all container labels complete (#, date, signed, pres., etc)?	YESNONA
12. Did all container labels and tags agree with custody papers?	YE\$NONA
13a. Were VOA vials received?	YESNONA
b. Was there any observable headspace present in any VOA vial?	YES. NO. NA
Larger than this.	
14. Was there a Trip Blank in this cooler? YESNONA If multiple coolers, sequence	e #
I certify that I unloaded the cooler and answered questions 7-14 (intial)	
15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level?	YESNONA
b. Did the bottle labels indicate that the correct preservatives were used	YESNONA
16. Was residual chlorine present?	YESNO. NA
1 certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (intial)	22
17. Were custody papers properly filled out (ink, signed, etc)?	YESNONA
18. Did you sign the custody papers in the appropriate place?	YESNONA
19. Were correct containers used for the analysis requested?	YESNONA
20. Was sufficient amount of sample sent in each container?	ESNONA
certify that I entered this project into LIMS and answered questions 17-20 (intial)	27
I certify that I attached a label with the unique LIMS number to each container (intial)	<del>-</del>
21. Were there Non-Conformance issues at login? YES. NO Was a NCM generated? YES. NO	<b>‡</b>

12/3/2018

Ver: 09/20/2016

Date/Time:

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Cooler Temperature(s) °C and Other Remarks:

Received by:

Company

Date/Time:

0 - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 I - Acetone U - Acetone V - MCAA W - pH 4-5 Z - other (specify) HE LEADER IN ENVIRONMENTAL TESTING estAmerica SAS votes: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyse & accreditation compliance upon out subcontract laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to 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. Special Instructions/Note: Company Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)

Return To Client Disposal By Lab Archive For Mont Preservation Codes C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid 10-61549.1 age: Page 1 of 1 Job#; 580-81805-1 I - Ice J - Di Water K - EDTA L - EDA 8)/11//J Total Number of containers ന Ŋ 580-81805 Method of Shipment Washington **Analysis Requested** E S Special Instructions/QC Requirements: Received by: Auligatury elaine.walker@testamericainc.com Accreditations Required (See note): Received by: Lab PM: Walker, Elaine M E-Mail: Chain of Custody Record × × NWTPH\_Gx/5030B C6-C12 Range (ON TO COM) (CEMENTATION OF Time: Company 74-Sea Field Filtered Sample (Yes or No) BT=Tissue, A=A Matrix Water Water Preservation Code Type (C=comp, G=grab) Sample Primary Deliverable Rank: 2 Sample Pacific 10:00 Pacific TAT Requested (days): Due Date Requested: 11/26/2018 Sample Date 11/13/18 11/13/18 Project #: 58011413 Phone: Jeliverable Requested: I, II, III, IV, Other (specify) Client Information (Sub Contract Lab) Sample Identification - Client ID (Lab ID) Phone (253) 922-2310 Fax (253) 922-5047 615-726-0177(Tel) 615-726-3404(Fax) ossible Hazard Identification TestAmerica Laboratories, Inc. 2960 Foster Creighton Drive, **Chevron Edmonds Terminal** rip Blank - 2 (580-81805-2) Jutfall #002 (580-81805-1) Empty Kit Relinquished by: Tacoma, WA 98424 5755 8th Street East Shipping/Receiving Project Name: Edmonds Terminal elinquished by: elinquished by: State, Zip: TN, 37204 Nashville

**TestAmerica Seattle** 

Custody Seals Intact: △ Yes △ No

linquished by:

Custody Seal No.:

### **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 580-81805-1

Login Number: 81805 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

oreator. Hobbs, Refineth i	
Question	Answer Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td>	N/A
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
s the Field Sampler's name present on COC?	True
here 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
here 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
flultiphasic samples are not present.	True
Samples do not require splitting or compositing.	True
Residual Chlorine Checked.	N/A

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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: 580-82036-1 Client Project/Site: Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

Kristiene D. allen

Authorized for release by: 12/3/2018 1:55:16 PM

Kristine Allen, Manager of Project Management (253)248-4970

kristine.allen@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

----- Links -----

Review your project results through

Total Access

**Have a Question?** 



Visit us at:
www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82036-1

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#### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82036-1

Job ID: 580-82036-1

Laboratory: TestAmerica Seattle

Narrative

Job Narrative 580-82036-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 11/21/2018 12:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.5° C.

#### GC/MS VOA

Method(s) NWTPH-Gx: The following continuing calibration verification (CCV) standard associated with batch 580-289814 recovered outside acceptance criteria for %D for surrogate Trifluorotoluene (Surr). Since the %Rec is within the acceptance criteria for the surrogate in the CCV and associated samples, the data have been reported. The following samples are impacted: Outfall #002 (580-82036-1), Trip Blank (580-82036-2), (CCV 580-289814/16), (CCV 580-289814/27) and (CCV 580-289814/5)

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

#### GC/MS Semi VOA

Method(s) 8270C SIM, 8270D SIM: Surrogate recovery for the following sample was outside control limits: Outfall #002 (580-82036-1). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

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

#### GC Semi VOA

Method(s) NWTPH-Dx: The method blank for preparation batch 580-289897 and analytical batch 580-289986 contained #2 Diesel (C10-C24) above the method detection limit. This target analyte concentration was less than the reporting limit (RL); therefore, re-extraction and/or re-analysis of samples was not performed.

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

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TestAmerica Seattle 12/3/2018

### **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82036-1

#### **Qualifiers**

#### GC/MS Semi VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits

#### **GC Semi VOA**

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.

Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample

#### **Glossary**

DL, RA, RE, IN

DLC

Abbreviation	These commonly used abbreviations may or may not be present in this report.
n	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
DI	Detection Limit (DoD/DOE)

EDL Estimated Detection Limit (Dioxin) LOD Limit of Detection (DoD/DOE) Limit of Quantitation (DoD/DOE) LOQ MDA

Minimum Detectable Activity (Radiochemistry) Minimum Detectable Concentration (Radiochemistry) MDC

Decision Level Concentration (Radiochemistry)

MDL Method Detection Limit Minimum Level (Dioxin) ML NC Not Calculated

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

**PQL Practical Quantitation Limit** 

QC **Quality Control** 

Relative Error Ratio (Radiochemistry) RER

Reporting Limit or Requested Limit (Radiochemistry) RL

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

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

12/3/2018

### **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82036-1

11/28/18 08:33 11/29/18 01:07

11/28/18 23:39

Client Sample ID: Outfall #002 Lab Sample ID: 580-82036-1 Date Collected: 11/21/18 08:00 **Matrix: Water** 

Date	Received:	11/21/18	12:00

Terphenyl-d14

Trifluorotoluene (Surr)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			11/29/18 22:21	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123			-		11/29/18 22:21	1
Toluene-d8 (Surr)	107		79 - 122					11/29/18 22:21	1
4-Bromofluorobenzene (Surr)	101		78 - 119					11/29/18 22:21	1
Dibromofluoromethane (Surr)	97		70 - 120					11/29/18 22:21	1
1,2-Dichloroethane-d4 (Surr)	95		70 - 120					11/29/18 22:21	1

Method: 8270C SIM - Semivolatile	<b>Organic Con</b>	pounds (	(GC/MS SIM)
Analyte	Result	Qualifier	R
Danzalalanthrasana	ND	-	0.05

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Analyte	Result Qual	lifier RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND —	0.051	0.014	ug/L		11/28/18 08:33	11/29/18 01:07	1
Benzo[a]pyrene	ND	0.10	0.011	ug/L		11/28/18 08:33	11/29/18 01:07	1
Benzo[b]fluoranthene	ND	0.051	0.011	ug/L		11/28/18 08:33	11/29/18 01:07	1
Benzo[k]fluoranthene	ND	0.051	0.012	ug/L		11/28/18 08:33	11/29/18 01:07	1
Chrysene	ND	0.10	0.016	ug/L		11/28/18 08:33	11/29/18 01:07	1
Dibenz(a,h)anthracene	ND	0.10	0.010	ug/L		11/28/18 08:33	11/29/18 01:07	1
Indeno[1,2,3-cd]pyrene	ND	0.051	0.014	ug/L		11/28/18 08:33	11/29/18 01:07	1
Surrogate	%Recovery Qual	lifier Limits				Prepared	Analyzed	Dil Fac

Method: NWTPH-Gx - Northwe	est - Volatile Petro	oleum Prod	ucts (GC)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			11/28/18 23:39	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)			50 - 150			_		11/28/18 23:39	

50 - 150

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.17	В	0.11	0.066	mg/L		11/29/18 09:06	11/30/18 21:12	1
Motor Oil (>C24-C36)	0.23	J	0.36	0.098	mg/L		11/29/18 09:06	11/30/18 21:12	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	93	· <del></del>	<del>50 - 150</del>				11/29/18 09:06	11/30/18 21:12	

### **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

**Client Sample ID: Trip Blank** 

TestAmerica Job ID: 580-82036-1

Lab Sample ID: 580-82036-2

Matrix: Water

Date Collected: 11/21/18 00:01 Date Received: 11/21/18 12:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			11/29/18 21:56	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	98		74 - 123			-		11/29/18 21:56	1
Toluene-d8 (Surr)	106		79 - 122					11/29/18 21:56	1
4-Bromofluorobenzene (Surr)	99		78 - 119					11/29/18 21:56	1
Dibromofluoromethane (Surr)	96		70 - 120					11/29/18 21:56	1
1,2-Dichloroethane-d4 (Surr)	95		70 <sub>-</sub> 120					11/29/18 21:56	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			11/28/18 15:55	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	85		50 - 150			_		11/28/18 15:55	1
Trifluorotoluene (Surr)	120		50 - 150					11/28/18 15:55	1

12/3/2018

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82036-1

#### Method: 624 - Volatile Organic Compounds (GC/MS)

мв мв

Lab Sample ID: MB 580-289927/14

**Matrix: Water** 

Analysis Batch: 289927

Client Sample ID: Method Blank Prep Type: Total/NA

RL Dil Fac Analyte Result Qualifier MDL Unit D Prepared Analyzed Benzene ND 1.0 0.53 ug/L 11/29/18 20:42

MB MB Qualifier Prepared Analyzed Dil Fac Surrogate %Recovery Limits 74 - 123 Trifluorotoluene (Surr) 101 11/29/18 20:42 Toluene-d8 (Surr) 107 79 - 122 11/29/18 20:42 100 78 - 119 11/29/18 20:42 4-Bromofluorobenzene (Surr) Dibromofluoromethane (Surr) 95 70 - 120 11/29/18 20:42 70 - 120 1,2-Dichloroethane-d4 (Surr) 90 11/29/18 20:42

LCS LCS

Lab Sample ID: LCS 580-289927/15

**Matrix: Water** 

Analysis Batch: 289927

Client Sample ID: Lab Control Sample Prep Type: Total/NA

Added Result Qualifier Analyte Unit %Rec Limits 10.0 37 - 151 Benzene 8.94 ug/L 89

Spike

LCS LCS %Recovery Qualifier Surrogate Limits Trifluorotoluene (Surr) 74 - 123 97 Toluene-d8 (Surr) 101 79 - 122 4-Bromofluorobenzene (Surr) 100 78 - 119 97 70 - 120 Dibromofluoromethane (Surr) 1,2-Dichloroethane-d4 (Surr) 90 70 - 120

Lab Sample ID: LCSD 580-289927/16

**Matrix: Water** 

Analysis Batch: 289927

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

%Rec.

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	10.0	8.94		ug/L		89	37 _ 151	0	30

LCSD LCSD %Recovery Qualifier Surrogate Limits Trifluorotoluene (Surr) 99 74 - 123 Toluene-d8 (Surr) 103 79 - 122 4-Bromofluorobenzene (Surr) 99 78 - 119 Dibromofluoromethane (Surr) 93 70 - 120 70 - 120 1,2-Dichloroethane-d4 (Surr) 90

Lab Sample ID: MB 580-289928/14 Client Sample ID: Method Blank Prep Type: Total/NA

**Matrix: Water Analysis Batch: 289928** 

MR MR

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			11/29/18 20:42	1

	MB	MB				
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123		11/29/18 20:42	1
Toluene-d8 (Surr)	107		79 - 122		11/29/18 20:42	1

TestAmerica Seattle

Page 7 of 16

TestAmerica Job ID: 580-82036-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

#### Method: 624 - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 580-289928/14

**Matrix: Water** 

**Analysis Batch: 289928** 

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB

Surrogate	%Recovery Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100	78 - 119		11/29/18 20:42	1
Dibromofluoromethane (Surr)	95	70 - 120		11/29/18 20:42	1
1,2-Dichloroethane-d4 (Surr)	90	70 - 120		11/29/18 20:42	1

Lab Sample ID: LCS 580-289928/15

**Matrix: Water** 

Analysis Batch: 289928

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

Spike LCS LCS %Rec. Analyte Added Limits Result Qualifier Unit D %Rec Benzene 10.0 8.94 ug/L 89 37 - 151

	LCS	LCS	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	97	-	74 - 123
Toluene-d8 (Surr)	101		79 - 122
4-Bromofluorobenzene (Surr)	100		78 - 119
Dibromofluoromethane (Surr)	97		70 - 120
1,2-Dichloroethane-d4 (Surr)	90		70 - 120

Lab Sample ID: LCSD 580-289928/16

**Matrix: Water** 

Analysis Batch: 289928

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

> %Rec. RPD

									,		
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene			10.0	8.94		ug/L		89	37 - 151	0	30
	LCSD	LCSD									
Surrogate	%Recovery	Qualifier	Limits								

Snike

LCSD LCSD

Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	99		74 - 123
Toluene-d8 (Surr)	103		79 - 122
4-Bromofluorobenzene (Surr)	99		78 - 119
Dibromofluoromethane (Surr)	93		70 - 120
1,2-Dichloroethane-d4 (Surr)	90		70 - 120

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

Lab Sample ID: MB 580-289798/1-A Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 289863

мв мв Dil Fac Analyte Result Qualifier RL MDL Unit Prepared Analyzed Benzo[a]anthracene 11/28/18 17:45 0.050 11/28/18 08:33 ND 0.014 ug/L Benzo[a]pyrene ND 0.10 0.011 ug/L 11/28/18 08:33 11/28/18 17:45 Benzo[b]fluoranthene ND 0.050 0.011 ug/L 11/28/18 08:33 11/28/18 17:45 ND Benzo[k]fluoranthene 0.050 0.012 ug/L 11/28/18 08:33 11/28/18 17:45 ND Chrysene 0.10 0.016 ug/L 11/28/18 08:33 11/28/18 17:45 ND 0.010 ug/L Dibenz(a,h)anthracene 0.10 11/28/18 08:33 11/28/18 17:45 ND 0.050 11/28/18 08:33 Indeno[1,2,3-cd]pyrene 0.014 ug/L 11/28/18 17:45

TestAmerica Seattle

Prep Batch: 289798

Page 8 of 16

TestAmerica Job ID: 580-82036-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-289798/1-A

Lab Sample ID: LCS 580-289798/2-A

**Matrix: Water** 

**Matrix: Water** 

**Analysis Batch: 289863** 

Analysis Batch: 289863

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 289798

MB MB

%Recovery Qualifier Limits Prepared Surrogate Analyzed Dil Fac 11/28/18 08:33 Terphenyl-d14 99 53 - 120 11/28/18 17:45

Client Sample ID: Lab Control Sample

Prep Type: Total/NA **Prep Batch: 289798** 

-	Spike	LCS	LCS				%Rec.
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits
Benzo[a]anthracene	4.00	4.45		ug/L		111	61 - 120
Benzo[a]pyrene	4.00	3.94		ug/L		99	65 - 120
Benzo[b]fluoranthene	4.00	3.65		ug/L		91	58 - 120
Benzo[k]fluoranthene	4.00	3.71		ug/L		93	58 - 120
Chrysene	4.00	3.58		ug/L		89	58 - 120
Dibenz(a,h)anthracene	4.00	3.92		ug/L		98	60 - 125
Indeno[1,2,3-cd]pyrene	4.00	3.64		ug/L		91	56 - 120

LCS LCS

Qualifier Limits Surrogate %Recovery Terphenyl-d14 53 \_ 120 114

Lab Sample ID: LCSD 580-289798/3-A

**Matrix: Water** 

Analysis Batch: 289863

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

Prep Batch: 289798

LCSD LCSD Spike %Rec. **RPD** Added Result Qualifier Limits RPD Limit Analyte Unit %Rec 4.00 108 3 16 Benzo[a]anthracene 4.31 ug/L 61 - 1204.00 3.85 17 Benzo[a]pyrene ug/L 96 65 - 120 2 Benzo[b]fluoranthene 4.00 3.51 88 58 - 120 20 ug/L Benzo[k]fluoranthene 4.00 3.63 ug/L 91 58 - 120 20 4.00 Chrysene 3.53 ug/L 88 58 \_ 120 16 Dibenz(a,h)anthracene 4.00 3.78 ug/L 95 60 - 12515 4.00 ug/L 87 56 - 120 Indeno[1,2,3-cd]pyrene 3 48 15

LCSD LCSD

%Recovery Qualifier Surrogate Limits Terphenyl-d14 102 53 - 120

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-289814/6 Client Sample ID: Method Blank

**Matrix: Water** 

Analysis Batch: 289814

Prep Type: Total/NA MB MB

Qualifier Analyte RL MDL Unit Dil Fac Result Prepared Analyzed Gasoline ND 0.25 0.10 mg/L 11/28/18 13:20

MB MB Dil Fac Qualifier Limits Prepared Surrogate %Recovery Analyzed 4-Bromofluorobenzene (Surr) 87 50 - 150 11/28/18 13:20 50 - 150 11/28/18 13:20 Trifluorotoluene (Surr) 111

TestAmerica Seattle

12/3/2018

Page 9 of 16

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

#### Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC) (Continued)

Lab Sample ID: LCS 580-289814/7 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

Analysis Batch: 289814

Spike LCS LCS %Rec. babbA Result Qualifier Limits Analyte Unit D %Rec Gasoline 1.00 1.08 mg/L 108 79 \_ 120

LCS LCS Qualifier Surrogate %Recovery Limits 50 \_ 150 4-Bromofluorobenzene (Surr) 92 Trifluorotoluene (Surr) 126 50 - 150

Lab Sample ID: LCSD 580-289814/8 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 289814

LCSD LCSD %Rec. RPD Spike Analyte Added Result Qualifier Unit D %Rec Limits RPD Limit Gasoline 1.00 1.14 mg/L 114 79 - 120 10

LCSD LCSD %Recovery Qualifier Limits Surrogate 50 - 150 4-Bromofluorobenzene (Surr) 94 129 50 - 150 Trifluorotoluene (Surr)

#### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-289897/1-B Client Sample ID: Method Blank Prep Type: Total/NA

**Matrix: Water** 

Analysis Batch: 289986

MR MR Analyte Result Qualifier RL MDL Unit Prepared Analyzed Dil Fac #2 Diesel (C10-C24) 0.0687 J 0.11 11/29/18 09:06 11/30/18 16:50 0.065 mg/L mg/L Motor Oil (>C24-C36) ND 0.35 0.096 11/29/18 09:06 11/30/18 16:50

MR MR Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac 94 11/29/18 09:06 o-Terphenyl 50 - 150 11/30/18 16:50

Lab Sample ID: LCS 580-289897/2-B Client Sample ID: Lab Control Sample

Analysis Batch: 289986

**Matrix: Water** 

Spike LCS LCS %Rec. Analyte Added Result Unit Qualifier D %Rec Limits #2 Diesel (C10-C24) 2.00 2.04 mg/L 102 50 - 120Motor Oil (>C24-C36) 2.00 2.30 mg/L 115 64 - 120

LCS LCS %Recovery Surrogate Qualifier Limits o-Terphenyl 88 50 - 150

Lab Sample ID: LCSD 580-289897/3-B Client Sample ID: Lab Control Sample Dup **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 289986 **Prep Batch: 289897** LCSD LCSD Spike %Rec. **RPD** Added Result Qualifier Unit Limits RPD Limit Analyte %Rec #2 Diesel (C10-C24) 2.00 2.01 mg/L 101 50 - 120

TestAmerica Seattle

Prep Batch: 289897

Prep Type: Total/NA

**Prep Batch: 289897** 

### **QC Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Surrogate

o-Terphenyl

TestAmerica Job ID: 580-82036-1

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

%Recovery Qualifier

93

Lab Sample ID: LCSD 580-289897/3-B				Clie	nt Sam	iple ID:	Lab Contro	I Sampl	e Dup
Matrix: Water							Prep T	ype: To	tal/NA
Analysis Batch: 289986							Prep I	Batch: 2	89897
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Motor Oil (>C24-C36)	2.00	2.27		mg/L		113	64 - 120	1	24
LCSD LCSD									

Limits

50 - 150

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#### **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Received: 11/21/18 12:00

TestAmerica Job ID: 580-82036-1

Lab Sample ID: 580-82036-1

**Matrix: Water** 

Client Sample ID: Outfall #002 Date Collected: 11/21/18 08:00

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			289927	11/29/18 22:21	RSB	TAL SEA
Total/NA	Prep	3510C			289798	11/28/18 08:33	KO	TAL SEA
Total/NA	Analysis	8270C SIM		1	289863	11/29/18 01:07	W1T	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	289814	11/28/18 23:39	CJB	TAL SEA
Total/NA	Prep	3510C			289897	11/29/18 09:06	ко	TAL SEA
Total/NA	Cleanup	3630C			289951	11/29/18 15:16	KO	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	289986	11/30/18 21:12	TL1	TAL SEA

Client Sample ID: Trip Blank

Lab Sample ID: 580-82036-2

Date Collected: 11/21/18 00:01

Matrix: Water

Date Received: 11/21/18 12:00

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	289928	11/29/18 21:56	RSB	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	289814	11/28/18 15:55	CJB	TAL SEA

Laboratory References:

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

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### **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82036-1

#### **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	<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
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

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### **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82036-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-82036-1	Outfall #002	Water	11/21/18 08:00	11/21/18 12:00
580-82036-2	Trip Blank	Water	11/21/18 00:01	11/21/18 12:00

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THE LEADER IN ENVIRONMENTAL TESTING

Loc: 580 82036 TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047

Short Hold

Rush

Chain of **Custody Record** 

	`	www.testam	iericainc.co	m											
Aveady S	Client Con	Client Contact Peter campbel						Date L	1/21/1	8	Chain	Chain of Custody Number 3 4 9 1			
Address 1100 olive wa	y, svite 800		Number (Area Co	,		***************************************				Number		Page		of	Ĺ
Project Name and Location (State)  Edwords Terri	WA 7810	Sampler Evric Billing Cont	Vruege tact	Lab Cor Elú	ntact Whe W	auce	$\rightarrow$	Kw/SGC	Analysis (i More space	Attach list if e is needed				l Instruc	
Contract/Purchase Order/Quote No.  Sample I.D. and Location/Descript	tion Date	Time	Matrix Sed. Soil	res.	Containers Preservativ	res	Benzene	NWITCH-CAK	CRANS 87				Conditie	ons of R	eceipt
(Containers for each sample may be combined  Outful # 002	on one line) Date	Aii	Sed. Soil	7 Unpres.	8	ZnAc/ NaOH	X		X				2H =	7.86	>
Trip Blank					6							1 1 ,	- USP 566	i st	andor
												X	Bana	tene e	CPAL)
		III BAILLIANNA INTO MA				1	herm. I	D: <u>A Z</u>	Cor: 1.			W    \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	l quar	ntita: Incun	five Less
	580-82036 C	hain of Custoo	dy			F	acking: Just. Se	B o	No 4 ry, None	FedEx: UPS:_ Lab Ce Other:	ur: <u>×</u>	<del>-</del> <del>-</del>	nan 1	Lug	1
Cooler  Yes No Cooler Temp:	Possible Hazard Identification  Non-Hazard	nable □ SA	kin Irritant	Poison B	□ Unkr	1	mple Dis Return 1		☐ Dispo	sal By Lab ve For	Mor		ee may be a retained lor		
Turn Around Time Required (business days)  ☐ 24 Hours ☐ 48 Hours ☐ 5 Days	☐ 10 Days ☐ 15 Days	X Other _	STAT		Requiremen										
1. Relinquished By Sign/Print  2. Relinquished By Stan/Print	lourger	Date 11/21/	18   Time Time	0	Received By Received By	0/	Fra	nt Is	(0 Lo	ing J	^	Date	121/18	Time IZC Time	10
Relinquished By Sign/Print     Sign/Print		Date	Time		Received By				<del></del>	······································	······································	Date Date		Time	
Comments				- Control of the Cont											

### **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 580-82036-1

Login Number: 82036 List Source: TestAmerica Seattle

List Number: 1

Creator: Gall, Brandon A

Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey neter.</td <td>N/A</td> <td>Lab does not accept radioactive samples.</td>	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	N/A	Not present
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or ampered 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	
s 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	



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: 580-82599-1 Client Project/Site: Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 12/19/2018 5:02:30 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

·····LINKS ·······

Review your project results through
Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82599-1

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#### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82599-1

Job ID: 580-82599-1

**Laboratory: TestAmerica Seattle** 

Narrative

Job Narrative 580-82599-1

#### Receipt

Two samples were received on 12/11/2018 1:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.9° C.

#### **GC/MS VOA**

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

#### GC/MS Semi VOA

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

#### GC Semi VOA

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

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# **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Not Calculated

**Quality Control** 

**Practical Quantitation Limit** 

Relative Error Ratio (Radiochemistry)

Toxicity Equivalent Factor (Dioxin) Toxicity Equivalent Quotient (Dioxin)

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 Job ID: 580-82599-1

# Glossary

NC

ND

**PQL** 

QC

RER

RLRPD

TEF

TEQ

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)

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Collected: 12/10/18 13:00

Date Received: 12/11/18 13:00

Terphenyl-d14

Trifluorotoluene (Surr)

Client Sample ID: Outfall #002

TestAmerica Job ID: 580-82599-1

Lab Sample ID: 580-82599-1

**Matrix: Water** 

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Method: 624 - Volatile Orga	anic Compounds (C	GC/MS)						
Analyte	Result Qual	lifier RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND ND	1.0	0.53	ug/L			12/18/18 22:28	1
Surrogate	%Recovery Qua	lifier Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	102	74 - 123					12/18/18 22:28	1
Toluene-d8 (Surr)	104	79 - 122					12/18/18 22:28	1
4-Bromofluorobenzene (Surr)	101	78 - 119					12/18/18 22:28	1
Dibromofluoromethane (Surr)	106	70 - 120					12/18/18 22:28	1
1,2-Dichloroethane-d4 (Surr)	114	70 - 120					12/18/18 22:28	1

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

Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND ND	0.25	0.071	ug/L		12/16/18 06:57	12/17/18 20:24	5
Benzo[a]pyrene	ND	0.51	0.056	ug/L		12/16/18 06:57	12/17/18 20:24	5
Benzo[b]fluoranthene	ND	0.25	0.056	ug/L		12/16/18 06:57	12/17/18 20:24	5
Benzo[k]fluoranthene	ND	0.25	0.061	ug/L		12/16/18 06:57	12/17/18 20:24	5
Chrysene	ND	0.51	0.081	ug/L		12/16/18 06:57	12/17/18 20:24	5
Dibenz(a,h)anthracene	ND	0.51	0.051	ug/L		12/16/18 06:57	12/17/18 20:24	5
Indeno[1,2,3-cd]pyrene	ND	0.25	0.071	ug/L		12/16/18 06:57	12/17/18 20:24	5
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac

2/17/18 20:24	5	
Analyzed	Dil Fac	

<del>-</del> -	
Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (	GC)

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mothod: Militari II-OX - Morthing	ot Volutile	o i culoicul	II I I Oddoto	(33)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			12/14/18 14:44	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	86		50 - 150					12/14/18 14:44	1

50 - 150

53 - 120

	Analyzed	Dil Fac
_	12/14/18 14:44	1
	12/14/18 14:44	1

<u>12/16/18 06:57</u> <u>12/17/18 20:24</u>

Method: NWTPH-Dx - Semi-V	olatile Petro	leum Prod	ucts by NWT	PH with	Silica G	el Cle	eanup		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11	0.067	mg/L		12/13/18 15:47	12/16/18 19:51	1
Motor Oil (>C24-C36)	ND		0.36	0.099	mg/L		12/13/18 15:47	12/16/18 19:51	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	75		50 - 150				12/13/18 15:47	12/16/18 19:51	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82599-1

Client Sample ID: Trip Blank

Date Collected: 12/10/18 00:01 Date Received: 12/11/18 13:00 Lab Sample ID: 580-82599-2

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			12/18/18 22:53	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	99		74 - 123					12/18/18 22:53	1
Toluene-d8 (Surr)	106		79 - 122					12/18/18 22:53	1
4-Bromofluorobenzene (Surr)	102		78 - 119					12/18/18 22:53	1
Dibromofluoromethane (Surr)	97		70 - 120					12/18/18 22:53	1
1,2-Dichloroethane-d4 (Surr)	109		70 - 120					12/18/18 22:53	1

Method: NWTPH-Gx - Nort	hwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			12/14/18 13:23	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	70		50 - 150			-		12/14/18 13:23	1

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Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82599-1

Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-291496/5

**Matrix: Water** 

Analysis Batch: 291496

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB

Analyte	Result Qualifier	RL	MDL Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND	1.0	0.53 ug/L			12/18/18 16:39	1

	MB	MB				
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	102		74 - 123		12/18/18 16:39	1
Toluene-d8 (Surr)	105		79 - 122		12/18/18 16:39	1
4-Bromofluorobenzene (Surr)	99		78 - 119		12/18/18 16:39	1
Dibromofluoromethane (Surr)	99		70 - 120		12/18/18 16:39	1
1,2-Dichloroethane-d4 (Surr)	109		70 - 120		12/18/18 16:39	1

Lab Sample ID: LCS 580-291496/6

**Matrix: Water** 

**Analysis Batch: 291496** 

Client Sample ID: Lab Control Sample Prep Type: Total/NA

LCS	LCS	
%Recovery	Qualifier	Limits
100		74 - 123
104		79 - 122
104		78 - 119
104		70 - 120
112		70 - 120
	%Recovery 100 104 104	104 104 104

Lab Sample ID: LCSD 580-291496/7

**Matrix: Water** 

Analyte

Benzene

Analysis Batch: 291496

Client Sample II	): Lab Contro	I Sample Dup
	Prep T	ype: Total/NA

 Spike
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 %Rec.
 RPD

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 Result 10.0
 Qualifier 20.0
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	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	102		74 - 123
Toluene-d8 (Surr)	100		79 - 122
4-Bromofluorobenzene (Surr)	98		78 - 119
Dibromofluoromethane (Surr)	101		70 - 120
1,2-Dichloroethane-d4 (Surr)	104		70 - 120

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

Lab Sample ID: MB 580-291255/1-A

**Matrix: Water** 

**Analysis Batch: 291323** 

Client Sample ID: Method Blank Prep Type: Total/NA Prep Batch: 291255

	MB	МВ							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050	0.014	ug/L		12/16/18 06:57	12/17/18 15:21	1
Benzo[a]pyrene	ND		0.10	0.011	ug/L		12/16/18 06:57	12/17/18 15:21	1
Benzo[b]fluoranthene	ND		0.050	0.011	ug/L		12/16/18 06:57	12/17/18 15:21	1
	Benzo[a]anthracene Benzo[a]pyrene	Analyte         Result           Benzo[a]anthracene         ND           Benzo[a]pyrene         ND	AnalyteResultQualifierBenzo[a]anthraceneNDBenzo[a]pyreneND	Analyte         Result Denzo[a]anthracene         Qualifier ND         RL 0.050           Benzo[a]pyrene         ND         0.10	Analyte         Result Denzo[a]anthracene         Qualifier ND         RL ND         MDL ND           Benzo[a]pyrene         ND         0.050         0.014           Denzo[a]pyrene         ND         0.10         0.011	Analyte         Result Benzo[a]pyrene         Qualifier         RL O.050         MDL Unit Unit Unit Unit Unit Unit Unit Unit	Analyte         Result Benzo[a]pyrene         Result ND         Qualifier         RL         MDL unit ug/L         D           Benzo[a]pyrene         ND         0.050         0.014         ug/L	Analyte         Result Benzo[a]anthracene         Qualifier         RL 0.050         MDL unit ug/L         D 12/16/18 06:57           Benzo[a]pyrene         ND 0.010         0.010         0.011 ug/L         12/16/18 06:57	Analyte         Result Benzo[a]pyrene         Result ND         Qualifier Qualifier         RL ND         MDL Unit Ug/L         D 12/16/18 06:57         Prepared Analyzed           Benzo[a]pyrene         ND         0.050         0.014         ug/L         12/16/18 06:57         12/17/18 15:21

TestAmerica Seattle

12/19/2018

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TestAmerica Job ID: 580-82599-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-291255/1-A

**Matrix: Water** 

**Analysis Batch: 291323** 

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

**Prep Batch: 291255** 

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.050	0.012	ug/L		12/16/18 06:57	12/17/18 15:21	1
Chrysene	ND		0.10	0.016	ug/L		12/16/18 06:57	12/17/18 15:21	1
Dibenz(a,h)anthracene	ND		0.10	0.010	ug/L		12/16/18 06:57	12/17/18 15:21	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.014	ug/L		12/16/18 06:57	12/17/18 15:21	1

MB MB

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Terphenyl-d14 96 53 - 120 <u>12/16/18 06:57</u> <u>12/17/18 15:21</u>

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA **Prep Batch: 291255** 

Lab Sample ID: LCS 580-291255/2-A **Matrix: Water** 

**Analysis Batch: 291323** 

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzo[a]anthracene	4.00	3.89		ug/L		97	61 - 120	
Benzo[a]pyrene	4.00	3.22		ug/L		80	65 - 120	
Benzo[b]fluoranthene	4.00	3.03		ug/L		76	58 - 120	
Benzo[k]fluoranthene	4.00	3.31		ug/L		83	58 - 120	
Chrysene	4.00	3.29		ug/L		82	58 - 120	
Dibenz(a,h)anthracene	4.00	3.64		ug/L		91	60 - 125	
Indeno[1,2,3-cd]pyrene	4.00	3.36		ug/L		84	56 - 120	

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 105 53 - 120

Lab Sample ID: LCSD 580-291255/3-A

**Matrix: Water** 

**Analysis Batch: 291323** 

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

**Prep Type: Total/NA Prep Batch: 291255** 

•	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzo[a]anthracene	4.00	4.13		ug/L		103	61 - 120	6	16
Benzo[a]pyrene	4.00	3.53		ug/L		88	65 - 120	9	17
Benzo[b]fluoranthene	4.00	3.32		ug/L		83	58 - 120	9	20
Benzo[k]fluoranthene	4.00	3.35		ug/L		84	58 - 120	1	20
Chrysene	4.00	3.27		ug/L		82	58 - 120	1	16
Dibenz(a,h)anthracene	4.00	3.82		ug/L		96	60 - 125	5	15
Indeno[1,2,3-cd]pyrene	4.00	3.53		ug/L		88	56 - 120	5	15

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 104 53 - 120

TestAmerica Seattle

Client: ARCADIS U.S. Inc

TestAmerica Job ID: 580-82599-1

Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-291165/6 Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

**Analysis Batch: 291165** 

	INIB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			12/14/18 12:02	1
	МВ	MB							
_		_							

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac 4-Bromofluorobenzene (Surr) 75 50 - 150 12/14/18 12:02 Trifluorotoluene (Surr) 109 50 - 150 12/14/18 12:02

Lab Sample ID: LCS 580-291165/7 **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA

Analysis Batch: 291165

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Gasoline	 1.00	0.880		mg/L		88	79 - 120	

LCS LCS Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 50 - 150 77 103 50 - 150 Trifluorotoluene (Surr)

Lab Sample ID: LCSD 580-291165/8 **Client Sample ID: Lab Control Sample Dup** Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 291165** 

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Gasoline	1.00	0.830		ma/L		83	79 - 120	6	10

LCSD LCSD %Recovery Qualifier Surrogate I imits 4-Bromofluorobenzene (Surr) 74 50 - 150 Trifluorotoluene (Surr) 99 50 - 150

#### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-291074/1-A **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA **Analysis Batch: 291263** Prep Batch: 291074

MB MB Analyte Result Qualifier RL **MDL** Unit Prepared Dil Fac Analyzed #2 Diesel (C10-C24) ND 0.11 12/13/18 15:47 12/16/18 20:35 0.065 mg/L Motor Oil (>C24-C36) ND 0.35 12/13/18 15:47 12/16/18 20:35 0.096 mg/L MB MB

Limits Dil Fac Surrogate %Recovery Qualifier Prepared Analyzed o-Terphenyl <u>12/13/18 15:47</u> <u>12/16/18 20:35</u> 50 - 150 70

Lab Sample ID: LCS 580-291074/2-A **Client Sample ID: Lab Control Sample** 

**Matrix: Water** Prep Type: Total/NA **Analysis Batch: 291263** Prep Batch: 291074 Spike LCS LCS %Rec. Added D %Rec Limits

Analyte Result Qualifier Unit #2 Diesel (C10-C24) 2.00 1.61 mg/L 80 50 - 120

TestAmerica Seattle

12/19/2018

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# **QC Sample Results**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-82599-1 Project/Site: Edmonds Terminal

# Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: LCS 580-2 Matrix: Water Analysis Batch: 291263	91074/2-A					Clie	nt Sa	mple ID	Prep Type: Total/NA Prep Batch: 291074
			Spike	LCS	LCS				%Rec.
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits
Motor Oil (>C24-C36)			2.00	1.83		mg/L		92	64 - 120
	LCS	LCS							
Surrogate	%Recovery	Qualifier	Limits						
o-Terphenyl	94		50 - 150						

Lab Sample ID: LCSD 580-291074/3-A Matrix: Water		(	Client S	ample	ID: Lat	Control S Prep Typ			
Analysis Batch: 291263							Prep Ba	atch: 29	91074
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
#2 Diesel (C10-C24)	2.00	1.71		mg/L		86	50 - 120	6	26
Motor Oil (>C24-C36)	2.00	2.04		mg/L		102	64 - 120	11	24

Limits

50 - 150

LCSD LCSD %Recovery Qualifier

104

Surrogate

o-Terphenyl

TestAmerica Seattle

12/19/2018

#### **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82599-1

Lab Sample ID: 580-82599-1

Matrix: Water

Client Sample ID: Outfall #002

Date Collected: 12/10/18 13:00 Date Received: 12/11/18 13:00

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	291496	12/18/18 22:28	T1W	TAL SEA
Total/NA	Prep	3510C			291255	12/16/18 06:57	KO	TAL SEA
Total/NA	Analysis	8270C SIM		5	291323	12/17/18 20:24	T1W	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	291165	12/14/18 14:44	T1W	TAL SEA
Total/NA	Prep	3510C			291074	12/13/18 15:47	DSO	TAL SEA
Total/NA	Cleanup	3630C			291093	12/13/18 17:44	DSO	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	291263	12/16/18 19:51	Z1R	TAL SEA

Client Sample ID: Trip Blank Lab Sample ID: 580-82599-2

Date Collected: 12/10/18 00:01 Matrix: Water

Date Received: 12/11/18 13:00

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	291496	12/18/18 22:53	T1W	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	291165	12/14/18 13:23	T1W	TAL SEA

#### **Laboratory References:**

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

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# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-82599-1

Project/Site: Edmonds Terminal

# **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	<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	11-05-19
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

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TestAmerica Seattle

# **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82599-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-82599-1	Outfall #002	Water	12/10/18 13:00	12/11/18 13:00
580-82599-2	Trip Blank	Water	12/10/18 00:01	12/11/18 13:00

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THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com Loc: 580 **82599** 

Short Hold

Rush

Chain of Custody Record

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580-82599 Chain of Custody												_								-			······································	•		
Cooler Possible  Yes No Cooler Temp: Non	Hazard Identification Hazard 🏻 Flan	_	Skii	n Irritai	nt	 □ <i>P</i> c	oison E	} [		nknov		ample Retu				□ Di □ Ai		l By La For	b	Mc	onths		ee may bi retained			
Turn Around Time Required (business days)  24 Hours	Days 🗆 15 Days	X Ott	ner	ST	A-	Γ		C Req	uirem	ents	(Speci	fy)	.,.,.		***************************************				***************************************							
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2. Relinquished By SigniPrini		Date			īme			. Rece			gn/Pr	int			udeur runue							Date	************		ime	
3. Relinquished By Sign/Print		Date		7	īme		3	. Rece	ived B	By Si	gn/Pr	int										Date		7	ime	
Comments										,																

# **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 580-82599-1

Login Number: 82599 List Source: TestAmerica Seattle

List Number: 1

Creator: Gall, Brandon A

Creator: Gall, Brandon A		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td>Lab does not accept radioactive samples.</td>	N/A	Lab does not accept radioactive samples.
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	

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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: 580-82864-1 Client Project/Site: Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elains Walker

Authorized for release by: 12/31/2018 5:22:13 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

·····LINKS ······

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**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82864-1

# **Table of Contents**

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Chain of Custody	15
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#### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82864-1

Job ID: 580-82864-1

**Laboratory: TestAmerica Seattle** 

Narrative

Job Narrative 580-82864-1

#### Receipt

Two samples were received on 12/21/2018 11:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.9° C.

#### **GC/MS VOA**

Method(s) NWTPH-Gx: The surrogate recovery for the blank associated with analytical batch 580-292156 was outside the upper control limits.

Method(s) NWTPH-Gx: The surrogate recovery for the blank associated with analytical batch 580-292117 was outside the upper control limits.

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

#### GC/MS Semi VOA

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

#### GC Semi VOA

Method(s) NWTPH-Dx: The Diesel Range Organics (DRO) concentration reported for the following sample is due to the presence of discrete peaks: Outfall #002 (580-82864-1).

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

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## **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82864-1

#### **Qualifiers**

#### **GC VOA**

Quaimer	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
Χ	Surrogate is outside control limits

#### **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.

#### **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)
DI RA RE IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample

LOQ MDA MDC

DLC

**EDL** 

LOD

Minimum Detectable Activity (Radiochemistry) Minimum Detectable Concentration (Radiochemistry)

Decision Level Concentration (Radiochemistry)

Estimated Detection Limit (Dioxin)

Limit of Detection (DoD/DOE)

Limit of Quantitation (DoD/DOE)

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** 

**Quality Control** QC

**RER** Relative Error Ratio (Radiochemistry)

RLReporting Limit or Requested Limit (Radiochemistry)

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

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

TestAmerica Seattle

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12/31/2018

Lab Sample ID: 580-82864-1

**Matrix: Water** 

Date Collected: 12/20/18 14:00 Date Received: 12/21/18 11:15

Client Sample ID: Outfall #002

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			12/27/18 21:49	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	103		74 - 123					12/27/18 21:49	1
Toluene-d8 (Surr)	97		79 - 122					12/27/18 21:49	1
4-Bromofluorobenzene (Surr)	101		78 - 119					12/27/18 21:49	1
Dibromofluoromethane (Surr)	104		70 - 120					12/27/18 21:49	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 120					12/27/18 21:49	1

Method: 8270C SIM - Sen	nivolatile Organic Compou	nds (GC/MS	SIM)					
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND	0.25	0.071	ug/L		12/27/18 15:06	12/28/18 21:08	5
Benzo[a]pyrene	ND	0.51	0.056	ug/L		12/27/18 15:06	12/28/18 21:08	5
Benzo[b]fluoranthene	ND	0.25	0.056	ug/L		12/27/18 15:06	12/28/18 21:08	5
Benzo[k]fluoranthene	ND	0.25	0.061	ug/L		12/27/18 15:06	12/28/18 21:08	5
Chrysene	ND	0.51	0.081	ug/L		12/27/18 15:06	12/28/18 21:08	5
Dibenz(a,h)anthracene	ND	0.51	0.051	ug/L		12/27/18 15:06	12/28/18 21:08	5
Indeno[1,2,3-cd]pyrene	ND	0.25	0.071	ug/L		12/27/18 15:06	12/28/18 21:08	5
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	78	53 - 120				12/27/18 15:06	12/28/18 21:08	5

Method: NWTPH-Gx - Northw	est - Volatile	e Petroleu	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	0.15	J	0.25	0.10	mg/L			12/28/18 02:28	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	84		50 - 150				<u> </u>	12/28/18 02:28	
Trifluorotoluene (Surr)	112		50 - 150					12/28/18 02:28	1

Method: NWTPH-Dx - Semi-Vo	olatile Petro	leum Prod	ucts by NWT	PH with	Silica G	el Cle	anup		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.098	J	0.11	0.066	mg/L		12/31/18 07:32	12/31/18 14:40	1
Motor Oil (>C24-C36)	0.21	J	0.36	0.098	mg/L		12/31/18 07:32	12/31/18 14:40	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	100		50 - 150				12/31/18 07:32	12/31/18 14:40	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82864-1

14.0

Client Sample ID: Trip Blank

Date Collected: 12/20/18 00:01 Date Received: 12/21/18 11:15 Lab Sample ID: 580-82864-2

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			12/27/18 19:19	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	103		74 - 123					12/27/18 19:19	1
Toluene-d8 (Surr)	96		79 - 122					12/27/18 19:19	1
4-Bromofluorobenzene (Surr)	102		78 - 119					12/27/18 19:19	1
Dibromofluoromethane (Surr)	105		70 - 120					12/27/18 19:19	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 120					12/27/18 19:19	1

Method: NWTPH-Gx - Nort	hwest - Volatile	Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			12/27/18 16:00	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	82		50 - 150			•		12/27/18 16:00	1
Trifluorotoluene (Surr)	109		50 - 150					12/27/18 16:00	1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82864-1

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-292137/5

**Matrix: Water** 

**Analysis Batch: 292137** 

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB

Analyte Result Qualifier RL **MDL** Unit D Prepared Analyzed Dil Fac 1.0 Benzene  $\overline{\mathsf{ND}}$ 0.53 ug/L 12/27/18 16:50

	MB	MB				
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	102		74 - 123		12/27/18 16:50	1
Toluene-d8 (Surr)	98		79 - 122		12/27/18 16:50	1
4-Bromofluorobenzene (Surr)	102		78 - 119		12/27/18 16:50	1
Dibromofluoromethane (Surr)	103		70 - 120		12/27/18 16:50	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 120		12/27/18 16:50	1

Lab Sample ID: LCS 580-292137/6

**Matrix: Water** 

**Analysis Batch: 292137** 

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzene 10.0 9.55 ug/L 95 37 - 151

LCS LCS Surrogate %Recovery Qualifier Limits Trifluorotoluene (Surr) 102 74 - 123 98 79 - 122 Toluene-d8 (Surr) 4-Bromofluorobenzene (Surr) 104 78 - 119 Dibromofluoromethane (Surr) 104 70 - 120 1,2-Dichloroethane-d4 (Surr) 102 70 - 120

Lab Sample ID: LCSD 580-292137/7

**Matrix: Water** 

**Analysis Batch: 292137** 

Spike LCSD LCSD %Rec. Added Result Qualifier Limits **Analyte** Unit D %Rec RPD Limit Benzene 10.0 8.87 ug/L 89 37 - 151

LCSD LCSD

Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	101		74 - 123
Toluene-d8 (Surr)	97		79 - 122
4-Bromofluorobenzene (Surr)	102		78 - 119
Dibromofluoromethane (Surr)	103		70 - 120
1,2-Dichloroethane-d4 (Surr)	101		70 - 120

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

Lab Sample ID: MB 580-292144/1-A **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA **Analysis Batch: 292183 Prep Batch: 292144** 

MB MB Result Qualifier RL **MDL** Unit Prepared Dil Fac Analyte Analyzed Benzo[a]anthracene  $\overline{\mathsf{ND}}$ 0.050 0.014 ug/L 12/27/18 15:06 12/28/18 15:06 Benzo[a]pyrene ND 0.10 0.011 ug/L 12/27/18 15:06 12/28/18 15:06 Benzo[b]fluoranthene ND 12/27/18 15:06 12/28/18 15:06 0.050 0.011 ug/L

TestAmerica Seattle

12/31/2018

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

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

MB MB Result Qualifier

 $\overline{\mathsf{ND}}$ 

ND

ND

ND

73

%Recovery

MB MB

Qualifier

TestAmerica Job ID: 580-82864-1

**Client Sample ID: Method Blank** 

Analyzed

Analyzed

**Prepared** 

Prepared

**Prep Type: Total/NA** Prep Batch: 292144

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

**Analysis Batch: 292183** 

Lab Sample ID: MB 580-292144/1-A

Dil Fac

Dil Fac

<u>12/27/18 15:06</u> <u>12/28/18 15:06</u>

<u>12/27/18 15:06</u> <u>12/28/18 15:06</u>

12/27/18 15:06 12/28/18 15:06

12/27/18 15:06 12/28/18 15:06

12/27/18 15:06 12/28/18 15:06

**Matrix: Water** 

Benzo[k]fluoranthene

Dibenz(a,h)anthracene

Indeno[1,2,3-cd]pyrene

Analyte

Chrysene

Surrogate

Terphenyl-d14

Lab Sample ID: LCS 580-292144/2-A **Client Sample ID: Lab Control Sample Matrix: Water** Prep Type: Total/NA **Analysis Batch: 292183** Prep Batch: 292144

RL

0.050

0.10

0.10

0.050

Limits

53 - 120

**MDL** Unit

0.012 ug/L

0.016 ug/L

0.010 ug/L

0.014 ug/L

	Spike	LCS	LCS				%Rec.
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits
Benzo[a]anthracene	4.00	4.21		ug/L		105	61 - 120
Benzo[a]pyrene	4.00	3.98		ug/L		100	65 - 120
Benzo[b]fluoranthene	4.00	3.91		ug/L		98	58 - 120
Benzo[k]fluoranthene	4.00	3.79		ug/L		95	58 - 120
Chrysene	4.00	3.45		ug/L		86	58 - 120
Dibenz(a,h)anthracene	4.00	3.71		ug/L		93	60 - 125
Indeno[1,2,3-cd]pyrene	4.00	3.42		ug/L		85	56 - 120

LCS LCS Surrogate %Recovery Qualifier Limits Terphenyl-d14 90 53 - 120

Lab Sample ID: LCSD 580-292144/3-A

**Matrix: Water** 

Analysis Batch: 292183

**Client Sample ID: Lab Control Sample Dup** Prep Type: Total/NA **Prep Batch: 292144** 

Alialysis Datcii. 232 103								i ieb De	ittii. Z	/ <b>4</b>   <del>1   1  </del>
	•	Spike	LCSD	LCSD				%Rec.		RPD
	Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
	Benzo[a]anthracene	4.00	4.12		ug/L		103	61 - 120	2	16
	Benzo[a]pyrene	4.00	3.89		ug/L		97	65 - 120	2	17
	Benzo[b]fluoranthene	4.00	3.92		ug/L		98	58 - 120	0	20
	Benzo[k]fluoranthene	4.00	3.73		ug/L		93	58 - 120	2	20
	Chrysene	4.00	3.38		ug/L		85	58 - 120	2	16
	Dibenz(a,h)anthracene	4.00	3.94		ug/L		98	60 - 125	6	15
	Indeno[1,2,3-cd]pyrene	4.00	3.50		ug/L		88	56 - 120	2	15

LCSD LCSD Surrogate %Recovery Qualifier Limits Terphenyl-d14 86 53 - 120

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82864-1

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

Lab Sample ID: MB 580-292117/8 Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA **Analysis Batch: 292117** MB MB Analyte Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 0.25 Gasoline  $\overline{\mathsf{ND}}$ 0.10 mg/L 12/27/18 14:12 MB MB Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac

4-Bromofluorobenzene (Surr) 89 50 - 150 12/27/18 14:12 609 X Trifluorotoluene (Surr) 50 - 150 12/27/18 14:12 Lab Sample ID: LCS 580-292117/6 **Client Sample ID: Lab Control Sample** Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 292117** 

LCS LCS Spike %Rec. **Analyte** Added Result Qualifier Unit Limits D %Rec Gasoline 1.00 0.915 91 79 - 120 mg/L

LCS LCS Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 50 - 150 90 116 50 - 150 Trifluorotoluene (Surr)

Lab Sample ID: LCSD 580-292117/7 **Client Sample ID: Lab Control Sample Dup** Prep Type: Total/NA

**Matrix: Water** 

**Analysis Batch: 292117** 

LCSD LCSD RPD Spike %Rec. Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Gasoline 1.00 0.830 mg/L 83 79 - 120 10

LCSD LCSD %Recovery Qualifier Surrogate Limits 4-Bromofluorobenzene (Surr) 87 50 - 150 Trifluorotoluene (Surr) 107 50 - 150

Lab Sample ID: MB 580-292156/6

**Matrix: Water** 

**Analysis Batch: 292156** 

MB MB Analyte RL **MDL** Unit Result Qualifier Prepared Analyzed Dil Fac 0.25 Gasoline  $\overline{\mathsf{ND}}$ 0.10 mg/L 12/27/18 18:19

MB MB Surrogate Qualifier Limits %Recovery Prepared Analyzed Dil Fac 4-Bromofluorobenzene (Surr) 88 50 - 150 12/27/18 18:19 603 X Trifluorotoluene (Surr) 50 - 150 12/27/18 18:19

Lab Sample ID: LCS 580-292156/7 **Matrix: Water** 

**Analysis Batch: 292156** 

Spike LCS LCS %Rec. Added Result Qualifier Unit %Rec Limits Analyte Gasoline 1.00 0.893 mg/L 89 79 - 120

TestAmerica Seattle

Prep Type: Total/NA

**Client Sample ID: Method Blank** 

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

TestAmerica Job ID: 580-82864-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

## Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC) (Continued)

Lab Sample ID: LCS 580-292156/7

**Matrix: Water** 

**Analysis Batch: 292156** 

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

LCS LCS

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	92		50 - 150
Trifluorotoluene (Surr)	112		50 - 150

Lab Sample ID: LCSD 580-292156/8 **Client Sample ID: Lab Control Sample Dup** 

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

Analysis Batch: 292156

	Spik	e LCSD	LCSD				%Rec.		RPD
Analyte	Adde	d Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Gasoline	1.0	0.815		mg/L	_	81	79 - 120	9	10

LCSD LCSD

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	87		50 - 150
Trifluorotoluene (Surr)	104		50 - 150

#### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-292312/1-B

**Matrix: Water** 

**Analysis Batch: 292338** 

**Client Sample ID: Method Blank** 

Prep Type: Total/NA

Prep Batch: 292312

, , , , , , , , , , , , , , , , , , , ,	MD	МВ							
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11	0.065				12/31/18 13:35	1
Motor Oil (>C24-C36)	ND		0.35	0.096	mg/L		12/31/18 07:32	12/31/18 13:35	1
	MB	МВ							
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac

50 - 150

LCS LCS

Lab Sample ID: LCS 580-292312/2-B

**Matrix: Water** 

o-Terphenyl

**Analysis Batch: 292338** 

**Client Sample ID: Lab Control Sample** 

12/31/18 07:32 12/31/18 13:35

**Prep Type: Total/NA Prep Batch: 292312** 

%Rec.

Result Qualifier Unit Analyte Added Limits D %Rec #2 Diesel (C10-C24) 2.00 1.82 mg/L 91 50 - 120 Motor Oil (>C24-C36) 2.00 1.96 64 - 120 mg/L 98

Spike

LCS LCS

92

Surrogate %Recovery Qualifier Limits o-Terphenyl 50 - 150

Lab Sample ID: LCSD 580-292312/3-B

**Matrix: Water** 

**Analysis Batch: 292338** 

**Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA Prep Batch: 292312** 

	Spike	LCSD	LCSD			%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit D	%Rec	Limits	RPD	Limit
#2 Diesel (C10-C24)	2.00	1.80		mg/L	90	50 - 120	1	26
Motor Oil (>C24-C36)	2.00	1.96		mg/L	98	64 - 120	0	24

TestAmerica Seattle

# **QC Sample Results**

Client: ARCADIS U.S. Inc TestAmeric Project/Site: Edmonds Terminal

TestAmerica Job ID: 580-82864-1

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: LCSD 580-292312/3-B

**Matrix: Water** 

**Analysis Batch: 292338** 

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

**Prep Batch: 292312** 

LCSD LCSD

 6

3

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#### **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82864-1

Lab Sample ID: 580-82864-1

**Matrix: Water** 

Client Sample ID: Outfall #002

Date Collected: 12/20/18 14:00 Date Received: 12/21/18 11:15

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624			292137	12/27/18 21:49	TL1	TAL SEA
Total/NA	Prep	3510C			292144	12/27/18 15:06	JCM	TAL SEA
Total/NA	Analysis	8270C SIM		5	292183	12/28/18 21:08	DSO	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	292156	12/28/18 02:28	CJB	TAL SEA
Total/NA	Prep	3510C			292312	12/31/18 07:32	KO	TAL SEA
Total/NA	Cleanup	3630C			292322	12/31/18 10:01	KO	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	292338	12/31/18 14:40	Z1R	TAL SEA

Client Sample ID: Trip Blank Lab Sample ID: 580-82864-2

Date Collected: 12/20/18 00:01 Matrix: Water

Date Received: 12/21/18 11:15

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	292137	12/27/18 19:19	TL1	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	292117	12/27/18 16:00	CJB	TAL SEA

#### **Laboratory References:**

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

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# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-82864-1

Project/Site: Edmonds Terminal

# **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	<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	11-05-19
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

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# **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82864-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-82864-1	Outfall #002	Water	12/20/18 14:00	12/21/18 11:15
580-82864-2	Trip Blank	Water	12/20/18 00:01	12/21/18 11:15

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Loc:	580
82	864

Rush

Short Hold

Chain of Custody Record

Client Modes	**************************************		Client	Conta	act (	on N		e ((	•		-		-			**********			D	ate 2	12	0/	18			C	Chain of Custody N	umber 3	69	93
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Address  1100 OUR Wig Sv  City  Scotty  Project Name and Location (State)  Edmndy Termina	State Zip	0 (1) 9	Sampl Ja. Billing	Inl		L		Lal	Com	tact	W	o IV	er	) ( V ( V ( V ( V ( V ( V ( V ( V ( V (	20 =	, ;;	ノジント	1000 A	nalys ore s <sub>l</sub>	is (At pace	tach is ne	list il eeded	f d)				Special	Instru	ctions	/
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Sample I.D. and Location/Descript (Containers for each sample may be combined	tion d on one line)	Date	Time	Air	Aqueous	Soil		Unpres.	H2S04	ниоз	) HCI	NaOH	ZnAC/ NaOH	ď	ζ : Σ z	3 7	7	C C												
Outfall #002		12/20/18			×			2			8				<b>X</b> ],	<b>X</b> :	X	X									et	' ک		
TRIP BIANK					Y						6				X)	<b>X</b>												**************************************		
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Cooler  Yes  No Cooler Temp:  Urn Around Time Required (business days)	Possible H	  azard Identification  azard □ Flamm			in Irrita			Poisor					Sin C		-					isposi chive					Monti	hs	(A fee may be as are retained long			
24 Hours 48 Hours 5 Days	☐ 10 Da		<b>⊠</b> Oth Date						1. R	eceiv	ved By	V Siz	gn/Pr	int	<del></del>							<u>~</u>				<u>i</u>	Date 12/21/18	Time		
Relinquished By Sign/Print	Liti	<u> </u>	Date 12/3 Date	21/	18	\ \ \ Time	\$		2. Re	eceiv	red B	Siz	zn/Pr	int	r out	<b>10</b> 3	37	U	L	hn	4	<u>, J.</u>	<u>سو</u>		******	***************************************	Date	Time		***************************************
Relinquished By Sign/Print			Date			Time			3. Re	eceiv	/ed B)	/ Sig		The	rm.	ID:_	Ŋ	Z	Cor	:	₹.6	<u>)</u> °	—— Unc	. 3	.1		Date	Time		
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DISTRIBUTION: WHITE - Stays with the Sam,	oles; CANARY	- Returned to Client	with Repo	ort; Pli	VK I	ield (	Copy Pa	age	15 (	of 1	16			Blue	e Ice.	. K	DI	)ry,	Non	e	-			_	<b>*</b>		TAI	8274 1	-580 (0 <b>2/31</b> ,	<sup>210)</sup> /2018

Client: ARCADIS U.S. Inc

Job Number: 580-82864-1

Login Number: 82864 List Source: TestAmerica Seattle

List Number: 1

Creator: Gall, Brandon A

Creator: Gali, Brandon A		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td>Lab does not accept radioactive samples.</td>	N/A	Lab does not accept radioactive samples.
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	

# **TestAmerica**

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: 580-82965-1 Client Project/Site: Edmonds Terminal

For:

ARCADIS U.S. Inc. 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elaine Walker

Authorized for release by: 1/3/2019 3:08:07 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

----- LINKS -----

**Review your project** results through Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82965-1

# **Table of Contents**

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#### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82965-1

Job ID: 580-82965-1

**Laboratory: TestAmerica Seattle** 

**Narrative** 

Job Narrative 580-82965-1

#### Receipt

Two samples were received on 12/28/2018 12:25 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.8° C.

#### **GC/MS VOA**

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

#### GC/MS Semi VOA

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

#### GC Semi VOA

Method(s) NWTPH-Dx: The Diesel Range Organics (DRO) concentration reported for the following sample is due to the presence of discrete peaks: Outfall #002 (580-82965-1).

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

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## **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82965-1

#### **Qualifiers**

#### **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.

#### **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)

TestAmerica Seattle

1/3/2019

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# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82965-1

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Client Sample ID: Outfall #002

Date Collected: 12/27/18 10:55 Date Received: 12/28/18 12:25 Lab Sample ID: 580-82965-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			12/31/18 18:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	104		74 - 123			-		12/31/18 18:54	1
Toluene-d8 (Surr)	97		79 - 122					12/31/18 18:54	1
4-Bromofluorobenzene (Surr)	101		78 - 119					12/31/18 18:54	1
Dibromofluoromethane (Surr)	104		70 - 120					12/31/18 18:54	1
1,2-Dichloroethane-d4 (Surr)	102		70 - 120					12/31/18 18:54	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.052	0.014	ug/L		01/02/19 07:47	01/02/19 16:48	1
Benzo[a]pyrene	ND		0.10	0.011	ug/L		01/02/19 07:47	01/02/19 16:48	1
Benzo[b]fluoranthene	ND		0.052	0.011	ug/L		01/02/19 07:47	01/02/19 16:48	1
Benzo[k]fluoranthene	ND		0.052	0.012	ug/L		01/02/19 07:47	01/02/19 16:48	1
Chrysene	ND		0.10	0.017	ug/L		01/02/19 07:47	01/02/19 16:48	1
Dibenz(a,h)anthracene	ND		0.10	0.010	ug/L		01/02/19 07:47	01/02/19 16:48	1
Indeno[1,2,3-cd]pyrene	ND		0.052	0.014	ug/L		01/02/19 07:47	01/02/19 16:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	62		53 - 120				01/02/19 07:47	01/02/19 16:48	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			01/02/19 20:10	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	80		50 - 150					01/02/19 20:10	1
Trifluorotoluene (Surr)	117		50 <sub>-</sub> 150					01/02/19 20:10	1

Method: NWTPH-Dx - Semi-Vo	olatile Petro	leum Prod	ucts by NW1	PH with	ı Silica G	iel Cle	anup		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.091	J	0.11	0.067	mg/L		12/31/18 07:32	12/31/18 15:02	1
Motor Oil (>C24-C36)	0.12	J	0.36	0.099	mg/L		12/31/18 07:32	12/31/18 15:02	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	91		50 - 150				12/31/18 07:32	12/31/18 15:02	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82965-1

**Client Sample ID: Trip Blank** 

Date Collected: 12/27/18 00:00 Date Received: 12/28/18 12:25 Lab Sample ID: 580-82965-2

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			12/31/18 18:30	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	103		74 - 123					12/31/18 18:30	1
Toluene-d8 (Surr)	96		79 - 122					12/31/18 18:30	1
4-Bromofluorobenzene (Surr)	102		78 - 119					12/31/18 18:30	1
Dibromofluoromethane (Surr)	105		70 - 120					12/31/18 18:30	1
1,2-Dichloroethane-d4 (Surr)	102		70 - 120					12/31/18 18:30	1

Method: NWTPH-Gx - North Analyte		Petroleui Qualifier	m Products ( RL	GC) MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			01/02/19 16:05	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	76		50 - 150			-		01/02/19 16:05	1
Trifluorotoluene (Surr)	115		50 - 150					01/02/19 16:05	1

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Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82965-1

#### Method: 624 - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-292330/5 **Client Sample ID: Method Blank Matrix: Water Prep Type: Total/NA** 

Analysis Batch: 292330

MB	MB							
Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
ND		1.0	0.53	ug/L			12/31/18 11:40	1
МВ	MB							
%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
104		74 - 123					12/31/18 11:40	1
95		79 - 122					12/31/18 11:40	1
102		78 - 119					12/31/18 11:40	1
104		70 - 120					12/31/18 11:40	1
106		70 - 120					12/31/18 11:40	1
	Result ND MB %Recovery 104 95 102	MB MB %Recovery Qualifier 104 95 102 104	Result         Qualifier         RL           ND         1.0           MB MB           %Recovery         Qualifier         Limits           104         74 - 123           95         79 - 122           102         78 - 119           104         70 - 120	Result ND         Qualifier         RL ND         MDL ND           MB MB         MB         MB         MB           %Recovery Qualifier Limits         74 - 123         79 - 122           102 78 - 119         70 - 120	Result ND         Qualifier Qualifier         RL ND         MDL Unit Ug/L           MB         MB         MB         Way/L           104         74-123         79-122           102         78-119         70-120	Result         Qualifier         RL         MDL         Unit         D           ND         1.0         0.53         ug/L           MB         MB         WRecovery         Qualifier         Limits           104         74 - 123         95         79 - 122           102         78 - 119         70 - 120	Result ND         Qualifier         RL ND         MDL unit ug/L         D ug/L         Prepared           MB %Recovery 9 95 79 - 122 102 104 104 105 105 105 105 105 105 105 105 105 105	Result ND         Qualifier         RL ND         Unit ug/L         D ug/L         Prepared 12/31/18 11:40           MB MB         MB         MB         Prepared 2/31/18 11:40         Prepared 3/31/18 11:40         Analyzed 3/31/18 11:40           104         74 - 123         12/31/18 11:40         12/31/18 11:40           95         79 - 122         12/31/18 11:40           102         78 - 119         12/31/18 11:40           104         70 - 120         12/31/18 11:40

Lab Sample ID: LCS 580-292330/6 **Client Sample ID: Lab Control Sample Matrix: Water Prep Type: Total/NA** 

**Analysis Batch: 292330** 

LCS LCS Spike %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzene 10.0 9.69 ug/L 97 37 - 151

LCS	LCS	
%Recovery	Qualifier	Limits
104		74 - 123
97		79 - 122
104		78 - 119
105		70 - 120
103		70 - 120
	%Recovery 104 97 104 105	97 104 105

Lab Sample ID: LCSD 580-292330/7 **Client Sample ID: Lab Control Sample Dup** Prep Type: Total/NA

**Matrix: Water Analysis Batch: 292330** 

Spike LCSD LCSD %Rec. RPD Added Analyte Result Qualifier Unit Limits RPD Limit D %Rec Benzene 10.0 96 37 - 151 9.60 ug/L

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
Trifluorotoluene (Surr)	101		74 - 123
Toluene-d8 (Surr)	96		79 - 122
4-Bromofluorobenzene (Surr)	104		78 - 119
Dibromofluoromethane (Surr)	102		70 - 120
1,2-Dichloroethane-d4 (Surr)	102		70 - 120

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

Lab Sample ID: MB 580-292389/1-A **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA **Analysis Batch: 292406 Prep Batch: 292389** 

MR MR

	IVID	IAID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050	0.014	ug/L		01/02/19 07:47	01/02/19 13:47	1
Benzo[a]pyrene	ND		0.10	0.011	ug/L		01/02/19 07:47	01/02/19 13:47	1
Benzo[b]fluoranthene	ND		0.050	0.011	ug/L		01/02/19 07:47	01/02/19 13:47	1

TestAmerica Seattle

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TestAmerica Job ID: 580-82965-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

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

Lab Sample ID: MB 580-292389/1-A

Lab Sample ID: LCS 580-292389/2-A

**Matrix: Water** 

**Matrix: Water** 

Analysis Batch: 292406

**Analysis Batch: 292406** 

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

Prep Batch: 292389

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[k]fluoranthene	ND		0.050	0.012	ug/L		01/02/19 07:47	01/02/19 13:47	1
Chrysene	ND		0.10	0.016	ug/L		01/02/19 07:47	01/02/19 13:47	1
Dibenz(a,h)anthracene	ND		0.10	0.010	ug/L		01/02/19 07:47	01/02/19 13:47	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.014	ug/L		01/02/19 07:47	01/02/19 13:47	1

MB MB

MR ME

%Recovery Qualifier Limits Surrogate Prepared Analyzed Dil Fac 01/02/19 07:47 01/02/19 13:47 53 - 120 Terphenyl-d14 71

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA Prep Batch: 292389

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits Benzo[a]anthracene 4.00 4.20 ug/L 105 61 - 120 4.00 Benzo[a]pyrene 4.03 ug/L 101 65 - 120 4.00 3.82 Benzo[b]fluoranthene ug/L 95 58 - 120 Benzo[k]fluoranthene 4.00 3.81 95 58 - 120 ug/L 90 Chrysene 4.00 ug/L 3.60 58 - 120 Dibenz(a,h)anthracene 4.00 3.70 ug/L 92 60 - 125 Indeno[1,2,3-cd]pyrene 4.00 3.31 ug/L 83 56 - 120

LCS LCS

Surrogate %Recovery Qualifier Limits Terphenyl-d14 83 53 - 120

Lab Sample ID: LCSD 580-292389/3-A

**Matrix: Water** 

Analysis Batch: 292406

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

Prep Type: Total/NA **Prep Batch: 292389** 

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	Spike	LCSD	LCSD				%Rec.		RPD	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Benzo[a]anthracene	4.00	4.52		ug/L		113	61 - 120	7	16	
Benzo[a]pyrene	4.00	4.28		ug/L		107	65 - 120	6	17	
Benzo[b]fluoranthene	4.00	4.18		ug/L		104	58 - 120	9	20	
Benzo[k]fluoranthene	4.00	4.12		ug/L		103	58 - 120	8	20	
Chrysene	4.00	3.91		ug/L		98	58 - 120	8	16	
Dibenz(a,h)anthracene	4.00	4.01		ug/L		100	60 - 125	8	15	
Indeno[1,2,3-cd]pyrene	4.00	3.81		ug/L		95	56 - 120	14	15	

LCSD LCSD

Surrogate %Recovery Qualifier Limits Terphenyl-d14 99 53 - 120

TestAmerica Seattle

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82965-1

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

Prep Type: Total/NA

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-292417/6

**Matrix: Water** 

**Analysis Batch: 292417** 

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB Analyte Result Qualifier RL **MDL** Unit D Analyzed Dil Fac Prepared 0.25 Gasoline  $\overline{\mathsf{ND}}$ 0.10 mg/L 01/02/19 14:16

MB MB %Recovery Surrogate Qualifier Limits Prepared Analyzed Dil Fac 4-Bromofluorobenzene (Surr) 83 50 - 150 01/02/19 14:16 01/02/19 14:16 Trifluorotoluene (Surr) 116 50 - 150

Lab Sample ID: LCS 580-292417/7

**Matrix: Water** 

**Analysis Batch: 292417** 

LCS LCS Spike %Rec. **Analyte** Added Result Qualifier Limits Unit D %Rec Gasoline 1.00 0.841 84 79 - 120 mg/L

LCS LCS Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 50 - 150 81 109 50 - 150 Trifluorotoluene (Surr)

Lab Sample ID: LCSD 580-292417/8 Client Sample ID: Lab Control Sample Dup

**Matrix: Water** 

**Analysis Batch: 292417** 

RPD Spike LCSD LCSD %Rec. Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Gasoline 1.00 0.899 mg/L 79 - 120

LCSD LCSD %Recovery Qualifier Surrogate I imits 4-Bromofluorobenzene (Surr) 85 50 - 150 Trifluorotoluene (Surr) 109 50 - 150

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup

Lab Sample ID: MB 580-292312/1-B **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA **Analysis Batch: 292338** Prep Batch: 292312

MB MB

Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac #2 Diesel (C10-C24) ND 0.11 12/31/18 07:32 12/31/18 13:35 0.065 mg/L Motor Oil (>C24-C36) ND 0.35 12/31/18 07:32 12/31/18 13:35 0.096 mg/L MB MB Qualifier Limits Dil Fac Surrogate %Recovery Prepared Analyzed 50 - 150 <u>12/31/18 07:32</u> <u>12/31/18 13:35</u> o-Terphenyl 92

Lab Sample ID: LCS 580-292312/2-B **Client Sample ID: Lab Control Sample** 

**Matrix: Water** 

Prep Type: Total/NA **Analysis Batch: 292338 Prep Batch: 292312** Spike LCS LCS %Rec. Added Analyte Result Qualifier Unit D %Rec Limits #2 Diesel (C10-C24) 2.00 1.82 mg/L 91 50 - 120

TestAmerica Seattle

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1/3/2019

### **QC Sample Results**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-82965-1 Project/Site: Edmonds Terminal

#### Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup (Continued)

Lab Sample ID: LCS 580-2 Matrix: Water Analysis Batch: 292338	92312/2-B					Clie	nt Sa	mple ID	Prep Type: Total/NA Prep Batch: 292312
			Spike	LCS	LCS				%Rec.
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits
Motor Oil (>C24-C36)			2.00	1.96		mg/L		98	64 - 120
	LCS	LCS							
Surrogate	%Recovery	Qualifier	Limits						
o-Terphenyl	91		50 - 150						

Lab Sample ID: LCSD 580-292312/3-B Matrix: Water Analysis Batch: 292338			C	Client	Sample	D: Lal	Control Prep Ty Prep Ba	pe: Tot	al/NA
•	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
#2 Diesel (C10-C24)	2.00	1.80		mg/L		90	50 - 120	1	26
Motor Oil (>C24-C36)	2.00	1.96		mg/L		98	64 - 120	0	24

LCSD LCSD %Recovery Qualifier Limits Surrogate 50 - 150 o-Terphenyl 91

1/3/2019

#### **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82965-1

Lab Sample ID: 580-82965-1

Matrix: Water

Client Sample ID: Outfall #002

Date Collected: 12/27/18 10:55 Date Received: 12/28/18 12:25

Prep Type Total/NA	Batch Type Analysis	Batch Method 624	Run	Dilution Factor 1	Batch Number 292330	Prepared or Analyzed 12/31/18 18:54	Analyst JSM	Lab TAL SEA
Total/NA	Prep	3510C			292389	01/02/19 07:47	KO	TAL SEA
Total/NA	Analysis	8270C SIM		1	292406	01/02/19 16:48	T1W	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	292417	01/02/19 20:10	CJB	TAL SEA
Total/NA	Prep	3510C			292312	12/31/18 07:32	KO	TAL SEA
Total/NA	Cleanup	3630C			292322	12/31/18 10:01	KO	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	292338	12/31/18 15:02	Z1R	TAL SEA

Client Sample ID: Trip Blank Lab Sample ID: 580-82965-2

Date Collected: 12/27/18 00:00 Date Received: 12/28/18 12:25 Matrix: Water

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	292330	12/31/18 18:30	JSM	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	292417	01/02/19 16:05	CJB	TAL SEA

**Laboratory References:** 

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

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#### **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-82965-1

Project/Site: Edmonds Terminal

#### **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	<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	11-05-19
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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82965-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-82965-1	Outfall #002	Water	12/27/18 10:55	12/28/18 12:25
580-82965-2	Trip Blank	Water	12/27/18 00:00	12/28/18 12:25

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THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Rush	

Short Hold

Chain of Custody Record

Client Aradis		Client Contact	or (an	ovell		Date 12/27/18	Chain of Custody I	34,919
Address 100 Olive Way Svite	800	Telephone Num	ber (Area Code)/Fa	x Number		Lab Number	Page	of
Scotale State	7 8 0 1	Sampler Jason Li	+7 b	ab Contact Enine Walking	2 W W	ralysis (Attach list if re space is needed)		
Project Name and Location (State)	<u> </u>	Billing Contact			1 2 5		Sp	<sup>Loc: 580</sup> 8 <b>2965</b>
Contract/Purchase Order/Quote No.	,		Matrix	Containers & Preservatives	コード		Сс	-005
Sample I.D. and Location/Description (Containers for each sample may be combined on one line	Date	Time Varieous	Sed. Soil	HZS04 HW03 HCI Na0H Na0H Na0H	BARY EPA NATH-6X NATH-8X CPAHI 82			
ortall #002	12/27/18 10	55 X	1	8	$\times \times \times \times$		et1- "/	1.51
TRIP Blank		<u>-     ン</u>		6				
							× +38	Gr. s. s
							silica	
								7
							* BM2-	+ CPAHS
		580-82965 Cha	in of Custody	Packi Cust.	m. ID: At Cor er Dsc: Med ing: Bubble Seal: Yes No. Y Ice, Wet, Dry, Nor	LAD CODE A	less the	a lug/L
Cooler         Possible           ☐ Yes         ☐ No Cooler Temp:	⊔ Hazard Identification Hazard □ Flammat	nie 🗆 Skin Ir.	ritant 🗆 Poisc		•	Disposal By Lab Archive For Montl		ssessed if samples ger than 1 month)
Turn Around Time Required (business days) □ 24 Hours □ 48/10µrs □ 5 Days □ 10 D	ays 🗆 15 Days	Q Other ST	AT	QC Requirements (Specify)				
1. Relinquished By Sign/Print		Date 17 /28/18	Time	1. Received By Sign/Print	Francis	co Lunc, Ja	Date 12/28/18	Time   1 Z Z S
2. Relinquished by sign wrim		Date	Time	2. Received By Sign/Print		/	Date	Time
3. Relinquished By Sign/Print		Date	Time	3. Received By Sign/Print			Date	Time
Comments								<u> </u>

Client: ARCADIS U.S. Inc

Job Number: 580-82965-1

Login Number: 82965 List Source: TestAmerica Seattle

List Number: 1

Creator: Hobbs, Kenneth F

oreator. Hobbs, Neillieth i		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
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").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# APPENDIX J

**DPE System Vapor Laboratory Analytical Results and Chain of Custody Documentation** 



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: 580-73617-1

Client Project/Site: Chevron Edmonds Terminal

Revision: 1

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

Authorized for release by: 1/22/2018 4:11:16 PM

Kim Presley, Project Management Assistant I

(253)922-2310

kim.presley@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

.....LINKS .....

**Review your project** results through Total Access

**Have a Question?** 



Visit us at:

www.testamericainc.com

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.

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#### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-1

Job ID: 580-73617-1

**Laboratory: TestAmerica Seattle** 

Narrative

CASE NARRATIVE
Client: ARCADIS U.S. Inc
Project: Chevron Edmonds Terminal

Report Number: 580-73617-1

Revision 1: January 22, 2018

Per Client email 1/22/2018, the Outfall #2 sample date has been reported seperately.

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 12/14/2017 3:40 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.2° C.

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.

#### **FIXED GASES**

Samples VSP 801 (580-73617-3) and VSP 802 (580-73617-4) were analyzed for Fixed Gases in accordance with D1946. The samples were analyzed on 12/18/2017 and 12/19/2017.

Samples VSP 801 (580-73617-3)[1.54X] and VSP 802 (580-73617-4)[1.53X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

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

#### **VOLATILE ORGANIC COMPOUNDS IN AMBIENT AIR**

Samples VSP 801 (580-73617-3) and VSP 802 (580-73617-4) were analyzed for volatile organic compounds in ambient air in accordance with EPA Method TO15. The samples were analyzed on 12/21/2017.

1,2-Dichloroethane-d4 (Surr) failed the surrogate recovery criteria high for VSP 801 (580-73617-3). 1,2-Dichloroethane-d4 (Surr) failed the surrogate recovery criteria high for LCS 320-200839/7. 1,2-Dichloroethane-d4 (Surr) failed the surrogate recovery criteria high for LCSD 320-200839/8. This analyte is not use as a monitoring analyte.

Sample VSP 801 (580-73617-3)[62.9X] 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.

TestAmerica Seattle 1/22/2018 (Rev. 1)

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#### **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-1

#### **Qualifiers**

#### Air - GC/MS VOA

Qualifier Description

X Surrogate is outside control limits

Air - GC 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.

#### **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)

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#### **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-1

12/18/17 11:49

Client Sample ID: VSP 801 Lab Sample ID: 580-73617-3

Date Collected: 12/14/17 09:35 Matrix: Air

Date Received: 12/14/17 15:40

**Oxygen** 

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	2400		25	5.0	ppb v/v			12/21/17 17:22	62.9
Ethylbenzene	3600		25	4.0	ppb v/v			12/21/17 17:22	62.9
Toluene	29		25	3.2	ppb v/v			12/21/17 17:22	62.9
m,p-Xylene	2500		50	6.3	ppb v/v			12/21/17 17:22	62.9
o-Xylene	240		25	3.4	ppb v/v			12/21/17 17:22	62.9
TPH (as Gasoline)	290000		6300	2500	ppb v/v			12/21/17 17:22	62.9
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
4-Bromofluorobenzene (Surr)	105		70 - 130					12/21/17 17:22	62.
1,2-Dichloroethane-d4 (Surr)	167	X	70 - 130					12/21/17 17:22	62.
Toluene-d8 (Surr)	100		70 - 130					12/21/17 17:22	62.
	ses in Air (GC)								
Metnod: บา946 - Fixed Gas			ъ.	MDI	Unit	D	Prepared	Analyzed	Dil Fac
	, ,	Qualifier	RL	IVIDE	Ollit		ricparca	Analyzea	Dil Fa
Method: D1946 - Fixed Gas Analyte Carbon Dioxide (TCD)	, ,		0.77	0.016			Тторитои	12/18/17 11:49	1.54

0.31

0.011 % v/v

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1.54

#### **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-1

Lab Sample ID: 580-73617-4

Matrix: Air

Date Collected: 12/14/17 09:45 Date Received: 12/14/17 15:40

Client Sample ID: VSP 802

Sample Container: Summa Canister 1L

Method: D1946 - Fixed Gases in Air (GC)

Analyte

**Oxygen** 

Methane (FID)

Carbon Dioxide (TCD)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	2.0		0.40	0.079	ppb v/v			12/21/17 18:13	1
Ethylbenzene	11		0.40	0.063	ppb v/v			12/21/17 18:13	1
Toluene	1.5		0.40	0.051	ppb v/v			12/21/17 18:13	1
m,p-Xylene	12		0.80	0.10	ppb v/v			12/21/17 18:13	1
o-Xylene	1.8		0.40	0.054	ppb v/v			12/21/17 18:13	1
TPH (as Gasoline)	570		100	40	ppb v/v			12/21/17 18:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)			70 - 130			-		12/21/17 18:13	1
1,2-Dichloroethane-d4 (Surr)	108		70 - 130					12/21/17 18:13	1
Toluene-d8 (Surr)	101		70 - 130					12/21/17 18:13	1

RL

0.77

0.31

0.00015

MDL Unit

0.016 % v/v

0.011 % v/v

0.000031 % v/v

D

Prepared

Analyzed

12/18/17 12:02

12/19/17 10:46

12/18/17 12:02

Result Qualifier

0.57 J

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0.0061

TestAmerica Seattle

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Dil Fac

1.53

1.53

1.53

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-1

#### Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-200839/11

Matrix: Air

**Analysis Batch: 200839** 

Client Sample ID: Method Blank Prep Type: Total/NA

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.40	0.079	ppb v/v			12/21/17 16:38	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			12/21/17 16:38	1
Toluene	ND		0.40	0.051	ppb v/v			12/21/17 16:38	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			12/21/17 16:38	1
o-Xylene	ND		0.40	0.054	ppb v/v			12/21/17 16:38	1
TPH (as Gasoline)	ND		100	40	ppb v/v			12/21/17 16:38	1

MB MB

Surrogate	%Recovery	Qualifier	Limits		Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		70 - 130	_		12/21/17 16:38	1
1,2-Dichloroethane-d4 (Surr)	97		70 - 130			12/21/17 16:38	1
Toluene-d8 (Surr)	97		70 - 130			12/21/17 16:38	1

Lab Sample ID: LCS 320-200839/4

**Matrix: Air** 

**Analysis Batch: 200839** 

Client Sample ID: Lab Control Sample Prep Type: Total/NA

-	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzene	20.0	19.0		ppb v/v		95	68 - 128	
Ethylbenzene	20.0	23.0		ppb v/v		115	64 - 124	
Toluene	20.0	21.1		ppb v/v		106	68 - 128	
m,p-Xylene	40.0	46.9		ppb v/v		117	65 - 125	
o-Xylene	20.0	23.8		ppb v/v		119	65 - 125	

LCS LCS

Surrogate	%Recovery Qualifie	r Limits
4-Bromofluorobenzene (Surr)	100	70 - 130
1,2-Dichloroethane-d4 (Surr)	100	70 - 130
Toluene-d8 (Surr)	101	70 - 130

Lab Sample ID: LCS 320-200839/7

**Matrix: Air** 

**Analysis Batch: 200839** 

Client Sample ID:	Lab Control Sample
	Prep Type: Total/NA

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

 Analyte
 Added TPH (as Gasoline)
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	LCS	LCS	
Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	115		70 - 130
1,2-Dichloroethane-d4 (Surr)	149	Χ	70 - 130
Toluene-d8 (Surr)	105		70 - 130

Lab Sample ID: LCSD 320-200839/5

**Matrix: Air** 

Analysis Batch: 200839

Analysis Daten. 200000										
	Spike	LCSD	LCSD				%Rec.		RPD	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Benzene	20.0	18.3		ppb v/v	_	91	68 - 128	4	25	
Ethylbenzene	20.0	21.5		ppb v/v		108	64 - 124	7	25	

TestAmerica Seattle

Prep Type: Total/NA

Page 7 of 25

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TestAmerica Job ID: 580-73617-1

Client: ARCADIS U.S. Inc Project/Site: Chevron Edmonds Terminal

#### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-200839/5

**Matrix: Air** 

**Analysis Batch: 200839** 

Client Sample ID: Lab Control Sample Dup

**Prep Type: Total/NA** 

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Toluene	20.0	19.8		ppb v/v		99	68 - 128	7	25
m,p-Xylene	40.0	43.6		ppb v/v		109	65 - 125	7	25
o-Xylene	20.0	22.2		ppb v/v		111	65 - 125	7	25

LCSD LCSD %Recovery Qualifier Surrogate Limits 4-Bromofluorobenzene (Surr) 106 70 - 130 1,2-Dichloroethane-d4 (Surr) 102 70 - 130 Toluene-d8 (Surr) 101 70 - 130

Lab Sample ID: LCSD 320-200839/8 **Client Sample ID: Lab Control Sample Dup** 

**Matrix: Air** 

**Analysis Batch: 200839** 

	<b>Spike</b>	LCSD	LCSD				%Rec.		RPD	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
TPH (as Gasoline)	5000	4830		ppb v/v		97	70 - 130	4	25	

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	117		70 - 130
1,2-Dichloroethane-d4 (Surr)	142	Χ	70 - 130
Toluene-d8 (Surr)	107		70 - 130

MR MR

#### Method: D1946 - Fixed Gases in Air (GC)

Lab Sample ID: MB 320-200219/11

**Matrix: Air** 

**Analysis Batch: 200219** 

**Client Sample ID: Method Blank** 

**Client Sample ID: Lab Control Sample** 

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

Prep Type: Total/NA

Prep Type: Total/NA

**Prep Type: Total/NA** 

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	ND		0.50	0.011	% v/v			12/18/17 10:27	1
Methane (TCD)	ND		0.50	0.14	% v/v			12/18/17 10:27	1
Oxygen	ND		0.20	0.0074	% v/v			12/18/17 10:27	1

Lab Sample ID: LCS 320-200219/2

**Matrix: Air** 

Analysis Batch: 200219								
	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Carbon Dioxide (TCD)	24.4	26.1		% v/v		107	80 - 120	
Methane (TCD)	26.1	28.7		% v/v		110	80 - 120	

Lab Sample ID: LCS 320-200219/5

**Matrix: Air** 

Analysis Batch: 200219								
	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Oxygen	15.7	13.7		% v/v		87	80 - 120	 _

TestAmerica Seattle

#### **QC Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-1

Method: D1946 - Fixed Gases in Air (GC) (Continued)

Lab Sample ID: LCSD 320-200219/3

Matrix: Air

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

Analysis Batch: 200219

Spike LCSD LCSD %Rec. RPD Analyte Added Result Qualifier Unit D %Rec Limits RPD Limit % v/v Carbon Dioxide (TCD) 24.4 26.1 80 - 120 0 20 107 Methane (TCD) 26.1 28.6 % v/v 109 80 - 120 20 0

Lab Sample ID: LCSD 320-200219/6

Matrix: Air

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

**Analysis Batch: 200219** 

LCSD LCSD **RPD** Spike %Rec. Analyte Added Result Qualifier Limits **RPD** Limit Oxygen 15.7 13.7 % v/v 87 80 - 120

Lab Sample ID: MB 320-200409/5

Matrix: Air

Client Sample ID: Method Blank

Prep Type: Total/NA

**Analysis Batch: 200409** 

MB MB Analyte Result Qualifier RL **MDL** Unit **Prepared** Analyzed Dil Fac Methane (FID) ND 0.00010 0.000020 % v/v 12/19/17 09:42 ND 0.20 0.0074 % v/v 12/19/17 09:42 Oxygen

Lab Sample ID: LCS 320-200409/2

Matrix: Air

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analysis Batch: 200409

 Analyte
 Added Methane (FID)
 Result 0.0250
 Qualifier 0.0255
 Unit w/v v/v
 D 90 80 - 120
 80 - 120

Lab Sample ID: LCSD 320-200409/3

Client Sample ID: Lab Control Sample Dup
Matrix: Air

Prep Type: Total/NA

**Analysis Batch: 200409** 

LCSD LCSD **RPD** Spike %Rec. Analyte Added Result Qualifier Unit %Rec Limits RPD Limit Methane (FID) 0.0250 0.0237 % v/v 95 80 - 120 20

TestAmerica Seattle

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#### **Lab Chronicle**

Client: ARCADIS U.S. Inc

**Client Sample ID: VSP 801** 

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-1

Lab Sample ID: 580-73617-3

Matrix: Air

Date Collected: 12/14/17 09:35
Date Received: 12/14/17 15:40

Batch Batch Dilution Batch Prepared **Prep Type** Method Type Run **Factor** Number or Analyzed Analyst Lab Total/NA Analysis TO-15 62.9 200839 12/21/17 17:22 AP1 TAL SAC D1946 Total/NA Analysis 1.54 200409 12/19/17 10:27 EMJ TAL SAC Total/NA Analysis D1946 1.54 200219 12/18/17 11:49 EMJ TAL SAC

Client Sample ID: VSP 802 Lab Sample ID: 580-73617-4

Date Collected: 12/14/17 09:45 Matrix: Air

Date Received: 12/14/17 15:40

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15			200839	12/21/17 18:13	AP1	TAL SAC
Total/NA	Analysis	D1946		1.53	200409	12/19/17 10:46	EMJ	TAL SAC
Total/NA	Analysis	D1946		1.53	200219	12/18/17 12:02	EMJ	TAL SAC

**Laboratory References:** 

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

TestAmerica Seattle

#### **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-73617-1

Project/Site: Chevron Edmonds Terminal

#### **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	<b>Expiration Date</b>
Alaska (UST)	State Program	10	UST-022	03-02-18
ANAB	DoD ELAP		L2236	01-19-19
ANAB	ISO/IEC 17025		L2236	01-19-19
California	State Program	9	2901	01-31-18
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-18

#### **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	UST-055	01-31-18
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-18
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-19
Illinois	NELAP	5	200060	03-17-18
Kansas	NELAP	7	E-10375	10-31-18
L-A-B	DoD ELAP		L2468	01-20-21
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-18-18
Michigan	State Program	5	9947	01-31-18
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-18
New Jersey	NELAP	2	CA005	06-30-18
New York	NELAP	2	11666	04-01-18
Oregon	NELAP	10	4040	01-29-20
Pennsylvania	NELAP	3	68-01272	03-31-18
Texas	NELAP	6	T104704399	05-31-18
US Fish & Wildlife	Federal		LE148388-0	07-31-18
USDA	Federal		P330-11-00436	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-18
Virginia	NELAP	3	460278	03-14-18
Washington	State Program	10	C581	05-05-18
West Virginia (DW)	State Program	3	9930C	12-31-17
Wyoming	State Program	8	8TMS-L	01-28-19

TestAmerica Seattle

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## **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-73617-3	VSP 801	Air	12/14/17 09:35	12/14/17 15:40
580-73617-4	VSP 802	Air	12/14/17 09:45	12/14/17 15:40

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#### TestAmerica Seattle

5755 8th Street East Tacoma, WA 98424

## **Chain of Custody Record**



THE LEADER IN ENVIRONMENTAL TESTING

Phone (253) 922-2310 Fax (253) 922-5047																									
Client Information	Sampler: Evic	Kruege	S.		PM: alker, E	Elaine	e M						Carrier	Track	ing No	(s):				-27035-8	3908.	.1			
Client Contact: Jason Little	Phone: 303-	519-7	t192		/ail: nine.wa	alker(	@tes	tame	ricaine	c.com	1								Page Pag	e: je 1 of 1			·		
Company: ARCADIS U.S. Inc									Α	naly	/sis	Requ	este	ed :					Job #	t	7.	36	17		*******
Address:	Due Date Request	ed:						T	T	1	<u> </u>			T					9	ervation		es.			
1100 Olive Way Suite 800 City	TAT Requested (d	ays}:		·	- 1														A - H B - N	HCL NaOH		M - He N - Not			
Seattle State, Zip:	Fivedays	<b>S</b>					İ					1		İ						Zn Acetate Vitric Acid		O - Asi P - Nac			
WA, 98101	<u> </u>				<b>」</b> Ⅰ						.5	0								√aHSO4 √eOH		Q - Na: R - Na:			
Phone: 206-726-4720(Tel)	Po #: B0045362.0010	)						_	624		10	77							H - A	Amchlor Ascorbic Ac	cid		Dodeca	ahydrale	e
Email: Jason,Little@arcadis.com	WO#: 0015254061				N N	<u>ş</u>	Odd/CdQ	) H		~	AT	0						2		l Water		U - Age	AA		
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Washington			T				Dv. Northu	Hall	\ \v	70		thas		-				er of	<u> </u>						
Comunic Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (w=water, S=solid, O=waste/oil, BT=Tissue, A=A	leld Filtere	Perform MS/MS/	NWTPH DV	624 5ml, NWTPH GX	Benzene	×	TPH GIRD	Fired to						Total Number		Specia	al Ins	structio	ons/No	ote:	
Sample Identification	Sample Date			tion Code:		ΧN	400:054 37050	A										X							
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VSP 801	12/14/17	0935	6	Air	$\Pi$		1			X	X	ΧÌ		$\uparrow$					Р	D:	3	01.	5 p.	pm	******
V5P80Z	12/14/17		6	AW						X	X	XT							3	ŊΞ					*****
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Possible Hazard Identification											may	be as	esse	d if	samı	les a	re re	taine	ed lo	nger tha	n 1 r	nonth	)	***	
Non-Hazard Flammable Skin Irritant Pois	on B Unkn	own L F	Radiologica	<u> </u>					Clier			⊃ <sub>Dis</sub>		By I	Lab			Arch.	ive F	or		Moi	nths		
Deliverable Requested: I, If, III, IV, Other (specify)					S	pecia	al Ins	tructi	ons/C	₹C Re	quire	ments													
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Custody Seals Intact: Custody Seal No.:	<u> </u>					Co	oler Ti	emper	ature(s	)°C an	d Othe	er Rema	erks:												

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Allow Allow

Ver: 0/22/2018 (Rev. 1)

Ver; 09/20/2016

Cooler Temperature(s) °C and Other Remarks

TestAmerica

# Chain of Custody Record

**TestAmerica Seattle** 

5755 8th Street East Tacoma, WA 98424	Cha	ain o	iin of Custody Record	tody F	ecor	D				lest <sup>A</sup>	lestAmerica
Phone (253) 922-2310 Fax (253) 922-5047	Campler			M de II	. William	1		Carrier Tracking Note	No(e)	COC No.	
Client Information (Sub Contract Lab)	gambier			Wal	Walker, Elaine M	e M		Carrier Liac	ng No(s).	580-52003.1	
Client Contact Shipping/Receiving	Phone			E-Mail: elaine	ne.walker	@testa	E-Mail: elaine.walker@testamericainc.com	State of Origin: Washington	E E	Page 1 of 1	
Company. TestAmerica Laboratories, Inc.					Accredita	ions Req	Accreditations Required (See note):			Job# 580-73617-1	
Address 880 Riverside Parkway	Due Date Requested: 12/21/2017						Analy	Analysis Requested		Preservation Codes:	1
City West Sacramento	TAT Requested (days):					-				B - NaOH C - Zn Acetate	M - Hexane N - None O - AsNaO2
State, 2.p. CA, 95605					200	p				E - NaHSO4	D - Na2045
Phone 916-373-5600(Tel) 916-372-1059(Fax)	PO#,				(0	400				G - Amchlor H - Ascorbic Acid	S - H2SO4 T - TSP Dodecahvdrate
Email:	WO#					-					
Project Name: Chevron Edmonds Terminal	Project #. 58011413									K-EDTA L-EDA	W - pH 4-5 Z - other (specify)
Site. Chevron Edmonds Terminal	SSOW#.									of con	
Samule Identification - Client ID (I ab ID)	Sample Date	Sample	Sample Type (C=comp,	(Wewater, Smoolid, Orwasteich,	beretlii bieii	Ib9T_iA\8¢fC				redmuk listo	Special Instructions Moto.
	X	X	7 00	Preservation Code:	×	-					mad definition and the
VSP 801 (580-73617-3)	12/14/17	09:35 Parific		Air		×				-	
VSP 802 (580-73617-4)	12/14/17	09:45		Air		×				-	
		racino								4	
						+					
Note: Since laboratory accreditations are subject to change. TestAmerica Laboratores, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This samples shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/lessta/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratories 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.	Laboratorres, inc. places the ow ysis/lests/matrix being analyzed e current to date, return the sign.	nership of m the sample ed Chain of	ethod, analyte s must be ship Custody attest	& accreditations & secreditations & secr	on compliar ie TestAme inplicance to	ce upon o	out subcontract lab atory or other instru erica Laboratories,	oratories This sample s octions will be provided inc.	nipment is forwarded in Any changes to accre	under chain-of-custody. ditation status should be	If the laboratory does not s brought to TestAmerica
Possible Hazard Identification					San	ple Dis	sposal (A fee	Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)	samples are re	ained longer than	1 month)
Unconfirmed					1	Retui	Return To Client	Disposal By Lab		Archive For	Months
Deliverable Requested: I, II, III, IV, Other (specify)	Primary Deliverable	le Rank: 2			Spe	cial Inst	Special Instructions/QC Requirements	equirements:			
Empty Kit Relinquished by:		Date:			Time:			Metho	Method of Shipment		
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Relinquished by:	Date/Time:			Company		Received by	by.		Date/Time:		Company

Custody Seals Intact: A Yes A No

Airbill Here	
:	* .
456 3209 3908	

Sample Receiving



580-73617 Field Sheet

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations. File in the job folder with the COC.

File in the job folder with the COC.	1
Notes:	Cooler Custody Seal: 246974  # Bags:1L, 2L, 10L
*	
	# Canisters:1L,6L, TA
	Transferred by Sacramento - Yes No
	# Canisters Unused:1L,6L
	# Flow Regulators:, # Gauges:
	Co-locator
	Initial & Date 12-16-(7

N:\QA-828 CANISTER RECEIVING NOTES.DOC

QA-828 JS 11/13/2015



# Sacramento 1 Liter Canister QC Certification Batch Certification

Date Cleaned/Batch ID	12-8-17 320-34118
Date of QC	12/11/2017
Data File Number	0: [mgocucm]1/02 cm 171211)
	M59121107-d

320-34118 Chain of Custody

(File ID for certification analysis of canister designated below)

#### **CANISTER ID NUMBERS**

34001065	34001093
3:1000674	34001036
8502	34001964
34000731	34001950 % 12-11-17 34001950
34000740	34001622
34001243	3400060
8934	8937
34000863	34001051

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

Q:\DOCUMENT-MANAGEMENT\FORMS\QA-814A 1-LITER BATCH CAN QC 20171023.DOC QA-814 A

RE 10232017

#### FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-34118-1 SDG No.: Client Sample ID: 34001065 Lab Sample ID: 320-34118-1 Lab File ID: MS9121107.D Matrix: Air Analysis Method: TO-15 Date Collected: 12/08/2017 00:00 Sample wt/vol: 500(mL) \_\_\_\_\_ Date Analyzed: 12/11/2017 17:26 Soil Aliquot Vol: Dilution Factor: 1 Soil Extract Vol.: GC Column: RTX-Volatiles ID: 0.32(mm) Level: (low/med) Low % Moisture: Analysis Batch No.: 199336 Units: ppb v/v

-		11 - ,			
CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.34	J	5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.11
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	ND		0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.27
75-00-3	Chloroethane	ND		0.80	0.31
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.057
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroetha ne	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.11
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.15
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.088

#### FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-34118-1 SDG No.: Client Sample ID: 34001065 Lab Sample ID: 320-34118-1 Lab File ID: MS9121107.D Matrix: Air Analysis Method: TO-15 Date Collected: 12/08/2017 00:00 Sample wt/vol: 500(mL) Date Analyzed: 12/11/2017 17:26 Soil Aliquot Vol: Dilution Factor: 1 Soil Extract Vol.: GC Column: RTX-Volatiles ID: 0.32(mm) Level: (low/med) Low % Moisture: Analysis Batch No.: 199336 Units: ppb v/v

		<del></del>			
CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.1
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.1
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.1
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.08
123-91-1	1,4-Dioxane	ND		0.80	0.1
141-78-6	Ethyl acetate	ND		0.30	0.1
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.1
142-82-5	n-Heptane	ND		0.80	0.06
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.07
591-78-6	2-Hexanone	ND		0.40	0.08
98-82-8	Isopropylbenzene	ND		0.80	0.1
99-87-6	4-Isopropyltoluene	ND		0.80	0.1
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.1
80-62-6	Methyl methacrylate	ND		0.80	0.1
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.1
75-09-2	Methylene Chloride	ND		0.40	0.07
98-83-9	alpha-Methylstyrene	ND		0.40	0.06
91-20-3	Naphthalene	ND		0.80	0.5
111-65-9	n-Octane	ND		0.40	0.05
109-66-0	n-Pentane	ND		0.80	0.2
115-07-1	Propylene	ND		0.40	0.09
103-65-1	N-Propylbenzene	ND		0.40	0.05
100-42-5	Styrene	ND		0.40	0.05
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.06
127-18-4	Tetrachloroethene	ND		0.40	0.05
109-99-9	Tetrahydrofuran	ND		0.80	0.2
108-88-3	Toluene	ND		0.40	0.05
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethan	ND		0.40	0.1
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.4
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.06
11 33 0					

# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

 Lab Name: TestAmerica Sacramento
 Job No.: 320-34118-1

 SDG No.:
 Lab Sample ID: 320-34118-1

 Matrix: Air
 Lab File ID: MS9121107.D

 Analysis Method: TO-15
 Date Collected: 12/08/2017 00:00

 Sample wt/vol: 500 (mL)
 Date Analyzed: 12/11/2017 17:26

 Soil Aliquot Vol:
 Dilution Factor: 1

 Soil Extract Vol.:
 GC Column: RTX-Volatiles ID: 0.32 (mm)

 % Moisture:
 Level: (low/med) Low

 Analysis Batch No.: 199336
 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	93		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	103		70-130
2037-26-5	Toluene-d8 (Surr)	102		70-130

# TestAmerica Sacramento Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\ATMS9\20171211-51603.b\MS9121107.D

Lims ID: 320-34118-A-1
Client ID: 34001065
Sample Type: Client

Inject. Date: 11-Dec-2017 17:26:30 ALS Bottle#: 5 Worklist Smp#: 7

Purge Vol: 5.000 mL Dil. Factor: 1.0000

Sample Info: 320-34118-A-1

Misc. Info.: 500 mL CAN CERT

Operator ID: LHS/GKI Instrument ID: ATMS9

Method: \ChromNA\Sacramento\ChromData\ATMS9\20171211-51603.b\TO15\_ATMS9N.m

Limit Group: MSA - TO15 - ICAL

Last Update:11-Dec-2017 20:51:54Calib Date:27-Oct-2017 12:09:30Integrator:RTEID Type:Deconvolution IDQuant Method:Internal StandardQuant By:Initial CalibrationLast ICal File:\\ChromNA\Sacramento\ChromData\ATMS9\20171026-49584.b\MS9102628.D

Column 1: RTX Volatiles (0.32 mm) Det: MS SCAN

Process Host: XAWRK001

First Level Reviewer: phanthasena Date: 12-Dec-2017 12:16:43

First Level Reviewer: phanthasena			Date:			12-Dec-2017 12:16:43		
2	RT (min.)	Adj RT	Dlt RT		Doononco	OnCol Amt	Floor	
Sig	(111111.)	(111111.)	(111111.)	Q	Response	ppp v/v	Flags	
130	12.325	12.331	-0.006	91	42216	4.00		
114	14.417	14.423	-0.006	97	172750	4.00		
117	20.337	20.331	0.006	92	113188	4.00		
65	13.499	13.505	-0.006	97	68147	4.10		
100	17.575	17.581	-0.006	98	89938	4.08		
174	22.259	22.259	0.000	82	47155	3.71		
41	4.300	4.252	0.048	66	896	0.0720		
43	5.024	4.988	0.036	21	916	0.0368		
43	7.725	7.640	0.085	96	8248	0.3419		
49	8.906	8.899	0.007	70	1168	0.0603		
58	18.408	18.378	0.030	89	831	0.0360		
120	22.709	22.709	0.000	94	143	0.006668	M	
118	23.190	23.178	0.012	87	764	0.0272		
91	23.269	23.281	-0.012	79	593	0.0137		
120	23.318	23.324	-0.006	88	524	0.0180		
119	23.762	23.762	0.000	94	1498	0.0214		
146	23.859	23.859	0.000	92	1397	0.0422		
146	23.987	23.987	0.000	89	1531	0.0461		
91	24.096	24.096	0.000	93	2611	0.0413		
92	24.303	24.303	0.000	95	1002	0.0270		
146	24.473	24.473	0.000	91	1759	0.0558		
180	26.706	26.700	0.006	91	3399	0.1292		
128	27.065	27.071	-0.006	97	11785	0.2990		
	130 114 117 65 100 174 41 43 43 49 58 120 118 91 120 119 146 146 91 92 146 180	Sig         RT (min.)           130         12.325           114         14.417           117         20.337           65         13.499           100         17.575           174         22.259           41         4.300           43         5.024           43         7.725           49         8.906           58         18.408           120         22.709           118         23.190           91         23.269           120         23.318           119         23.762           146         23.859           146         23.987           91         24.096           92         24.303           146         24.473           180         26.706	RT (min.)         Adj RT (min.)           130         12.325         12.331           114         14.417         14.423           117         20.337         20.331           65         13.499         13.505           100         17.575         17.581           174         22.259         22.259           41         4.300         4.252           43         5.024         4.988           43         7.725         7.640           49         8.906         8.899           58         18.408         18.378           120         22.709         22.709           118         23.190         23.178           91         23.269         23.281           120         23.318         23.324           119         23.762         23.762           146         23.859         23.859           146         23.987         23.987           91         24.096         24.096           92         24.303         24.303           146         24.473         24.473           180         26.706         26.700	Sig         RT (min.)         Adj RT (min.)         Dit RT (min.)           130         12.325         12.331         -0.006           114         14.417         14.423         -0.006           117         20.337         20.331         0.006           65         13.499         13.505         -0.006           100         17.575         17.581         -0.006           174         22.259         22.259         0.000           41         4.300         4.252         0.048           43         5.024         4.988         0.036           43         7.725         7.640         0.085           49         8.906         8.899         0.007           58         18.408         18.378         0.030           120         22.709         22.709         0.000           118         23.190         23.178         0.012           120         23.318         23.324         -0.006           119         23.762         23.762         0.000           146         23.859         23.859         0.000           146         23.987         23.987         0.000           92	Sig         RT (min.)         Adj RT (min.)         Dlt RT (min.)         Q           130         12.325         12.331         -0.006         91           114         14.417         14.423         -0.006         97           117         20.337         20.331         0.006         92           65         13.499         13.505         -0.006         98           174         22.259         22.259         0.000         82           41         4.300         4.252         0.048         66           43         5.024         4.988         0.036         21           43         7.725         7.640         0.085         96           49         8.906         8.899         0.007         70           58         18.408         18.378         0.030         89           120         22.709         22.709         0.000         94           118         23.190         23.178         0.012         87           91         23.269         23.281         -0.012         79           120         23.318         23.324         -0.006         88           119         23.762         23.762	Sig         RT (min.)         Adj RT (min.)         Dlt RT (min.)         Q Response           130         12.325         12.331         -0.006         91         42216           114         14.417         14.423         -0.006         97         172750           117         20.337         20.331         0.006         92         113188           65         13.499         13.505         -0.006         97         68147           100         17.575         17.581         -0.006         98         89938           174         22.259         22.259         0.000         82         47155           41         4.300         4.252         0.048         66         896           43         5.024         4.988         0.036         21         916           43         7.725         7.640         0.085         96         8248           49         8.906         8.899         0.007         70         1168           58         18.408         18.378         0.030         89         831           120         22.709         22.709         0.000         94         143           118         23.190	Sig         RT (min.)         Adj RT (min.)         Dit RT (min.)         Q Response         OnCol Amt ppb v/v           130         12.325         12.331         -0.006         91         42216         4.00           114         14.417         14.423         -0.006         97         172750         4.00           117         20.337         20.331         0.006         92         113188         4.00           65         13.499         13.505         -0.006         97         68147         4.10           100         17.575         17.581         -0.006         98         89938         4.08           174         22.259         22.259         0.000         82         47155         3.71           41         4.300         4.252         0.048         66         896         0.0720           43         5.024         4.988         0.036         21         916         0.0368           43         7.725         7.640         0.085         96         8248         0.3419           49         8.906         8.899         0.007         70         1168         0.0603           58         18.408         18.378         0.030	

Report Date: 12-Dec-2017 12:16:43 Chrom Revision: 2.2 16-Aug-2017 16:24:46

QC Flag Legend Review Flags

M - Manually Integrated

Reagents:

VAMSIS20\_00080 Amount Added: 50.00 Units: mL Run Reagent

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TestAmerica Sacramento

\\ChromNA\Sacramento\ChromData\ATMS9\20171211-51603.b\MS9121107.D Data File:

Injection Date: 11-Dec-2017 17:26:30 Instrument ID: ATMS9 Operator ID: LHS/GKI

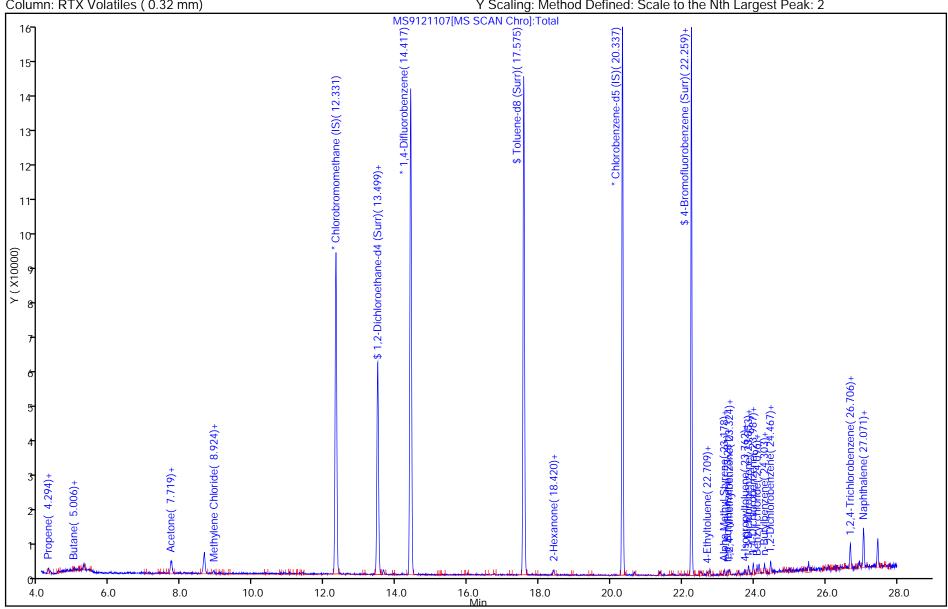
Lims ID: Worklist Smp#: Lab Sample ID: 320-34118-1 7 320-34118-A-1

Client ID: 34001065

Purge Vol: 5.000 mL Dil. Factor: ALS Bottle#: 1.0000 5

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Y Scaling: Method Defined: Scale to the Nth Largest Peak: 2



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TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\ATMS9\20171211-51603.b\MS9121107.D

Injection Date: 11-Dec-2017 17:26:30 Instrument ID: ATMS9
Lims ID: 320-34118-A-1 Lab Sample ID: 320-34118-1

Client ID: 34001065

Report Date: 12-Dec-2017 12:16:44

Operator ID: LHS/GKI ALS Bottle#: 5 Worklist Smp#: 7

Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

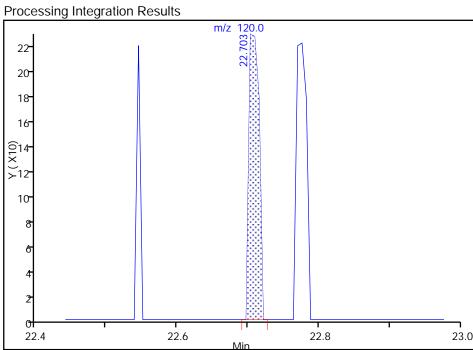
Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 110 4-Ethyltoluene, CAS: 622-96-8

Signal: 1

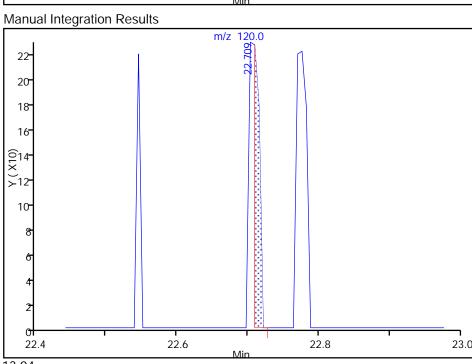
RT: 22.70 Area: 224

Amount: 0.010446 Amount Units: ppb v/v



RT: 22.71 Area: 143

Amount: 0.006668 Amount Units: ppb v/v



Reviewer: ilievg, 11-Dec-2017 18:13:04 Audit Action: Split an Integrated Peak

Audit Reason: Shouldering

Report Date: 12-Dec-2017 12:16:44 Chrom Revision: 2.2 16-Aug-2017 16:24:46 Manual Integration/User Assign Peak Report

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\ATMS9\20171211-51603.b\MS9121107.D

Injection Date: 11-Dec-2017 17:26:30 Instrument ID: ATMS9
Lims ID: 320-34118-A-1 Lab Sample ID: 320-34118-1

Client ID: 34001065

Operator ID: LHS/GKI ALS Bottle#: 5 Worklist Smp#: 7

Purge Vol: 5.000 mL Dil. Factor: 1.0000

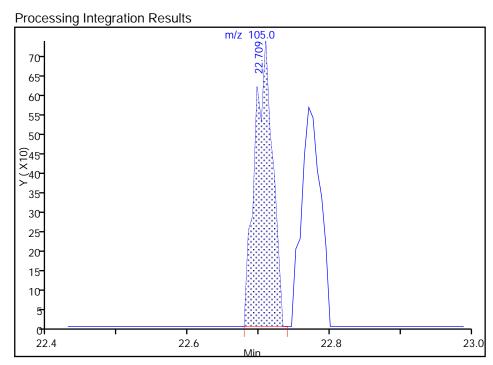
Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 110 4-Ethyltoluene, CAS: 622-96-8

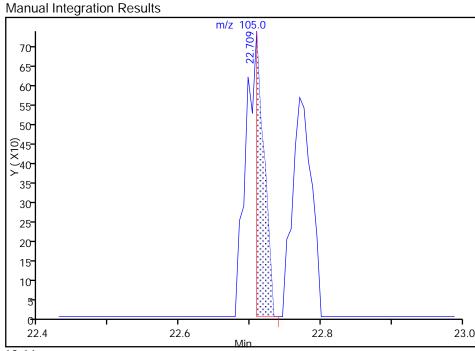
Signal: 2

RT: 22.71
Area: 1275
Amount: 0.010446
Amount Units: ppb v/v



RT: 22.71 Area: 663

Amount: 0.006668 Amount Units: ppb v/v



Reviewer: ilievg, 11-Dec-2017 18:13:11 Audit Action: Split an Integrated Peak

Audit Reason: Shouldering

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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: 580-73804-1

Client Project/Site: Chevron Edmonds Terminal

Revision: 1

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

Kim hesley

Authorized for release by: 1/23/2018 10:35:48 AM Kim Presley, Project Management Assistant I (253)922-2310 kim.presley@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

·····LINKS ······

Review your project results through

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**Have a Question?** 



Visit us at: www.testamericainc.com

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: ARCADIS U.S. Inc Project/Site: Chevron Edmonds Terminal TestAmerica Job ID: 580-73804-1

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#### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-1

Job ID: 580-73804-1

**Laboratory: TestAmerica Seattle** 

**Narrative** 

Job Narrative 580-73804-1

#### Revision 1: January 23, 2018

Per client email 1/22/18, the outfall #2 sample data has been reported seperately.

#### Receipt

Two samples were received on 12/21/2017 1:55 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.2° C.

#### **Receipt Exceptions**

The following samples were received in air sample bags: VSP-801 (580-73804-3) and VSP-802 (580-73804-4). In order to extend the holding times, these samples were transferred from the air sample bags into Summa canisters. Sample 3 was transferred on 12/22/17 at 12:22 to canister 34001693. Sample 4 was transferred on 12/22/17 at 12:23 to canister 34001704.

#### Air - GC VOA

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

#### Air - GC/MS VOA

Method(s) TO-15: 1,2-Dichloroethane-d4 (Surrogate) recovery for the following samples were outside control limits: VSP-801 (580-73804-3), (CCV 320-201429/5), (LCS 320-201429/6) and (LCSD 320-201429/7). This analyte is not use as a monitoring analytes.

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

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# **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-1

#### **Qualifiers**

#### Air - GC/MS VOA

Qualifier **Qualifier Description** 

 $\overline{\mathsf{X}}$ Surrogate is outside control limits

Air - GC VOA

Qualifier **Qualifier Description** 

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

#### **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 Contains No Free Liquid **CNF** 

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

Decision Level Concentration (Radiochemistry) DLC

**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 Minimum Level (Dioxin) MLNC

Not Calculated

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

**PQL Practical Quantitation Limit** 

**Quality Control** QC

Relative Error Ratio (Radiochemistry) **RER** 

Reporting Limit or Requested Limit (Radiochemistry) RL

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

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

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-1

Lab Sample ID: 580-73804-3

Matrix: Air

Date Collected: 12/20/17 16:30 Date Received: 12/21/17 13:55

**Client Sample ID: VSP-801** 

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	910		6.2	1.2	ppb v/v			12/27/17 21:56	15.6
Toluene	13		6.2	0.80	ppb v/v			12/27/17 21:56	15.6
m,p-Xylene	1600		12	1.6	ppb v/v			12/27/17 21:56	15.6
o-Xylene	160		6.2	0.84	ppb v/v			12/27/17 21:56	15.6
TPH (as Gasoline)	160000		1600	620	ppb v/v			12/27/17 21:56	15.6
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	113		70 - 130					12/27/17 21:56	15.6
1,2-Dichloroethane-d4 (Surr)	134	X	70 - 130					12/27/17 21:56	15.6
Toluene-d8 (Surr)	100		70 - 130					12/27/17 21:56	15.6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	2500		23	3.7	ppb v/v			12/28/17 09:20	58.5
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		70 - 130			-		12/28/17 09:20	58.5
1,2-Dichloroethane-d4 (Surr)	127		70 - 130					12/28/17 09:20	58.5
Toluene-d8 (Surr)	99		70 - 130					12/28/17 09:20	58.5

Method: D1946 - Fixed Gases	in Air (GC)							
Analyte	Result Qualifier	r RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.32 J	0.78	0.017	% v/v			12/26/17 10:09	1.56
Methane (FID)	0.0048	0.00047	0.000094	% v/v			12/28/17 09:28	4.68
Oxygen	19	0.31	0.012	% v/v			12/26/17 10:09	1.56

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# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-1

Lab Sample ID: 580-73804-4

Matrix: Air

Date Collected: 12/20/17 16:45 Date Received: 12/21/17 13:55

**Client Sample ID: VSP-802** 

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.67		0.40	0.079	ppb v/v			12/27/17 22:47	1
Ethylbenzene	8.2		0.40	0.063	ppb v/v			12/27/17 22:47	1
Toluene	0.60		0.40	0.051	ppb v/v			12/27/17 22:47	1
m,p-Xylene	8.6		0.80	0.10	ppb v/v			12/27/17 22:47	1
o-Xylene	1.2		0.40	0.054	ppb v/v			12/27/17 22:47	1
TPH (as Gasoline)	600		100	40	ppb v/v			12/27/17 22:47	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)			70 - 130			-		12/27/17 22:47	1
1,2-Dichloroethane-d4 (Surr)	99		70 - 130					12/27/17 22:47	1
Toluene-d8 (Surr)	100		70 - 130					12/27/17 22:47	1

Method: D1946 - Fixed Gase	s in Air (GC)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.43	J	0.74	0.016	% v/v			12/26/17 10:21	1.47
Methane (FID)	0.0033		0.00026	0.000052	% v/v			12/28/17 09:49	2.58
Oxygen	19		0.29	0.011	% v/v			12/26/17 10:21	1.47

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Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-1

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-201429/10

**Matrix: Air** 

**Analysis Batch: 201429** 

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB Analyte **Result Qualifier** RL MDL Unit Prepared Analyzed Dil Fac Benzene ND 0.40 0.079 ppb v/v 12/27/17 18:05 Ethylbenzene ND 12/27/17 18:05 0.40 0.063 ppb v/v ND Toluene 0.40 0.051 ppb v/v 12/27/17 18:05 m,p-Xylene ND 0.80 0.10 ppb v/v 12/27/17 18:05 o-Xylene ND 0.40 0.054 ppb v/v 12/27/17 18:05 TPH (as Gasoline) ND 100 40 ppb v/v 12/27/17 18:05

MB MB

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		70 - 130	 	12/27/17 18:05	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130		12/27/17 18:05	1
Toluene-d8 (Surr)	97		70 - 130		12/27/17 18:05	1

Lab Sample ID: LCS 320-201429/3

**Matrix: Air** 

**Analysis Batch: 201429** 

Client Sample ID: Lab Control Sample Prep Type: Total/NA

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzene	20.0	17.6		ppb v/v		88	68 - 128	
Ethylbenzene	20.0	19.4		ppb v/v		97	64 - 124	
Toluene	20.0	18.0		ppb v/v		90	68 - 128	
m,p-Xylene	40.0	39.3		ppb v/v		98	65 - 125	
o-Xylene	20.0	19.9		ppb v/v		100	65 - 125	

LCS LCS

Surrogate	%Recovery Qualifie	er Limits
4-Bromofluorobenzene (Surr)	106	70 - 130
1,2-Dichloroethane-d4 (Surr)	109	70 - 130
Toluene-d8 (Surr)	103	70 - 130

Lab Sample ID: LCS 320-201429/6

**Matrix: Air** 

**Analysis Batch: 201429** 

Client Sample ID:	Lab Control Sample
	Prep Type: Total/NA

 Analyte
 Added TPH (as Gasoline)
 Added TPH (as Gasoline)
 LCS LCS LCS LCS WRec.
 WRec. Limits Qualifier Ppb v/v
 Unit Ppb v/v
 D ppb v/v
 PREC Limits Ppb v/v
 Limits Ppb v/v
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 Surrogate
 %Recovery
 Qualifier
 Limits

 4-Bromofluorobenzene (Surr)
 118
 70 - 130

 1,2-Dichloroethane-d4 (Surr)
 146
 X
 70 - 130

 Toluene-d8 (Surr)
 106
 70 - 130

Lab Sample ID: LCSD 320-201429/4

**Matrix: Air** 

Analysis Batch: 201429

<b>Client Sample</b>	ID: Lab	Control	Sample Dup
		Pren Tv	ne: Total/NA

7 maryolo Datom 201 120	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	20.0	14.2		ppb v/v		71	68 - 128	21	25
Ethylbenzene	20.0	16.5		nnh v/v		82	64 - 124	16	25

TestAmerica Seattle

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Spike

Added

20.0

40.0

20.0

15.0

33.4

17.0

TestAmerica Job ID: 580-73804-1

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

#### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-201429/4

**Matrix: Air** 

Analyte

Toluene

o-Xylene

m,p-Xylene

**Matrix: Air** 

**Analysis Batch: 201429** 

<b>Client Sample ID: Lab</b>	Control	Sam	ole Dup
	Prep Tv	pe: T	otal/NA

LCSD LCSD RPD %Rec. Result Qualifier RPD Unit %Rec Limits Limit 75 68 - 128 25 ppb v/v 18 ppb v/v 84 65 - 125 16 25

85

Client Sample ID: Lab Control Sample Dup

**Client Sample ID: Lab Control Sample** 

**Client Sample ID: Lab Control Sample** 

65 - 125

16

Prep Type: Total/NA

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	107		70 - 130
1,2-Dichloroethane-d4 (Surr)	110		70 - 130
Toluene-d8 (Surr)	101		70 - 130

Lab Sample ID: LCSD 320-201429/7

**Analysis Batch: 201429** 

Spike LCSD LCSD %Rec. **RPD** Added Result Qualifier Analyte Unit %Rec Limits **RPD** Limit TPH (as Gasoline) 5000 4520 ppb v/v 90 70 - 130

	LCSD	LCSD	
Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	115		70 - 130
1,2-Dichloroethane-d4 (Surr)	139	X	70 - 130
Toluene-d8 (Surr)	106		70 - 130

MB MB

#### Method: D1946 - Fixed Gases in Air (GC)

Lab Sample ID: MB 320-201255/11

**Matrix: Air** 

**Analysis Batch: 201255** 

Client Sample ID: Method Blank Prep Type: Total/NA

ppb v/v

Result Qualifier RL **MDL** Unit **Analyte** Prepared Analyzed Dil Fac Carbon Dioxide (TCD)  $\overline{\mathsf{ND}}$ 0.50 0.011 % v/v 12/26/17 09:38 Methane (TCD) ND 0.50 0.14 % v/v 12/26/17 09:38 ND 0.20 Oxygen 0.0074 % v/v 12/26/17 09:38

Lab Sample ID: LCS 320-201255/2

**Matrix: Air** 

**Analysis Batch: 201255** 

LCS LCS Spike %Rec. Added Result Qualifier Limits Analyte Unit %Rec Carbon Dioxide (TCD) 24.4 26.1 % v/v 107 80 - 120 Methane (TCD) 26 1 28.6 % v/v 109 80 - 120

Lab Sample ID: LCS 320-201255/5

**Matrix: Air** 

Analysis Batch: 201255								
-	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Oxygen	15.7	13.8		% v/v		88	80 - 120	

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Prep Type: Total/NA

Prep Type: Total/NA

# QC Sample Results

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-1

Method: D1946 - Fixed Gases in Air (GC) (Continued)

Lab Sample ID: LCSD 320-201255/3 Client Sample ID: Lab Control Sample Dup **Matrix: Air** Prep Type: Total/NA

**Analysis Batch: 201255** 

	<b>Эріке</b>	LCSD	LCSD				%Rec.		KPD	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Carbon Dioxide (TCD)	24.4	26.2		% v/v		107	80 - 120	0	20	
Methane (TCD)	26.1	28.7		% v/v		110	80 - 120	1	20	

Lab Sample ID: LCSD 320-201255/6 **Client Sample ID: Lab Control Sample Dup Matrix: Air** Prep Type: Total/NA **Analysis Batch: 201255** 

	Spik	e LCSD	LCSD				%Rec.		RPD
Analyte	Adde	d Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Oxygen	15.	7 13.7		% v/v	_	87	80 - 120	1	20

Lab Sample ID: MB 320-201585/5 **Client Sample ID: Method Blank Matrix: Air** Prep Type: Total/NA

**Analysis Batch: 201585** 

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane (FID)	ND		0.00010	0.000020	% v/v			12/28/17 09:14	1

Lab Sample ID: LCS 320-201585/2 **Client Sample ID: Lab Control Sample** Matrix: Air Prep Type: Total/NA **Analysis Batch: 201585** 

		Spike	LCS	LCS				%Rec.	
Analyte		Added	Result	Qualifier	Unit	D	%Rec	Limits	
Methane (FID)	 	0.0250	0.0225		% v/v		90	80 - 120	 

Lab Sample ID: LCSD 320-201585/3 **Client Sample ID: Lab Control Sample Dup Matrix: Air** Prep Type: Total/NA **Analysis Batch: 201585** 

Spike LCSD LCSD %Rec. RPD Added Analyte Result Qualifier Unit Limits RPD Limit D %Rec 0.0250 Methane (FID) 0.0230 % v/v 92 80 - 120

TestAmerica Seattle

#### **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-1

Lab Sample ID: 580-73804-3

Matrix: Air

Date Collected: 12/20/17 16:30 Date Received: 12/21/17 13:55

Client Sample ID: VSP-801

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		15.6	201429	12/27/17 21:56	AP1	TAL SAC
Total/NA	Analysis	TO-15	DL	58.5	201429	12/28/17 09:20	AP1	TAL SAC
Total/NA	Analysis	D1946		4.68	201585	12/28/17 09:28	EMJ	TAL SAC
Total/NA	Analysis	D1946		1.56	201255	12/26/17 10:09	EMJ	TAL SAC

**Client Sample ID: VSP-802** Lab Sample ID: 580-73804-4

Date Collected: 12/20/17 16:45 Matrix: Air

Date Received: 12/21/17 13:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1 1 -		12/27/17 22:47	AP1	TAL SAC
Total/NA	Analysis	D1946		2.58	201585	12/28/17 09:49	EMJ	TAL SAC
Total/NA	Analysis	D1946		1.47	201255	12/26/17 10:21	EMJ	TAL SAC

#### **Laboratory References:**

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

# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 580-73804-1

Project/Site: Chevron Edmonds Terminal

#### **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	<b>Expiration Date</b>
Alaska (UST)	State Program	10	UST-022	03-02-18
ANAB	DoD ELAP		L2236	01-19-19
ANAB	ISO/IEC 17025		L2236	01-19-19
California	State Program	9	2901	01-31-18
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-18

#### **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	UST-055	01-31-18
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-18
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-19
Illinois	NELAP	5	200060	03-17-18
Kansas	NELAP	7	E-10375	10-31-18
L-A-B	DoD ELAP		L2468	01-20-21
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-18-18
Michigan	State Program	5	9947	01-31-18
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-18
New Jersey	NELAP	2	CA005	06-30-18
New York	NELAP	2	11666	04-01-18
Oregon	NELAP	10	4040	01-29-20
Pennsylvania	NELAP	3	68-01272	03-31-18
Texas	NELAP	6	T104704399	05-31-18
US Fish & Wildlife	Federal		LE148388-0	07-31-18
USDA	Federal		P330-11-00436	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-18
Virginia	NELAP	3	460278	03-14-18
Washington	State Program	10	C581	05-05-18
West Virginia (DW)	State Program	3	9930C	12-31-17
Wyoming	State Program	8	8TMS-L	01-28-19

TestAmerica Seattle

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# **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-73804-3	VSP-801	Air	12/20/17 16:30	12/21/17 13:55
580-73804-4	VSP-802	Air	12/20/17 16:45	12/21/17 13:55

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**TestAmerica Seattle** 

5755 8th Street East

Loc: 580 73804

## **Chain of Custody Record**



Tacoma, WA 98424 Phone (253) 922-2310 Fax (253) 922-5047 THE LEADER IN ENVIRONMENTAL TESTING Sampler: Bric Voucger Carrier Tracking No(s): COC No: Client Information Walker, Elaine M 580-27035-8908.1 Client Contact: 363-519-7192 E-Mail: Jason Little elaine.walker@testamericainc.com Page 1 of 1 Company: ARCADIS U.S. Inc. Analysis Requested Address: Due Date Requested: Preservation Codes: 19-15 1100 Olive Way Suite 800 A - HCL M - Hexane City: TAT Requested (days): B - NaOH N - None Seattle Ç 5 days C - Zn Acetate O - AsNaO2 State, Zip: D - Nitric Acid P - Na2O4S WA. 98101 Ö E - NaHSO4 Q - Na2SQ3 624 Phone: F - MeOH R - Na2S2O3 Metterp G - Amchior 206-726-4720(Tel) B0045362.0010 S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate NWTPH\_Dx - Northwest - DRO/RRO W0#: EA. U - Acetone t-lce Jason.Little@arcadis.com 0015254061 J - DI Water V - MCAA K - EDTA W - pH 4-5 Project #: Chevron Edmonds Terminal 1 - FDA Z - other (specify) 58011413 Benzeneby 7PPI gasolne 22 SSOW#: Other: 624\_5ml, NWTPH\_Gx Washington Matrix Sample Type S≂solid, O≃waste/oji, Sample (C=comp. 87 Sample Identification Sample Date Time G=grab) BT=Yissue, A=Ai Special Instructions/Note: Preservation Code: Outfall #002 600 Water Trìo blank 6 Water Water 108-92V 12/20/17 1630 6 air  $|\times|$ × VSP-802 12/20/17 645 dir Therm. ID A Cor S. 2 Under Cooler Dsc Swill @Lab 1325 Wet Packs Packing Will L Custody Seal: Yes Note Possible Hazard Identification Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) Non-Hazard Flammable Skin Irritant Poison B Unknown Radiological Return To Client Disposal By Lab Archive For Deliverable Requested: I, II, III, IV, Other (specify) Special Instructions/QC Requirements: Empty Kit Relinquished by: Date: Method of Shipment Time: Refinquished by: Company Relinquished by: Company Relinquished by: Date/Time: Company Received by: Date/Time: Company Custody Seals Intact: Custody Seal No.: Cooler Temperature(s) °C and Other Remarks: Δ Yes Δ No

TestAmerica Seattle			Toch Amorio
5755 8th Street East Tacoma, WA 98424	Chain of Custody Record		
Phone (253) 922-2310 Fax (253) 922-5047			THE LEADER IN ENVIRONMENTAL TESTING
	Sampler Lab PM:	Carrier Tracking No(s):	COC No:

Phone   Phon	Title Walker (Nos or No)  Rield Filtered Sample (Yes or No)  Reduint MSMASD (Yes or No)  Reduinted (Restanced (NoD) MBTEX Only)  X X TO15/Air_Pass_Can (MOD) MBTEX Only  X X TO15/Air_PassCan_14D  X X Gregitations Required (See	Analysis Requested  Analys	1 of 1  Vation Codes:  Nonne None Acetate O-AsNaO2 Ic Acid P. Na2CO4S SSO4 O-Na2CO3 OH R. Na2S2O3 OH R. Na2S2O3 OH R. Na2S2O3 Chilor T. TSP Dodecahydrate U. Acetane U. Acetane V. MCAA TA W. PH 4-5 A Z. other (specify)
Shipping/Receiving   Shipping/Receiving   Shipping/Receiving   Shipping/Receiving   Shipping/Receiving   Accretination   TestAmerical Laboratories, Inc.   Accretination   TestAmerical Laboratories, Inc.   Accretination   TestAmerical Laboratories, Inc.   TestAmerical Laborato	Theid Filtered Sample (Yes or No)  Accelulation  Read Filtered Sample (Yes or No)  Read Filtered Sample (Yes or No)  A X D1946/Air_Pass_Can (MOD) MBTEX Only  A X D1946/Air_Pass_Can (MOD) MBTEX Only  A X A X A D1946/Air_Pass_Can (MOD) MBTEX Only  A X A X A X A X A X A X A X A X A X A	Page Page National Number of containers  1 - Ass Page Page Page Page Page Page Page Page	
TestAmeries   TestAmeries	Perform MSMNSD (Yes or No.)  Perform MSMNSD (Yes or No.)  Perform MSMNSD (Yes or No.)  A X To15/Air_Pass_Can (MoD) MBTEX Only  A X To16/Air_Pass_Can (MoD) MBTEX Only  A X X X To16/Air_Pass_Can (MoD) MBTEX Only  A X X X To16/Air_Pass_Can (MoD) MBTEX Only  A X X X X X X X X X X X X X X X X X X	Section 1 Section 1 Section 2 Sectio	
Matrix   14/2018   14/20	Field Filtered Sample (Yes or No)  Perform MS/MS/D (Yes or No)  Perform MS/MS/D (Yes or No)  X X D1946/Nr_Pass_Can (MOD) MBTEX Only  A	Programmers And Mumber of containers And Andrews Andre	
TAT Requested (days):   TAT	Field Filtered Sample (Yes or No)  Perform MSMSD (Yes or No)  X X TO15/Air_Pass_Can (MOD) MBTEX Only  X X TO45/Air_Pass_Can_140	Standard of containers of the	
Potest # 20000   Pote	Keid Filtered Sample (Yes or No)     X	F - Meters	
Propect Name. Chevron Edmonds Terminal SSOW# SSOW# Chevron Edmonds Terminal SSOW# Sheer Chevron Edmonds Terminal SSOW# Chevron Edmonds Terminal SSOW# Chevron Edmonds Terminal SSOW# Sample Identification - Client ID (Lab ID) Sample Date Time Garab Sample (C=Comp. Sample C=Comp.  Tots/Nir_Pass_Can (MOD) MB'  Tots/Nir_Pass_Can (MOD) MB'  X X Tots/Nir_Pass_Can (MOD) MB'	Other:	W - ph 4-5 Z - other (specify) ial Instructions/Note:	
Sie Chevron Edmonds Terminal Chevron Edmonds Terminal Sample Identification - Client ID (Lab ID) Sample Identif	Field Filtered Sampl Perform MSMSD (Y  X X TO15/Air_Pass_Can (M	Other	ial Instructions/Note:
Sample Identification - Client ID (Lab ID)  Sample Date Time G=grab) In-rises. Ann. L. D. Clecomp.  VSP-802 (580-73804-4)  Note: Since laboratory accreditations are subject to change. TestAmerica Laboratories, inc. places the ownership of method, analyte & accreditation compliance. Laboratories, inc. attention immediately. If all requested accreditations are cultum to date, return the signed Chain of Custody attesting to said compliance.	boretil Fliteld Fliteld Man Man Man Man Man Man Man Man Man Man		ial Instructions/Note:
VSP-801 (580-73804-4)  VSP-802 (580-73804-4)  Note: Since iaboratory accreditations are subject to change. TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance currently maintain accreditation in the State of Origin listed above for analysis/firsts/firmatix being analyzed, the samples must be shipped back to the TestAmerica Laboratories, Inc. attention immediately If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to	× ×		
VSP-801 (580-73804-4)  VSP-802 (580-73804-4)  Air  VSP-802 (580-73804-4)  Air  Air  Air  Air  Air  Air  Air  Ai	××	7 7	
VSP-802 (580-73804-4)  Air  Pacific  Pacific  Air  Note: Since (aboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance currently maintain accreditation in the State of Origin listed above for analysis/frests/maint being analyzed, the samples must be shipped back to the TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to	×	-	
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Note: Since laboratory accreditations are subject to change. TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance ourserity maintain accreditation in the State of Origin listed above for analysis/firests/mainty being analyzed, the samples must be shipped back to the TestAmeric Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to			
	& accreditation compliance upon out subcontract laboratoric bed back to the TestAmerica laboratory or other instructions in to said complicance to TestAmerica Laboratories, Inc.	les. This sample shipment is forwarded under chain-of-cusics will be provided. Any changes to accreditation status shoul	ody. If the laboratory does not id be brought to TestAmerica
Possible Hazard Identification  Unconfirmed	Sample Disposal ( A fee may k	Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)  Return To Client Disposal By Lab Mor	han 1 month) Months
(equested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements		
quished by:	Time	Method of Shipment:	
3.8 Land Date (Time 17 1444 Company 7	4	Dieu Daterting/22/2017	11:15 Thus
Relinquished by. Company Re	Company Received by:	Date/Tinfe:	Company
Reinquished by. Company R	Sompany Received by:	Date/Time	Company
eals Intact: Custody Seal No.:	Cooler Temperature(s) <sup>3</sup> C and Other Remarks:	ner Remarks:	
Δ Yes Δ No			Ver: 09/20/2016

Client: ARCADIS U.S. Inc

List Source: TestAmerica Seattle

Job Number: 580-73804-1

Login Number: 73804 List Number: 1

Creator: Gall, Brandon A

Creator. Gali, Brandon A		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td>Lab does not accept radioactive samples.</td>	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	N/A	Not present
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: ARCADIS U.S. Inc Job Number: 580-73804-1

List Source: TestAmerica Sacramento
List Number: 2
List Creation: 12/22/17 12:28 PM

Creator: James, Emily M

oreator. Cames, Emmy in		
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	247001
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
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?	False	Received project as a subcontract.
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.	N/A	
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	

## **Sacramento**

JOB#	580-7	73804
Sample #	3	

Client/Project:		VFR ID:	
Canister Serial #:	34001693	Duration:	□ <sub>Hrs</sub> □ <sub>Min</sub>
Cleaning Job:		Flow:	mL/min
Client ID:		Initials:	
Site Location:			

	F	TELD		
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY					
READING	PRESS.	DATE	INITIALS		
INITIAL VACUUM CHECK (INCHES Hg)	29.8		JMT		
Helium Pre-dilution - Final Pressure (INCHES Hg)					
INITIAL PRESSURE (PSIA)	14.48	12/26/17	EJ		
FINAL PRESSURE (PSIA)	22.58	12/26/17	EJ		
Pressurization Gas: N2 He	SCREENED	SCRN DIL. VS 250mLs:			
Initial Canister Dilution Factor = 1.56					

CANISTER REPRESSURIZATION						
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF	
12/27/17	14.70	44.10	1.56	SV	4.68	
			4.68		#DIV/0!	
			#DIV/0!		#DIV/0!	

Analytical Dilution Factors							
Canister DF = 1.56	х	Load DF = 10 250 25	х	Bag DF = BVf (mLs) Bvi (mLs)	Date 12/27/2017	Instr. ATMS2	File # FINAL DF 15.59392265
Canister DF = 1.56	х	Load DF = 12.5 LVf (mLs) 250 LVi (mLs) 20	x	Bag DF = BVf (mLs) Bvi (mLs)	Date 12/28/2017 3 3 1	Instr. ATMS2	File # FINAL DF 58.47720994
Canister DF = 1.56	x	Load DF = #DIV/0! LVf (mLs) LVi (mLs)	x	Bag DF = BVf (mLs) Bvi (mLs)	Date 1	Instr.	File # FINAL DF #DIV/0!

580-73804 Printed 12/28/20174:48 PM Canister Field Data Record v 1.0 Revision Date 8/1/13 1

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# **Sacramento**

JOB#	580-7	73804
Sample #	4	

Client/Project:		VFR ID:	
Canister Serial #:	34001704	Duration:	□ <sub>Hrs</sub> □ <sub>Min</sub>
Cleaning Job:		Flow:	mL/min
Client ID:		Initials:	
Site Location:			

FIELD							
READING TIME PRESS. DATE INITIALS							
INITIAL FIELD VACUUM							
FINAL FIELD READING							

LABORATORY								
READING	PRESS.	DATE	INITIALS					
INITIAL VACUUM CHECK (INCHES Hg)	29.8		JMT					
Helium Pre-dilution - Final Pressure (INCHES Hg)								
INITIAL PRESSURE (PSIA)	14.44	12/26/17	EJ					
FINAL PRESSURE (PSIA)	21.27	12/26/17	EJ					
Pressurization Gas: N2 He	SCREENED	SCRN DIL. VS 250mLs:						
Initial Canister Dilution Factor = 1.47								

CANISTER REPRESSURIZATION						
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF	
12/28/17	12.15	21.25	1.47	EJ	2.58	
			2.58		#DIV/0!	
			#DIV/0!		#DIV/0!	

r		Analytical Dily	<b>-</b>				
		Analytical Dilu	ition Fact	ors			
					Date 12/27/2017	Instr. ATMS2	File #
					12/21/2017	ATIVISZ	FINAL DF
Canister DF = 1.47	Χ	Load DF = 0.6849315	Χ	Bag DF =	1	=	1.008898418
		250		BVf (mLs)			
		365		Bvi (mLs)			
					Date	Instr.	File #
							FINAL DF
Canister DF = 1.47	X	Load DF = #DIV/0!	X	Bag DF =	1	=	#DIV/0!
	^	LVf (mLs)	^	BVf (mLs)		_	,,,,,,,,
		LVi (mLs)		Bvi (mLs)			
					Date	Instr.	File #
							=::::::==
Canister DF = 1.47	Χ	Load DF = #DIV/0!	X	Bag DF =	1	_	FINAL DF #DIV/0!
Callister Dr = 1.47	^	LVf (mLs)	^	Bag Dr = BVf (mLs)		=	#UIV/U!
		LVi (mLs)		Bvi (mLs)			

580-73804 Printed 12/28/20174:48 PM Canister Field Data Record v 1.0 Revision Date 8/1/13

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2 Tedlar Bags. 1L



TestAmerico

Sample Receivir

W 500-75804 Field Sheet

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations: File in the leb folder with the COC.

Notes:	P.O.	Cooler Custody Seel: Mes. 247001  # Bags: 2 1L, 2L, 10L
		# Bags: 2 1L, 2L, 10L
4.15	3209 4525	
		# Cenisters:1L,6L, TA Non TA
·		Transferred by Secremento - Yes  No  No
		di Cenisters Unused:1L,6L
		# Flow Regulators:, # Gauges:
		Co-locator
		Initial & Date & T 12/22/17

N:\QA-828 CANISTER RECEIVING NOTES.DOC

QA-828 JS 11/13/2015



# Sacramento 1 Liter Canister QC Certification Batch Certification

Date Cleaned/Batch ID	12-12-17 320-34257	
Date of QC	12/15/2017	
Data File Number	C: (M&DCUEM) 1 DATA 171215)	320-34257 Chain of Custody
(File ID for certification ar	nalysis of canister designated below)	

#### CANISTER ID NUMBERS

A 34001771	7509
34001869	34001754
34001865	34001857
34001803	34001866
34001081	34001929
34001958	341001908
34001704	34001693
34001840	34001902

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"*" INDICATES THE C	AN OR CANS WHICH WERE SCREENED.
Shylu	12/18/17
1 <sup>st</sup> level Reviewed By:	Date:
SE	12/19/14
2nd level Reviewed By:	Date:

Q:\DOCUMENT-MANAGEMENT\FORMS\QA-814A 1-LITER BATCH CAN QC 20171023.DOC QA-814 A

RE 10232017

# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-34257-1 SDG No.: Client Sample ID: 34001771 Lab Sample ID: 320-34257-1 Lab File ID: MS9121516.D Matrix: Air Analysis Method: TO-15 Date Collected: 12/12/2017 00:00 Sample wt/vol: 500(mL) Date Analyzed: 12/16/2017 02:15 Soil Aliquot Vol: Dilution Factor: 1 GC Column: RTX-Volatiles ID: 0.32 (mm) Soil Extract Vol.: % Moisture: Level: (low/med) Low Analysis Batch No.: 200130 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.81	J	5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.13
104-51-8	n-Butylbenzene	ND		0.40	0.1
135-98-8	sec-Butylbenzene	ND		0.40	0.07
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	0.53	J	0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.06
75-45-6	Chlorodifluoromethane	ND		0.80	0.2
75-00-3	Chloroethane	ND		0.80	0.33
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.05
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroetha	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.13
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.1
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.07
107-06-2	1,2-Dichloroethane	ND		0.80	0.08

# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-34257-1 SDG No.: Client Sample ID: 34001771 Lab Sample ID: 320-34257-1 Lab File ID: MS9121516.D Matrix: Air Analysis Method: TO-15 Date Collected: 12/12/2017 00:00 Sample wt/vol: 500(mL) Date Analyzed: 12/16/2017 02:15 Soil Aliquot Vol: Dilution Factor: 1 Soil Extract Vol.: GC Column: RTX-Volatiles ID: 0.32(mm) Level: (low/med) Low % Moisture: Analysis Batch No.: 200130 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.1
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.08
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.1
78-87-5	1,2-Dichloropropane	ND		0.40	0.2
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.1
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.08
123-91-1	1,4-Dioxane	ND		0.80	0.1
141-78-6	Ethyl acetate	ND		0.30	0.1
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.1
142-82-5	n-Heptane	ND		0.80	0.06
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.07
591-78-6	2-Hexanone	ND		0.40	0.08
98-82-8	Isopropylbenzene	ND		0.80	0.1
99-87-6	4-Isopropyltoluene	ND		0.80	0.1
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.1
80-62-6	Methyl methacrylate	ND		0.80	0.1
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.1
75-09-2	Methylene Chloride	ND		0.40	0.07
98-83-9	alpha-Methylstyrene	ND		0.40	0.06
91-20-3	Naphthalene	ND		0.80	0.5
111-65-9	n-Octane	ND		0.40	0.05
109-66-0	n-Pentane	ND		0.80	0.2
115-07-1	Propylene	0.15	J	0.40	0.09
103-65-1	N-Propylbenzene	ND		0.40	0.05
100-42-5	Styrene	ND		0.40	0.05
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.06
127-18-4	Tetrachloroethene	ND		0.40	0.05
109-99-9	Tetrahydrofuran	ND		0.80	0.2
108-88-3	Toluene	ND		0.40	0.05
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethan	ND		0.40	0.1
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.4
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.06
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.06
/9-00-5	1,1,2-Trichloroethane	ND		0.40	

FORM I TO-15

# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento	Job No.: <u>320-34257-1</u>
SDG No.:	
Client Sample ID: 34001771	Lab Sample ID: 320-34257-1
Matrix: Air	Lab File ID: MS9121516.D
Analysis Method: TO-15	Date Collected: 12/12/2017 00:00
Sample wt/vol: 500 (mL)	Date Analyzed: 12/16/2017 02:15
Soil Aliquot Vol:	Dilution Factor: 1
Soil Extract Vol.:	GC Column: RTX-Volatiles ID: 0.32 (mm)
% Moisture:	Level: (low/med) Low
Analysis Batch No.: 200130	Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	93		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	107		70-130
2037-26-5	Toluene-d8 (Surr)	103		70-130

Report Date: 18-Dec-2017 13:02:18 Chrom Revision: 2.2 08-Dec-2017 11:41:26

> TestAmerica Sacramento **Target Compound Quantitation Report**

\\ChromNA\Sacramento\ChromData\ATMS9\20171215-51808.b\MS9121516.D Data File:

Lims ID: 320-34257-A-1 Client ID: 34001771 Sample Type: Client

Inject. Date: 16-Dec-2017 02:15:30 ALS Bottle#: Worklist Smp#: 13 16

Purge Vol: 5.000 mL Dil. Factor: 1.0000

Sample Info: 320-34257-A-1

Misc. Info.: 500 mL CAN CERT

Operator ID: LHS/GKI Instrument ID: ATMS9

Method: \\ChromNA\Sacramento\ChromData\ATMS9\20171215-51808.b\TO15\_ATMS9N.m

Limit Group: MSA - TO15 - ICAL

18-Dec-2017 13:02:17 Calib Date: Last Update: 27-Oct-2017 12:09:30 Integrator: RTE ID Type: **Deconvolution ID** Quant Method: Internal Standard Quant By: **Initial Calibration** \\ChromNA\Sacramento\ChromData\ATMS9\20171026-49584.b\MS9102628.D Last ICal File:

Column 1: RTX Volatiles (0.32 mm) Det: MS SCAN

XAWRK005 Process Host:

First Level Reviewer: phanthasena Date: 18-Dec-2017 13:02:17

Commound	Cia	RT (min.)	Adj RT	Dlt RT		Deemana	OnCol Amt	Flores
Compound	Sig	(min.)	(min.)	(min.)	Q	Response	ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	12.325	12.331	-0.006	91	34016	4.00	
• •								
* 21,4-Difluorobenzene	114	14.411	14.417	-0.006	97	146626	4.00	
<ul><li>* 3 Chlorobenzene-d5 (IS)</li></ul>	117	20.337	20.337	0.001	94	97872	4.00	
\$ 41,2-Dichloroethane-d4 (Sur	65	13.486	13.499	-0.013	96	57476	4.29	
\$ 5 Toluene-d8 (Surr)	100	17.575	17.575	0.000	97	76860	4.11	
\$ 6 4-Bromofluorobenzene (Surr	174	22.259	22.265	-0.006	81	41026	3.73	
14 Propene	41	4.270	4.245	0.025	49	1535	0.1531	
15 Dichlorodifluoromethane	85	4.331	4.318	0.019	35	787	0.0362	
31 Acetone	43	7.707	7.640	0.067	96	15807	0.8133	
48 Carbon disulfide	76	8.942	8.948	-0.006	99	13761	0.5256	
68 Benzene	78	13.809	13.815	-0.006	91	2447	0.0758	
85 Toluene	91	17.721	17.733	-0.012	18	1222	0.0303	
121 4-Isopropyltoluene	119	23.768	23.761	0.007	96	3610	0.0595	
Reagents:								
VAMSIS20 00080		Amount	Added: 5	0.00	ι	Jnits: mL	Run Reager	nt

VAMSIS20\_00080 Run Reagent

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20171215-51808.b\MS9121516.D

LHS/GKI Injection Date: 16-Dec-2017 02:15:30 Instrument ID: ATMS9 Operator ID: Worklist Smp#: 16

Lims ID: 320-34257-A-1 Lab Sample ID: 320-34257-1 Client ID:

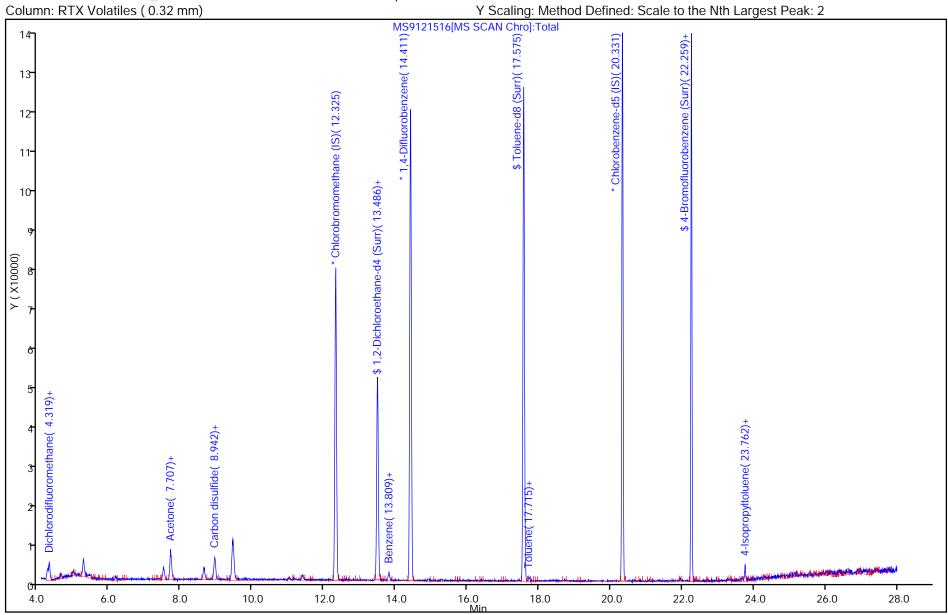
34001771

5.000 mL

Purge Vol:

Dil. Factor: ALS Bottle#: 13 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL



Chrom Revision: 2.2 08-Dec-2017 11:41:26

Report Date: 18-Dec-2017 13:02:20

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-50 -75 100 38

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9.3

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20171215-51808.b\MS9121516.D

Injection Date: 16-Dec-2017 02:15:30 Instrument ID: ATMS9 Lims ID: 320-34257-A-1 Lab Sample ID: 320-34257-1

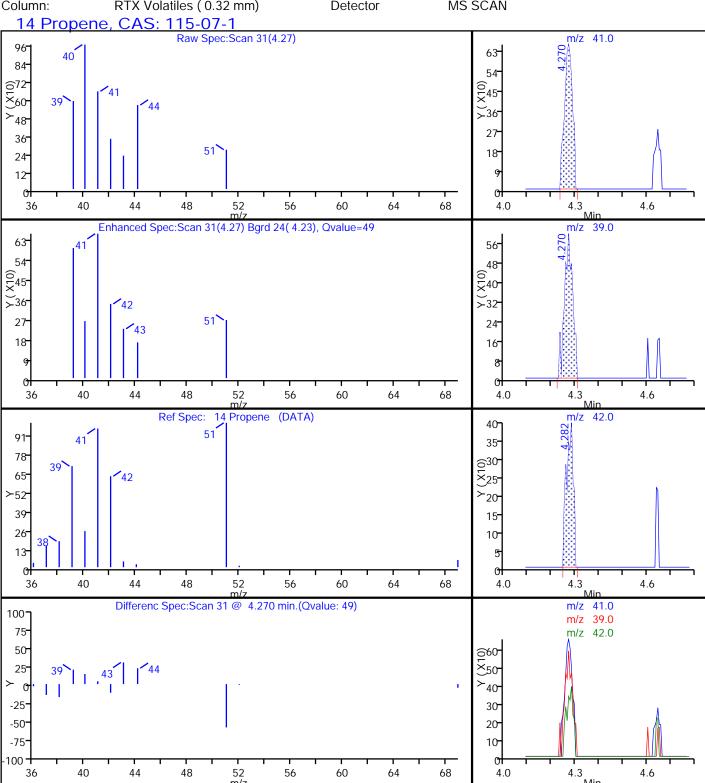
Client ID: 34001771

ALS Bottle#: Operator ID: LHS/GKI 13 Worklist Smp#: 16

Dil. Factor: Purge Vol: 5.000 mL 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN





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: 580-73946-1

Client Project/Site: Edmonds Terminal

Revision: 1

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

Kim hesley

Authorized for release by: 1/23/2018 11:12:58 AM

Kim Presley, Project Management Assistant I (253)922-2310

kim.presley@testamericainc.com

Designee for

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

LINKS ....

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Have a Question?



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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: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73946-1

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#### **Case Narrative**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73946-1

Job ID: 580-73946-1

**Laboratory: TestAmerica Seattle** 

Narrative

Job Narrative 580-73946-1

#### Revision 1: January 23, 2018

Per client email 1/22/18, the outfall #2 sample data has been reported separately.

#### Receipt

Two samples were received on 12/28/2017 2:55 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was -0.4° C.

#### **Receipt Exceptions**

The following samples were received in air sample bags: VSP-801 (580-73946-3) and VSP-802 (580-73946-4). EPA Method TO-15 describes the use of canisters for sampling and analysis, therefore, the use of air sample bags constitutes a modification to the method. In order to extend the holding times, these samples were transferred: VSP-801 (580-73946-3) was transferred from the air sample bag into 1L Summa canister #34001768 at 16:27 on 12/29/2017, and VSP-802 (580-73946-4) was transferred from the air sample bag into 1L Summa canister #34001930 at 16:29 on 12/29/2017.

#### Air - GC VOA

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

#### Air - GC/MS VOA

Method(s) TO-15: 1,2-Dichloroethane-d4 (Surrogate) recovery for the following sample was outside control limits: VSP-801 (580-73946-3). This analyte is not use as a monitoring analyte.

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

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### **Definitions/Glossary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73946-1

#### **Qualifiers**

#### Air - GC/MS VOA

Qualifier	Qualifier Description					
X	Surrogate is outside control limits					
E	Result exceeded calibration range.					

#### Air - GC 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.

#### **Glossary**

Abbreviation	These commonly used abbreviations may or may not be present in this report.
n	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 Potentials Activity (Podice)

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)

TestAmerica Seattle

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73946-1

Client Sample ID: VSP-801

Date Collected: 12/28/17 11:20 Date Received: 12/28/17 14:55

Methane (FID)

**Oxygen** 

Sample Container: Summa Canister 1L

Lab Sample ID: 580-73946-3

01/03/18 09:30

01/02/18 13:25

Matrix: Air

Method: TO-15 - Volatile Or	rganic Compoi	unds in An	nbient Air						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	480		7.5	1.5	ppb v/v			01/04/18 00:47	18.78
Ethylbenzene	1300	E	7.5	1.2	ppb v/v			01/04/18 00:47	18.78
Toluene	8.1		7.5	0.96	ppb v/v			01/04/18 00:47	18.78
m,p-Xylene	1100		15	1.9	ppb v/v			01/04/18 00:47	18.78
o-Xylene	110		7.5	1.0	ppb v/v			01/04/18 00:47	18.78
TPH (as Gasoline)	100000		1900	750	ppb v/v			01/04/18 00:47	18.78
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	110		70 - 130			-		01/04/18 00:47	18.78
1,2-Dichloroethane-d4 (Surr)	165	Χ	70 - 130					01/04/18 00:47	18.78
Toluene-d8 (Surr)	101		70 - 130					01/04/18 00:47	18.78
Method: D1946 - Fixed Gas	es in Air (GC)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.39		0.73	0.016	% v/v			01/02/18 13:25	1.45

0.00015

0.29

0.000029 % v/v

0.011 % v/v

0.0076

18

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1.45

1.45

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

**Client Sample ID: VSP-802** 

TestAmerica Job ID: 580-73946-1

Lab Sample ID: 580-73946-4

01/02/18 13:40

01/03/18 09:45

01/02/18 13:40

Matrix: Air

0.016 % v/v

0.011 % v/v

0.000029 % v/v

Date Collected: 12/28/17 11:15 Date Received: 12/28/17 14:55

Carbon Dioxide (TCD)

Methane (FID)

**Oxygen** 

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.58		0.40	0.079	ppb v/v			01/04/18 01:38	1
Ethylbenzene	5.7		0.40	0.063	ppb v/v			01/04/18 01:38	1
Toluene	1.4		0.40	0.051	ppb v/v			01/04/18 01:38	1
m,p-Xylene	7.8		0.80	0.10	ppb v/v			01/04/18 01:38	1
o-Xylene	1.5		0.40	0.054	ppb v/v			01/04/18 01:38	1
TPH (as Gasoline)	180		100	40	ppb v/v			01/04/18 01:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		70 - 130			-		01/04/18 01:38	1
1,2-Dichloroethane-d4 (Surr)	96		70 - 130					01/04/18 01:38	1
Toluene-d8 (Surr)	104		70 - 130					01/04/18 01:38	1
Method: D1946 - Fixed Gas	es in Air (GC)								

0.73

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Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73946-1

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-202269/13

**Matrix: Air** 

**Analysis Batch: 202269** 

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

MB MB Analyte **Result Qualifier** RL MDL Unit Prepared Analyzed Dil Fac Benzene ND 0.40 0.079 ppb v/v 01/03/18 18:39 Ethylbenzene ND 0.063 ppb v/v 01/03/18 18:39 0.40 ND Toluene 0.40 0.051 ppb v/v 01/03/18 18:39 m,p-Xylene ND 0.80 0.10 ppb v/v 01/03/18 18:39 o-Xylene ND 0.40 0.054 ppb v/v 01/03/18 18:39 TPH (as Gasoline) ND 100 40 ppb v/v 01/03/18 18:39

MB MB

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130	 	01/03/18 18:39	1
1,2-Dichloroethane-d4 (Surr)	91		70 - 130		01/03/18 18:39	1
Toluene-d8 (Surr)	101		70 - 130		01/03/18 18:39	1

Lab Sample ID: LCS 320-202269/3

**Matrix: Air** 

**Analysis Batch: 202269** 

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

**Client Sample ID: Lab Control Sample** 

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

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzene	20.0	19.8		ppb v/v		99	68 - 128	
Ethylbenzene	20.0	20.5		ppb v/v		103	64 - 124	
Toluene	20.0	18.7		ppb v/v		93	68 - 128	
m,p-Xylene	40.0	41.5		ppb v/v		104	65 - 125	
o-Xylene	20.0	21.1		ppb v/v		106	65 - 125	

LCS LCS

Surrogate	%Recovery Quality	fier Limits
4-Bromofluorobenzene (Surr)	113	70 - 130
1,2-Dichloroethane-d4 (Surr)	100	70 - 130
Toluene-d8 (Surr)	101	70 - 130

Lab Sample ID: LCS 320-202269/9

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Matrix: Air			Prep Type: Total/NA
analysis Batch: 202269			
	Spike	LCS LCS	%Rec.

Spike Analyte Added Result Qualifier Unit D %Rec Limits TPH (as Gasoline) 5000 4320 ppb v/v 86 70 - 130

LCS LCS

%Recovery Qualifier	Limits
108	70 - 130
129	70 - 130
105	70 - 130
	108 129

Lab Sample ID: LCSD 320-202269/10

**Matrix: Air** 

Analysis Batch: 202269									
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
TPH (as Gasoline)	5000	4430		ppb v/v		89	70 - 130	2	25

TestAmerica Seattle

Prep Type: Total/NA

TestAmerica Job ID: 580-73946-1

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-202269/10

Lab Sample ID: LCSD 320-202269/4

**Matrix: Air** 

**Analysis Batch: 202269** 

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

**Prep Type: Total/NA** 

LCSD LCSD

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	105		70 - 130
1,2-Dichloroethane-d4 (Surr)	124		70 - 130
Toluene-d8 (Surr)	102		70 - 130

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

Prep Type: Total/NA

**Matrix: Air** 

**Analysis Batch: 202269** 

_	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	20.0	21.3		ppb v/v		107	68 - 128	7	25
Ethylbenzene	20.0	22.4		ppb v/v		112	64 - 124	9	25
Toluene	20.0	21.0		ppb v/v		105	68 - 128	12	25
m,p-Xylene	40.0	45.4		ppb v/v		114	65 - 125	9	25
o-Xylene	20.0	22.9		ppb v/v		114	65 - 125	8	25

LCSD LCSD

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	108		70 - 130
1,2-Dichloroethane-d4 (Surr)	97		70 - 130
Toluene-d8 (Surr)	106		70 - 130

#### Method: D1946 - Fixed Gases in Air (GC)

Lab Sample ID: MB 320-202122/8

**Matrix: Air** 

**Analysis Batch: 202122** 

**Client Sample ID: Method Blank** 

Prep Type: Total/NA

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	ND		0.50	0.011	% v/v			01/02/18 12:28	
Methane (TCD)	ND		0.50	0.14	% v/v			01/02/18 12:28	1
Oxygen	ND		0.20	0.0074	% v/v			01/02/18 12:28	1

Methane (TCD)

Carbon Dioxide (TCD)

Lab Sample ID: LCS 320-202122/2				Clie	nt Sai	nple ID	: Lab Control Sample
Matrix: Air							Prep Type: Total/NA
Analysis Batch: 202122							
_	Spike	LCS	LCS				%Rec.
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits

26.2

28.7

24.4

26.1

% v/v

% v/v

107

110

80 - 120

80 - 120

**Client Sample ID: Lab Control Sample** 

Lab Sample ID: LCS 320-202122/5

**Matrix: Air** 

Analysis Batch: 202122								
-	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Oxygen	15.7	13.7		% v/v	_	87	80 - 120	

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Prep Type: Total/NA

# **QC Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Edmonds Terminal

TestAmerica Job ID: 580-73946-1

Method: D1946 - Fixed Gases in Air (GC) (Continued)

Lab Sample ID: LCSD 320-202122/3	Client Sample ID: Lab Control Sample Dup
Matrix: Air	Prep Type: Total/NA

**Analysis Batch: 202122** 

	<b>Бріке</b>	LC2D	LC2D				%Rec.		RPD	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Carbon Dioxide (TCD)	24.4	26.1		% v/v		107	80 - 120	0	20	
Methane (TCD)	26.1	28.6		% v/v		109	80 - 120	0	20	

Lab Sample ID: LCSD 320-202122/6 **Client Sample ID: Lab Control Sample Dup Matrix: Air** Prep Type: Total/NA **Analysis Batch: 202122** LCSD LCSD %Rec. **RPD** Spike Analyte Added Result Qualifier Unit Limits **RPD** Limit Oxygen 15.7 13.7 % v/v 87 80 - 120

Lab Sample ID: MB 320-202244/5

Matrix: Air

Client Sample ID: Method Blank
Prep Type: Total/NA

**Analysis Batch: 202244** 

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane (FID)	ND		0.00010	0.000020	% v/v			01/03/18 09:17	1

Lab Sample ID: LCS 320-202244/2

Matrix: Air

Analysis Batch: 202244

Spike

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

\*\*Rec.\*\*

 Analyte
 Added Methane (FID)
 Result 0.0250
 Qualifier 0.0235
 Unit w/v v/v
 D 94 80 - 120

Lab Sample ID: LCSD 320-202244/3 **Client Sample ID: Lab Control Sample Dup Matrix: Air** Prep Type: Total/NA Analysis Batch: 202244 Spike LCSD LCSD %Rec. RPD Added Result Qualifier Limits Limit Analyte Unit D %Rec RPD Methane (FID) 0.0250 0.0234 % v/v 94 80 - 120 20

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1/23/2018 (Rev. 1)

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#### **Lab Chronicle**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Client Sample ID: VSP-801

TestAmerica Job ID: 580-73946-1

Lab Sample ID: 580-73946-3

Matrix: Air

Date Collected: 12/28/17 11:20

Date Received: 12/28/17 14:55

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		18.78	202269	01/04/18 00:47	AP1	TAL SAC
Total/NA	Analysis	D1946		1.45	202244	01/03/18 09:30	EMJ	TAL SAC
Total/NA	Analysis	D1946		1.45	202122	01/02/18 13:25	EMJ	TAL SAC

Client Sample ID: VSP-802 Lab Sample ID: 580-73946-4

Date Collected: 12/28/17 11:15 **Matrix: Air** 

Date Received: 12/28/17 14:55

	Batch	Batch		Dilution	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1 -	202269	01/04/18 01:38	AP1	TAL SAC
Total/NA	Analysis	D1946		1.46	202244	01/03/18 09:45	EMJ	TAL SAC
Total/NA	Analysis	D1946		1.46	202122	01/02/18 13:40	EMJ	TAL SAC

#### **Laboratory References:**

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

# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc

Project/Site: Edmonds Terminal

TestAmerica Job ID: 580-73946-1

#### **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	UST-022	03-02-18
ANAB	DoD ELAP		L2236	01-19-19
ANAB	ISO/IEC 17025		L2236	01-19-19
California	State Program	9	2901	01-31-18
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-18

#### **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	<b>Identification Number</b>	Expiration Date
Alaska (UST)	State Program	10	UST-055	01-31-18
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-18
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-19
Illinois	NELAP	5	200060	03-17-18
Kansas	NELAP	7	E-10375	10-31-18
L-A-B	DoD ELAP		L2468	01-20-21
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-18-18
Michigan	State Program	5	9947	01-31-18
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-18
New Jersey	NELAP	2	CA005	06-30-18
New York	NELAP	2	11666	04-01-18
Oregon	NELAP	10	4040	01-29-20
Pennsylvania	NELAP	3	68-01272	03-31-18
Texas	NELAP	6	T104704399	05-31-18
US Fish & Wildlife	Federal		LE148388-0	07-31-18
USDA	Federal		P330-11-00436	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-18
Virginia	NELAP	3	460278	03-14-18
Washington	State Program	10	C581	05-05-18
Wyoming	State Program	8	8TMS-L	01-28-19

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## **Sample Summary**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

TestAmerica Job ID: 580-73946-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-73946-3	VSP-801	Air	12/28/17 11:20	12/28/17 14:55
580-73946-4	VSP-802	Air	12/28/17 11:15	12/28/17 14:55

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<b>TestAm</b>	

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047

Rush	
	Chain of
Short Hold	Custody Record

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	azard Identification		<u>.</u>	1.		L		-						nple L					Disp	osa.	і. I Ву	Lab	1	1	E.		(A fee n	nav be	asses	sed if	sample	es
☐ Yes ☐ No Cooler Temp: ☐ Non-H	azard 🗀 Flan	mmable [	□ Ski	n Irri	itant		Pois			$\Box \ \nu$					п То	Clien	t		Arci	ive .	For			N	lonti	าร	are reta					
Turn Around Time Required (business days)  ☐ 24 Hours ☐ 48 Hours ☐ 5 Days ☐ 10 Da	ys 🔲 15 Days	s □ <i>0#</i>	her					10	C Rec	quiren	nents	s (Spe	ecify)																			
1. Relinquished By Sign/Print Jan L;		, Date	138 /1	-j	Tim	e 2 (		1	. Rece	eived .	Ву .	Sign/	Prin	i Fr		<u> </u>	16	<i>,</i>	į.	114	,	) e				'	Date 17/78		7   7	ime	ς	
2. Relinquished By Sign/Print  Figure 1500 Lung	5,	Date	8/1-	7	Timi	e 55			P. Rece		By .		Prin	15	/ 1	بريد	X	_		3	<del>y</del>	- <u>-</u>				- 1	Date 2/2		$T_{i}$	ime 1	455	5
3. Relinquished By Sign/Print		Date		·············	Time	e		3	. Rece	eived i				·	-			Ô	1								Date	4		ime		
Comments					L		*****												,													

Client: ARCADIS U.S. Inc Job Number: 580-73946-1

Login Number: 73946 List Source: TestAmerica Seattle

List Number: 1

Creator: Blankinship, Tom X

Question	Anower	Commont
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	

#### **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 580-73946-1

Login Number: 73946 List Source: TestAmerica Sacramento

List Number: 2

Creator: Iliev, Gabriela K

oreator. mev, Gabriela it		
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	247019
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	N/A	
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	Received as Subcontract
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	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	N/A	
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	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	N/A	

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#### **Sacramento**

JOB#	580-7	73946
Sample #	3	

Client/Project:		VFR ID:	
Canister Serial #:	34001768	Duration:	□ <sub>Hrs</sub> □ <sub>Min</sub>
Cleaning Job:		Flow:	mL/min
Client ID:		Initials:	
Site Location:			

	F	TELD		
READING	TIME	PRESS.	DATE	INITIALS
INITIAL FIELD VACUUM				
FINAL FIELD READING				

LABORATORY										
READING	PRESS.	DATE	INITIALS							
INITIAL VACUUM CHECK (INCHES Hg)	29.8		JMT							
Helium Pre-dilution - Final Pressure (INCHES Hg)										
INITIAL PRESSURE (PSIA)	14.58	01/02/18	EJ							
FINAL PRESSURE (PSIA)	21.17	01/02/18	EJ							
Pressurization Gas:	SCREENED	SCRN DIL. VS 250mLs:								
Initial Canister Dilution Factor = 1.45		_	_							

CANISTER REPRESSURIZATION											
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF						
			1.45		#DIV/0!						
			#DIV/0!		#DIV/0!						
			#DIV/0!		#DIV/0!						

		Analytical Dilu	ution Fact	tors			
Canister DF = 1.45	X	Load DF = 4.3103448 250 58	x	Bag DF = BVf (mLs) Bvi (mLs)	Date 1/3/2018 3 3 1	Instr. MS2	File # FINAL DF 18.77572016
Canister DF = 1.45	x	Load DF = #DIV/0! LVf (mLs) LVi (mLs)	x	Bag DF = BVf (mLs) Bvi (mLs)	Date 1	Instr.	File # FINAL DF #DIV/0!
Canister DF = 1.45	x	Load DF = #DIV/0! LVf (mLs) LVi (mLs)	х	Bag DF = BVf (mLs) Bvi (mLs)	Date 1	Instr.	File # FINAL DF #DIV/0!

580-73946 Printed 1/4/20188:34 AM Canister Field Data Record v 1.0
Page 1 of 2 Revision Date 8/1/13

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#### **Sacramento**

_		
JOB#	580-73946	
Sample #	4	

Client/Project:		VFR ID:	
Canister Serial #:	34001930	Duration:	□ <sub>Hrs</sub> □ <sub>Min</sub>
Cleaning Job:		Flow:	mL/min
Client ID:		Initials:	
Site Location:			

FIELD								
READING TIME PRESS. DATE INITIALS								
INITIAL FIELD VACUUM								
FINAL FIELD READING								

LABORATORY							
READING	PRESS.	DATE	INITIALS				
INITIAL VACUUM CHECK (INCHES Hg)	29.8		JMT				
Helium Pre-dilution - Final Pressure (INCHES Hg)							
INITIAL PRESSURE (PSIA)	14.42	01/02/18	EJ				
FINAL PRESSURE (PSIA)	21.10	01/02/18	EJ				
Pressurization Gas: N2 He	SCREENED	SCRN DIL. VS 250mLs:					
Initial Canister Dilution Factor = 1.46							

	CANISTER REPRESSURIZATION					
Date	Pi (PSIA)	Pf (PSIA)	Initial DF	Initials	NEW DF	
			1.46		#DIV/0!	
			#DIV/0!		#DIV/0!	
			#DIV/0!		#DIV/0!	

		Analytical Dilu	ution Fact	tors			
Canister DF = 1.46	X	Load DF = 0.6849315 250 365	x	Bag DF = BVf (mLs) Bvi (mLs)	Date 1/3/2018	Instr. MS2	Final DF 1.00222294
Canister DF = 1.46	x	Load DF = #DIV/0! LVf (mLs) LVi (mLs)	x	Bag DF = BVf (mLs) Bvi (mLs)	Date 1	Instr.	File # FINAL DF #DIV/0!
Canister DF = 1.46	x	Load DF = #DIV/0! LVf (mLs) LVi (mLs)	х	Bag DF = BVf (mLs) Bvi (mLs)	Date 1	Instr.	File # FINAL DF #DIV/0!

580-73946 Printed 1/4/20188:34 AM Canister Field Data Record v 1.0
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# Airbill Here

Two tedlar Bags. IL



TestAmerico

Semple Re

Use this form to record Sample Custody Seal, Cooler Custody Seal, Temperature & corrected Temperature & other observations:

Notes: P.O.	Cooler Custody Seal: U.S., 247019
	Bags: 1L, 2L, 10L
	Cenisters:1L,6L, TA   Non TA
·	Transferred by Secremento - Yes
	# Cenisters Unused:1L,6L
	# Flow Regulators:, # Gauges:
	Co-locator
	Intitled & Date Ed 12/29/17

N:\QA-828 CANISTER RECEIVING NOTES.DOC

QA-828 JS 11/13/2015



# Sacramento 1 Liter Canister QC Certification Batch Certification

7-4-	Clea		10-1	-1-	
1310	( .   02	nen/	Rai	cn	11 1
	CICA	100	Dui		

2-27-17 320-34705

Date of QC

12/27/2017

Data File Number

C. MSDUEN 1 DATA 17 1227

(File ID for certification analysis of canister designated below)

320-34705 Chain of Custody

320-34703 Chair of Custody

#### CANISTER ID NUMBERS

1	SS (22717
6	34001909 34001709
	34001715
	34001705
	34001773
	34001752
	34001870
	7540
	34001768

34001930	
34001873	
341001887	
34001957	
34001858	
34001820	
31001698	
34001884	

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"\*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

1st level Reviewed By:

Date:

2nd level Reviewed By:

12/28/17

Date:

Q:\DOCUMENT-MANAGEMENT\FORMS\QA-814A 1-LITER BATCH CAN QC 20171023.DOC QA-814 A

RE 10232017

# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-34705-1 SDG No.: Client Sample ID: 34001709 Lab Sample ID: 320-34705-1 Matrix: Air Lab File ID: MS6122725.D Analysis Method: TO-15 Date Collected: 12/26/2017 00:00 Sample wt/vol: 500(mL) Date Analyzed: 12/28/2017 12:20 Soil Aliquot Vol: Dilution Factor: 1 GC Column: RTX-Volatiles ID: 0.32(mm) Soil Extract Vol.: % Moisture: Level: (low/med) Low Analysis Batch No.: 201510 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.45	J	5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	0.17	J	0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.13
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	0.25	J	0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.06
75-45-6	Chlorodifluoromethane	ND		0.80	0.2
75-00-3	Chloroethane	ND		0.80	0.33
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.05
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroetha ne	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.13
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.1
75-71-8	Dichlorodifluoromethane	ND		0.40	0.1
75-34-3	1,1-Dichloroethane	ND		0.30	0.07
107-06-2	1,2-Dichloroethane	ND		0.80	0.08

# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-34705-1 SDG No.: Client Sample ID: 34001709 Lab Sample ID: 320-34705-1 Matrix: Air Lab File ID: MS6122725.D Analysis Method: TO-15 Date Collected: 12/26/2017 00:00 Sample wt/vol: 500(mL) Date Analyzed: 12/28/2017 12:20 Soil Aliquot Vol: Dilution Factor: 1 GC Column: RTX-Volatiles ID: 0.32 (mm) Soil Extract Vol.: % Moisture: Level: (low/med) Low Analysis Batch No.: 201510 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.087
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14
75-09-2	Methylene Chloride	0.11	ЈВ	0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	ND		0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	0.059	ЈВ	0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethan e	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.06

# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento

SDG No.:

Client Sample ID: 34001709

Lab Sample ID: 320-34705-1

Matrix: Air

Lab File ID: MS6122725.D

Analysis Method: TO-15

Date Collected: 12/26/2017 00:00

Sample wt/vol: 500(mL)

Date Analyzed: 12/28/2017 12:20

Soil Aliquot Vol:

Soil Extract Vol.:

GC Column: RTX-Volatiles ID: 0.32(mm)

% Moisture:

Level: (low/med) Low

Analysis Batch No.: 201510

Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	100		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	103		70-130
2037-26-5	Toluene-d8 (Surr)	100		70-130

Report Date: 28-Dec-2017 13:14:05 Chrom Revision: 2.2 08-Dec-2017 11:41:26

> TestAmerica Sacramento **Target Compound Quantitation Report**

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20171227-52183.b\MS6122725.D

Lims ID: 320-34705-A-1 Client ID: 34001709 Sample Type: Client

Inject. Date: 28-Dec-2017 12:20:30 ALS Bottle#: Worklist Smp#: 25 6

Purge Vol: 25.000 mL Dil. Factor: 1.0000

Sample Info: 320-33801-A-1

Misc. Info.: 500 mL

Operator ID: LHS Instrument ID: ATMS6

Method: \\ChromNA\Sacramento\ChromData\ATMS6\20171227-52183.b\TO15\_ATMS6.m

Limit Group: MSA - TO15 - ICAL

28-Dec-2017 13:13:56 Calib Date: Last Update: 27-Dec-2017 16:18:30 Integrator: RTE ID Type: **Deconvolution ID** Quant Method: Internal Standard Quant By: **Initial Calibration** Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS6\20171227-52183.b\MS6122704.D

Column 1: RTX Volatiles (0.32 mm) Det: MS SCAN

Process Host: XAWRK014

First Level Reviewer: leeh Date: 28-Dec-2017 13:13:56

T II St ECVCI TCVICWOI. ICCII		Dutc.				20 DCC 2017 13:13:30			
Compound	Cia	RT (min.)	Adj RT	Dlt RT		Doonance	OnCol Amt	Flogo	
Compound	Sig	(min.)	(min.)	(min.)	Q	Response	ppb v/v	Flags	
* 1 Chlorobromomethane (IS)	130	13.308	13.295	0.013	91	30883	4.00		
<ul><li>* 2 1,4-Difluorobenzene</li></ul>	114	15.437	15.431	0.006	95	160287	4.00		
* 3 Chlorobenzene-d5 (IS)	117	22.159	22.159	0.000	87	250994	4.00		
\$ 41,2-Dichloroethane-d4 (Sur	65	14.512	14.506	0.012	40	61413	4.11		
\$ 5 Toluene-d8 (Surr)	100	18.886	18.888	0.006	99	154378	4.01		
\$ 6 4-Bromofluorobenzene (Surr	95	24.720	24.714	0.006	91	227658	3.98		
12 Chlorodifluoromethane	51	4.669	4.671	0.000	97	6428	0.1424		
17 Butane	43	5.478	5.474	0.006	83	10922	0.1665		
26 Trichlorofluoromethane	101	7.400	7.386	0.018	59	1970	0.0333		
27 Pentane	43	7.443	7.453	-0.006	94	4151	0.0836		
32 Acetone	43	8.459	8.426	0.036	97	35317	0.4458		
36 2-Methyl-2-propanol	59	9.146	9.096	0.054	78	1790	0.0360		
39 Methylene Chloride	49	9.712	9.717	0.000	59	3590	0.1103		
40 Carbon disulfide	76	9.779	9.796	-0.012	95	9959	0.2456		
48 2-Butanone (MEK)	72	12.316	12.279	0.043	93	1798	0.1517		
58 Isooctane	57	14.397	14.414	-0.013	80	3005	0.0264		
63 Benzene	78	14.841	14.846	0.000	95	3465	0.0435		
75 Toluene	91	19.063	19.058	0.012	98	5717	0.0587		
87 m-Xylene & p-Xylene	91	22.573	22.573	0.000	93	3605	0.0416		
120 Hexachlorobutadiene	225	31.716	31.722	-0.007	77	1096	0.0271		
Reagents:									

Reagents:

VAMSIS20\_00090 Amount Added: 50.00 Units: mL Run Reagent

Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20171227-52183.b\MS6122725.D

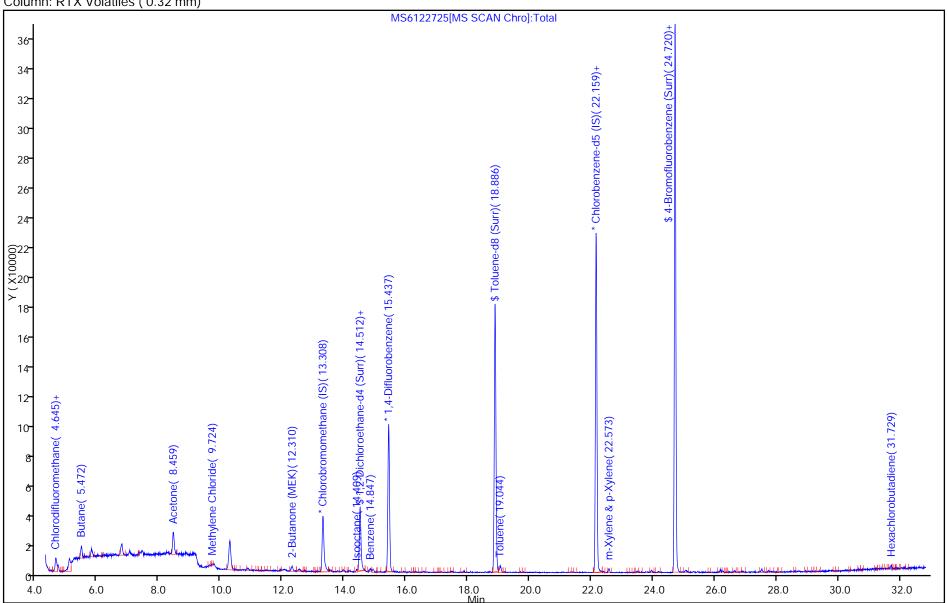
Injection Date: 28-Dec-2017 12:20:30 Instrument ID: ATMS6 Operator ID: LHS Worklist Smp#: Lims ID: Lab Sample ID: 320-34705-1 25 320-34705-A-1

34001709 Client ID:

Purge Vol: 25.000 mL Dil. Factor: ALS Bottle#: 1.0000 6

Method: TO15\_ATMS6 Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)



Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20171227-52183.b\MS6122725.D

Injection Date: Instrument ID: 28-Dec-2017 12:20:30 ATMS6 Lims ID: 320-34705-A-1 Lab Sample ID: 320-34705-1

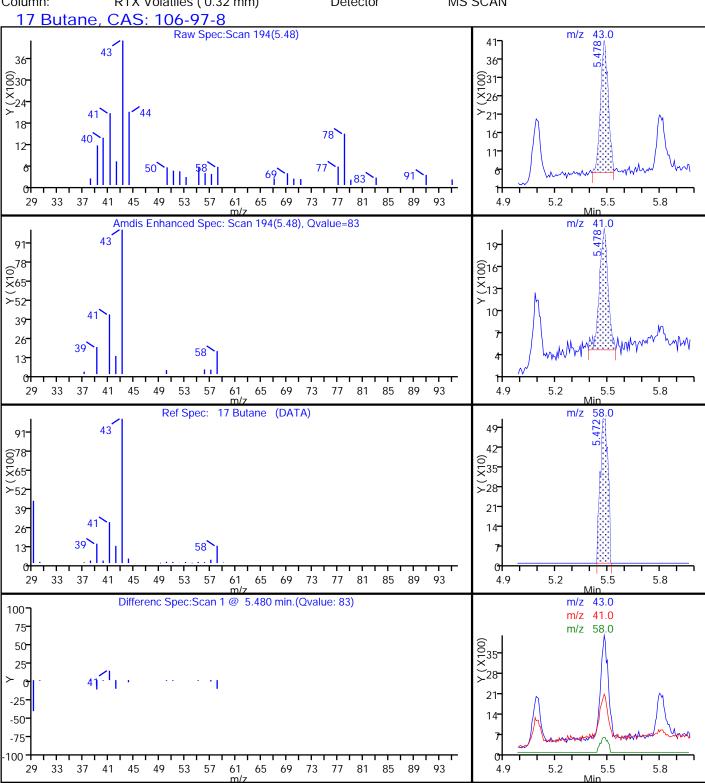
Client ID: 34001709

ALS Bottle#: Operator ID: LHS 6 Worklist Smp#: 25

Purge Vol: 25.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS6 Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN



Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20171227-52183.b\MS6122725.D

Injection Date: 28-Dec-2017 12:20:30 Instrument ID: ATMS6 320-34705-A-1 Lims ID: Lab Sample ID: 320-34705-1

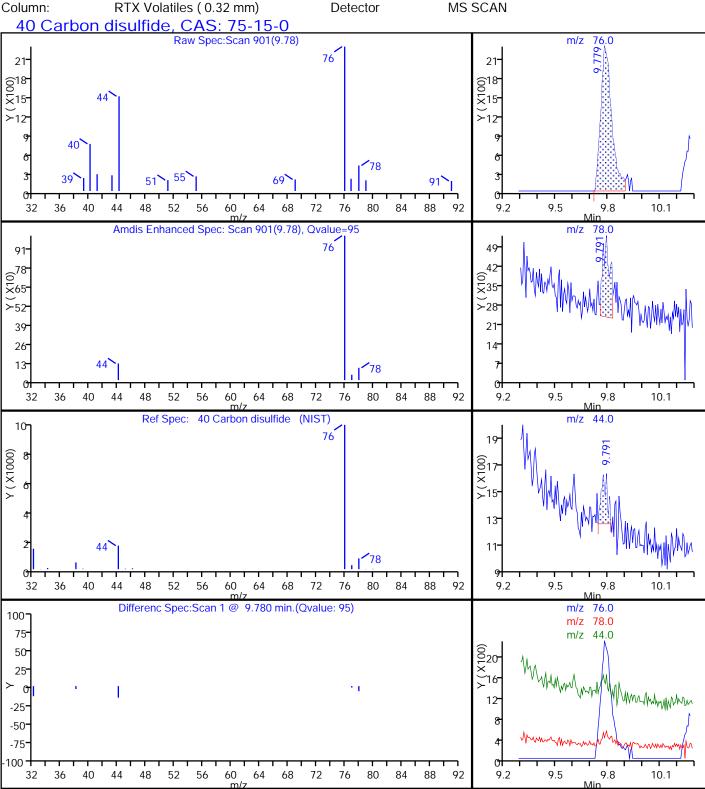
Client ID: 34001709

LHS ALS Bottle#: Worklist Smp#: Operator ID: 6 25

Purge Vol: 25.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS6 Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector



Data File: \ChromNA\Sacramento\ChromData\ATMS6\20171227-52183.b\MS6122725.D

 Injection Date:
 28-Dec-2017 12:20:30
 Instrument ID:
 ATMS6

 Lims ID:
 320-34705-A-1
 Lab Sample ID:
 320-34705-1

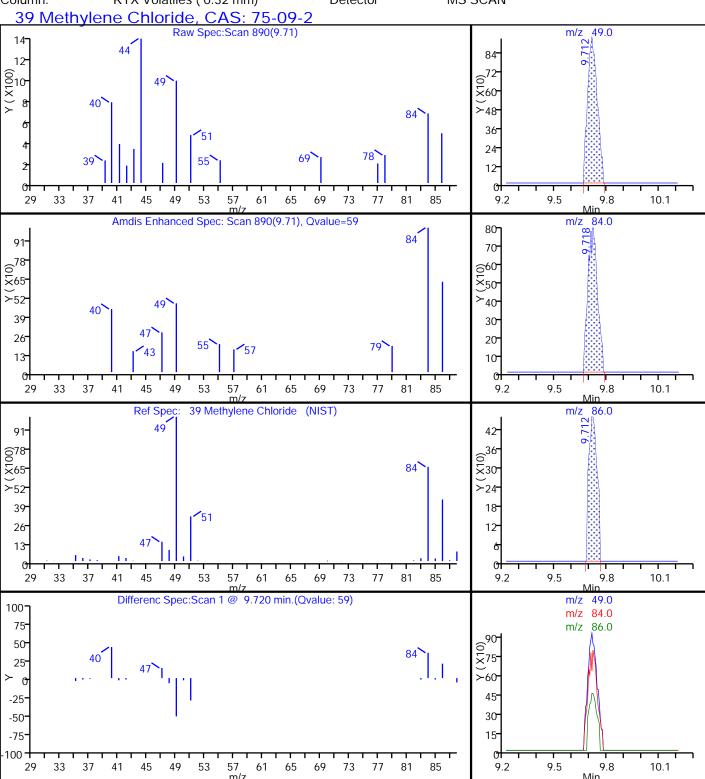
Client ID: 34001709

Operator ID: LHS ALS Bottle#: 6 Worklist Smp#: 25

Purge Vol: 25.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS6 Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN



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Data File: \\ChromNA\Sacramento\ChromData\ATMS6\20171227-52183.b\MS6122725.D

Injection Date: 28-Dec-2017 12:20:30 Instrument ID: ATMS6 320-34705-1 Lims ID: 320-34705-A-1 Lab Sample ID:

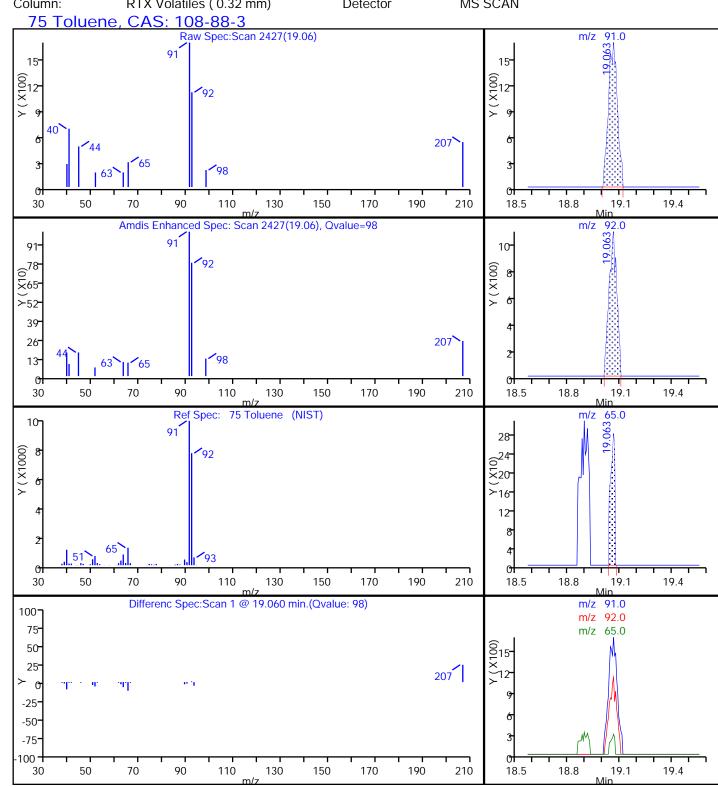
Client ID: 34001709

LHS ALS Bottle#: Worklist Smp#: Operator ID: 6 25

Dil. Factor: Purge Vol: 25.000 mL 1.0000

Method: TO15\_ATMS6 Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN





THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento 880 Riverside Parkway West Sacramento, CA 95605 Tel: (916)373-5600

TestAmerica Job ID: 320-36324-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc. 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elaine Walker

Authorized for release by: 3/2/2018 2:25:51 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

-----LINKS -----

**Review your project** results through **Total Access** 

**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

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#### **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-36324-1

#### **Qualifiers**

#### Air - GC/MS VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

#### Air - GC VOA

alifier Description

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

#### **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

Percent Recovery %R 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 Minimum Level (Dioxin) MI

NC Not Calculated

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

**PQL Practical Quantitation Limit** 

**Quality Control** QC

Relative Error Ratio (Radiochemistry) **RER** 

Reporting Limit or Requested Limit (Radiochemistry) RL

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

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

TestAmerica Sacramento

3/2/2018

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#### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Job ID: 320-36324-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-36324-1

#### Receipt

Two samples were received on 2/22/2018 9:00 AM; the samples arrived in good condition, properly preserved.

#### Air - GC VOA

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

#### Air - GC/MS VOA

Method(s) TO-15: 1,2-Dichloroethane-d4 (Surrogate) recovery for the following sample was outside control limits: VSP - 801 (320-36324-1). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method(s) TO-15: The Gasoline Range Organics (GRO) concentration reported for the following sample is due to the presence of discrete peaks: VSP - 802 (320-36324-2). Isopropyl alcohol

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

TestAmerica Job ID: 320-36324-1

#### **Detection Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Client Sample ID: VSP - 801

TestAmerica Job ID: 320-36324-1

Lab Sample ID: 320-36324-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	280		2.6	0.51	ppb v/v	6.45	_	TO-15	Total/NA
Ethylbenzene	26		2.6	0.41	ppb v/v	6.45		TO-15	Total/NA
Toluene	1.2	J	2.6	0.33	ppb v/v	6.45		TO-15	Total/NA
m,p-Xylene	25		5.2	0.65	ppb v/v	6.45		TO-15	Total/NA
o-Xylene	3.0		2.6	0.35	ppb v/v	6.45		TO-15	Total/NA
TPH (as Gasoline)	18000		650	260	ppb v/v	6.45		TO-15	Total/NA
Carbon Dioxide (TCD)	0.50	J	0.84	0.018	% v/v	1.68		D1946	Total/NA
Methane (FID)	0.016		0.00017	0.000034	% v/v	1.68		D1946	Total/NA
Oxygen	18		0.34	0.012	% v/v	1.68		D1946	Total/NA

Client Sample ID: VSP - 802 Lab Sample ID: 320-36324-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac I	) Method	Prep Type
Benzene	0.17	J	0.40	0.079	ppb v/v		TO-15	Total/NA
Ethylbenzene	0.83		0.40	0.063	ppb v/v	1	TO-15	Total/NA
Toluene	0.66		0.40	0.051	ppb v/v	1	TO-15	Total/NA
m,p-Xylene	1.9		0.80	0.10	ppb v/v	1	TO-15	Total/NA
o-Xylene	0.49		0.40	0.054	ppb v/v	1	TO-15	Total/NA
TPH (as Gasoline)	320		100	40	ppb v/v	1	TO-15	Total/NA
Carbon Dioxide (TCD)	0.35	J	1.0	0.022	% v/v	2.08	D1946	Total/NA
Methane (FID)	0.0030		0.00021	0.000042	% v/v	2.08	D1946	Total/NA
Oxygen	18		0.42	0.015	% v/v	2.08	D1946	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

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#### **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Lab Sample ID: 320-36324-1

TestAmerica Job ID: 320-36324-1

Client Sample ID: VSP - 801 Date Collected: 02/20/18 15:30 Matrix: Air

Date Received: 02/22/18 09:00

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	280		2.6	0.51	ppb v/v			03/01/18 22:22	6.45
Ethylbenzene	26		2.6	0.41	ppb v/v			03/01/18 22:22	6.45
Toluene	1.2	J	2.6	0.33	ppb v/v			03/01/18 22:22	6.45
m,p-Xylene	25		5.2	0.65	ppb v/v			03/01/18 22:22	6.45
o-Xylene	3.0		2.6	0.35	ppb v/v			03/01/18 22:22	6.45
TPH (as Gasoline)	18000		650	260	ppb v/v			03/01/18 22:22	6.45
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130			•		03/01/18 22:22	6.45
1,2-Dichloroethane-d4 (Surr)	132	X	70 - 130					03/01/18 22:22	6.45
Toluene-d8 (Surr)	101		70 - 130					03/01/18 22:22	6.45
Method: D1946 - Fixed Gas	ses in Air (GC)								
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.50	J	0.84	0.018	% v/v			02/26/18 13:22	1.68
Methane (FID)	0.016		0.00017	0.000034	% v/v			02/26/18 14:47	1.68
Methane (TCD)	ND		0.84	0.23	% v/v			02/26/18 13:22	1.68
Oxygen	18		0.34	0.012	% v/v			02/26/18 13:22	1.68

Client Sample ID: VSP - 802 Lab Sample ID: 320-36324-2 Matrix: Air

Date Collected: 02/20/18 15:45 Date Received: 02/22/18 09:00

Method: TO-15 - Volatile O	•	unds in An Qualifier	nbient Air RL	MDI	Unit	D	Droporod	Analyzad	Dil Fac
Analyte							Prepared	Analyzed	DII Fac
Benzene	0.17		0.40	0.079				03/01/18 23:14	1
Ethylbenzene	0.83		0.40	0.063	ppb v/v			03/01/18 23:14	1
Toluene	0.66		0.40	0.051	ppb v/v			03/01/18 23:14	1
m,p-Xylene	1.9		0.80	0.10	ppb v/v			03/01/18 23:14	1
o-Xylene	0.49		0.40	0.054	ppb v/v			03/01/18 23:14	1
TPH (as Gasoline)	320		100	40	ppb v/v			03/01/18 23:14	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130			•		03/01/18 23:14	1
1,2-Dichloroethane-d4 (Surr)	88		70 - 130					03/01/18 23:14	1
Toluene-d8 (Surr)	96		70 - 130					03/01/18 23:14	1
Method: D1946 - Fixed Gas	ses in Air (GC)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.35	J	1.0	0.022	% v/v			02/26/18 13:32	2.08
Methane (FID)	0.0030		0.00021	0.000042	% v/v			02/26/18 15:07	2.08
Methane (TCD)	ND		1.0	0.28	% v/v			02/26/18 13:32	2.08

#### **Surrogate Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-36324-1

#### Method: TO-15 - Volatile Organic Compounds in Ambient Air

Matrix: Air Prep Type: Total/NA

			Pe	ercent Surrog	ate Recovery (Acceptance Limits)
		BFB	DCA	TOL	
Lab Sample ID	Client Sample ID	(70-130)	(70-130)	(70-130)	
320-36324-1	VSP - 801	96	132 X	101	
320-36324-2	VSP - 802	98	88	96	
LCS 320-210733/3	Lab Control Sample	100	92	97	
LCS 320-210733/6	Lab Control Sample	103	116	99	
LCSD 320-210733/4	Lab Control Sample Dup	99	95	99	
LCSD 320-210733/7	Lab Control Sample Dup	105	117	101	
MB 320-210733/10	Method Blank	96	89	98	

BFB = 4-Bromofluorobenzene (Surr)

DCA = 1,2-Dichloroethane-d4 (Surr)

TOL = Toluene-d8 (Surr)

TestAmerica Sacramento

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Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-36324-1

#### Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-210733/10

**Matrix: Air** 

**Analysis Batch: 210733** 

**Client Sample ID: Method Blank** 

Prep Type: Total/NA

	MB MB							
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND ND	0.40	0.079	ppb v/v			03/01/18 19:55	1
Ethylbenzene	ND	0.40	0.063	ppb v/v			03/01/18 19:55	1
Toluene	ND	0.40	0.051	ppb v/v			03/01/18 19:55	1
m,p-Xylene	ND	0.80	0.10	ppb v/v			03/01/18 19:55	1
o-Xylene	ND	0.40	0.054	ppb v/v			03/01/18 19:55	1
TPH (as Gasoline)	ND	100	40	ppb v/v			03/01/18 19:55	1

MB MB

ı							
	Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
	4-Bromofluorobenzene (Surr)	96		70 - 130		03/01/18 19:55	1
	1,2-Dichloroethane-d4 (Surr)	89		70 - 130		03/01/18 19:55	1
	Toluene-d8 (Surr)	98		70 - 130		03/01/18 19:55	1

Lab Sample ID: LCS 320-210733/3

**Matrix: Air** 

**Analysis Batch: 210733** 

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzene	20.0	17.6		ppb v/v		88	68 - 128	 
Ethylbenzene	20.0	21.5		ppb v/v		107	64 - 124	
Toluene	20.0	18.8		ppb v/v		94	68 - 128	
m,p-Xylene	40.0	44.8		ppb v/v		112	65 - 125	
o-Xylene	20.0	20.8		ppb v/v		104	65 - 125	

LCS LCS

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	100		70 - 130
1,2-Dichloroethane-d4 (Surr)	92		70 - 130
Toluene-d8 (Surr)	97		70 - 130

Lab Sample ID: LCS 320-210733/6

**Matrix: Air** 

**Analysis Batch: 210733** 

<b>Client Sample ID: Lab Control Sample</b>	
Prep Type: Total/NA	

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit D %Rec Limits TPH (as Gasoline) 5000 3690 70 - 130 ppb v/v

LCS LCS %Recovery Qualifier Surrogate Limits 4-Bromofluorobenzene (Surr) 70 - 130 103 70 - 130 1,2-Dichloroethane-d4 (Surr) 116 Toluene-d8 (Surr) 70 - 130 99

Lab Sample ID: LCSD 320-210733/4

Matrix: Air

**Analysis Batch: 210733** 

<b>Client Sample ID: Lab</b>	<b>Control Sample Dup</b>
	<b>Prep Type: Total/NA</b>

Analysis Baton. 210700									
-	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	 20.0	20.3		ppb v/v		101	68 - 128	14	25
Ethylbenzene	20.0	23.7		v/v dag		118	64 - 124	10	25

TestAmerica Sacramento

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Client: ARCADIS U.S. Inc

TestAmerica Job ID: 320-36324-1 Project/Site: Chevron Edmonds Terminal

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-210733/4

Client Sample ID: Lab Control Sample Dup **Matrix: Air** Prep Type: Total/NA **Analysis Batch: 210733** 

LCSD LCSD **RPD** Spike %Rec. Added Result Qualifier Limits RPD Analyte Unit %Rec Limit Toluene 20.0 21.9 110 68 - 128 16 25 ppb v/v m,p-Xylene 40.0 49.0 ppb v/v 123 65 - 125 9 25 o-Xylene 20.0 22.8 ppb v/v 114 65 - 125 9 25

LCSD LCSD %Recovery Qualifier Limits Surrogate 4-Bromofluorobenzene (Surr) 99 70 - 130 95 70 - 130 1,2-Dichloroethane-d4 (Surr) Toluene-d8 (Surr) 99 70 - 130

Client Sample ID: Lab Control Sample Dup Lab Sample ID: LCSD 320-210733/7

Matrix: Air

**Analysis Batch: 210733** 

Spike LCSD LCSD %Rec. **RPD** Result Qualifier Analyte Added Unit %Rec Limits **RPD** Limit TPH (as Gasoline) 5000 4000 80 70 - 130 25 ppb v/v

LCSD LCSD %Recovery Qualifier Limits Surrogate 105 70 - 130 4-Bromofluorobenzene (Surr) 1,2-Dichloroethane-d4 (Surr) 70 - 130 117 Toluene-d8 (Surr) 101 70 - 130

Method: D1946 - Fixed Gases in Air (GC)

Lab Sample ID: MB 320-210033/5 Client Sample ID: Method Blank Prep Type: Total/NA

**Matrix: Air** 

**Analysis Batch: 210033** 

MB MB RL **MDL** Unit **Analyte** Result Qualifier D Prepared Analyzed Dil Fac Methane (FID)  $\overline{\mathsf{ND}}$ 0.00010 0.000020 % v/v 02/26/18 10:11

Lab Sample ID: LCS 320-210033/2 **Client Sample ID: Lab Control Sample Matrix: Air** Prep Type: Total/NA

**Analysis Batch: 210033** 

Spike LCS LCS %Rec. Added Analyte Result Qualifier Unit D %Rec Limits Methane (FID) 0.0250 0.0222 89 80 - 120

Lab Sample ID: LCSD 320-210033/3 Client Sample ID: Lab Control Sample Dup Prep Type: Total/NA

Matrix: Air

**Analysis Batch: 210033** 

Spike LCSD LCSD %Rec. RPD Analyte Added Result Qualifier Unit %Rec Limits RPD Limit Methane (FID) 0.0250 0.0223 % v/v 89 80 - 120 0

TestAmerica Sacramento

Prep Type: Total/NA

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#### QC Sample Results

Client: ARCADIS U.S. Inc

**Analysis Batch: 210035** 

**Matrix: Air** 

Project/Site: Chevron Edmonds Terminal

Lab Sample ID: MB 320-210035/11

Method: D1946 - Fixed Gases in Air (GC) (Continued)

TestAmerica Job ID: 320-36324-1

Client Sample ID: Method Blank

Prep Type: Total/NA

MR MR

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	ND		0.50	0.011	% v/v			02/26/18 11:35	1
Methane (TCD)	ND		0.50	0.14	% v/v			02/26/18 11:35	1
Oxygen	ND		0.20	0.0074	% v/v			02/26/18 11:35	1

Lab Sample ID: LCS 320-210035/2 **Client Sample ID: Lab Control Sample Matrix: Air Prep Type: Total/NA** 

**Analysis Batch: 210035** 

	Spike	LCS LCS				%Rec.	
Analyte	Added	Result Qualif	ier Unit	D	%Rec	Limits	
Carbon Dioxide (TCD)	24.4	24.7	% v/v		101	80 - 120	
Methane (TCD)	26.1	26.2	% v/v		100	80 - 120	

Lab Sample ID: LCS 320-210035/5 **Client Sample ID: Lab Control Sample Matrix: Air** Prep Type: Total/NA **Analysis Batch: 210035** Spike LCS LCS %Rec.

Analyte Added Result Qualifier Limits Unit D %Rec 15.7 13.4 % v/v 85 80 - 120 Oxygen

Lab Sample ID: LCSD 320-210035/3 Client Sample ID: Lab Control Sample Dup **Matrix: Air** Prep Type: Total/NA **Analysis Batch: 210035** 

Spike LCSD LCSD %Rec. **RPD** Analyte Added Result Qualifier Unit D %Rec Limits RPD Limit 24.4 % v/v Carbon Dioxide (TCD) 24.8 80 - 120 20 101 0 Methane (TCD) 26.1 26.2 % v/v 100 80 - 120 20

Lab Sample ID: LCSD 320-210035/6 Client Sample ID: Lab Control Sample Dup Matrix: Air Prep Type: Total/NA **Analysis Batch: 210035** 

LCSD LCSD RPD Spike %Rec. Analyte Added Result Qualifier Unit %Rec Limits RPD Limit 15.7 Oxygen 13.4 % v/v 85 80 - 120

3/2/2018

#### **QC Association Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-36324-1

#### Air - GC/MS VOA

#### **Analysis Batch: 210733**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-36324-1	VSP - 801	Total/NA	Air	TO-15	
320-36324-2	VSP - 802	Total/NA	Air	TO-15	
MB 320-210733/10	Method Blank	Total/NA	Air	TO-15	
LCS 320-210733/3	Lab Control Sample	Total/NA	Air	TO-15	
LCS 320-210733/6	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-210733/4	Lab Control Sample Dup	Total/NA	Air	TO-15	
LCSD 320-210733/7	Lab Control Sample Dup	Total/NA	Air	TO-15	

#### Air - GC VOA

#### **Analysis Batch: 210033**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-36324-1	VSP - 801	Total/NA	Air	D1946	<u> </u>
320-36324-2	VSP - 802	Total/NA	Air	D1946	
MB 320-210033/5	Method Blank	Total/NA	Air	D1946	
LCS 320-210033/2	Lab Control Sample	Total/NA	Air	D1946	
LCSD 320-210033/3	Lab Control Sample Dup	Total/NA	Air	D1946	

#### **Analysis Batch: 210035**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-36324-1	VSP - 801	Total/NA	Air	D1946	
320-36324-2	VSP - 802	Total/NA	Air	D1946	
MB 320-210035/11	Method Blank	Total/NA	Air	D1946	
LCS 320-210035/2	Lab Control Sample	Total/NA	Air	D1946	
LCS 320-210035/5	Lab Control Sample	Total/NA	Air	D1946	
LCSD 320-210035/3	Lab Control Sample Dup	Total/NA	Air	D1946	
LCSD 320-210035/6	Lab Control Sample Dup	Total/NA	Air	D1946	

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#### **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-36324-1

Client Sample ID: VSP - 801 Lab Sample ID: 320-36324-1

Date Collected: 02/20/18 15:30 Matrix: Air

Date Received: 02/22/18 09:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		6.45	65 mL	250 mL	210733	03/01/18 22:22	AP1	TAL SAC
Total/NA	Analysis	D1946		1.68	50 mL	50 mL	210033	02/26/18 14:47	EMJ	TAL SAC
Total/NA	Analysis	D1946		1.68	50 mL	50 mL	210035	02/26/18 13:22	EMJ	TAL SAC

Client Sample ID: VSP - 802

Date Collected: 02/20/18 15:45

Lab Sample ID: 320-36324-2

Matrix: Air

Date Received: 02/22/18 09:00

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	520 mL	250 mL	210733	03/01/18 23:14	AP1	TAL SAC
Total/NA	Analysis	D1946		2.08	50 mL	50 mL	210033	02/26/18 15:07	EMJ	TAL SAC
Total/NA	Analysis	D1946		2.08	50 mL	50 mL	210035	02/26/18 13:32	EMJ	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: ARCADIS U.S. Inc TestAmerica Job ID: 320-36324-1

Project/Site: Chevron Edmonds Terminal

#### **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	<b>Expiration Date</b>
Alaska (UST)	State Program	10	17-020	01-20-21
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-18
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
lorida	NELAP	4	E87570	06-30-18
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-19
Ilinois	NELAP	5	200060	03-17-18
Kansas	NELAP	7	E-10375	10-31-18
A-B	DoD ELAP		L2468	01-20-21
ouisiana	NELAP	6	30612	06-30-18
laine	State Program	1	CA0004	04-14-18
Michigan	State Program	5	9947	01-31-18 *
evada	State Program	9	CA00044	07-31-18
lew Hampshire	NELAP	1	2997	04-18-18
ew Jersey	NELAP	2	CA005	06-30-18
lew York	NELAP	2	11666	04-01-18
regon	NELAP	10	4040	01-29-19
Pennsylvania	NELAP	3	68-01272	03-31-18
exas	NELAP	6	T104704399	05-31-18
JS Fish & Wildlife	Federal		LE148388-0	07-31-18
JSDA	Federal		P330-11-00436	01-17-21
JSEPA UCMR	Federal	1	CA00044	11-06-18
Jtah	NELAP	8	CA00044	02-28-18 *
'irginia	NELAP	3	460278	03-14-18
Vashington	State Program	10	C581	05-05-18
West Virginia (DW)	State Program	3	9930C	12-31-18
Nyoming	State Program	8	8TMS-L	01-28-19

#### **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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

TestAmerica Sacramento

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

#### **Method Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-36324-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL SAC
D1946	Fixed Gases in Air (GC)	ASTM	TAL SAC

#### **Protocol References:**

ASTM = ASTM International

EPA = US Environmental Protection Agency

#### Laboratory References:

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

#### **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-36324-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-36324-1	VSP - 801	Air	02/20/18 15:30	02/22/18 09:00
320-36324-2	VSP - 802	Air	02/20/18 15:45	02/22/18 09:00

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Form No. CA-C-WI-003, Rev. 1, dated 05/10/2013

# Canister Samples Chain of Custody Record

TestAmerica Sacramento

880 Riverside Parkway

**TestAmerica** 

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples

Otiner: Fixed 4as (methane, 02 EPATO-15 for BTEX 8 TRH-6 TestAmerica Laboratories, Inc. (See below for Add'l Items) Sample Specific Notes: COCs 320-36324 Chain of Custody or Lab Use Only: of lob / SDG No.: Walk-in Client: ab Sampling: Office (Please specify in notes section) andfill Gas Sell Gas 122/18 ndoor Air Sample Type Office specify in notes section) 0000 Jason Little 81\8/0A9∃ 4-HUL 'X-1a 888E / Stet / 9tet-d MTSA EPA 25C / 25.3 Lymed SPA 3C H9A-AM 10-12 (Med / Std / Low / SIM) Samples Collected By: Samples Received by: 34001936 34000 66 Canister Received by:
Received by:
CMAA
Condition: Flow Controller ID Canister Canister Vacuum in Vacuum in Field, 'Hg Field, 'Hg (Start)' (Stop)' Temperature (Fahrenheit) Temperature (Fahrenheit) Ambient Ambient Anaylsis Turnaround Time Standard (Specific): STAT Time Date / Time: Date / Time: Date / Time: Opened by: Rush (Specifiy) Time Start 1530 525 Interior Interior Project Manager: Site Contact: TA Contact: 2/20/18 81/00/2 Sample Date(s) Phone: Suite 800 Email: Start Start Stop Stop Special Instructions/QC Requirements & Comments: Site/Location: 11720 unit ci2d, Edwards w.A. Project Name: Edmonds Termina City/State/Zip Scattle/WA/4810 Shipper Name: West Sacramento, CA 95605 phone 916.374,4378 fax 916.372,1059 Sample Identification Address: 1100 Olive way Avecadi 150-802 Samples Relinquished by: Client Contact Information USP-801 Samples Shipped by: Relinquished by: Company Name: Lab Use Only: # O d

#### **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 320-36324-1

Login Number: 36324 List Source: TestAmerica Sacramento

List Number: 1

Creator: Iliev, Gabriela K

Creator. lilev, Gabriela K		
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	247138
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
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.	N/A	
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	

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#### Sacramento 1 Liter Canister QC Certification **Batch Certification**

Date Cleaned/Batch ID	1-10-18 326-34970	
Date of QC	1/21/2018	
Data File Number	C: MSDEWEM 1 0ATA 1801211	320-34970 Chain of Custody
(File ID for certification and	[ 8 € (2   ≤   .4 alysis of canister designated below)	

#### **CANISTER ID NUMBERS**

X-34000934	34000808
34001014	3400068
34001220	34000654
34001635	8933
31001103	34000465
34000328	34001244
34000661	34000762
34001669	34001936

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"\*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

1st level Reviewed By:

2nd level Reviewed By:

Date:

Q:\DOCUMENT-MANAGEMENT\FORMS\QA-814A 1-LITER BATCH CAN QC 20171023.DOC QA-814 A

RE 10232017

Lab Name: TestAmerica Sacramento Job No.: 320-34970-1 SDG No.: Client Sample ID: 34000934 Lab Sample ID: 320-34970-1 Matrix: Air Lab File ID: 18012131.D Analysis Method: TO-15 Date Collected: 01/10/2018 00:00 Sample wt/vol: 500(mL) Date Analyzed: 01/22/2018 10:16 Soil Aliquot Vol: Dilution Factor: 1 GC Column: RTX-Volatiles ID: 0.32(mm) Soil Extract Vol.: % Moisture: Level: (low/med) Low Analysis Batch No.: 204839 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.30	J	5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.13
71-43-2	Benzene	ND		0.40	0.07
100-44-7	Benzyl chloride	ND		0.80	0.1
75-27-4	Bromodichloromethane	ND		0.30	0.06
75-25-2	Bromoform	ND		0.40	0.07
74-83-9	Bromomethane	ND		0.80	0.3
106-99-0	1,3-Butadiene	ND		0.80	0.1
106-97-8	n-Butane	ND		0.40	0.1
78-93-3	2-Butanone (MEK)	ND		0.80	0.2
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.1
104-51-8	n-Butylbenzene	ND		0.40	0.1
135-98-8	sec-Butylbenzene	ND		0.40	0.07
98-06-6	tert-Butylbenzene	ND		0.80	0.06
75-15-0	Carbon disulfide	ND		0.80	0.07
56-23-5	Carbon tetrachloride	ND		0.80	0.06
108-90-7	Chlorobenzene	ND		0.30	0.06
75-45-6	Chlorodifluoromethane	ND		0.80	0.2
75-00-3	Chloroethane	ND		0.80	0.3
67-66-3	Chloroform	ND		0.30	0.09
74-87-3	Chloromethane	ND		0.80	0.2
95-49-8	2-Chlorotoluene	ND		0.40	0.08
110-82-7	Cyclohexane	ND		0.40	0.08
124-48-1	Dibromochloromethane	ND		0.40	0.07
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.07
74-95-3	Dibromomethane	ND		0.40	0.05
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroetha ne	ND		0.40	0.1
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.1
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.1
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.1
75-71-8	Dichlorodifluoromethane	ND		0.40	0.1
75-34-3	1,1-Dichloroethane	ND		0.30	0.07
107-06-2	1,2-Dichloroethane	ND		0.80	0.08

Lab Name: TestAmerica Sacramento Job No.: 320-34970-1 SDG No.: Client Sample ID: 34000934 Lab Sample ID: 320-34970-1 Matrix: Air Lab File ID: 18012131.D Analysis Method: TO-15 Date Collected: 01/10/2018 00:00 Sample wt/vol: 500(mL) \_\_\_\_\_ Date Analyzed: 01/22/2018 10:16 Soil Aliquot Vol: Dilution Factor: 1 Soil Extract Vol.: GC Column: RTX-Volatiles ID: 0.32(mm) Level: (low/med) Low % Moisture: Analysis Batch No.: 204839 Units: ppb v/v

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CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.087
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.14
75-09-2	Methylene Chloride	ND		0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	ND		0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethan e	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.067

FORM I TO-15

 Lab Name: TestAmerica Sacramento
 Job No.: 320-34970-1

 SDG No.:
 Lab Sample ID: 320-34970-1

 Matrix: Air
 Lab File ID: 18012131.D

 Analysis Method: TO-15
 Date Collected: 01/10/2018 00:00

 Sample wt/vol: 500(mL)
 Date Analyzed: 01/22/2018 10:16

 Soil Aliquot Vol:
 Dilution Factor: 1

 Soil Extract Vol.:
 GC Column: RTX-Volatiles ID: 0.32 (mm)

 % Moisture:
 Level: (low/med) Low

 Analysis Batch No.: 204839
 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054
1330-20-7	Xylenes, Total	ND		1.2	0.074

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	103		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	99		70-130
2037-26-5	Toluene-d8 (Surr)	104		70-130

Chrom Revision: 2.2 08-Dec-2017 11:41:26 Report Date: 22-Jan-2018 11:23:40

> TestAmerica Sacramento **Target Compound Quantitation Report**

Data File:

Lims ID: 320-34970-A-1 Client ID: 34000934 Sample Type: Client

Inject. Date: 22-Jan-2018 10:16:30 ALS Bottle#: Worklist Smp#: 27 7

Purge Vol: 250.000 mL Dil. Factor: 1.0000

320-34970-A-1 Sample Info:

500 mL CAN CERT Misc. Info.:

Operator ID: RG Instrument ID: ATMS2

Method: 

Limit Group: MSA - TO15 - ICAL

22-Jan-2018 11:23:39 Calib Date: Last Update: 20-Jan-2018 11:26:30 Integrator: RTE ID Type: **Deconvolution ID** Quant Method: Internal Standard Quant By: **Initial Calibration** Last ICal File:

Column 1: RTX Volatiles (0.32 mm) Det: MS SCAN

XAWRK014 Process Host:

First Level Reviewer: vanommens Date: 22-Jan-2018 11:23:39

					1			
		RT	Adj RT	DIt RT			OnCol Amt	
Compound	Sig	(min.)	(min.)	(min.)	Q	Response	ppb v/v	Flags
<ul><li>* 1 Chlorobromomethane (IS)</li></ul>	130	11.386	11.386	0.000	94	74029	4.00	
* 21,4-Difluorobenzene	114	13.472	13.479	-0.007	95	307580	4.00	
* 3 Chlorobenzene-d5 (IS)	117	19.532	19.532	0.000	86	282466	4.00	
\$ 41,2-Dichloroethane-d4 (Sur	65	12.536	12.530	0.000	0	102650	3.96	
\$ 5 Toluene-d8 (Surr)	100	16.703	16.695	0.000	99	196061	4.17	
\$ 6 4-Bromofluorobenzene (Surr	95	21.551	21.558	-0.007	91	207892	4.14	
10 Propene	41	3.939	3.931	0.006	91	752	0.0460	
18 Butane	43	4.566	4.564	0.000	97	2543	0.0810	
32 Acetone	43	6.963	6.899	0.061	95	5395	0.3048	
39 Methylene Chloride	49	8.101	8.090	0.006	68	742	0.0329	
73 n-Octane		16.697	16.793	-0.103	42	1296	0.0234	
123 1,2,4-Trichlorobenzene		25.986	25.980	0.006	69	775	0.0149	
Reagents:	180							

VAMSIS20\_00101 Amount Added: 50.00 Units: mL Run Reagent

Page 22 of 24

Report Date: 22-Jan-2018 11:23:40 Chrom Revision: 2.2 08-Dec-2017 11:41:26

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS2\20180121-53148.b\18012131.D

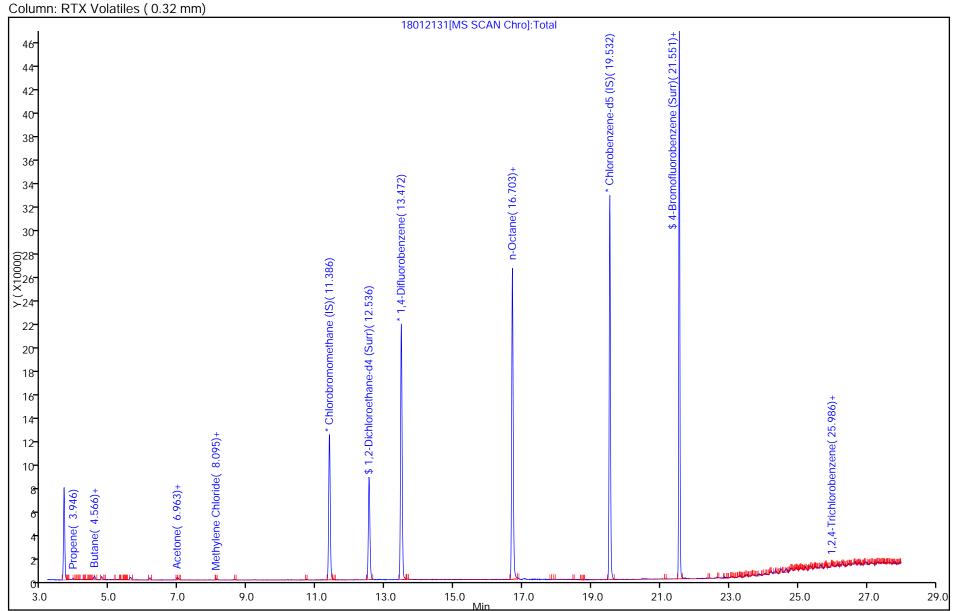
 Injection Date:
 22-Jan-2018 10:16:30
 Instrument ID:
 ATMS2
 Operator ID:
 RG

 Lims ID:
 320-34970-A-1
 Lab Sample ID:
 320-34970-1
 Worklist Smp#:
 27

Client ID: 34000934

Purge Vol: 250.000 mL Dil. Factor: 1.0000 ALS Bottle#: 7

Method: TO15\_ATMS2N Limit Group: MSA - TO15 - ICAL



Page 23 of 24 3/2/2018

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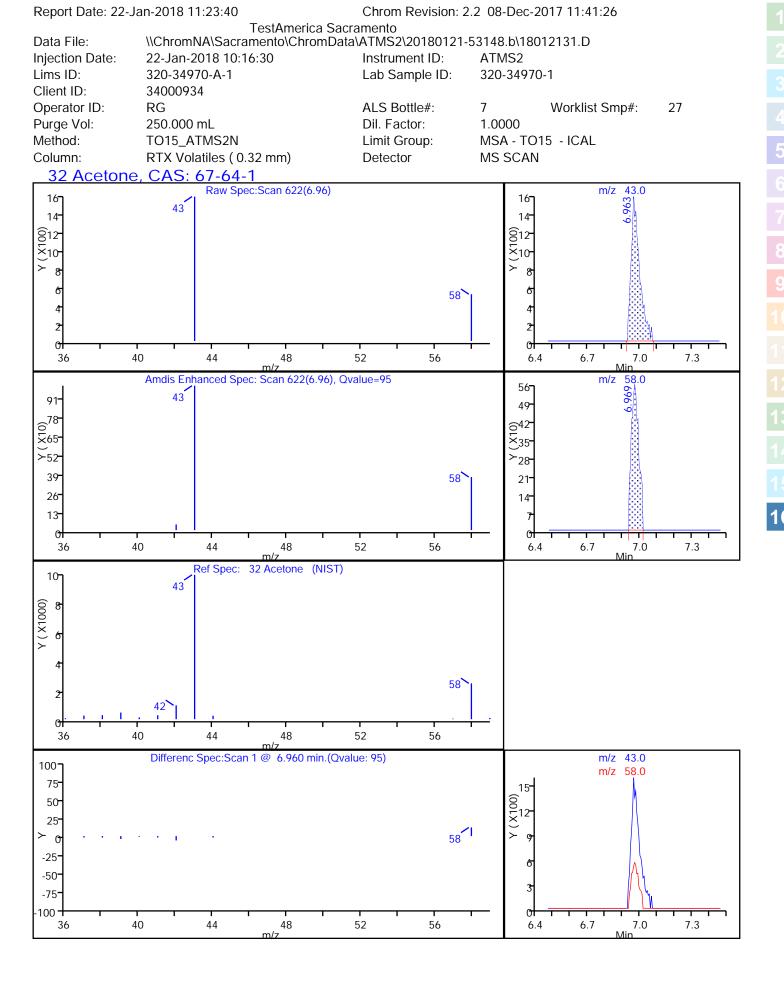
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THE LEADER IN ENVIRONMENTAL TESTING

### ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento 880 Riverside Parkway West Sacramento, CA 95605 Tel: (916)373-5600

TestAmerica Job ID: 320-37147-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elaine Walker

Authorized for release by: 4/3/2018 12:09:34 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

.....LINKS .....

Review your project results through
Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

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#### **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Toxicity Equivalent Factor (Dioxin)
Toxicity Equivalent Quotient (Dioxin)

TestAmerica Job ID: 320-37147-1

#### **Qualifiers**

#### Air - GC/MS VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

#### Glossary

TEF

TEQ

<del>Olocoul y</del>	
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

TestAmerica Sacramento

4/3/2018

#### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

.S. Inc TestAmerica Job ID: 320-37147-1

Job ID: 320-37147-1

**Laboratory: TestAmerica Sacramento** 

Narrative

Job Narrative 320-37147-1

#### Receipt

Two samples were received on 3/16/2018 9:05 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

#### Air - GC VOA

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

#### Air - GC/MS VOA

Method(s) TO-15: 1,2-Dichloroethane-d4 (Surrogate) recovery for the following sample was outside control limits: VSP-801 (320-37147-1). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

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

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#### **Detection Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Client Sample ID: VSP-801

TestAmerica Job ID: 320-37147-1

Lab Sample ID: 320-37147-1

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D Method	Prep Type
Benzene	170	2.0	0.39	ppb v/v	4.93	TO-15	Total/NA
Ethylbenzene	260	2.0	0.31	ppb v/v	4.93	TO-15	Total/NA
Toluene	17	2.0	0.25	ppb v/v	4.93	TO-15	Total/NA
m,p-Xylene	440	3.9	0.49	ppb v/v	4.93	TO-15	Total/NA
o-Xylene	60	2.0	0.27	ppb v/v	4.93	TO-15	Total/NA
TPH (as Gasoline)	20000	490	200	ppb v/v	4.93	TO-15	Total/NA
Methane (FID)	0.0044	0.00064	0.00013	% v/v	6.38	D1946	Total/NA
Oxygen	17	1.3	0.047	% v/v	6.38	D1946	Total/NA

Client Sample ID: VSP-802 Lab Sample ID: 320-37147-2

Analyte	Result Qualifi	ier RL	MDL	Unit	Dil Fac	D Method	Prep Type
Benzene	0.11 J	0.40	0.079	ppb v/v		TO-15	Total/NA
Ethylbenzene	0.47	0.40	0.063	ppb v/v	1	TO-15	Total/NA
Toluene	0.99	0.40	0.051	ppb v/v	1	TO-15	Total/NA
m,p-Xylene	1.8	0.80	0.10	ppb v/v	1	TO-15	Total/NA
o-Xylene	0.60	0.40	0.054	ppb v/v	1	TO-15	Total/NA
TPH (as Gasoline)	220	100	40	ppb v/v	1	TO-15	Total/NA
Methane (FID)	0.0041	0.0014	0.00029	% v/v	14.33	D1946	Total/NA
Oxygen	20	2.9	0.11	% v/v	14.33	D1946	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

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#### **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-37147-1

Client Sample ID: VSP-801

Date Collected: 03/14/18 10:10 Date Received: 03/16/18 09:05

Sample Container: Summa Canister 1L

Lab Sample ID: 320-37147-1

Matrix: Air

Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	170	2.0	0.39	ppb v/v			03/27/18 23:26	4.93
Ethylbenzene	260	2.0	0.31	ppb v/v			03/27/18 23:26	4.93
Toluene	17	2.0	0.25	ppb v/v			03/27/18 23:26	4.93
m,p-Xylene	440	3.9	0.49	ppb v/v			03/27/18 23:26	4.93
o-Xylene	60	2.0	0.27	ppb v/v			03/27/18 23:26	4.93
TPH (as Gasoline)	20000	490	200	ppb v/v			03/27/18 23:26	4.93
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac

Surrogate	%Recovery Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	110	70 - 130		03/27/18 23:26	4.93
1,2-Dichloroethane-d4 (Surr)	135 X	70 - 130		03/27/18 23:26	4.93
Toluene-d8 (Surr)	108	70 - 130		03/27/18 23:26	4.93

Method: D1946 - Fixed Gases in Air (GC)								
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	ND —	3.2	0.068	% v/v			03/28/18 16:11	6.38
Methane (FID)	0.0044	0.00064	0.00013	% v/v			03/29/18 11:21	6.38
Oxygen	17	1.3	0.047	% v/v			03/28/18 16:11	6.38

**Client Sample ID: VSP-802** Lab Sample ID: 320-37147-2 Matrix: Air

Date Collected: 03/14/18 10:20 Date Received: 03/16/18 09:05

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.11	J	0.40	0.079	ppb v/v			03/28/18 00:29	1
Ethylbenzene	0.47		0.40	0.063	ppb v/v			03/28/18 00:29	1
Toluene	0.99		0.40	0.051	ppb v/v			03/28/18 00:29	1
m,p-Xylene	1.8		0.80	0.10	ppb v/v			03/28/18 00:29	1
o-Xylene	0.60		0.40	0.054	ppb v/v			03/28/18 00:29	1
TPH (as Gasoline)	220		100	40	ppb v/v			03/28/18 00:29	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130					03/28/18 00:29	1
1,2-Dichloroethane-d4 (Surr)	95		70 - 130					03/28/18 00:29	1
Toluene-d8 (Surr)	102		70 - 130					03/28/18 00:29	1

Method: D1946 - Fixed Gases in Air (GC)									
	Analyte	Result Quali	lifier RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Carbon Dioxide (TCD)	ND ND	7.2	0.15	% v/v			03/28/18 16:21	14.33
	Methane (FID)	0.0041	0.0014	0.00029	% v/v			03/29/18 11:36	14.33
	Oxygen	20	2.9	0.11	% v/v			03/28/18 16:21	14.33

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#### **Surrogate Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-37147-1

#### Method: TO-15 - Volatile Organic Compounds in Ambient Air

Matrix: Air Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)				
		BFB	DCA	TOL		
Lab Sample ID	Client Sample ID	(70-130)	(70-130)	(70-130)		
320-37147-1	VSP-801	110	135 X	108		
320-37147-2	VSP-802	96	95	102		
LCS 320-215022/3	Lab Control Sample	108	100	106		
LCS 320-215022/6	Lab Control Sample	104	124	102		
LCSD 320-215022/4	Lab Control Sample Dup	101	99	102		
LCSD 320-215022/7	Lab Control Sample Dup	109	126	103		
MB 320-215022/10	Method Blank	98	94	101		

BFB = 4-Bromofluorobenzene (Surr)

DCA = 1,2-Dichloroethane-d4 (Surr)

TOL = Toluene-d8 (Surr)

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TestAmerica Job ID: 320-37147-1

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

#### Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-215022/10

**Matrix: Air** 

Analysis Batch: 215022

**Client Sample ID: Method Blank** 

Prep Type: Total/NA

	MR MR							
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND	0.40	0.079	ppb v/v			03/27/18 19:36	1
Ethylbenzene	ND	0.40	0.063	ppb v/v			03/27/18 19:36	1
Toluene	ND	0.40	0.051	ppb v/v			03/27/18 19:36	1
m,p-Xylene	ND	0.80	0.10	ppb v/v			03/27/18 19:36	1
o-Xylene	ND	0.40	0.054	ppb v/v			03/27/18 19:36	1
TPH (as Gasoline)	ND	100	40	ppb v/v			03/27/18 19:36	1

MB MB

Surrogate	%Recovery	Qualifier	Limits	Prepared Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130	03/27/18 19:36	1
1,2-Dichloroethane-d4 (Surr)	94		70 - 130	03/27/18 19:36	1
Toluene-d8 (Surr)	101		70 - 130	03/27/18 19:36	1

Lab Sample ID: LCS 320-215022/3

**Matrix: Air** 

Analysis Batch: 215022

		Client Sample ID: Lab Control Sample	
		Prep Type: Total/NA	4
Owiles	100 100	0/ 0	

Spike LCS LCS %Rec. Added Analyte Result Qualifier Unit D %Rec Limits Benzene 20.0 18.6 ppb v/v 93 68 - 128 Ethylbenzene 20.0 17.2 ppb v/v 86 64 - 124 20.0 Toluene 23.5 68 - 128 ppb v/v 117 m,p-Xylene 40.0 34.6 ppb v/v 86 65 - 125 o-Xylene 20.0 15.8 ppb v/v 79 65 - 125

LCS LCS

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	108		70 - 130
1,2-Dichloroethane-d4 (Surr)	100		70 - 130
Toluene-d8 (Surr)	106		70 - 130

Lab Sample ID: LCS 320-215022/6

**Matrix: Air** 

**Analysis Batch: 215022** 

Client Sample ID	: Lab Control Sample
	Prep Type: Total/NA

Spike LCS LCS %Rec. Analyte Added Result Qualifier Unit %Rec Limits TPH (as Gasoline) 5000 4110 82 70 - 130 ppb v/v

LCS LCS

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	104		70 - 130
1,2-Dichloroethane-d4 (Surr)	124		70 - 130
Toluene-d8 (Surr)	102		70 - 130

Lab Sample ID: LCSD 320-215022/4

**Matrix: Air** 

**Analysis Batch: 215022** 

<b>Client Sample I</b>	D: Lab	Contro	Sam	ole Dup
		<b>Prep Ty</b>	/pe: T	otal/NA

-	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	 20.0	20.1		ppb v/v		100	68 - 128	8	25
Ethylbenzene	20.0	19.8		ppb v/v		99	64 - 124	14	25

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Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-37147-1

#### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-215022/4

**Matrix: Air** 

**Analysis Batch: 215022** 

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Toluene	20.0	23.1		ppb v/v		116	68 - 128	2	25
m,p-Xylene	40.0	40.2		ppb v/v		100	65 - 125	15	25
o-Xylene	20.0	18.3		ppb v/v		92	65 - 125	15	25

LCSD LCSD

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	101		70 - 130
1,2-Dichloroethane-d4 (Surr)	99		70 - 130
Toluene-d8 (Surr)	102		70 - 130

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

Lab Sample ID: LCSD 320-215022/7 **Matrix: Air** Prep Type: Total/NA

**Analysis Batch: 215022** 

Spike LCSD LCSD %Rec. **RPD** Result Qualifier Limits Analyte Added Unit D %Rec **RPD** Limit TPH (as Gasoline) 5000 4260 ppb v/v 85 70 - 130

LCSD LCSD %Recovery Qualifier Limits Surrogate 4-Bromofluorobenzene (Surr) 70 - 130 109 1,2-Dichloroethane-d4 (Surr) 126 70 - 130 Toluene-d8 (Surr) 103 70 - 130

#### Method: D1946 - Fixed Gases in Air (GC)

Lab Sample ID: MB 320-215262/7

**Matrix: Air** 

**Analysis Batch: 215262** 

Client Sample ID: Method Blank

Prep Type: Total/NA

•	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	ND		0.50	0.011	% v/v			03/28/18 15:57	1
Methane (TCD)	ND		0.50	0.14	% v/v			03/28/18 15:57	1
Oxygen	ND		0.20	0.0074	% v/v			03/28/18 15:57	1

**Matrix: Air** 

**Analysis Batch: 215262** 

Lab Sample ID: LCS 320-215262/2 **Client Sample ID: Lab Control Sample** Prep Type: Total/NA

LCS LCS Spike %Rec. Analyte Added Result Qualifier Limits Unit D %Rec Carbon Dioxide (TCD) 24.4 24.8 % v/v 101 80 - 120 Methane (TCD) 26.1 26.3 % v/v 101 80 - 120

Lab Sample ID: LCS 320-215262/5

**Matrix: Air** 

Analysis Batch: 215262								
	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Oxygen	15.7	13.5		% v/v		86	80 - 120	

TestAmerica Sacramento

Prep Type: Total/NA

**Client Sample ID: Lab Control Sample** 

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#### QC Sample Results

Client: ARCADIS U.S. Inc

**Matrix: Air** 

Methane (FID)

Project/Site: Chevron Edmonds Terminal

Lab Sample ID: LCSD 320-215262/3

Method: D1946 - Fixed Gases in Air (GC) (Continued)

TestAmerica Job ID: 320-37147-1

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

**Analysis Batch: 215262** Spike LCSD LCSD %Rec. RPD Analyte Added Result Qualifier Unit D %Rec Limits RPD Limit % v/v Carbon Dioxide (TCD) 24.4 24.9 80 - 120 20 102 0

Methane (TCD) 26.1 26.4 % v/v 101 80 - 120 20 Lab Sample ID: LCSD 320-215262/6 Client Sample ID: Lab Control Sample Dup

Matrix: Air Prep Type: Total/NA **Analysis Batch: 215262** 

LCSD LCSD **RPD** Spike %Rec. Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Oxygen 15.7 13.5 % v/v 86 80 - 120

Lab Sample ID: MB 320-215408/6 **Client Sample ID: Method Blank Matrix: Air** Prep Type: Total/NA

**Analysis Batch: 215408** 

MB MB Analyte Result Qualifier RL **MDL** Unit Prepared Analyzed Dil Fac Methane (FID) ND 0.00010 0.000020 % v/v 03/29/18 11:06 Oxygen ND 0.20 0.0074 % v/v 03/29/18 11:06

**Client Sample ID: Lab Control Sample** Lab Sample ID: LCS 320-215408/2 Matrix: Air Prep Type: Total/NA

**Analysis Batch: 215408** 

Spike LCS LCS %Rec. Added Result Qualifier Unit %Rec Limits 0.0250 Methane (FID) 0.0246 % v/v 80 - 120

0.0250

Lab Sample ID: LCSD 320-215408/3 Client Sample ID: Lab Control Sample Dup **Matrix: Air** Prep Type: Total/NA

**Analysis Batch: 215408** LCSD LCSD **RPD** Spike %Rec. Analyte Added Result Qualifier Unit %Rec Limits RPD Limit

0.0248

% v/v

99

80 - 120

20

4/3/2018

#### **QC Association Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-37147-1

#### Air - GC/MS VOA

#### **Analysis Batch: 215022**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-37147-1	VSP-801	Total/NA	Air	TO-15	
320-37147-2	VSP-802	Total/NA	Air	TO-15	
MB 320-215022/10	Method Blank	Total/NA	Air	TO-15	
LCS 320-215022/3	Lab Control Sample	Total/NA	Air	TO-15	
LCS 320-215022/6	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-215022/4	Lab Control Sample Dup	Total/NA	Air	TO-15	
LCSD 320-215022/7	Lab Control Sample Dup	Total/NA	Air	TO-15	

#### Air - GC VOA

#### **Analysis Batch: 215262**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-37147-1	VSP-801	Total/NA	Air	D1946	_
320-37147-2	VSP-802	Total/NA	Air	D1946	
MB 320-215262/7	Method Blank	Total/NA	Air	D1946	
LCS 320-215262/2	Lab Control Sample	Total/NA	Air	D1946	
LCS 320-215262/5	Lab Control Sample	Total/NA	Air	D1946	
LCSD 320-215262/3	Lab Control Sample Dup	Total/NA	Air	D1946	
LCSD 320-215262/6	Lab Control Sample Dup	Total/NA	Air	D1946	

#### **Analysis Batch: 215408**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-37147-1	VSP-801	Total/NA	Air	D1946	
320-37147-2	VSP-802	Total/NA	Air	D1946	
MB 320-215408/6	Method Blank	Total/NA	Air	D1946	
LCS 320-215408/2	Lab Control Sample	Total/NA	Air	D1946	
LCSD 320-215408/3	Lab Control Sample Dup	Total/NA	Air	D1946	

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#### **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Analysis

D1946

TestAmerica Job ID: 320-37147-1

03/28/18 16:11 EMJ

Client Sample ID: VSP-801 Lab Sample ID: 320-37147-1

Date Collected: 03/14/18 10:10 Matrix: Air Date Received: 03/16/18 09:05

Batch Batch Dil Initial Batch Final Prepared **Prep Type** Method Factor Number Type Run **Amount Amount** or Analyzed Analyst Lab Total/NA Analysis TO-15 4.93 100 mL 250 mL 215022 03/27/18 23:26 AP1 TAL SAC D1946 Total/NA Analysis 6.38 50 mL 50 mL 215408 03/29/18 11:21 EMJ TAL SAC

6.38

Client Sample ID: VSP-802

Date Collected: 03/14/18 10:20

Lab Sample ID: 320-37147-2

Matrix: Air

50 mL

50 mL

215262

Date Received: 03/16/18 09:05

<del>_</del>	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	515 mL	250 mL	215022	03/28/18 00:29	AP1	TAL SAC
Total/NA	Analysis	D1946		14.33	50 mL	50 mL	215408	03/29/18 11:36	EMJ	TAL SAC
Total/NA	Analysis	D1946		14.33	50 mL	50 mL	215262	03/28/18 16:21	EMJ	TAL SAC

**Laboratory References:** 

Total/NA

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

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TAL SAC

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#### **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 320-37147-1

Project/Site: Chevron Edmonds Terminal

#### **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
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-18
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-19
Illinois	NELAP	5	200060	03-17-18 *
Kansas	NELAP	7	E-10375	10-31-18
L-A-B	DoD ELAP		L2468	01-20-21
ouisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	CA0004	04-14-18 *
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-18
lew Jersey	NELAP	2	CA005	06-30-18
lew York	NELAP	2	11666	03-31-19
Dregon	NELAP	10	4040	01-29-19
Pennsylvania	NELAP	3	68-01272	03-31-18 *
Texas	NELAP	6	T104704399	05-31-18
US Fish & Wildlife	Federal		LE148388-0	07-31-18
JSDA	Federal		P330-11-00436	01-17-21
JSEPA UCMR	Federal	1	CA00044	11-06-18
Jtah	NELAP	8	CA00044	02-28-19
/irginia	NELAP	3	460278	03-14-19
Washington	State Program	10	C581	05-05-18
West Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	8	8TMS-L	01-28-19

#### **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>	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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

4/3/2018

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

#### **Method Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-37147-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL SAC
D1946	Fixed Gases in Air (GC)	ASTM	TAL SAC

#### **Protocol References:**

ASTM = ASTM International

EPA = US Environmental Protection Agency

#### Laboratory References:

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

#### **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-37147-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-37147-1	VSP-801	Air	03/14/18 10:10	03/16/18 09:05
320-37147-2	VSP-802	Air	03/14/18 10:20	03/16/18 09:05

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Sypophs at

# **TestAmerica Sacramento**

880 Riverside Parkway

Company Name:

# O d

Canister Samples Chain of Custody Record

restAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples

**TestAmerica** 

Fixed Gas! Methane TestAmerica Laboratories, Inc. (See below for Add'l Items) Sample Specific Notes: cocs or Lab Use Only: 0, \$ (0, Job / SDG No .: Valk-in Client: .ab Sampling: Other (Please specify in notes section) Landfill Gas 11A InsidmA 1A 100bn edyT elqme2 Ofher (Please specify in notes section) Jason Little 81/81 A93 888E / Spet / 94et-d MTSA EPA 25C / 25.3 EPA 3C HAA-AM A-HYT H9A-AM Samples Collected By: 320-32458 328-35825 Canister ₽ Controller 0 Vacuum in Vacuum in Field, 'Hg (Start)' (Stop)' Email: SCORT. 20rn @ orcodis. COM Canister Project Manager: 5c0tt 2000 Anaylsis Turnaround Time Site Contact: Peter Coumpipell TA Contact: Plainne Wolfker STAT Time Standard (Specific): Rush (Specifiy) 1020 Time Start 1010 3/14/18 3/4/8 Sample Date(s) 500.48800 1 98101 Project Name: Edundands Termina West Sacramento, CA 95605 phone 916.374.4378 fax 916.372.1059 Sample Identification Site/Location: 11720 WMOLD PLA Address: [100 Oll of work of City/State/Zip Scoutte | W.A. Arcodis VSP-802 Client Contact Information 158-301

Form No. CA-C-WI-003, Rev. 1, dated 05/10/2013 として 3060 romer Samples Received by: Received by: Received by: Condition: 430 37000684 Date / Time: 3/14/ 3 Date / Time: Date / Time: Opened by: I no on times Shipper Name Samples Relinquished by: Relinguished by: Samples Shipped by: ab Use Only:

Any questions call 303-519-7192

Temperature (Fahrenheit)

Ambient

Interior

Start

Stop

Special Instructions/QC Requirements & Comments:

Temperature (Fahrenheit)

Ambient

Interior

Start

Stop

2

320-37147 Chain of Custody

#### **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 320-37147-1

Login Number: 37147 List Source: TestAmerica Sacramento

List Number: 1

Creator: Branscum, Cassie

Creator. Dranscum, Cassie		
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	SIGN
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
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.	False	tag ID's don't match
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.	N/A	
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	

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# Sacramento 1 Liter Canister QC Certification Batch Certification

Date Cleaned/Batch ID	1-25-18 320-35438	
Date of QC	2/8/18	
Data File Number	18020820	320-35438 Chain of Custody

(File ID for certification analysis of canister designated below)

#### **CANISTER ID NUMBERS**

24000999	8782
34000684	34002001
34000670	34000806
34001100	34000982
34001632	31002005
34001642	34001245
34000662	34000633
34000620	34001120

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"\*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

2/9/18

1st level Reviewed By:

2/9/18

Date:

ZRK8

2nd level Reviewed By:

Date:

Q:\DOCUMENT-MANAGEMENT\FORMS\QA-814A 1-LITER BATCH CAN QC 20171023.DOC QA-814 A

RE 10232017



# Sacramento 1 Liter Canister QC Certification Batch Certification

Date Cleaned/Batch ID	2-6-18 320-35825	
Date of QC	2/4/18	
Data File Number	MS9020920	320-35825 Chain of Custody

(File ID for certification analysis of canister designated below)

#### CANISTER ID NUMBERS

+34000932	34000628
34000908	34001947
7706	34000994
8962	34001105
34000968	34000977
34001106	34000771
34001058	34001110
34000658	34001649

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"*" INDICATES THE CAN OR CANS WHICH WERE SCREENED				
farm for	2/12/18			
1 <sup>st</sup> level Reviewed By:	Date:			
mind	2/12/18			
2nd level Reviewed By:	Date:			

Q:\DOCUMENT-MANAGEMENT\FORMS\QA-814A 1-LITER BATCH CAN QC 20171023.DOC QA-814 A

RE 10232017

Lab Name: TestAmerica Sacramento Job No.: 320-35438-1 SDG No.: Client Sample ID: 34000999 Lab Sample ID: 320-35438-1 Matrix: Air Lab File ID: 18020820.D Analysis Method: TO-15 Date Collected: 01/25/2018 00:00 Sample wt/vol: 250(mL) Date Analyzed: 02/09/2018 02:44 Soil Aliquot Vol: Dilution Factor: 1 GC Column: RTX-Volatiles ID: 0.32(mm) Soil Extract Vol.: % Moisture: Level: (low/med) Low Analysis Batch No.: 207546 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	ND		5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.1
107-05-1	Allyl chloride	ND		0.80	0.1
71-43-2	Benzene	ND		0.40	0.07
100-44-7	Benzyl chloride	ND		0.80	0.1
75-27-4	Bromodichloromethane	ND		0.30	0.06
75-25-2	Bromoform	ND		0.40	0.07
74-83-9	Bromomethane	ND		0.80	0.3
106-99-0	1,3-Butadiene	ND		0.80	0.1
106-97-8	n-Butane	ND		0.40	0.1
78-93-3	2-Butanone (MEK)	ND		0.80	0.2
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.1
104-51-8	n-Butylbenzene	ND		0.40	0.1
135-98-8	sec-Butylbenzene	ND		0.40	0.07
98-06-6	tert-Butylbenzene	ND		0.80	0.06
75-15-0	Carbon disulfide	0.19	J	0.80	0.07
56-23-5	Carbon tetrachloride	ND		0.80	0.06
108-90-7	Chlorobenzene	ND		0.30	0.06
75-45-6	Chlorodifluoromethane	ND		0.80	0.2
75-00-3	Chloroethane	ND		0.80	0.3
67-66-3	Chloroform	ND		0.30	0.09
74-87-3	Chloromethane	ND		0.80	0.2
95-49-8	2-Chlorotoluene	ND		0.40	0.08
110-82-7	Cyclohexane	ND		0.40	0.08
124-48-1	Dibromochloromethane	ND		0.40	0.07
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.07
74-95-3	Dibromomethane	ND		0.40	0.05
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroetha ne	ND		0.40	0.1
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.1
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.1
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.1
75-71-8	Dichlorodifluoromethane	ND		0.40	0.1
75-34-3	1,1-Dichloroethane	ND		0.30	0.07
107-06-2	1,2-Dichloroethane	ND		0.80	0.08

Lab Name: TestAmerica Sacramento Job No.: 320-35438-1 SDG No.: Client Sample ID: 34000999 Lab Sample ID: 320-35438-1 Matrix: Air Lab File ID: 18020820.D Analysis Method: TO-15 Date Collected: 01/25/2018 00:00 Sample wt/vol: 250(mL) Date Analyzed: 02/09/2018 02:44 Soil Aliquot Vol: Dilution Factor: 1 Soil Extract Vol.: GC Column: RTX-Volatiles ID: 0.32(mm) Level: (low/med) Low % Moisture: Analysis Batch No.: 207546 Units: ppb v/v

156-59-2         cis-1,2-Dichloroethene         ND         0.40         0.08           156-60-5         trans-1,2-Dichloroethene         ND         0.40         0.1           78-87-5         1,2-Dichloropropane         ND         0.40         0.2           10061-01-5         cis-1,3-Dichloropropene         ND         0.40         0.1           10061-02-6         trans-1,3-Dichloropropene         ND         0.40         0.08           123-91-1         1,4-Dioxane         ND         0.30         0.1           141-78-6         Ethyl acetate         ND         0.30         0.1           100-41-4         Ethylbenzene         ND         0.40         0.06           622-96-8         4-Ethyltoluene         ND         0.40         0.1           142-82-5         n-Heptane         ND         0.40         0.1           87-68-3         Hexachlorobutadiene         ND         0.80         0.06           87-78-6         2-Hexanone         ND         0.80         0.07           99-87-6         4-Isopropylbenzene         ND         0.80         0.1           1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.1           108-62-			<del></del>			
156-59-2         cis-1,2-Dichloroethene         ND         0.40         0.08           156-60-5         trans-1,2-Dichloroethene         ND         0.40         0.1           78-87-5         1,2-Dichloropropane         ND         0.40         0.2           10061-01-5         cis-1,3-Dichloropropene         ND         0.40         0.1           10061-02-6         trans-1,3-Dichloropropene         ND         0.40         0.08           123-91-1         1,4-Dioxane         ND         0.30         0.1           141-78-6         Ethyl acetate         ND         0.30         0.1           100-41-4         Ethylbenzene         ND         0.40         0.06           622-96-8         4-Ethyltoluene         ND         0.40         0.1           142-82-5         n-Heptane         ND         0.40         0.1           87-68-3         Hexachlorobutadiene         ND         0.80         0.06           87-78-6         2-Hexanone         ND         0.80         0.07           99-87-6         4-Isopropylbenzene         ND         0.80         0.1           1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.1           108-62-	CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
156-60-5	75-35-4	1,1-Dichloroethene	ND		0.80	0.1
1,2-Dichloropropane	156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.08
10061-01-5	156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.1
10061-02-6	78-87-5	1,2-Dichloropropane	ND		0.40	0.2
123-91-1	10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.1
141-78-6	10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.08
100-41-4	123-91-1	1,4-Dioxane	ND		0.80	0.1
622-96-8         4-Ethyltoluene         ND         0.40         0.1           142-82-5         n-Heptane         ND         0.80         0.06           87-68-3         Hexachlorobutadiene         ND         0.80         0.07           110-54-3         n-Hexane         ND         0.80         0.07           591-78-6         2-Hexanone         ND         0.40         0.08           98-82-8         Isopropylbenzene         ND         0.80         0.1           1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.1           108-10-1         4-Methyl-z-pentanone (MIBK)         ND         0.80         0.1           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.0           98-83-9         alpha-Methylstyrene         ND         0.40         0.0           98-83-9         alpha-Methylstyrene         ND         0.40         0.0           91-20-3         Naphthalene         ND         0.40         0.0           111-65-9         n-Octane         ND         0.40         0.0           115-07-1         Propylene         ND         0.40         0.0           109-66-0         n-Pentane<	141-78-6	Ethyl acetate	ND		0.30	0.1
142-82-5         n-Heptane         ND         0.80         0.06           87-68-3         Hexachlorobutadiene         ND         2.0         0.4           110-54-3         n-Hexane         ND         0.80         0.07           591-78-6         2-Hexanone         ND         0.40         0.08           98-82-8         Isopropylbenzene         ND         0.80         0.1           99-87-6         4-Isopropyltoluene         ND         0.80         0.1           1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.1           108-10-1         4-Methyl-z-pentanone (MIBK)         ND         0.80         0.1           108-10-1         4-Methylene Chloride         0.076         J         0.40         0.0           98-83-9         alpha-Methylstyrene         ND         0.40         0.0           91-20-3         Naphthalene         ND         0.40         0.0           115-65-9         n-Octane         ND         0.40         0.05           109-66-0         n-Pentane         ND         0.40         0.05           100-42-5         Styrene         ND         0.40         0.05           100-42-5         St	100-41-4	Ethylbenzene	ND		0.40	0.063
87-68-3         Hexachlorobutadiene         ND         2.0         0.4           110-54-3         n-Hexane         ND         0.80         0.07           591-78-6         2-Hexanone         ND         0.40         0.08           98-82-8         Isopropylboluene         ND         0.80         0.1           99-87-6         4-Isopropyltoluene         ND         0.80         0.1           1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.1           80-62-6         Methyl methacrylate         ND         0.80         0.1           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.07           98-83-9         alpha-Methylstyrene         ND         0.40         0.07           98-83-9         alpha-Methylstyrene         ND         0.40         0.06           111-65-9         n-Octane         ND         0.40         0.05           109-66-0         n-Pentane         ND         0.40         0.05           109-66-0         n-Peropylbenzene         ND         0.40         0.05           100-42-5         Styrene         ND         0.40         0.05           107-93-45         1,1,2,2	622-96-8	4-Ethyltoluene	ND		0.40	0.1
110-54-3         n-Hexane         ND         0.80         0.07           591-78-6         2-Hexanone         ND         0.40         0.08           98-82-8         Isopropylbenzene         ND         0.80         0.1           99-87-6         4-Isopropyltoluene         ND         0.80         0.1           1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.1           80-62-6         Methyl methacrylate         ND         0.80         0.1           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.0           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.0           75-09-2         Methylene Chloride         0.076         J         0.40         0.0           98-83-9         alpha-Methylstyrene         ND         0.40         0.06           91-20-3         Naphthalene         ND         0.40         0.06           91-20-3         Naphthalene         ND         0.40         0.05           109-66-0         n-Pentane         ND         0.40         0.05           109-66-0         n-Pentane         ND         0.40         0.05           100-42-	142-82-5	n-Heptane	ND		0.80	0.06
591-78-6         2-Hexanone         ND         0.40         0.08           98-82-8         Isopropylbenzene         ND         0.80         0.1           99-87-6         4-Isopropyltoluene         ND         0.80         0.1           1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.1           80-62-6         Methyl methacrylate         ND         0.80         0.1           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.1           75-09-2         Methylene Chloride         0.076         J         0.40         0.07           98-83-9         alpha-Methylstyrene         ND         0.40         0.06           91-20-3         Naphthalene         ND         0.40         0.05           111-65-9         n-Octane         ND         0.40         0.05           109-66-0         n-Pentane         ND         0.40         0.05           103-65-1         N-Propylbenzene         ND         0.40         0.05           100-42-5         Styrene         ND         0.40         0.05           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.05           109-9	87-68-3	Hexachlorobutadiene	ND		2.0	0.4
98-82-8         Isopropylbenzene         ND         0.80         0.1           99-87-6         4-Isopropyltoluene         ND         0.80         0.1           1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.1           80-62-6         Methyl methacrylate         ND         0.40         0.1           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.07           75-09-2         Methylene Chloride         0.076         J         0.40         0.07           98-83-9         alpha-Methylstyrene         ND         0.40         0.06           91-20-3         Naphthalene         ND         0.80         0.5           111-65-9         n-Octane         ND         0.40         0.05           109-66-0         n-Pentane         ND         0.40         0.05           115-07-1         Propylene         ND         0.40         0.05           100-42-5         Styrene         ND         0.40         0.05           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.06           109-99-9         Tetrahydrofuran         ND         0.40         0.05           108-88	110-54-3	n-Hexane	ND		0.80	0.07
99-87-6 4-Isopropyltoluene ND 0.80 0.1 1634-04-4 Methyl-t-Butyl Ether (MTBE) ND 0.80 0.1 80-62-6 Methyl methacrylate ND 0.80 0.1 108-10-1 4-Methyl-2-pentanone (MIBK) ND 0.40 0.1 75-09-2 Methylene Chloride 0.076 J 0.40 0.07 98-83-9 alpha-Methylstyrene ND 0.40 0.40 0.06 91-20-3 Naphthalene ND 0.80 0.5 111-65-9 n-Octane ND 0.40 0.05 115-07-1 Propylene ND 0.80 0.2 155-07-1 Propylene ND 0.40 0.05 100-42-5 Styrene ND 0.40 0.05 100-42-5 Styrene ND 0.40 0.05 11,2,2-Tetrachloroethane ND 0.40 0.05 107-18-4 Tetrachloroethene ND 0.40 0.05 108-88-3 Toluene ND 0.40 0.05 108-88-3 Toluene ND 0.40 0.05 11,1,2-Trichloro-1,2,2-trifluoroethane ND 0.40 0.05 11,1,2-Trichloroethane ND 0.40 0.05 11,1,1-Trichloroethane ND 0.40 0.05	591-78-6	2-Hexanone	ND		0.40	0.08
1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.1           80-62-6         Methyl methacrylate         ND         0.80         0.1           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.1           75-09-2         Methylene Chloride         0.076         J         0.40         0.07           98-83-9         alpha-Methylstyrene         ND         0.40         0.06           91-20-3         Naphthalene         ND         0.80         0.5           111-65-9         n-Octane         ND         0.40         0.05           109-66-0         n-Pentane         ND         0.80         0.2           115-07-1         Propylene         ND         0.40         0.09           103-65-1         N-Propylbenzene         ND         0.40         0.05           100-42-5         Styrene         ND         0.40         0.05           127-18-4         Tetrachloroethene         ND         0.40         0.05           109-99-9         Tetrahydrofuran         ND         0.40         0.05           108-88-3         Toluene         ND         0.40         0.05           76-13-1 <t< td=""><td>98-82-8</td><td>Isopropylbenzene</td><td>ND</td><td></td><td>0.80</td><td>0.1</td></t<>	98-82-8	Isopropylbenzene	ND		0.80	0.1
80-62-6         Methyl methacrylate         ND         0.80         0.1           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.1           75-09-2         Methylene Chloride         0.076         J         0.40         0.07           98-83-9         alpha-Methylstyrene         ND         0.40         0.06           91-20-3         Naphthalene         ND         0.80         0.5           111-65-9         n-Octane         ND         0.40         0.05           109-66-0         n-Pentane         ND         0.80         0.2           115-07-1         Propylene         ND         0.40         0.09           103-65-1         N-Propylbenzene         ND         0.40         0.05           100-42-5         Styrene         ND         0.40         0.05           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.06           109-99-9         Tetrahydrofuran         ND         0.40         0.05           108-88-3         Toluene         ND         0.40         0.05           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethane         ND         0.40         0.04           120-82-	99-87-6	4-Isopropyltoluene	ND		0.80	0.1
108-10-1       4-Methyl-2-pentanone (MIBK)       ND       0.40       0.1         75-09-2       Methylene Chloride       0.076       J       0.40       0.07         98-83-9       alpha-Methylstyrene       ND       0.40       0.06         91-20-3       Naphthalene       ND       0.80       0.5         111-65-9       n-Octane       ND       0.40       0.05         109-66-0       n-Pentane       ND       0.40       0.05         105-07-1       Propylene       ND       0.40       0.09         103-65-1       N-Propylbenzene       ND       0.40       0.05         100-42-5       Styrene       ND       0.40       0.05         79-34-5       1,1,2,2-Tetrachloroethane       ND       0.40       0.05         109-99-9       Tetrachloroethene       ND       0.40       0.05         108-88-3       Toluene       ND       0.40       0.05         76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan       ND       0.40       0.1         120-82-1       1,2,4-Trichlorobenzene       ND       0.30       0.06         17-55-6       1,1,1-Trichloroethane       ND       0.30       0.06 <td>1634-04-4</td> <td>Methyl-t-Butyl Ether (MTBE)</td> <td>ND</td> <td></td> <td>0.80</td> <td>0.1</td>	1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.1
75-09-2         Methylene Chloride         0.076         J         0.40         0.07           98-83-9         alpha-Methylstyrene         ND         0.40         0.06           91-20-3         Naphthalene         ND         0.80         0.5           111-65-9         n-Octane         ND         0.40         0.05           109-66-0         n-Pentane         ND         0.40         0.09           103-65-1         Propylene         ND         0.40         0.09           100-42-5         Styrene         ND         0.40         0.05           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.06           109-99-9         Tetrachloroethene         ND         0.40         0.05           108-88-3         Toluene         ND         0.40         0.05           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.1           120-82-1         1,2,4-Trichlorobenzene         ND         0.30         0.06           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.06	80-62-6	Methyl methacrylate	ND		0.80	0.1
98-83-9         alpha-Methylstyrene         ND         0.40         0.06           91-20-3         Naphthalene         ND         0.80         0.5           111-65-9         n-Octane         ND         0.40         0.05           109-66-0         n-Pentane         ND         0.80         0.2           115-07-1         Propylene         ND         0.40         0.09           103-65-1         N-Propylbenzene         ND         0.40         0.05           100-42-5         Styrene         ND         0.40         0.05           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.05           109-99-9         Tetrachloroethene         ND         0.40         0.05           108-88-3         Toluene         ND         0.40         0.05           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.1           120-82-1         1,2,4-Trichlorobenzene         ND         0.30         0.06           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.06	108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.1
91-20-3         Naphthalene         ND         0.80         0.5           111-65-9         n-Octane         ND         0.40         0.05           109-66-0         n-Pentane         ND         0.80         0.2           115-07-1         Propylene         ND         0.40         0.09           103-65-1         N-Propylbenzene         ND         0.40         0.05           100-42-5         Styrene         ND         0.40         0.05           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.05           109-99-9         Tetrachloroethene         ND         0.40         0.05           108-88-3         Toluene         ND         0.40         0.05           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.1           120-82-1         1,2,4-Trichlorobenzene         ND         0.30         0.06           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.06	75-09-2	Methylene Chloride	0.076	J	0.40	0.07
111-65-9         n-Octane         ND         0.40         0.05           109-66-0         n-Pentane         ND         0.80         0.2           115-07-1         Propylene         ND         0.40         0.09           103-65-1         N-Propylbenzene         ND         0.40         0.05           100-42-5         Styrene         ND         0.40         0.05           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.05           109-99-9         Tetrachloroethene         ND         0.80         0.2           108-88-3         Toluene         ND         0.40         0.05           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethane         ND         0.40         0.1           120-82-1         1,2,4-Trichlorobenzene         ND         0.30         0.06           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.06	98-83-9	alpha-Methylstyrene	ND		0.40	0.06
109-66-0         n-Pentane         ND         0.80         0.2           115-07-1         Propylene         ND         0.40         0.09           103-65-1         N-Propylbenzene         ND         0.40         0.05           100-42-5         Styrene         ND         0.40         0.05           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.06           127-18-4         Tetrachloroethene         ND         0.40         0.05           109-99-9         Tetrahydrofuran         ND         0.40         0.05           108-88-3         Toluene         ND         0.40         0.05           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.1           120-82-1         1,2,4-Trichlorobenzene         ND         0.30         0.06           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.06	91-20-3	Naphthalene	ND		0.80	0.5
115-07-1         Propylene         ND         0.40         0.09           103-65-1         N-Propylbenzene         ND         0.40         0.05           100-42-5         Styrene         ND         0.40         0.05           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.06           127-18-4         Tetrachloroethene         ND         0.40         0.05           109-99-9         Tetrahydrofuran         ND         0.40         0.05           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.1           20-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.4           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.06	111-65-9	n-Octane	ND		0.40	0.05
103-65-1         N-Propylbenzene         ND         0.40         0.05           100-42-5         Styrene         ND         0.40         0.05           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.06           127-18-4         Tetrachloroethene         ND         0.40         0.05           109-99-9         Tetrahydrofuran         ND         0.40         0.05           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.1           20-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.4           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.06	109-66-0	n-Pentane	ND		0.80	0.2
100-42-5         Styrene         ND         0.40         0.05           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.06           127-18-4         Tetrachloroethene         ND         0.40         0.05           109-99-9         Tetrahydrofuran         ND         0.80         0.2           108-88-3         Toluene         ND         0.40         0.05           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.1           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.4           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.06	115-07-1	Propylene	ND		0.40	0.09
79-34-5       1,1,2,2-Tetrachloroethane       ND       0.40       0.06         127-18-4       Tetrachloroethene       ND       0.40       0.05         109-99-9       Tetrahydrofuran       ND       0.80       0.2         108-88-3       Toluene       ND       0.40       0.05         76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan e       ND       0.40       0.1         120-82-1       1,2,4-Trichlorobenzene       ND       2.0       0.4         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.06	103-65-1	N-Propylbenzene	ND		0.40	0.05
127-18-4         Tetrachloroethene         ND         0.40         0.05           109-99-9         Tetrahydrofuran         ND         0.80         0.2           108-88-3         Toluene         ND         0.40         0.05           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.1           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.4           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.06	100-42-5	Styrene	ND		0.40	0.05
109-99-9         Tetrahydrofuran         ND         0.80         0.2           108-88-3         Toluene         ND         0.40         0.05           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.1           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.4           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.06	79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.06
108-88-3         Toluene         ND         0.40         0.05           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.1           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.4           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.06	127-18-4		ND		0.40	0.05
76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan e       ND       0.40       0.1         120-82-1       1,2,4-Trichlorobenzene       ND       2.0       0.4         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.06	109-99-9	Tetrahydrofuran	ND		0.80	0.2
e     120-82-1     1,2,4-Trichlorobenzene     ND     2.0     0.4       71-55-6     1,1,1-Trichloroethane     ND     0.30     0.06	108-88-3	Toluene	ND		0.40	0.05
71-55-6 1,1,1-Trichloroethane ND 0.30 0.06	76-13-1		ND		0.40	0.1
	120-82-1		ND		2.0	0.4
79-00-5 1,1,2-Trichloroethane ND 0.40 0.06	71-55-6	1,1,1-Trichloroethane	ND		0.30	0.06
	79-00-5	1,1,2-Trichloroethane	ND		0.40	0.06

FORM I TO-15

Lab Name: TestAmerica Sacramento Job No.: 320-35438-1 SDG No.: Client Sample ID: 34000999 Lab Sample ID: 320-35438-1 Matrix: Air Lab File ID: 18020820.D Analysis Method: TO-15 Date Collected: 01/25/2018 00:00 Sample wt/vol: 250(mL) Date Analyzed: 02/09/2018 02:44 Soil Aliquot Vol: Dilution Factor: 1 Soil Extract Vol.: GC Column: RTX-Volatiles ID: 0.32(mm) Level: (low/med) Low % Moisture: Analysis Batch No.: 207546 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND	Ī	0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054
1330-20-7	Xylenes, Total	ND		1.2	0.074

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	94		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	97		70-130
2037-26-5	Toluene-d8 (Surr)	97		70-130

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\18020820.D

Lims ID: 320-35438-A-1
Client ID: 34000999
Sample Type: Client

Inject. Date: 09-Feb-2018 02:44:30 ALS Bottle#: 14 Worklist Smp#: 19

Purge Vol: 250.000 mL Dil. Factor: 1.0000

Sample Info: 320-35438-A-1

Misc. Info.: 500mL

Operator ID: SV Instrument ID: ATMS2

Method: \ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\TO15\_ATMS2N.m

Limit Group: MSA - TO15 - ICAL

Last Update:09-Feb-2018 18:25:18Calib Date:06-Feb-2018 23:01:30Integrator:RTEID Type:Deconvolution IDQuant Method:Internal StandardQuant By:Initial CalibrationLast ICal File:\ChromNA\Sacramento\ChromData\ATMS2\20180206-53757.b\18020612.D

Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN

Process Host: XAWRK008

First Level Reviewer: phanthasena Date: 09-Feb-2018 18:25:18

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS) * 2 1,4-Difluorobenzene * 3 Chlorobenzene-d5 (IS) \$ 4 1,2-Dichloroethane-d4 (Sur) \$ 5 Toluene-d8 (Surr) \$ 6 4-Bromofluorobenzene (Surr 10 Propene 18 Butane 32 Acetone 39 Methylene Chloride 40 Carbon disulfide Reagents:	130 114 117 65 100 95 41 43 43 49 76	11.386 13.472 19.532 12.535 16.697 21.551 3.927 4.560 6.975 8.088 8.125	11.380 13.472 19.532 12.535 16.697 21.551 3.927 4.560 6.896 8.088 8.131	0.006 0.000 0.000 -0.001 0.000 0.000 0.000 0.079 0.000 -0.006	98 99 100 38 100 99 90 92 96 53 98	56371 229631 213900 82391 142544 147142 1007 541 4016 1485 6264	4.00 4.00 4.00 3.86 3.88 3.74 0.0632 0.0193 -0.7640 0.0756 0.1916	

VAMSIS20\_00106 Amount Added: 50.00 Units: mL Run Reagent

2

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5

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8

46

11

12

14

IV

Report Date: 09-Feb-2018 18:25:18 Chrom Revision: 2.2 24-Jan-2018 15:37:30

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\18020820.D

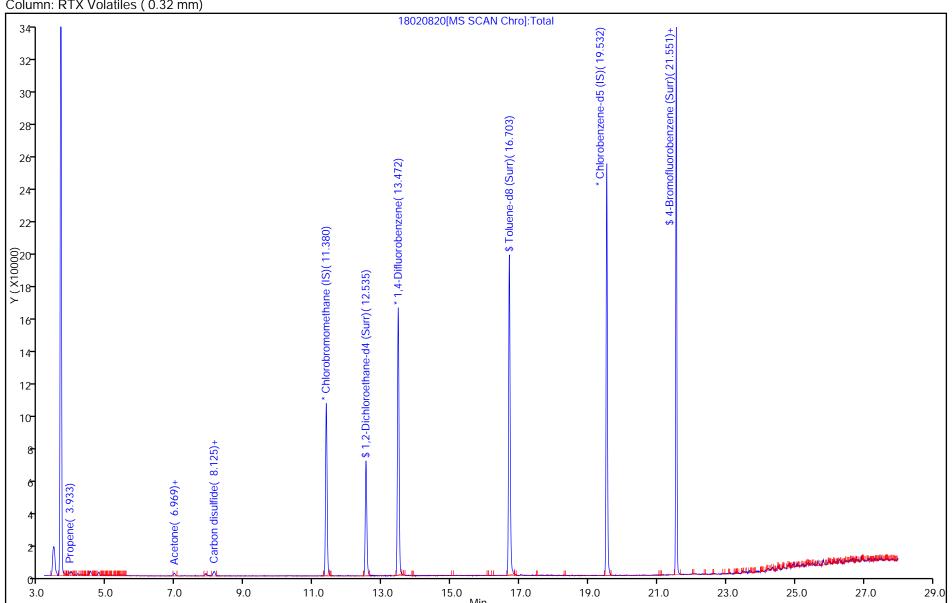
Injection Date: 09-Feb-2018 02:44:30 Instrument ID: ATMS2 Operator ID: SV Lims ID: Worklist Smp#: 320-35438-A-1 Lab Sample ID: 320-35438-1 19

Client ID: 34000999

Purge Vol: 250.000 mL Dil. Factor: ALS Bottle#: 1.0000 14

Method: TO15\_ATMS2N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)



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Chrom Revision: 2.2 24-Jan-2018 15:37:30

Report Date: 09-Feb-2018 18:25:19

Worklist Smp#:

19

 Injection Date:
 09-Feb-2018 02:44:30
 Instrument ID:
 ATMS2

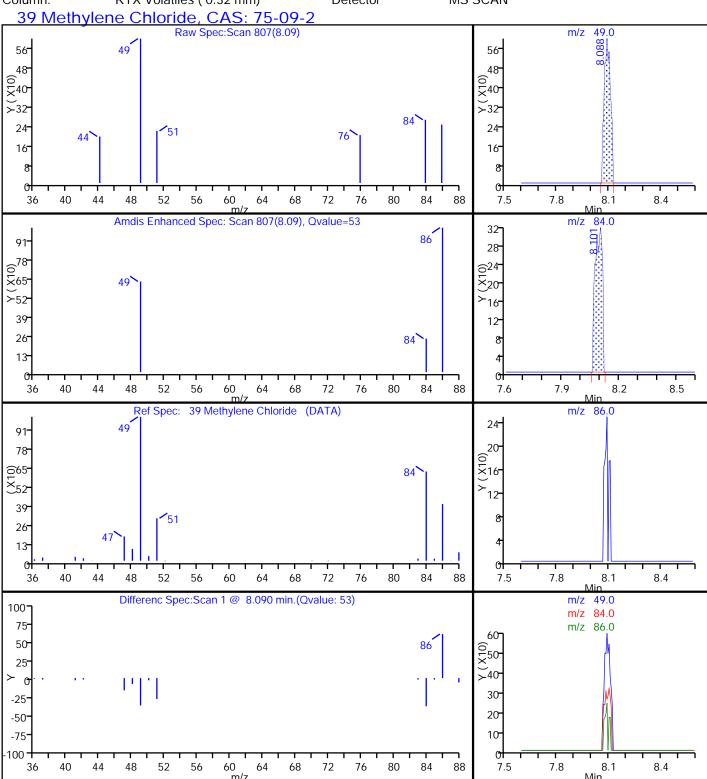
 Lims ID:
 320-35438-A-1
 Lab Sample ID:
 320-35438-1

 Client ID:
 34000999

Operator ID: SV ALS Bottle#: 14
Purge Vol: 250.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS2N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN



#### TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\18020820.D

Injection Date: 09-Feb-2018 02:44:30 Instrument ID: ATMS2 Lims ID: 320-35438-A-1 Lab Sample ID: 320-35438-1

34000999 Client ID:

SV ALS Bottle#: Operator ID: 14 Worklist Smp#: 19

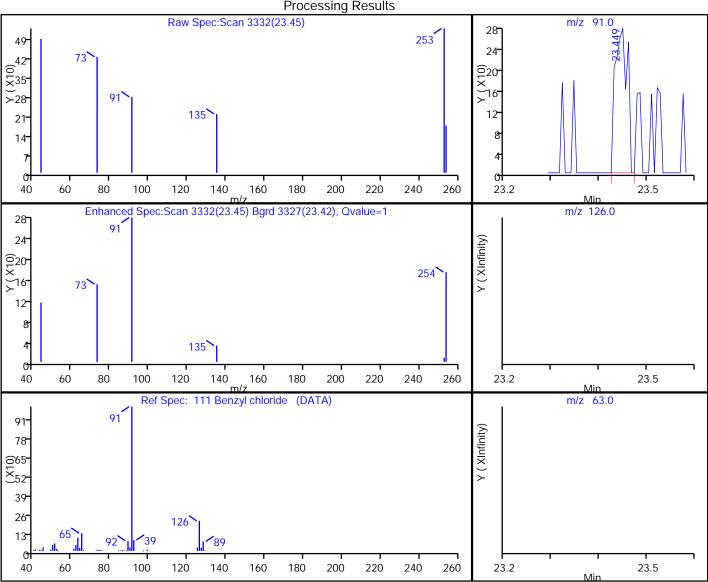
Purge Vol: 250.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS2N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 111 Benzyl chloride, CAS: 100-44-7

#### **Processing Results**



RT	Mass	Response	Amount
23.45	91.00	497	0.007955
23.44	126.00	0	
23.44	63.00	0	

Reviewer: phanthasena, 09-Feb-2018 18:25:18 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

#### TestAmerica Sacramento

Data File: 

Injection Date: 09-Feb-2018 02:44:30 Instrument ID: ATMS2 Lims ID: 320-35438-A-1 Lab Sample ID: 320-35438-1

34000999 Client ID:

SV ALS Bottle#: Operator ID: 14 Worklist Smp#: 19

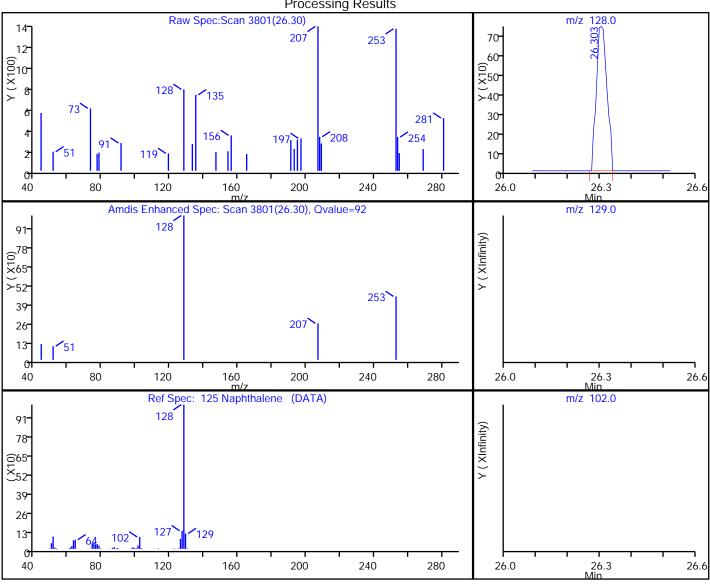
Purge Vol: 250.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS2N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 125 Naphthalene, CAS: 91-20-3

#### **Processing Results**



RT	Mass	Response	Amount
26.30	128.00	1750	0.025376
26.30	129.00	0	
26.30	102.00	0	

Reviewer: phanthasena, 09-Feb-2018 18:25:18 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

#### TestAmerica Sacramento

Data File: 

Injection Date: 09-Feb-2018 02:44:30 Instrument ID: ATMS2 Lims ID: 320-35438-A-1 Lab Sample ID: 320-35438-1

34000999 Client ID:

SV ALS Bottle#: Operator ID: 14 Worklist Smp#: 19

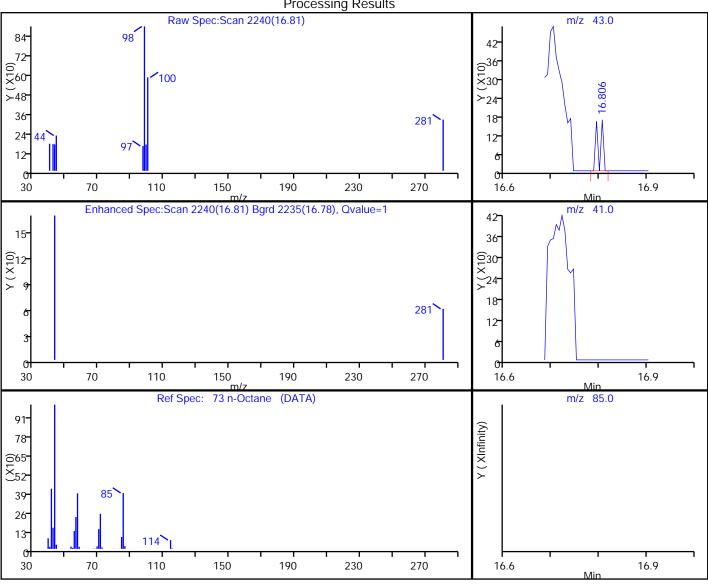
Purge Vol: 250.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS2N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 73 n-Octane, CAS: 111-65-9

#### **Processing Results**



RT	Mass	Response	Amount
16.81	43.00	118	0.002733
16.79	41.00	0	
16.79	85.00	0	

Reviewer: phanthasena, 09-Feb-2018 18:25:18 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

4/3/2018

# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-35825-1 SDG No.: Client Sample ID: 34000932 Lab Sample ID: 320-35825-1 Matrix: Air Lab File ID: MS9020920.D Analysis Method: TO-15 Date Collected: 02/06/2018 00:00 Sample wt/vol: 250(mL) Date Analyzed: 02/10/2018 03:50 Soil Aliquot Vol: Dilution Factor: 1 Soil Extract Vol.: GC Column: RTX-Volatiles ID: 0.32(mm) % Moisture: Level: (low/med) Low Analysis Batch No.: 207738 Units: ppb v/v

	<del></del> -	<del></del>			
CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.35	J	5.0	0.1
107-02-8	Acrolein	ND		2.0	0.2
107-13-1	Acrylonitrile	ND		2.0	0.1
107-05-1	Allyl chloride	ND		0.80	0.1
71-43-2	Benzene	ND		0.40	0.07
100-44-7	Benzyl chloride	ND		0.80	0.1
75-27-4	Bromodichloromethane	ND		0.30	0.06
75-25-2	Bromoform	ND		0.40	0.07
74-83-9	Bromomethane	ND		0.80	0.3
106-99-0	1,3-Butadiene	ND		0.80	0.1
106-97-8	n-Butane	ND		0.40	0.1
78-93-3	2-Butanone (MEK)	ND		0.80	0.2
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.1
104-51-8	n-Butylbenzene	ND		0.40	0.1
135-98-8	sec-Butylbenzene	ND		0.40	0.07
98-06-6	tert-Butylbenzene	ND		0.80	0.06
75-15-0	Carbon disulfide	0.50	JВ	0.80	0.07
56-23-5	Carbon tetrachloride	ND		0.80	0.06
108-90-7	Chlorobenzene	ND		0.30	0.06
75-45-6	Chlorodifluoromethane	ND		0.80	0.2
75-00-3	Chloroethane	ND		0.80	0.3
67-66-3	Chloroform	ND		0.30	0.09
74-87-3	Chloromethane	ND		0.80	0.2
95-49-8	2-Chlorotoluene	ND		0.40	0.08
110-82-7	Cyclohexane	ND		0.40	0.08
124-48-1	Dibromochloromethane	ND		0.40	0.07
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.07
74-95-3	Dibromomethane	ND		0.40	0.05
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroetha	ND		0.40	0.1
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.1
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.1
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.1
75-71-8	Dichlorodifluoromethane	ND		0.40	0.1
75-34-3	1,1-Dichloroethane	ND		0.30	0.07
107-06-2	1,2-Dichloroethane	ND		0.80	0.08

FORM I TO-15

# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-35825-1 SDG No.: Client Sample ID: 34000932 Lab Sample ID: 320-35825-1 Matrix: Air Lab File ID: MS9020920.D Analysis Method: TO-15 Date Collected: 02/06/2018 00:00 Sample wt/vol: 250(mL) Date Analyzed: 02/10/2018 03:50 Soil Aliquot Vol: Dilution Factor: 1 Soil Extract Vol.: GC Column: RTX-Volatiles ID: 0.32(mm) Level: (low/med) Low % Moisture: Analysis Batch No.: 207738 Units: ppb v/v

156-59-2         cis-1,2-Dichloroethene         ND         0.40         0.0           156-60-5         trans-1,2-Dichloroethene         ND         0.40         0.           78-87-5         1,2-Dichloropropane         ND         0.40         0.           10061-01-5         cis-1,3-Dichloropropene         ND         0.40         0.           10061-02-6         trans-1,3-Dichloropropene         ND         0.40         0.0           123-91-1         1,4-Dioxane         ND         0.30         0.           141-78-6         Ethyl acetate         ND         0.30         0.           100-41-4         Ethylbenzene         ND         0.40         0.0           622-96-8         4-Ethyltoluene         ND         0.40         0.           87-68-3         Hexachlorobutadiene         ND         0.40         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Isopropylbenzene         ND         0.80         0.           89-82-8			<del></del>			
156-59-2         cis-1,2-Dichloroethene         ND         0.40         0.0           156-60-5         trans-1,2-Dichloroethene         ND         0.40         0.           78-87-5         1,2-Dichloropropane         ND         0.40         0.           10061-01-5         cis-1,3-Dichloropropene         ND         0.40         0.           10061-02-6         trans-1,3-Dichloropropene         ND         0.40         0.0           123-91-1         1,4-Dioxane         ND         0.30         0.           141-78-6         Ethyl acetate         ND         0.30         0.           100-41-4         Ethylbenzene         ND         0.40         0.0           622-96-8         4-Ethyltoluene         ND         0.40         0.           87-68-3         Hexachlorobutadiene         ND         0.40         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Isopropylbenzene         ND         0.80         0.           89-82-8	CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
156-60-5	75-35-4	1,1-Dichloroethene	ND		0.80	0.1
1,2-Dichloropropane	156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
10061-01-5	156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.1
10061-02-6   trans-1,3-Dichloropropene	78-87-5	1,2-Dichloropropane	ND		0.40	0.2
123-91-1	10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.1
141-78-6	10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.08
100-41-4	123-91-1	1,4-Dioxane	ND		0.80	0.1
A=Ethyltoluene	141-78-6	Ethyl acetate	ND		0.30	0.1
142-82-5	100-41-4	Ethylbenzene	ND		0.40	0.063
87-68-3         Hexachlorobutadiene         ND         2.0         0.           110-54-3         n-Hexane         ND         0.80         0.0           591-78-6         2-Hexanone         ND         0.40         0.0           98-82-8         Isopropylboluene         ND         0.80         0.           99-87-6         4-Isopropyltoluene         ND         0.80         0.           1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.           80-62-6         Methyl methacrylate         ND         0.80         0.           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.           75-09-2         Methylene Chloride         ND         0.40         0.           98-83-9         alpha-Methylstyrene         ND         0.40         0.           91-20-3         Naphthalene         ND         0.40         0.           111-65-9         n-Octane         ND         0.40         0.           109-66-0         n-Pentane         ND         0.40         0.           103-65-1         N-Propylbenzene         ND         0.40         0.           100-42-5         Styrene         ND<	622-96-8	4-Ethyltoluene	ND		0.40	0.1
110-54-3	142-82-5	n-Heptane	ND		0.80	0.063
Section	87-68-3	Hexachlorobutadiene	ND		2.0	0.43
98-82-8         Isopropylbenzene         ND         0.80         0.80           99-87-6         4-Isopropyltoluene         ND         0.80         0.           1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.           80-62-6         Methyl methacrylate         ND         0.80         0.           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.           75-09-2         Methylene Chloride         ND         0.40         0.0           98-83-9         alpha-Methylstyrene         ND         0.40         0.0           99-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           109-88-3         Toluene	110-54-3	n-Hexane	ND		0.80	0.07
99-87-6 4-Isopropyltoluene ND 0.80 0.  1634-04-4 Methyl-t-Butyl Ether (MTBE) ND 0.80 0.  80-62-6 Methyl methacrylate ND 0.80 0.  108-10-1 4-Methyl-2-pentanone (MIBK) ND 0.40 0.0  75-09-2 Methylene Chloride ND 0.40 0.0  98-83-9 alpha-Methylstyrene ND 0.40 0.0  91-20-3 Naphthalene ND 0.80 0.  111-65-9 n-Octane ND 0.40 0.0  109-66-0 n-Pentane ND 0.80 0.  155-07-1 Propylene ND 0.40 0.0  100-42-5 Styrene ND 0.40 0.0  100-42-5 Styrene ND 0.40 0.0  127-18-4 Tetrachloroethane ND 0.40 0.0  109-99-9 Tetrahydrofuran ND 0.80 0.  108-88-3 Toluene ND 0.40 0.0  76-13-1 1,1,2-Trichloro-1,2,2-trifluoroethane ND 0.40 0.0  120-82-1 1,2,4-Trichlorobenzene ND 0.30 0.0  71-55-6 1,1,1-Trichloroethane ND 0.30 0.0	591-78-6	2-Hexanone	ND		0.40	0.08
1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.80           80-62-6         Methyl methacrylate         ND         0.80         0.           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.           75-09-2         Methylene Chloride         ND         0.40         0.0           98-83-9         alpha-Methylstyrene         ND         0.40         0.0           91-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.40         0.0           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoro	98-82-8	Isopropylbenzene	ND		0.80	0.1
80-62-6         Methyl methacrylate         ND         0.80         0.           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.           75-09-2         Methylene Chloride         ND         0.40         0.0           98-83-9         alpha-Methylstyrene         ND         0.40         0.0           91-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           127-18-4         Tetrachloroethane         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           1-1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.0           120-82-1         1,2,4-Trichlorobenzene         ND	99-87-6	4-Isopropyltoluene	ND		0.80	0.1
108-10-1       4-Methyl-2-pentanone (MIBK)       ND       0.40       0.         75-09-2       Methylene Chloride       ND       0.40       0.0         98-83-9       alpha-Methylstyrene       ND       0.40       0.0         91-20-3       Naphthalene       ND       0.80       0.         111-65-9       n-Octane       ND       0.40       0.0         109-66-0       n-Pentane       ND       0.80       0.         115-07-1       Propylene       ND       0.40       0.0         103-65-1       N-Propylbenzene       ND       0.40       0.0         100-42-5       Styrene       ND       0.40       0.0         79-34-5       1,1,2,2-Tetrachloroethane       ND       0.40       0.0         127-18-4       Tetrachloroethene       ND       0.40       0.0         108-88-3       Toluene       ND       0.40       0.0         76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan       ND       0.40       0.         120-82-1       1,2,4-Trichlorobenzene       ND       0.30       0.0         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.13
75-09-2         Methylene Chloride         ND         0.40         0.0           98-83-9         alpha-Methylstyrene         ND         0.40         0.0           91-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.0           120-82-1         1,2,4-Trichlorobenzene         ND         0.30         0.0           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	80-62-6	Methyl methacrylate	ND		0.80	0.1
98-83-9         alpha-Methylstyrene         ND         0.40         0.0           91-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           109-99-9         Tetrachloroethene         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.0           120-82-1         1,2,4-Trichlorobenzene         ND         0.30         0.0           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.1
91-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.0           120-82-1         1,2,4-Trichlorobenzene         ND         0.30         0.0           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	75-09-2	Methylene Chloride	ND		0.40	0.07
111-65-9       n-Octane       ND       0.40       0.0         109-66-0       n-Pentane       ND       0.80       0.         115-07-1       Propylene       ND       0.40       0.0         103-65-1       N-Propylbenzene       ND       0.40       0.0         100-42-5       Styrene       ND       0.40       0.0         79-34-5       1,1,2,2-Tetrachloroethane       ND       0.40       0.0         109-99-9       Tetrachloroethene       ND       0.40       0.0         108-88-3       Toluene       ND       0.40       0.0         76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan e       ND       0.40       0.         120-82-1       1,2,4-Trichlorobenzene       ND       2.0       0.         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	98-83-9	alpha-Methylstyrene	ND		0.40	0.06
109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.0           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	91-20-3	Naphthalene	ND		0.80	0.5
115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.0           76-13-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	111-65-9	n-Octane	ND		0.40	0.05
103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.0           71-55-6         1,1,1-Trichlorobenzene         ND         0.30         0.0           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	109-66-0	n-Pentane	ND		0.80	0.2
100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.80         0.           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	115-07-1	Propylene	ND		0.40	0.09
79-34-5       1,1,2,2-Tetrachloroethane       ND       0.40       0.0         127-18-4       Tetrachloroethene       ND       0.40       0.0         109-99-9       Tetrahydrofuran       ND       0.80       0.         108-88-3       Toluene       ND       0.40       0.0         76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan e       ND       0.40       0.         120-82-1       1,2,4-Trichlorobenzene       ND       2.0       0.         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	103-65-1	N-Propylbenzene	ND		0.40	0.05
127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.80         0.           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	100-42-5	Styrene	ND		0.40	0.05
127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.80         0.           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.06
108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	127-18-4		ND		0.40	0.05
76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan e       ND       0.40       0.         120-82-1       1,2,4-Trichlorobenzene       ND       2.0       0.         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	109-99-9	Tetrahydrofuran	ND		0.80	0.2
76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan e       ND       0.40       0.         120-82-1       1,2,4-Trichlorobenzene       ND       2.0       0.         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	108-88-3	_	ND		0.40	0.05
120-82-1       1,2,4-Trichlorobenzene       ND       2.0       0.         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	76-13-1		ND		0.40	0.1
	120-82-1		ND		2.0	0.4
79-00-5 1,1,2-Trichloroethane ND 0.40 0.0	71-55-6	1,1,1-Trichloroethane	ND		0.30	0.06
	79-00-5	1,1,2-Trichloroethane	ND		0.40	0.06

# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-35825-1 SDG No.: \_\_ Lab Sample ID: <u>320</u>-35825-1 Client Sample ID: 34000932 Matrix: Air Lab File ID: MS9020920.D Analysis Method: TO-15 Date Collected: 02/06/2018 00:00 Sample wt/vol: 250(mL) Date Analyzed: 02/10/2018 03:50 Soil Aliquot Vol: Dilution Factor: 1 Soil Extract Vol.: GC Column: RTX-Volatiles ID: 0.32(mm) Level: (low/med) Low % Moisture: Analysis Batch No.: 207738 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054
1330-20-7	Xylenes, Total	ND		1.2	0.074

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	93		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	93		70-130
2037-26-5	Toluene-d8 (Surr)	98		70-130

Report Date: 12-Feb-2018 09:59:05 Chrom Revision: 2.2 24-Jan-2018 15:37:30

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\MS9020920.D

Lims ID: 320-35825-A-1
Client ID: 34000932
Sample Type: Client

Inject. Date: 10-Feb-2018 03:50:30 ALS Bottle#: 15 Worklist Smp#: 20

Purge Vol: 5.000 mL Dil. Factor: 1.0000

Sample Info: 320-35825-A-1

Misc. Info.: 500

Operator ID: RG Instrument ID: ATMS9

Method: \ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\TO15\_ATMS9N.m

Limit Group: MSA - TO15 - ICAL

Last Update:12-Feb-2018 09:59:02Calib Date:09-Feb-2018 00:05:30Integrator:RTEID Type:Deconvolution IDQuant Method:Internal StandardQuant By:Initial CalibrationLast ICal File:\ChromNA\Sacramento\ChromData\ATMS9\20180208-53859.b\MS9020812.D

Column 1: RTX Volatiles (0.32 mm) Det: MS SCAN

Process Host: XAWRK023

First Level Reviewer: girr Date: 12-Feb-2018 09:59:04

First Level Reviewer: girr				D	ate:		12-Feb-201	8 09:59:04	
			RT	Adj RT	Dlt RT			OnCol Amt	
L	Compound	Sig	(min.)	(min.)	(min.)	Q	Response	ppb v/v	Flags
	* 1 Chlorobromomethane (IS)	130	12.318	12.324	-0.006	97	68548	4.00	
•	* 21,4-Difluorobenzene	114	14.411	14.411	0.000	100	279384	4.00	
,	* 3 Chlorobenzene-d5 (IS)	117	20.330	20.330	0.000	99	189414	4.00	
	\$ 41,2-Dichloroethane-d4 (Sur	65	13.480	13.498	-0.012	97	102059	3.71	
	\$ 5 Toluene-d8 (Surr)	100	17.575	17.582	0.000	98	139736	3.93	
	\$ 64-Bromofluorobenzene (Surr	174	22.259	22.259	0.000	99	92985	3.73	
	31 Acetone	43	7.689	7.624	0.061	95	9992	0.3488	
	47 Methylene Chloride	49	8.881	8.893	-0.012	67	1210	0.0503	
	48 Carbon disulfide	76	8.936	8.942	-0.006	99	20879	0.4993	
	76 Trichloroethene	130	15.153	15.172	-0.012	90	2170	0.0785	
	85 Toluene	91	17.733	17.734	0.006	13	729	0.009082	
	93 Tetrachloroethene	166	18.998	19.010	-0.012	89	1403	0.0367	
	103 1,1,2,2-Tetrachloroethane	83	22.089	22.089	0.000	86	849	0.0144	
	110 4-Ethyltoluene	120	22.703	22.703	-0.006	95	289	0.007845	
	111 1,3,5-Trimethylbenzene	120	22.764	22.770	-0.006	84	598	0.0115	
	114 tert-Butylbenzene	91	23.287	23.287	0.006	73	1409	0.0188	M
	115 1,2,4-Trimethylbenzene	120	23.317	23.324	-0.007	91	718	0.0142	
	117 1,3-Dichlorobenzene	146	23.859	23.859	0.000	89	1012	0.0148	
	120 1,4-Dichlorobenzene	146	23.993	23.987	0.006	93	1131	0.0164	
	123 n-Butylbenzene	92	24.303	24.297	0.006	95	955	0.0134	
	122 1,2-Dichlorobenzene	146	24.473	24.473	0.000	91	1114	0.0170	
	126 1,2,4-Trichlorobenzene	180	26.706	26.700	0.006	88	1343	0.0521	
	127 Naphthalene	128	27.071	27.065	0.006	96	4881	0.0281	
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Report Date: 12-Feb-2018 09:59:05 Chrom Revision: 2.2 24-Jan-2018 15:37:30

QC Flag Legend Review Flags

M - Manually Integrated

Reagents:

VAMSIS20\_00109 Amount Added: 50.00 Units: mL Run Reagent

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Report Date: 12-Feb-2018 09:59:05 Chrom Revision: 2.2 24-Jan-2018 15:37:30

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\MS9020920.D

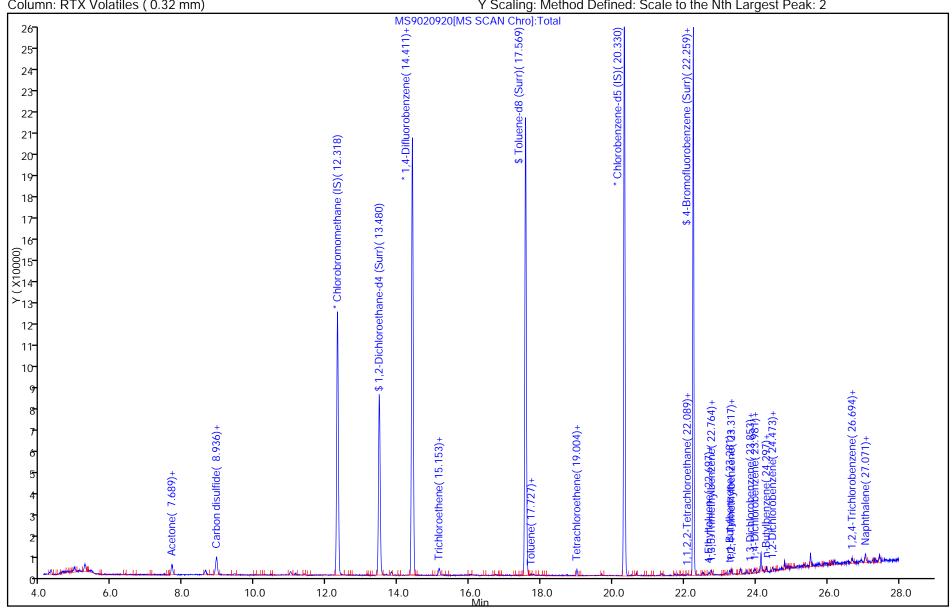
Injection Date: 10-Feb-2018 03:50:30 Instrument ID: ATMS9 Operator ID: RG Lims ID: Worklist Smp#: 320-35825-A-1 Lab Sample ID: 320-35825-1 20

Client ID: 34000932

Purge Vol: 5.000 mL Dil. Factor: ALS Bottle#: 15 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Y Scaling: Method Defined: Scale to the Nth Largest Peak: 2



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TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\MS9020920.D Injection Date: 10-Feb-2018 03:50:30 Instrument ID: ATMS9 320-35825-A-1 Lims ID: Lab Sample ID: 320-35825-1 Client ID: 34000932 Operator ID: RG ALS Bottle#: Worklist Smp#: 15 20 Dil. Factor: Purge Vol: 5.000 mL 1.0000 MSA - TO15 - ICAL Method: TO15\_ATMS9N Limit Group: Column: RTX Volatiles (0.32 mm) Detector MS SCAN 31 Acetone, CAS: 67-64-1 Raw Spec:Scan 593(7.69) 43,0 m/z 28 28 43 12 58 12 39 57 78 40 44 48 52 56 60 68 72 76 7.1 7.4 7.7 8.0 36 64 58.0 Amdis Enhanced Spec: Scan 593(7.69), Qvalue=95 m/z 12 43 91 10 ⊙<sup>78</sup> ×65 Y (X100) ≻52 58 39 26<del>-</del> 13 0 0 48 52 60 68 72 7.4 7.7 8.0 36 40 44 56 64 76 7.1 Ref Spec: 31 Acetone (NIST14.L) 43 91-78 <u>8</u>65 . ≿<sub>52</sub> 39 26 58 13 40 44 48 52 60 68 72 76 56 64 36 Differenc Spec:Scan 1 @ 7.690 min.(Qvalue: 95) m/z 43.0 100m/z 58.0 75 28 50 25 <sub>58</sub> -25 12 -50**-**-75 100 ┪ 0 40 44 48 52 56 60 64 68 72 76 7.1 7.4 7.7 0.8 36

Chrom Revision: 2.2 24-Jan-2018 15:37:30

Report Date: 12-Feb-2018 09:59:05

Chrom Revision: 2.2 24-Jan-2018 15:37:30

Report Date: 12-Feb-2018 09:59:05

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\MS9020920.D

Injection Date: 10-Feb-2018 03:50:30 Instrument ID: ATMS9 Lims ID: 320-35825-A-1 Lab Sample ID: 320-35825-1

Client ID: 34000932

ALS Bottle#: 20 Operator ID: RG 15 Worklist Smp#:

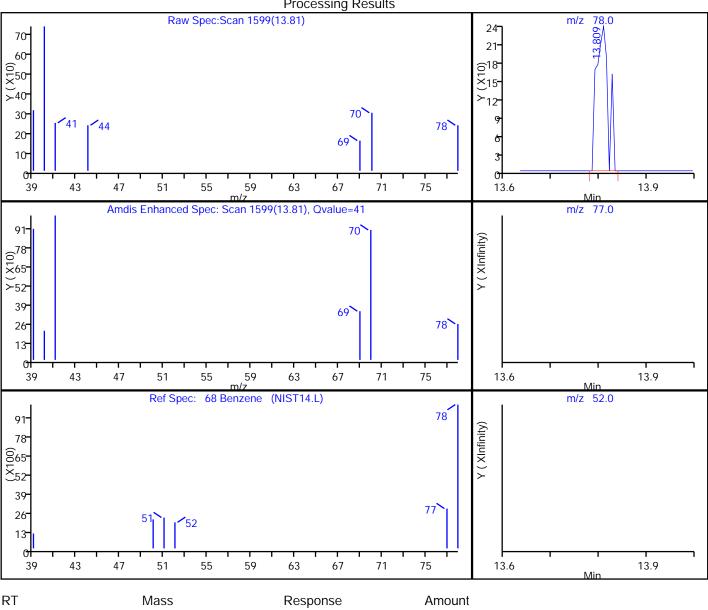
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

## 68 Benzene, CAS: 71-43-2

## **Processing Results**



RT	Mass	Response	Amount
13.81	78.00	403	0.006407
13.81	77.00	0	
13.81	52.00	0	

Reviewer: girr, 12-Feb-2018 09:59:04

Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

### TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\MS9020920.D

Injection Date: 10-Feb-2018 03:50:30 Instrument ID: ATMS9 Lims ID: 320-35825-A-1 Lab Sample ID: 320-35825-1

34000932 Client ID:

ALS Bottle#: Operator ID: RG 15 Worklist Smp#: 20

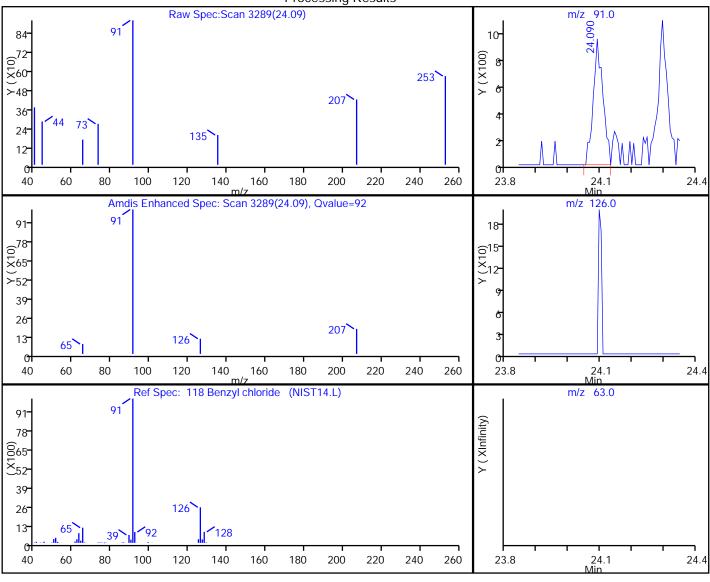
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

## 118 Benzyl chloride, CAS: 100-44-7

### **Processing Results**



RT	Mass	Response	Amount
24.09	91.00	1947	0.015137
24.10	126.00	0	
24.10	63.00	0	

Reviewer: girr, 12-Feb-2018 09:59:04

### TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\MS9020920.D

Injection Date: 10-Feb-2018 03:50:30 Instrument ID: ATMS9 Lims ID: 320-35825-A-1 Lab Sample ID: 320-35825-1

Client ID: 34000932

ALS Bottle#: 20 Operator ID: RG 15 Worklist Smp#:

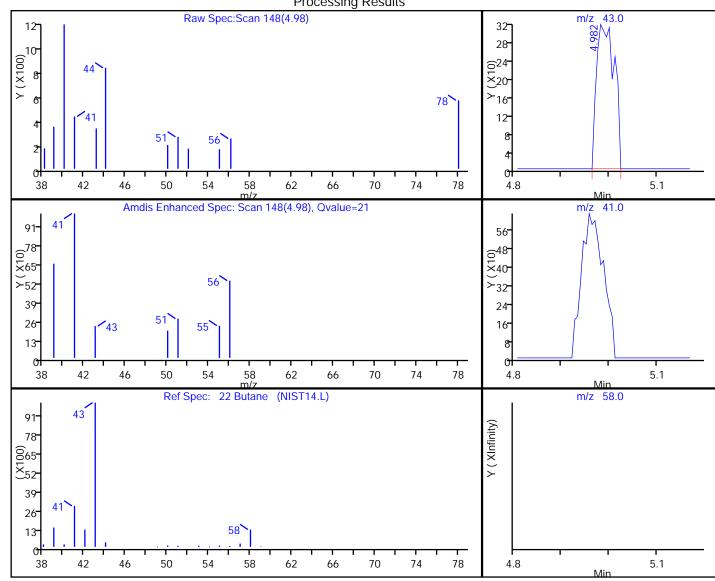
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

## 22 Butane, CAS: 106-97-8

### **Processing Results**





Reviewer: girr, 12-Feb-2018 09:59:04

Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

### TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\MS9020920.D

Injection Date: 10-Feb-2018 03:50:30 Instrument ID: ATMS9 Lims ID: 320-35825-A-1 Lab Sample ID: 320-35825-1

34000932 Client ID:

ALS Bottle#: Operator ID: RG 15 Worklist Smp#: 20

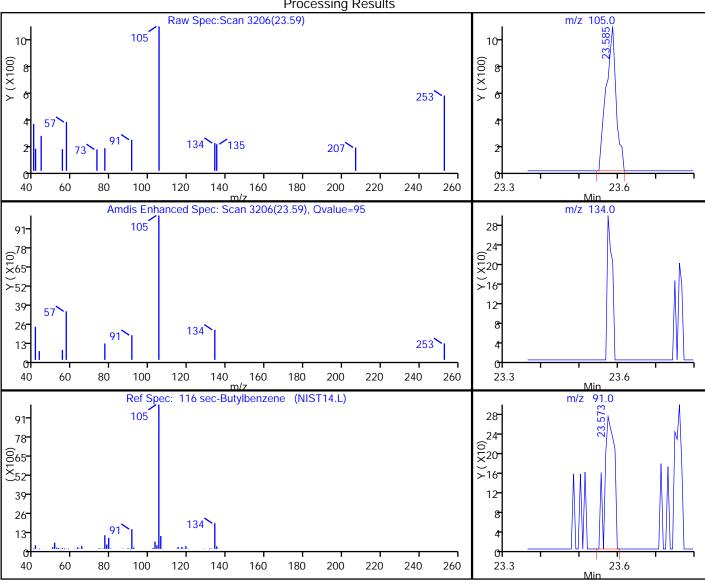
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

## 116 sec-Butylbenzene, CAS: 135-98-8

### **Processing Results**



RT	Mass	Response	Amount
23.59	105.00	1902	0.012652
23.58	134.00	0	
23.57	91.00	469	

Reviewer: girr, 12-Feb-2018 09:59:04

TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\MS9020920.D

Client ID: 34000932

Report Date: 12-Feb-2018 09:59:06

Operator ID: RG ALS Bottle#: 15 Worklist Smp#: 20

Purge Vol: 5.000 mL Dil. Factor: 1.0000

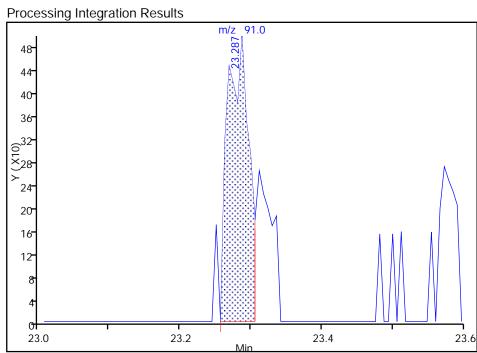
Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

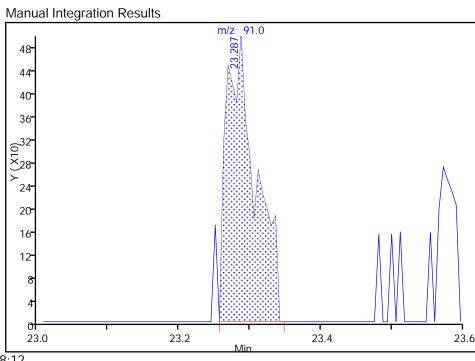
## 114 tert-Butylbenzene, CAS: 98-06-6

Signal: 1

RT: 23.29
Area: 1036
Amount: 0.013851
Amount Units: ppb v/v



RT: 23.29
Area: 1409
Amount: 0.018838
Amount Units: ppb v/v



Reviewer: girr, 12-Feb-2018 09:58:12 Audit Action: Manually Integrated

Audit Reason: Incomplete Integration

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4/3/2018

### TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\MS9020920.D

Client ID: 34000932

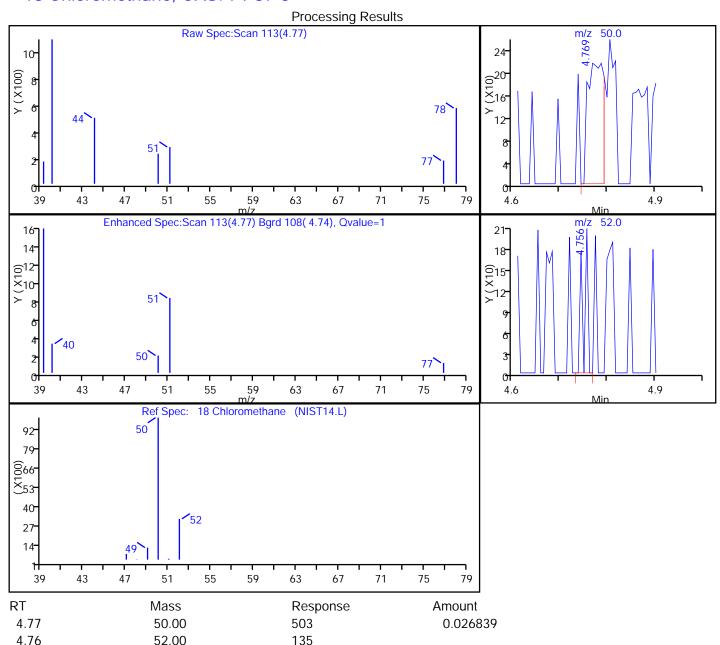
Operator ID: RG ALS Bottle#: 15 Worklist Smp#: 20

Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

# 18 Chloromethane, CAS: 74-87-3



Reviewer: girr, 12-Feb-2018 09:59:04

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

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### TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\MS9020920.D

Client ID: 34000932

Operator ID: RG ALS Bottle#: 15 Worklist Smp#: 20

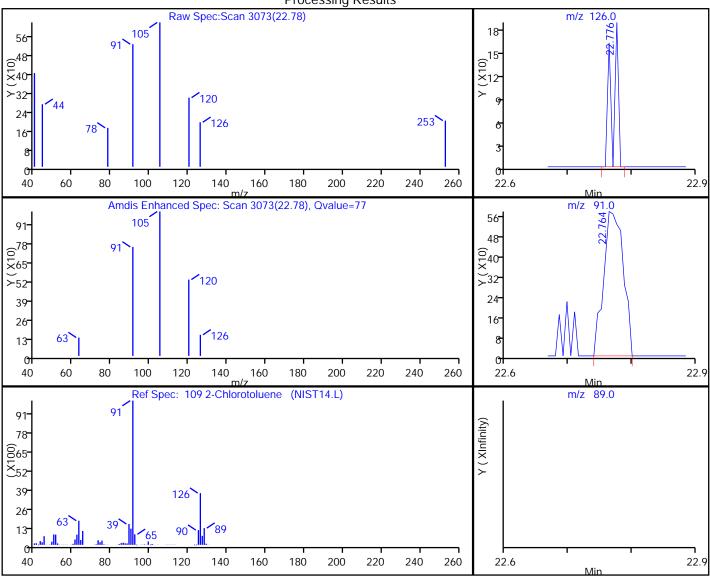
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

# 109 2-Chlorotoluene, CAS: 95-49-8

## **Processing Results**



RT	Mass	Response	Amount
22.78	126.00	129	0.004423
22.76	91.00	1240	
22.78	89.00	0	

Reviewer: girr, 12-Feb-2018 09:59:04

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

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<u>'</u>

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### TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\MS9020920.D

Injection Date: 10-Feb-2018 03:50:30 Instrument ID: ATMS9 Lims ID: 320-35825-A-1 Lab Sample ID: 320-35825-1

34000932 Client ID:

ALS Bottle#: Operator ID: RG 15 Worklist Smp#: 20

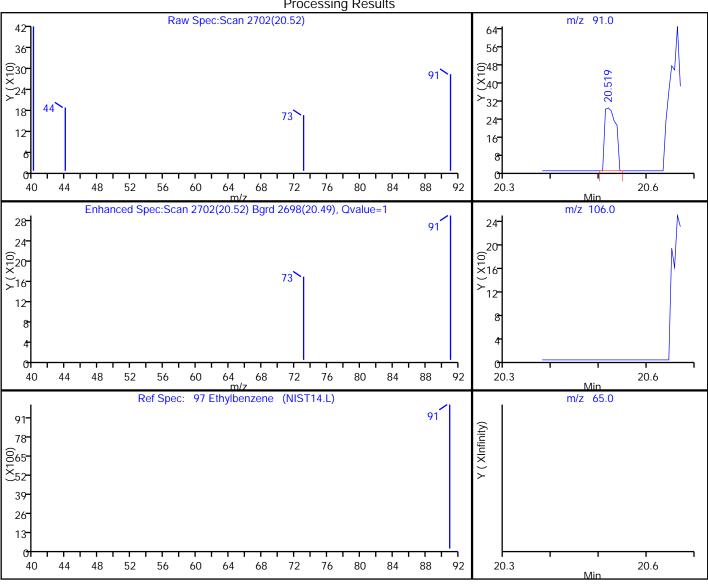
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Detector Column: RTX Volatiles (0.32 mm) MS SCAN

## 97 Ethylbenzene, CAS: 100-41-4

### **Processing Results**



RT	Mass	Response	Amount
20.52	91.00	457	0.004230
20.53	106.00	0	
20.53	65.00	0	

Reviewer: girr, 12-Feb-2018 09:59:04

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

4/3/2018

### TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\MS9020920.D

Injection Date: 10-Feb-2018 03:50:30 Instrument ID: ATMS9 Lims ID: 320-35825-A-1 Lab Sample ID: 320-35825-1

34000932 Client ID:

ALS Bottle#: Operator ID: RG 15 Worklist Smp#: 20

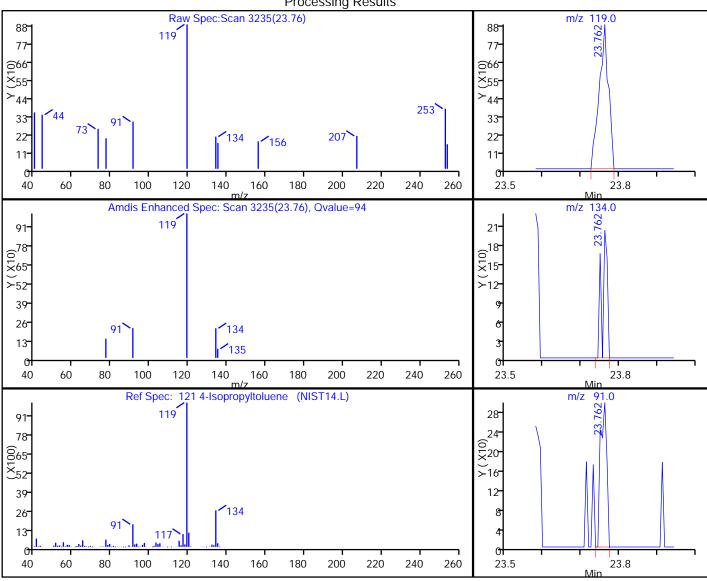
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

## 121 4-Isopropyltoluene, CAS: 99-87-6

### **Processing Results**



RT	Mass	Response	Amount
23.76	119.00	1515	0.011619
23.76	134.00	188	
23.76	91.00	336	

Reviewer: girr, 12-Feb-2018 09:59:04

### TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\MS9020920.D

Injection Date: 10-Feb-2018 03:50:30 Instrument ID: ATMS9 Lims ID: 320-35825-A-1 Lab Sample ID: 320-35825-1

34000932 Client ID:

ALS Bottle#: Operator ID: RG 15 Worklist Smp#: 20

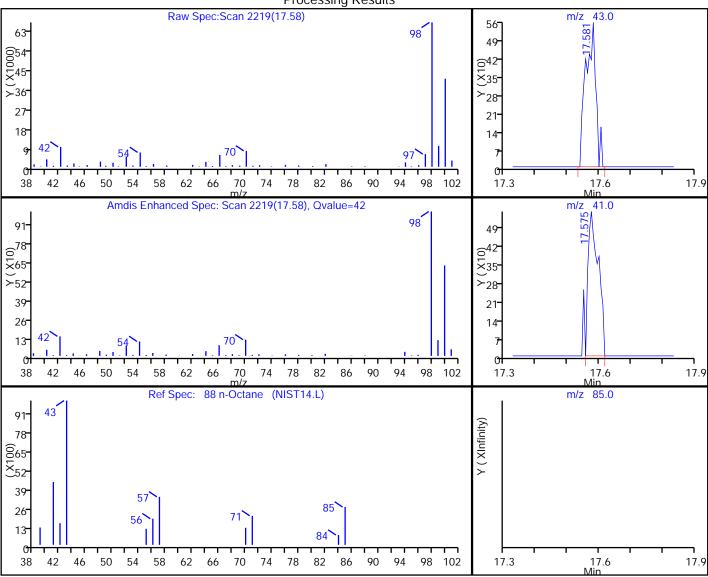
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

## 88 n-Octane, CAS: 111-65-9

### **Processing Results**



RT	Mass	Response	Amount
17.58	43.00	1242	0.022800
17.57	41.00	1224	
17.58	85.00	0	

Reviewer: girr, 12-Feb-2018 09:59:04

Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

### TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\MS9020920.D

Injection Date: 10-Feb-2018 03:50:30 Instrument ID: ATMS9 Lims ID: 320-35825-A-1 Lab Sample ID: 320-35825-1

Client ID: 34000932

ALS Bottle#: Operator ID: RG 15 Worklist Smp#: 20

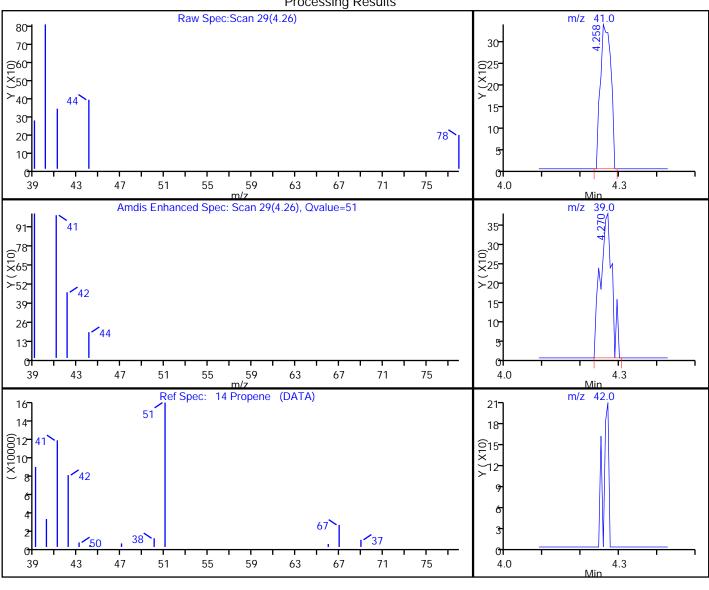
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

## 14 Propene, CAS: 115-07-1

### **Processing Results**



RT	Mass	Response	Amount
4.26	41.00	646	0.041507
4.27	39.00	804	
4.25	42.00	0	

Reviewer: girr, 12-Feb-2018 09:59:04

### TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\MS9020920.D

10-Feb-2018 03:50:30 Injection Date: Instrument ID: ATMS9 Lims ID: 320-35825-A-1 Lab Sample ID: 320-35825-1

34000932 Client ID:

ALS Bottle#: Operator ID: RG 15 Worklist Smp#: 20

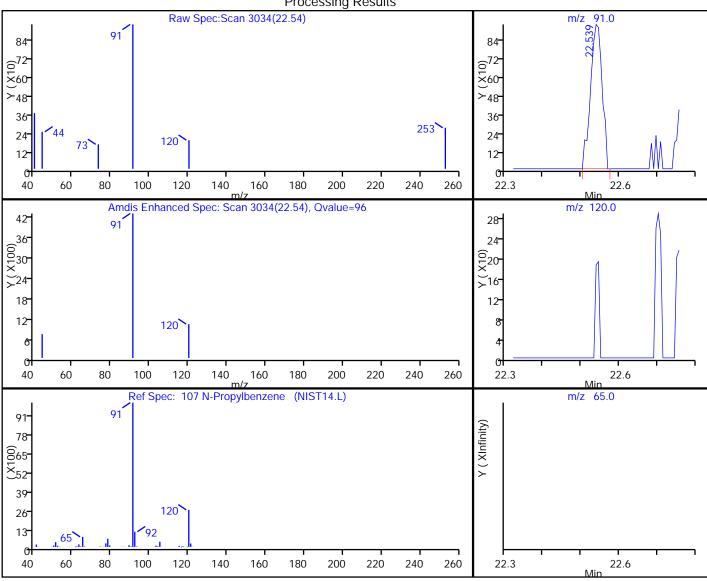
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

## 107 N-Propylbenzene, CAS: 103-65-1

### **Processing Results**



RT	Mass	Response	Amount
22.54	91.00	1994	0.013273
22.54	120.00	0	
22.54	65.00	0	

Reviewer: girr, 12-Feb-2018 09:59:04

### TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\MS9020920.D

Injection Date: 10-Feb-2018 03:50:30 Instrument ID: ATMS9 Lims ID: 320-35825-A-1 Lab Sample ID: 320-35825-1

34000932 Client ID:

ALS Bottle#: Operator ID: RG 15 Worklist Smp#: 20

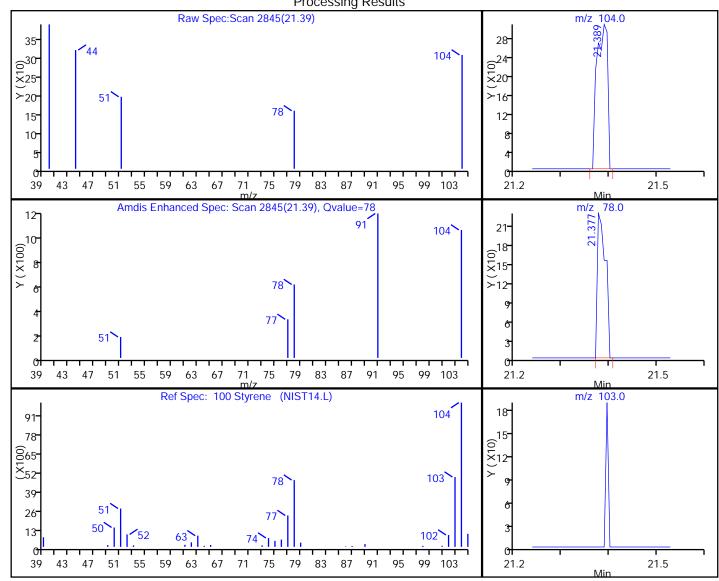
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

## 100 Styrene, CAS: 100-42-5

## **Processing Results**



RT	Mass	Response	Amount
21.39	104.00	476	0.007093
21.38	78.00	273	
21.38	103.00	0	

Reviewer: girr, 12-Feb-2018 09:59:04

### TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180209-53885.b\MS9020920.D

Injection Date: 10-Feb-2018 03:50:30 Instrument ID: ATMS9 Lims ID: 320-35825-A-1 Lab Sample ID: 320-35825-1

Client ID: 34000932

ALS Bottle#: Operator ID: RG 15 Worklist Smp#: 20

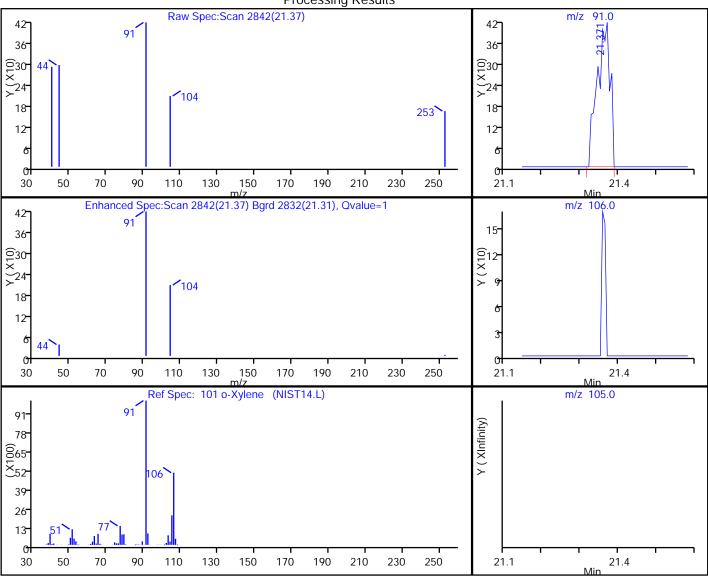
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

## 101 o-Xylene, CAS: 95-47-6

### **Processing Results**



RT	Mass	Response	Amount
21.37	91.00	995	0.011526
21.36	106.00	0	
21.36	105.00	0	
21.38	78.00	273	

Reviewer: girr, 12-Feb-2018 09:59:04

Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

4/3/2018



THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento 880 Riverside Parkway West Sacramento, CA 95605 Tel: (916)373-5600

TestAmerica Job ID: 320-39559-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elaine Walker

Authorized for release by: 5/31/2018 4:33:34 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

LINKS .....

Review your project results through
Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

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# **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-39559-1

### **Qualifiers**

### Air - GC/MS VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Air - GC VOA

Qualifier	<b>Qualifier Descrip</b>	otion

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

## **Glossary**

Abbreviation These commonly used abbreviations may or may not be present in this repo
---

Listed under the "D" column to designate that the result is reported on a dry weight basis ¤

Percent Recovery %R 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

Decision Level Concentration (Radiochemistry) DLC

**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 Minimum Level (Dioxin) MI

NC Not Calculated

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

**PQL Practical Quantitation Limit** 

**Quality Control** QC

Relative Error Ratio (Radiochemistry) **RER** 

Reporting Limit or Requested Limit (Radiochemistry) RL

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

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

TestAmerica Sacramento

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5/31/2018

### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-39559-1

Job ID: 320-39559-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-39559-1

#### Receipt

Two samples were received on 5/19/2018 9:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

### **Receipt Exceptions**

The container label for the following samples did not match the information listed on the Chain-of-Custody (COC): VSP-801 (320-39559-1) and VSP-802 (320-39559-2).

The container labels list the canister ID's as 34001953 and 8282 for samples 1 and 2 respectively, while the COC lists the canister ID's as 34001853 and 8202 for samples 1 and 2 respectively.

#### Air - GC VOA

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

#### Air - GC/MS VOA

Method(s) TO-15: 4-Bromofluorobenzene (Surrogate) and 1,2-Dichloroethane-d4 (Surrogate) recovery for the following sample was outside control limits: VSP-801 (320-39559-1). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method(s) TO-15: 1,2-Dichloroethane-d4 (Surrogate) recovery for the following samples were outside control limits: (CCV 320-226146/3), (LCS 320-226146/4) and (LCSD 320-226146/5). This analyte is mot use as a monitoring TPH (as Gasoline).

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

# **Detection Summary**

Client: ARCADIS U.S. Inc

Client Sample ID: VSP-801

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-39559-1

Lab Sample ID: 320-39559-1

Analyte	Result Qualifier	r RL	MDL	Unit	Dil Fac	O Method	Prep Type
Benzene	1.1	0.40	0.079	ppb v/v		TO-15	Total/NA
Ethylbenzene	1.9	0.40	0.063	ppb v/v	1	TO-15	Total/NA
Toluene	1.1	0.40	0.051	ppb v/v	1	TO-15	Total/NA
m,p-Xylene	8.3	0.80	0.10	ppb v/v	1	TO-15	Total/NA
o-Xylene	2.1	0.40	0.054	ppb v/v	1	TO-15	Total/NA
TPH (as Gasoline) - DL	34000	990	400	ppb v/v	9.92	TO-15	Total/NA
Carbon Dioxide (TCD)	0.35 J	0.90	0.019	% v/v	1.79	D1946	Total/NA
Methane (FID)	0.0011	0.00018	0.000036	% v/v	1.79	D1946	Total/NA
Oxygen	18	0.36	0.013	% v/v	1.79	D1946	Total/NA

Client Sample ID: VSP-802 Lab Sample ID: 320-39559-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.087	J	0.40	0.079	ppb v/v		_	TO-15	Total/NA
Ethylbenzene	0.12	J	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Toluene	0.14	J	0.40	0.051	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.23	J	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.069	J	0.40	0.054	ppb v/v	1		TO-15	Total/NA
TPH (as Gasoline)	280		100	40	ppb v/v	1		TO-15	Total/NA
Carbon Dioxide (TCD)	0.39	J	1.1	0.024	% v/v	2.22		D1946	Total/NA
Methane (FID)	0.0010		0.00022	0.000044	% v/v	2.22		D1946	Total/NA
Oxygen	18		0.44	0.016	% v/v	2.22		D1946	Total/NA

This Detection Summary does not include radiochemical test results.

5/31/2018

TestAmerica Sacramento

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# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Lab Sample ID: 320-39559-1

TestAmerica Job ID: 320-39559-1

Client Sample ID: VSP-801 Date Collected: 05/17/18 17:00 Matrix: Air

Date Received: 05/19/18 09:15

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.1		0.40	0.079	ppb v/v			05/31/18 01:01	1
Ethylbenzene	1.9		0.40	0.063	ppb v/v			05/31/18 01:01	1
Toluene	1.1		0.40	0.051	ppb v/v			05/31/18 01:01	1
m,p-Xylene	8.3		0.80	0.10	ppb v/v			05/31/18 01:01	1
o-Xylene	2.1		0.40	0.054	ppb v/v			05/31/18 01:01	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	251	X	70 - 130					05/31/18 01:01	1
1,2-Dichloroethane-d4 (Surr)	226	X	70 - 130					05/31/18 01:01	1
Toluene-d8 (Surr)	106		70 - 130					05/31/18 01:01	1

Method: TO-15 - Volatile Organity Analyte TPH (as Gasoline)	•	unds in An Qualifier	nbient Air - D RL 990	MDL	Unit ppb v/v	<u>D</u> .	Prepared	Analyzed 05/31/18 08:27	<b>Dil Fac</b> 9.92
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	115		70 - 130			=		05/31/18 08:27	9.92
1,2-Dichloroethane-d4 (Surr)	107		70 - 130					05/31/18 08:27	9.92
Toluene-d8 (Surr)	98		70 - 130					05/31/18 08:27	9.92

Method: D1946 - Fixed Gases	in Air (GC)							
Analyte	Result Qualific	er RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.35 J	0.90	0.019	% v/v			05/23/18 09:53	1.79
Methane (FID)	0.0011	0.00018	0.000036	% v/v			05/23/18 13:20	1.79
Oxygen	18	0.36	0.013	% v/v			05/23/18 09:53	1.79

**Client Sample ID: VSP-802** Lab Sample ID: 320-39559-2 Matrix: Air

Date Collected: 05/17/18 17:05 Date Received: 05/19/18 09:15

**O**xygen

Sample Container: Summa Canister 11

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.087	J	0.40	0.079	ppb v/v			05/31/18 01:59	1
Ethylbenzene	0.12	J	0.40	0.063	ppb v/v			05/31/18 01:59	1
Toluene	0.14	J	0.40	0.051	ppb v/v			05/31/18 01:59	1
m,p-Xylene	0.23	J	0.80	0.10	ppb v/v			05/31/18 01:59	1
o-Xylene	0.069	J	0.40	0.054	ppb v/v			05/31/18 01:59	1
TPH (as Gasoline)	280		100	40	ppb v/v			05/31/18 01:59	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130					05/31/18 01:59	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130					05/31/18 01:59	1
Toluene-d8 (Surr)	101		70 - 130					05/31/18 01:59	1
Method: D1946 - Fixed Gas	ses in Air (GC)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.39	J	1.1	0.024	% v/v			05/23/18 10:07	2.22
	0.0010		0.00022	0.000044	01 1			05/23/18 13:33	2.22

0.44

0.016 % v/v

18

TestAmerica Sacramento

2.22

05/23/18 10:07

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# **Surrogate Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-39559-1

# Method: TO-15 - Volatile Organic Compounds in Ambient Air

Matrix: Air Prep Type: Total/NA

			Percent Surrogate Recovery (Acceptance Limits)						
		BFB	DCA	TOL					
Lab Sample ID	Client Sample ID	(70-130)	(70-130)	(70-130)					
320-39559-1	VSP-801	251 X	226 X	106					
320-39559-1 - DL	VSP-801	115	107	98					
320-39559-2	VSP-802	94	101	101					
LCS 320-226146/4	Lab Control Sample	113	146 X	106					
LCS 320-226146/6	Lab Control Sample	107	109	101					
LCSD 320-226146/5	Lab Control Sample Dup	113	146 X	104					
LCSD 320-226146/7	Lab Control Sample Dup	108	109	103					
MB 320-226146/13	Method Blank	86	100	101					

#### Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

DCA = 1,2-Dichloroethane-d4 (Surr)

TOL = Toluene-d8 (Surr)

TestAmerica Sacramento

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5/31/2018

TestAmerica Job ID: 320-39559-1

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

# Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-226146/13

**Matrix: Air** 

Analysis Batch: 226146

Client Sam	ole ID: I	<b>Meth</b>	od Blan	k
	Prep Ty	ype:	Total/N	4

**Client Sample ID: Lab Control Sample** 

70 - 130

105

ppb v/v

<b>,</b>	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.40	0.079	ppb v/v			05/30/18 20:31	1
Ethylbenzene	ND		0.40	0.063	ppb v/v			05/30/18 20:31	1
Toluene	ND		0.40	0.051	ppb v/v			05/30/18 20:31	1
m,p-Xylene	ND		0.80	0.10	ppb v/v			05/30/18 20:31	1
o-Xylene	ND		0.40	0.054	ppb v/v			05/30/18 20:31	1
TPH (as Gasoline)	ND		100	40	ppb v/v			05/30/18 20:31	1

MB MB

ı							
	Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
	4-Bromofluorobenzene (Surr)	86		70 - 130	<del></del>	5/30/18 20:31	1
	1,2-Dichloroethane-d4 (Surr)	100		70 - 130	0	5/30/18 20:31	1
	Toluene-d8 (Surr)	101		70 - 130	0	5/30/18 20:31	1

Lab Sample ID: LCS 320-226146/4

TPH (as Gasoline)

Matrix: Air							Prep Type: Total/NA
Analysis Batch: 226146							
	Spike	LCS	LCS				%Rec.
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits

5230

5000

LCS LCS Surrogate %Recovery Qualifier Limits 70 - 130 4-Bromofluorobenzene (Surr) 113 1,2-Dichloroethane-d4 (Surr) 146 X 70 - 130 Toluene-d8 (Surr) 70 - 130 106

Analysis Batch: 226146

Lab Sample ID: LCS 320-226146/6	Client Sample ID: Lab Control Sample
Matrix: Air	Prep Type: Total/NA

•	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzene	20.0	21.9		ppb v/v		110	68 - 128	
Ethylbenzene	20.0	22.0		ppb v/v		110	64 - 124	
Toluene	20.0	20.8		ppb v/v		104	68 - 128	
m,p-Xylene	40.0	42.9		ppb v/v		107	65 - 125	
o-Xylene	20.0	21.1		ppb v/v		105	65 - 125	

	LCS	LCS	
Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	107		70 - 130
1,2-Dichloroethane-d4 (Surr)	109		70 - 130
Toluene-d8 (Surr)	101		70 130

Lab Sample ID: LCSD 320-226146/5

**Matrix: Air** 

Analysis Batch: 226146									
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
TPH (as Gasoline)	5000	5250		ppb v/v		105	70 - 130		25

TestAmerica Sacramento

Prep Type: Total/NA

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

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TestAmerica Job ID: 320-39559-1

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

## Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-226146/5

**Matrix: Air** 

**Analysis Batch: 226146** 

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

LCSD LCSD Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 70 - 130 113 1,2-Dichloroethane-d4 (Surr) 146 X 70 - 130 Toluene-d8 (Surr) 70 - 130 104

Lab Sample ID: LCSD 320-226146/7

**Matrix: Air** 

**Analysis Batch: 226146** 

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

Client Sample ID: Method Blank

**Client Sample ID: Lab Control Sample** 

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

**Prep Type: Total/NA** 

**Prep Type: Total/NA** 

Prep Type: Total/NA

	Spike	LCSD L	.CSD			%Rec.		RPD
Analyte	Added	Result Q	Qualifier Uni	t D	%Rec	Limits	RPD	Limit
Benzene	20.0	22.2	ppb	v/v	111	68 - 128	1	25
Ethylbenzene	20.0	21.1	ppb	v/v	106	64 - 124	4	25
Toluene	20.0	21.0	ppb	v/v	105	68 - 128	1	25
m,p-Xylene	40.0	41.3	ppb	v/v	103	65 - 125	4	25
o-Xylene	20.0	20.3	ppb	v/v	101	65 - 125	4	25

LCSD LCSD

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	108		70 - 130
1,2-Dichloroethane-d4 (Surr)	109		70 - 130
Toluene-d8 (Surr)	103		70 - 130

Method: D1946 - Fixed Gases in Air (GC)

Lab Sample ID: MB 320-224136/6

**Matrix: Air** 

Analysis Batch: 224136

MB MB

Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane (FID)	ND ND	0.00010	0.000020	% v/v			05/23/18 11:52	1

Lab Sample ID: LCS 320-224136/3

Matrix: Air

Analysis Batch: 224136						
_	Spike	LCS LC	CS		%Rec.	
Analyte	Added	Result Q	ualifier Unit	D %Rec	Limits	
Methane (FID)	0.0250	0.0233	% v/v	93	80 - 120	

Lab Sample ID: LCSD 320-224136/4

Matrix: Air

Analysis Ratch: 22/136

Allai	7313	Dateii.	227100	
_				

	Spike	LCSD LCSD			%Rec.		RPD
Analyte	Added	Result Qualifier	Unit	D %Rec	Limits	RPD	Limit
Methane (FID)	0.0250	0.0259	% v/v	104	80 - 120	11	20

TestAmerica Sacramento

5/31/2018

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# QC Sample Results

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-39559-1

# Method: D1946 - Fixed Gases in Air (GC) (Continued)

Lab Sample ID: MB 320-224915/11 Client Sample ID: Method Blank **Matrix: Air Prep Type: Total/NA** 

**Analysis Batch: 224915** 

	MB	MR							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	ND		0.50	0.011	% v/v			05/23/18 09:13	1
Methane (TCD)	ND		0.50	0.14	% v/v			05/23/18 09:13	1
Oxygen	ND		0.20	0.0074	% v/v			05/23/18 09:13	1

Lab Sample ID: LCS 320-224915/2 **Client Sample ID: Lab Control Sample Matrix: Air Prep Type: Total/NA** 

**Analysis Batch: 224915** 

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Carbon Dioxide (TCD)	24.4	24.3		% v/v	_	99	80 - 120	
Methane (TCD)	26.1	24.4		% v/v		93	80 - 120	

Lab Sample ID: LCS 320-224915/5 **Client Sample ID: Lab Control Sample Matrix: Air** Prep Type: Total/NA **Analysis Batch: 224915** Spike LCS LCS %Rec.

Analyte Added Result Qualifier Limits Unit D %Rec 15.9 13.8 % v/v 87 80 - 120 Oxygen

Lab Sample ID: LCSD 320-224915/3 Client Sample ID: Lab Control Sample Dup **Matrix: Air** Prep Type: Total/NA

**Analysis Batch: 224915** Spike LCSD LCSD %Rec. **RPD** Added Analyte Result Qualifier Unit D %Rec Limits RPD Limit 24.4 24.2 % v/v Carbon Dioxide (TCD) 99 80 - 120 20 0 Methane (TCD) 26.1 24.4 % v/v 93 80 - 120 20

Lab Sample ID: LCSD 320-224915/6 Client Sample ID: Lab Control Sample Dup Matrix: Air Prep Type: Total/NA **Analysis Batch: 224915** 

LCSD LCSD RPD Spike %Rec. Analyte Added Result Qualifier Unit %Rec Limits RPD Limit 80 - 120 Oxygen 15.9 13.8 % v/v 87

# **QC Association Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-39559-1

# Air - GC/MS VOA

## Analysis Batch: 226146

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-39559-1	VSP-801	Total/NA	Air	TO-15	
320-39559-1 - DL	VSP-801	Total/NA	Air	TO-15	
320-39559-2	VSP-802	Total/NA	Air	TO-15	
MB 320-226146/13	Method Blank	Total/NA	Air	TO-15	
LCS 320-226146/4	Lab Control Sample	Total/NA	Air	TO-15	
LCS 320-226146/6	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-226146/5	Lab Control Sample Dup	Total/NA	Air	TO-15	
LCSD 320-226146/7	Lab Control Sample Dup	Total/NA	Air	TO-15	

# Air - GC VOA

## **Analysis Batch: 224136**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-39559-1	VSP-801	Total/NA	Air	D1946	
320-39559-2	VSP-802	Total/NA	Air	D1946	
MB 320-224136/6	Method Blank	Total/NA	Air	D1946	
LCS 320-224136/3	Lab Control Sample	Total/NA	Air	D1946	
LCSD 320-224136/4	Lab Control Sample Dup	Total/NA	Air	D1946	

## **Analysis Batch: 224915**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-39559-1	VSP-801	Total/NA	Air	D1946	
320-39559-2	VSP-802	Total/NA	Air	D1946	
MB 320-224915/11	Method Blank	Total/NA	Air	D1946	
LCS 320-224915/2	Lab Control Sample	Total/NA	Air	D1946	
LCS 320-224915/5	Lab Control Sample	Total/NA	Air	D1946	
LCSD 320-224915/3	Lab Control Sample Dup	Total/NA	Air	D1946	
LCSD 320-224915/6	Lab Control Sample Dup	Total/NA	Air	D1946	

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### **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Analysis

D1946

**Client Sample ID: VSP-801** 

TestAmerica Job ID: 320-39559-1

Lab Sample ID: 320-39559-1

05/23/18 09:53 NS1

Matrix: Air

Date Collected: 05/17/18 17:00 Date Received: 05/19/18 09:15

50 mL

224915

Batch Batch Dil Initial Final Batch Prepared **Prep Type** Method Number Type Run **Factor Amount Amount** or Analyzed Analyst Lab Total/NA Analysis TO-15 446 mL 250 mL 226146 05/31/18 01:01 AP1 TAL SAC TO-15 Total/NA Analysis DL 9.92 45 mL 250 mL 226146 05/31/18 08:27 AP1 TAL SAC Total/NA Analysis D1946 1.79 50 mL 50 mL 224136 05/23/18 13:20 NS1 TAL SAC

1.79

Client Sample ID: VSP-802 Lab Sample ID: 320-39559-2

Date Collected: 05/17/18 17:05 Matrix: Air

50 mL

Date Received: 05/19/18 09:15

Total/NA

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	555 mL	250 mL	226146	05/31/18 01:59	AP1	TAL SAC
Total/NA	Analysis	D1946		2.22	50 mL	50 mL	224136	05/23/18 13:33	NS1	TAL SAC
Total/NA	Analysis	D1946		2.22	50 mL	50 mL	224915	05/23/18 10:07	NS1	TAL SAC

**Laboratory References:** 

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

TAL SAC

# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 320-39559-1

Project/Site: Chevron Edmonds Terminal

# **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
Arizona	State Program	9	AZ0708	08-11-18
Arkansas DEQ	State Program	6	88-0691	06-17-19
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-18
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-18
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
L-A-B	DoD ELAP		L2468	01-20-21
Louisiana	NELAP	6	30612	06-30-18
Maine	State Program	1	1 CA0004	
Michigan	State Program	5 9947		01-31-20
Nevada	State Program	9	CA00044	07-31-18
New Hampshire	NELAP	1	2997	04-18-19
New Jersey	NELAP	2	CA005	06-30-18
New York	NELAP	2	11666	03-31-19
Dregon	NELAP	10	4040	01-29-19
Pennsylvania	NELAP	3	68-01272	03-31-19
Texas	NELAP	6	T104704399	05-31-19
JS Fish & Wildlife	Federal		LE148388-0	07-31-18
USDA	Federal		P330-11-00436	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
√irginia	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

# **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>	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
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

TestAmerica Sacramento

# **Method Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-39559-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL SAC
D1946	Fixed Gases in Air (GC)	ASTM	TAL SAC

### **Protocol References:**

ASTM = ASTM International

EPA = US Environmental Protection Agency

### Laboratory References:

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

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### **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-39559-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-39559-1	VSP-801	Air	05/17/18 17:00	05/19/18 09:15
320-39559-2	VSP-802	Air	05/17/18 17:05	05/19/18 09:15

Form No. CA-C-WI-003, Rev. 1, dated 05/10/2013

13141516

81/2/4 83

340019 53

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Canister Canister

2828

# Canister Samples Chain of Custody Record

TestAmerica Sacramento

880 Riverside Parkway

TestAmerica THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples

TestAmerica Laboratories, Inc. methane, Dz, CO2 Other= Fixed bas (See below for Add'l Items) \$ TPH-6 Sample Specific Notes: Fox COCS EPA TO-15 For Lab Use Only: l of Job / SDG No.: Walk-in Client: ab Sampling: BTEX TA-54C COC No: 320-39559 Chain of Custody Ofher (Please specify in notes section) 51:60 81/61/6 eso liitbas. 5.18.18 05.80 TIA InsidmA F Sample Type エナン Office section) in notes section) 1 Sala STAPES 大田の C-O. 81/S1 A 43 888E / Stef / 94et-d MTSA Jason EPA 25C / 25.3 Se Le EPA 3C amet HAA-AM (WIS / MO7 / PIS / POW) SI-O. Samples Received by: Samples Collected By: FF00 | 853 \$202 Canister Received by: Received by: Flow 9 Canister Canister Vacuum in Vacuum in Field, 'Hg Field, 'Hg (Start)' (Stop)' Temperature (Fahrenheit) Temperature (Fahrenheit) いって F Ambient Ambient Anaylsis Turnaround Time Scott Time Standard (Specific): Date/Time: Date / Time: Date / Time: Opened by: Rush (Specifiy): Time Start 5/14/18/1705 Project Manager: 5/14/18 1700 Interior Interior Site Contact: TA Contact: Sample Date(s) Phone: Email: Start Start Stop Stop 5 Suresoo Special Instructions/QC Requirements & Comments: おはら Project Name: Edwonds Terming Site/Location: 1770 United Pd Address: WOO BLINE WAY 9.8101 City/State/Zip Scottle WAY 9.8101 Shipper Name 3 Sample Identification West Sacramento, CA 95605 phone 916.374.4378 fax 916.372.1059 Company Name: A Irc ad is 802 Client Contact Information USP-821 Samples Relinquished by: Samples Shipped by 150 ab Use Only: Phone: # O d -AX: 光

### **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 320-39559-1

Login Number: 39559 List Source: TestAmerica Sacramento

List Number: 1

Creator: James, Emily M

Answer	Comment
True	
True	506653
N/A	
True	
N/A	
N/A	
N/A	
True	
True	
True	
True	
False	IDs on containers do not match the COC. Logged in per COC.
True	
N/A	
True	
True	
True	
True	
N/A	
	True  True  N/A  True  N/A  N/A  N/A  True

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# Sacramento 1 Liter Canister QC Certification Batch Certification

Date Cleaned/Batch ID	D03-23-18 320-37470	
Date of QC	4/5/18	
Data File Number	1 MSDCUCH 1 DATA 180405	320-37470 Chain of Custody

(File ID for certification analysis of canister designated below)

### **CANISTER ID NUMBERS**

*	34001642 M59040508. d	34001940
	8282	34001632
	34000633	34001000
	34001953	34000238
	34000641	34000909
	34000661	34001634
	7566	8522
	34001245	34001936

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"*" INDICATES THE CA	N OR CANS WHICH WERE SCREENED.
Mylu	4/6/18
1 <sup>st</sup> level Reviewed By:	Date:
Ton	ulizh
2nd level Reviewed By:	Date:

P:\DOCUMENTS\QC SHEETS\QA-814-A 1-LITER BATCH CAN QC 20171023A.DOC QA-814 A

RE 10232017

# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento	Job No.: 320-37470-1
SDG No.:	
Client Sample ID: 34001642	Lab Sample ID: 320-37470-1
Matrix: Air	Lab File ID: MS9040508.D
Analysis Method: TO-15	Date Collected: 03/23/2018 00:00
Sample wt/vol: 500 (mL)	Date Analyzed: 04/05/2018 19:11
Soil Aliquot Vol:	Dilution Factor: 1
Soil Extract Vol.:	GC Column: RTX-Volatiles ID: 0.32 (mm)
% Moisture:	Level: (low/med) Low
Analysis Batch No.: 216518	Units: ppb v/v

narysis bac	CCN NO.: 216518	nits: ppb v/v			
CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.36	J	5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.13
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.11
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	ND		0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.06
75-45-6	Chlorodifluoromethane	ND		0.80	0.2
75-00-3	Chloroethane	ND		0.80	0.31
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.084
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.05
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroetha	ND		0.40	0.1
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.13
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.1
75-71-8	Dichlorodifluoromethane	ND		0.40	0.1
75-34-3	1,1-Dichloroethane	ND		0.30	0.07
	The state of the s	1			

FORM I TO-15

# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-37470-1 SDG No.: Client Sample ID: 34001642 Lab Sample ID: 320-37470-1 Matrix: Air Lab File ID: MS9040508.D Analysis Method: TO-15 Date Collected: 03/23/2018 00:00 Sample wt/vol: 500(mL) Date Analyzed: 04/05/2018 19:11 Soil Aliquot Vol: Dilution Factor: 1 GC Column: RTX-Volatiles ID: 0.32(mm) Soil Extract Vol.: % Moisture: Level: (low/med) Low Analysis Batch No.: 216518 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.07
591-78-6	2-Hexanone	ND		0.40	0.08
98-82-8	Isopropylbenzene	ND		0.80	0.1
99-87-6	4-Isopropyltoluene	ND		0.80	0.13
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.13
80-62-6	Methyl methacrylate	ND		0.80	0.1
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.1
75-09-2	Methylene Chloride	ND		0.40	0.07
98-83-9	alpha-Methylstyrene	ND		0.40	0.06
91-20-3	Naphthalene	ND		0.80	0.5
111-65-9	n-Octane	ND		0.40	0.05
109-66-0	n-Pentane	ND		0.80	0.2
115-07-1	Propylene	ND		0.40	0.09
103-65-1	N-Propylbenzene	ND		0.40	0.05
100-42-5	Styrene	ND		0.40	0.05
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.06
127-18-4	Tetrachloroethene	ND		0.40	0.05
109-99-9	Tetrahydrofuran	ND		0.80	0.2
108-88-3	Toluene	ND		0.40	0.05
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethan e	ND		0.40	0.1
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.4
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.06
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.06

FORM I TO-15

### 2

# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento

SDG No.:

Client Sample ID: 34001642

Lab Sample ID: 320-37470-1

Matrix: Air

Lab File ID: MS9040508.D

Analysis Method: TO-15

Date Collected: 03/23/2018 00:00

Sample wt/vol: 500(mL)

Date Analyzed: 04/05/2018 19:11

Soil Aliquot Vol:

Soil Extract Vol.:

GC Column: RTX-Volatiles ID: 0.32(mm)

% Moisture:

Level: (low/med) Low

Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND	Ī	0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054
1330-20-7	Xylenes, Total	ND		1.2	0.074

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	95		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	101		70-130
2037-26-5	Toluene-d8 (Surr)	100		70-130

Report Date: 06-Apr-2018 06:58:49 Chrom Revision: 2.2 13-Mar-2018 08:45:20

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \ChromNA\Sacramento\ChromData\ATMS9\20180405-56291.b\MS9040508.D

Lims ID: 320-37470-A-1
Client ID: 34001642
Sample Type: Client

Inject. Date: 05-Apr-2018 19:11:30 ALS Bottle#: 6 Worklist Smp#: 6

Purge Vol: 5.000 mL Dil. Factor: 1.0000

Sample Info: 320-37470-A-1

Misc. Info.: 500 mL CAN CERT

Operator ID: LHS Instrument ID: ATMS9

Method: \ChromNA\Sacramento\ChromData\ATMS9\20180405-56291.b\TO15\_ATMS9N.m

Limit Group: MSA - TO15 - ICAL

Last Update:06-Apr-2018 06:58:33Calib Date:05-Apr-2018 16:34:30Integrator:RTEID Type:Deconvolution IDQuant Method:Internal StandardQuant By:Initial CalibrationLast ICal File:\ChromNA\Sacramento\ChromData\ATMS9\20180405-56291.b\MS9040505.D

Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN

Process Host: XAWRK008

First Level Reviewer: phanthasena Date: 06-Apr-2018 12:39:20

		RT	Adj RT	Dlt RT			OnCol Amt	
Compound	Sig	(min.)	(min.)	(min.)	Q	Response	ppb v/v	Flags
<ul><li>1 Chlorobromomethane (IS)</li></ul>	130	12.312	12.312	0.000	96	39813	4.00	
<ul><li>* 2 1,4-Difluorobenzene</li></ul>	114	14.405	14.405	0.000	100	167532	4.00	
* 3 Chlorobenzene-d5 (IS)	117	20.330	20.324	0.006	99	97112	4.00	
\$ 41,2-Dichloroethane-d4 (Sur	65	13.480	13.480	0.000	97	58673	4.04	
\$ 5 Toluene-d8 (Surr)	100	17.568	17.569	-0.001	98	77488	3.99	
\$ 6 4-Bromofluorobenzene (Surr	174	22.259	22.259	0.000	97	34310	3.81	
31 Acetone	43	7.689	7.695	-0.006	94	9579	0.3625	
47 Methylene Chloride	49	8.893	8.881	0.012	6	671	0.0445	
126 1,2,4-Trichlorobenzene	180	26.694	26.694	0.000	78	493	0.0314	
Reagents:								

VAMSIS20\_00137 Amount Added: 50.00 Units: mL Run Reagent

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Report Date: 06-Apr-2018 06:58:49 Chrom Revision: 2.2 13-Mar-2018 08:45:20

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180405-56291.b\MS9040508.D

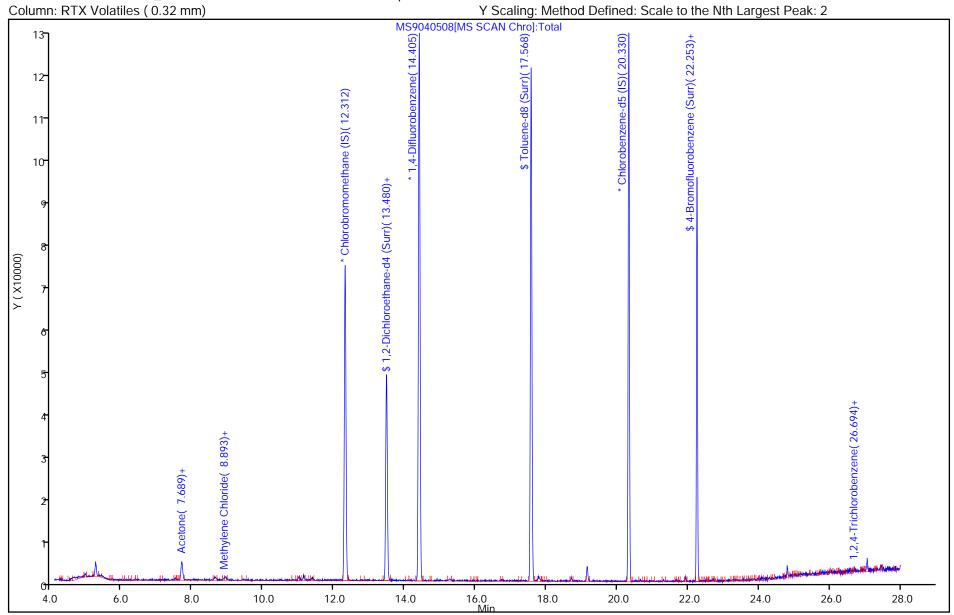
 Injection Date:
 05-Apr-2018 19:11:30
 Instrument ID:
 ATMS9
 Operator ID:
 LHS

 Lims ID:
 320-37470-A-1
 Lab Sample ID:
 320-37470-1
 Worklist Smp#:
 6

Client ID: 34001642

Purge Vol: 5.000 mL Dil. Factor: 1.0000 ALS Bottle#: 6

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL



TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180405-56291.b\MS9040508.D Injection Date: 05-Apr-2018 19:11:30 Instrument ID: ATMS9 Lims ID: 320-37470-A-1 Lab Sample ID: 320-37470-1 Client ID: 34001642 Operator ID: LHS ALS Bottle#: Worklist Smp#: 6 6 Dil. Factor: Purge Vol: 5.000 mL 1.0000 Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL Column: RTX Volatiles (0.32 mm) Detector MS SCAN 31 Acetone, CAS: 67-64-1 Raw Spec:Scan 593(7.69) m/z 43.0 28 43 24 24 Y (X100) 20 20 16 16 12 12 58 40 44 0 30 34 38 42 50 54 58 7.1 7.4 7.7 8.0 46 Amdis Enhanced Spec: Scan 593(7.69), Qvalue=94 m/z 58.0 12 43 91 10 78 Y (X10) Y (X100) 65<del>-</del> 52 58 39 26 13 0 0 8.0 34 42 50 54 58 30 38 46 7.1 7.4 7.7 31 Acetone (NIST14.L) Ref Spec: 43 91 78 (X100) 65<del>-</del> 52 39 26 58 13 30 34 38 50 54 58 42 46 m/z 43.0 Differenc Spec:Scan 1 @ 7.690 min.(Qvalue: 94) 100m/z 58.0 28 75<del>-</del> 24 Y (X100) 50 20 25 58 16 12 -25 -50**-**-75 -100 <del>-</del> 30 34 38 42 46 50 54 58 7.1 7.4 7.7 8.0

Chrom Revision: 2.2 13-Mar-2018 08:45:20

Report Date: 06-Apr-2018 06:58:49

**User Disabled Compound Report** 

### TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180405-56291.b\MS9040508.D

Injection Date: 05-Apr-2018 19:11:30 Instrument ID: ATMS9 Lims ID: 320-37470-A-1 Lab Sample ID: 320-37470-1

34001642 Client ID:

ALS Bottle#: Operator ID: LHS Worklist Smp#: 6 6

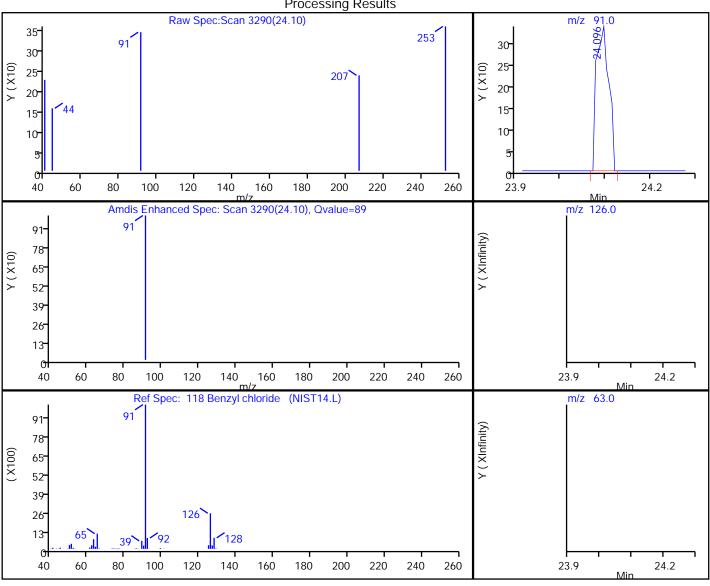
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

### 118 Benzyl chloride, CAS: 100-44-7

### **Processing Results**



RT	Mass	Response	Amount
24.10	91.00	647	0.023121
24.10	126.00	0	
24.10	63.00	0	

Reviewer: phanthasena, 06-Apr-2018 12:39:20

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

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TestAmerica Sacramento

Data File: \ChromNA\Sacramento\ChromData\ATMS9\20180405-56291.b\MS9040508.D

Client ID: 34001642

Operator ID: LHS ALS Bottle#: 6 Worklist Smp#: 6

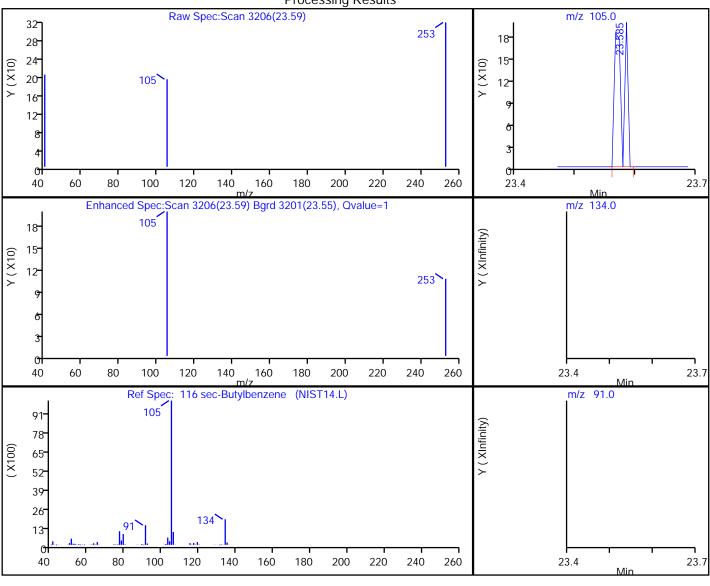
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

### 116 sec-Butylbenzene, CAS: 135-98-8

### **Processing Results**



RT	Mass	Response	Amount
23.59	105.00	196	0.003091
23.58	134.00	0	
23.58	91.00	0	

Reviewer: phanthasena, 06-Apr-2018 12:39:20

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

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**User Disabled Compound Report** 

### TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180405-56291.b\\MS9040508.D

Injection Date: 05-Apr-2018 19:11:30 Instrument ID: ATMS9 Lims ID: 320-37470-A-1 Lab Sample ID: 320-37470-1

34001642 Client ID:

ALS Bottle#: Operator ID: LHS Worklist Smp#: 6 6

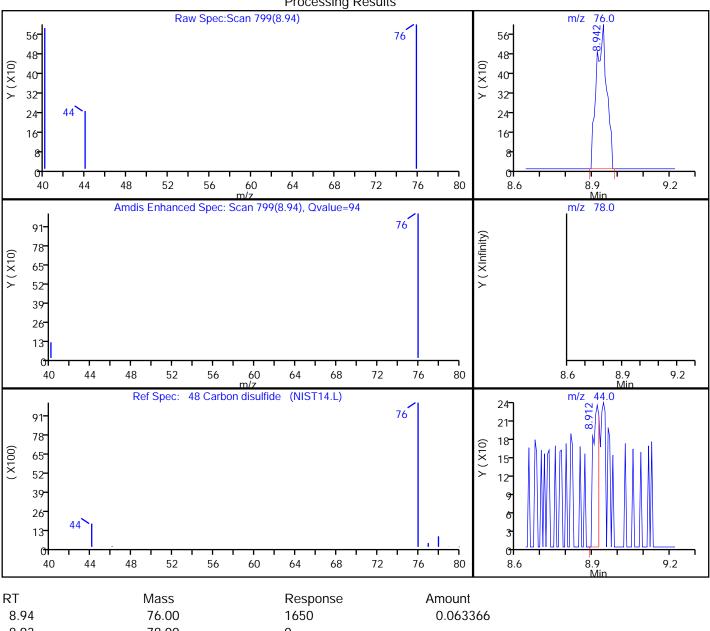
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

### 48 Carbon disulfide, CAS: 75-15-0

### **Processing Results**



8.93 78.00 0 8.91 44.00 372

Reviewer: phanthasena, 06-Apr-2018 12:39:20

Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

5/31/2018

Chrom Revision: 2.2 13-Mar-2018 08:45:20 **User Disabled Compound Report** 

### TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180405-56291.b\\MS9040508.D

Injection Date: 05-Apr-2018 19:11:30 Instrument ID: ATMS9 Lims ID: 320-37470-A-1 Lab Sample ID: 320-37470-1

34001642 Client ID:

ALS Bottle#: Operator ID: LHS Worklist Smp#: 6 6

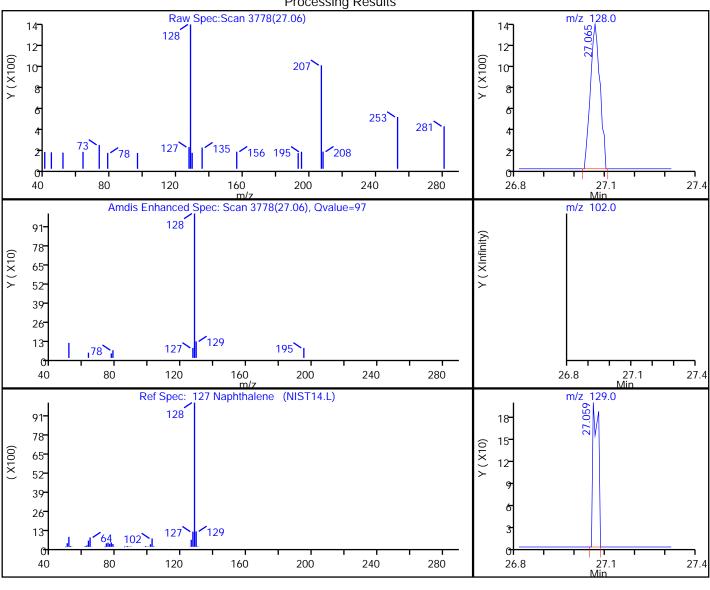
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

### 127 Naphthalene, CAS: 91-20-3

### **Processing Results**



RT	Mass	Response	Amount
27.06	128.00	3092	0.067371
27.07	102.00	0	
27.06	129.00	258	

Reviewer: phanthasena, 06-Apr-2018 12:39:20 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

**User Disabled Compound Report** 

### TestAmerica Sacramento

\\ChromNA\Sacramento\ChromData\ATMS9\20180405-56291.b\\MS9040508.D Data File:

Injection Date: 05-Apr-2018 19:11:30 Instrument ID: ATMS9 Lims ID: 320-37470-A-1 Lab Sample ID: 320-37470-1

34001642 Client ID:

ALS Bottle#: Operator ID: LHS Worklist Smp#: 6 6

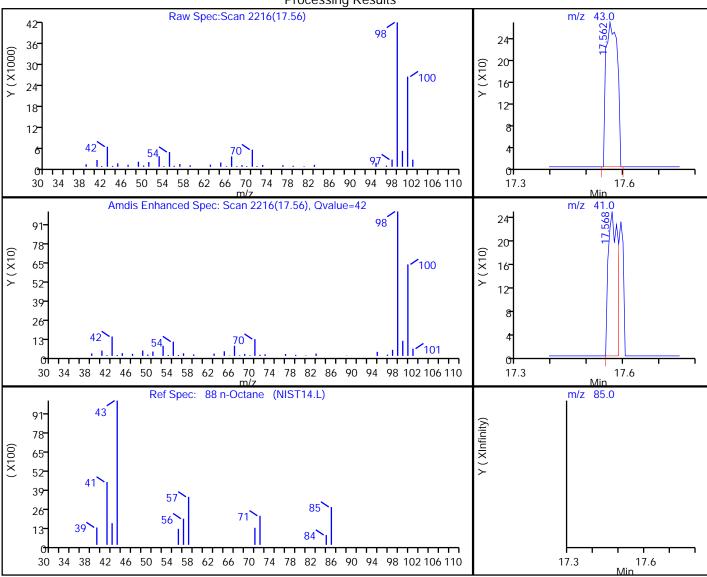
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

### 88 n-Octane, CAS: 111-65-9

### **Processing Results**



RT	Mass	Response	Amount
17.56	43.00	590	0.019884
17.57	41.00	441	
17.57	85.00	0	

Reviewer: phanthasena, 06-Apr-2018 12:39:20 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

### TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180405-56291.b\MS9040508.D

Injection Date: 05-Apr-2018 19:11:30 Instrument ID: ATMS9 Lims ID: 320-37470-A-1 Lab Sample ID: 320-37470-1

34001642 Client ID:

ALS Bottle#: Operator ID: LHS Worklist Smp#: 6 6

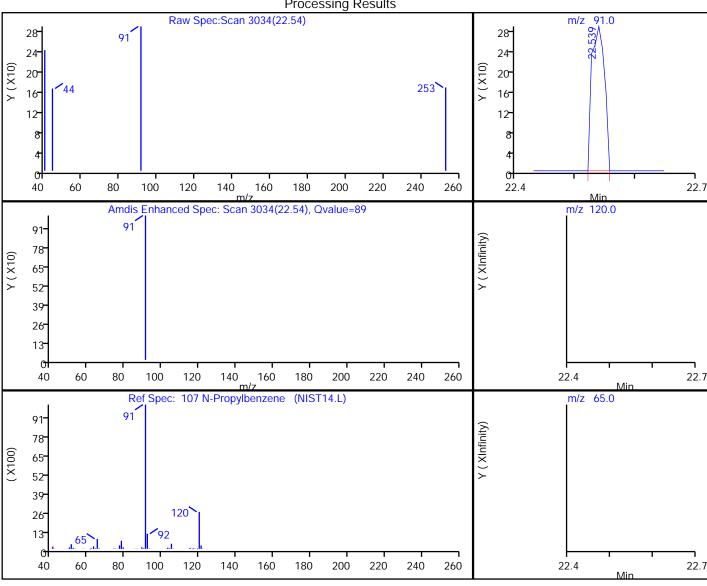
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

### 107 N-Propylbenzene, CAS: 103-65-1

### **Processing Results**



RT	Mass	Response	Amount
22.54	91.00	425	0.006467
22.54	120.00	0	
22.54	65.00	0	

Reviewer: phanthasena, 06-Apr-2018 12:39:20

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID



THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento 880 Riverside Parkway West Sacramento, CA 95605 Tel: (916)373-5600

TestAmerica Job ID: 320-41619-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elaine Walker

Authorized for release by: 8/15/2018 5:14:37 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

..... LINKS .....

Review your project results through
Total Access

**Have a Question?** 



Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page. 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.

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### **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-41619-1

### **Qualifiers**

### Air - GC/MS VOA

Qualifier **Qualifier Description** 

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Air - GC VOA

Qualifier **Qualifier Description** 

Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### **Glossary**

Listed under the "D" column to designate that the result is reported on a dry weight basis

%R Percent Recovery CFL Contains Free Liquid Contains No Free Liquid **CNF** 

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

Decision Level Concentration (Radiochemistry) DLC

**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 Minimum Level (Dioxin) MLNC

Not Calculated

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

**PQL Practical Quantitation Limit** 

**Quality Control** QC

Relative Error Ratio (Radiochemistry) **RER** 

Reporting Limit or Requested Limit (Radiochemistry) RL

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

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

TestAmerica Sacramento

8/15/2018

Page 3 of 30

### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-41619-1

Job ID: 320-41619-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-41619-1

### Receipt

Two samples were received on 7/31/2018 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

### Air - GC VOA

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

### Air - GC/MS VOA

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

### **Detection Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

**Client Sample ID: VSP-801** 

TestAmerica Job ID: 320-41619-1

Lab Sample ID: 320-41619-1

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D Meth	nod	Prep Type
Benzene	46	6.3	1.2	ppb v/v	15.7	TO-1	5	Total/NA
Ethylbenzene	51	6.3	0.99	ppb v/v	15.7	TO-1	15	Total/NA
m,p-Xylene	170	13	1.6	ppb v/v	15.7	TO-1	5	Total/NA
o-Xylene	28	6.3	0.85	ppb v/v	15.7	TO-1	5	Total/NA
TPH (as Gasoline)	17000	1600	630	ppb v/v	15.7	TO-1	5	Total/NA
Carbon Dioxide (TCD)	0.45 J	0.79	0.017	% v/v	1.57	D194	<b>1</b> 6	Total/NA
Methane (FID)	0.00080	0.00016	0.000031	% v/v	1.57	D194	16	Total/NA
Oxygen	18	0.31	0.012	% v/v	1.57	D194	<b>1</b> 6	Total/NA

Client Sample ID: VSP-802 Lab Sample ID: 320-41619-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Benzene	0.21	$\overline{J}$	0.40	0.079	ppb v/v		TO-15	Total/NA
Ethylbenzene	1.3		0.40	0.063	ppb v/v	1	TO-15	Total/NA
Toluene	1.6		0.40	0.051	ppb v/v	1	TO-15	Total/NA
m,p-Xylene	5.3		0.80	0.10	ppb v/v	1	TO-15	Total/NA
o-Xylene	1.9		0.40	0.054	ppb v/v	1	TO-15	Total/NA
TPH (as Gasoline)	280		100	40	ppb v/v	1	TO-15	Total/NA
Carbon Dioxide (TCD)	0.75	J	0.83	0.018	% v/v	1.66	D1946	Total/NA
Methane (FID)	0.0025		0.00017	0.000033	% v/v	1.66	D1946	Total/NA
Oxygen	17		0.33	0.012	% v/v	1.66	D1946	Total/NA

This Detection Summary does not include radiochemical test results.

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### **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-41619-1

Lab Sample ID: 320-41619-1

Matrix: Air

Date Collected: 07/26/18 12:45 Date Received: 07/31/18 09:00

Client Sample ID: VSP-801

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	46		6.3	1.2	ppb v/v			08/15/18 05:44	15.7
Ethylbenzene	51		6.3	0.99	ppb v/v			08/15/18 05:44	15.7
Toluene	ND		6.3	0.80	ppb v/v			08/15/18 05:44	15.7
m,p-Xylene	170		13	1.6	ppb v/v			08/15/18 05:44	15.7
o-Xylene	28		6.3	0.85	ppb v/v			08/15/18 05:44	15.7
TPH (as Gasoline)	17000		1600	630	ppb v/v			08/15/18 05:44	15.7
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		70 - 130			-		08/15/18 05:44	15.7
1,2-Dichloroethane-d4 (Surr)	93		70 - 130					08/15/18 05:44	15.7
Toluene-d8 (Surr)	98		70 - 130					08/15/18 05:44	15.7
Method: D1946 - Fixed Gas	ses in Air (GC)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.45	J	0.79	0.017	% v/v			08/02/18 09:41	1.57
Methane (FID)	0.00080		0.00016	0.000031	% v/v			08/09/18 10:19	1.57
Oxygen	18		0.31	0.012	% v/v			08/02/18 09:41	1.57

**Client Sample ID: VSP-802** Lab Sample ID: 320-41619-2 Matrix: Air

Date Collected: 07/26/18 12:55 Date Received: 07/31/18 09:00

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.21	J	0.40	0.079	ppb v/v			08/15/18 06:41	1
Ethylbenzene	1.3		0.40	0.063	ppb v/v			08/15/18 06:41	1
Toluene	1.6		0.40	0.051	ppb v/v			08/15/18 06:41	1
m,p-Xylene	5.3		0.80	0.10	ppb v/v			08/15/18 06:41	1
o-Xylene	1.9		0.40	0.054	ppb v/v			08/15/18 06:41	1
TPH (as Gasoline)	280		100	40	ppb v/v			08/15/18 06:41	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	106		70 - 130			•		08/15/18 06:41	1
1,2-Dichloroethane-d4 (Surr)	86		70 - 130					08/15/18 06:41	1
Toluene-d8 (Surr)	102		70 - 130					08/15/18 06:41	1
Method: D1946 - Fixed Gas	ses in Air (GC)								
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.75	J	0.83	0.018	% v/v			08/02/18 09:53	1.66
Methane (FID)	0.0025		0.00017	0.000033	% v/v			08/09/18 10:35	1.66
Oxygen	17		0.33	0.012	% v/v			08/02/18 09:53	1.66

### **Surrogate Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-41619-1

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

Matrix: Air Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)					
		BFB	DCA	TOL			
Lab Sample ID	Client Sample ID	(70-130)	(70-130)	(70-130)			
320-41619-1	VSP-801	103	93	98			
320-41619-2	VSP-802	106	86	102			
LCS 320-239788/4	Lab Control Sample	108	129	104			
LCS 320-239788/6	Lab Control Sample	114	98	105			
LCSD 320-239788/5	Lab Control Sample Dup	107	128	101			
LCSD 320-239788/7	Lab Control Sample Dup	114	100	103			
MB 320-239788/21	Method Blank	83	90	93			

BFB = 4-Bromofluorobenzene (Surr)

DCA = 1,2-Dichloroethane-d4 (Surr)

TOL = Toluene-d8 (Surr)

TestAmerica Job ID: 320-41619-1

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

### Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-239788/21

**Matrix: Air** 

**Analysis Batch: 239788** 

Client Sample ID: Method Blank Prep Type: Total/NA

MB MB Analyte Result Qualifier RL MDL Unit D Prepared Analyzed Dil Fac Benzene ND 0.40 0.079 ppb v/v 08/15/18 04:52 Ethylbenzene ND 08/15/18 04:52 0.40 0.063 ppb v/v ND Toluene 0.40 0.051 ppb v/v 08/15/18 04:52 m,p-Xylene ND 0.80 0.10 ppb v/v 08/15/18 04:52 o-Xylene ND 0.40 0.054 ppb v/v 08/15/18 04:52 TPH (as Gasoline) ND 100 40 ppb v/v 08/15/18 04:52

MB MB

Surrogate	%Recovery	Qualifier	Limits	Prej	pared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	83		70 - 130			08/15/18 04:52	1
1,2-Dichloroethane-d4 (Surr)	90		70 - 130			08/15/18 04:52	1
Toluene-d8 (Surr)	93		70 - 130			08/15/18 04:52	1

Lab Sample ID: LCS 320-239788/4

**Matrix: Air** 

**Analysis Batch: 239788** 

LCS LCS Spike %Rec. Added Analyte Result Qualifier Unit D %Rec Limits 5000 4180 TPH (as Gasoline) 84 70 - 130 ppb v/v

20.0

LCS LCS

Surrogate	%Recovery (	Qualifier	Limits
4-Bromofluorobenzene (Surr)	108		70 - 130
1,2-Dichloroethane-d4 (Surr)	129		70 - 130
Toluene-d8 (Surr)	104		70 - 130

Lab Sample ID: LCS 320-239788/6

Matrix: Air

Analyte

Benzene

Toluene

o-Xylene

m,p-Xylene

Ethylbenzene

**Analysis Batch: 239788** 

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

65 - 125

108

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

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

%Rec. LCS LCS Spike Added Result Qualifier Unit D %Rec Limits 20.0 20.8 ppb v/v 104 68 - 128 20.0 21.2 ppb v/v 106 64 - 124 68 - 128 20.0 22.3 111 ppb v/v 40.0 43.5 ppb v/v 109 65 - 125

ppb v/v

21.6

LCS LCS

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	114		70 - 130
1,2-Dichloroethane-d4 (Surr)	98		70 - 130
Toluene-d8 (Surr)	105		70 - 130

Lab Sample ID: LCSD 320-239788/5

**Matrix: Air** 

Analysis Batch: 239788									
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
TPH (as Gasoline)	5000	3980		ppb v/v		80	70 - 130	5	25

TestAmerica Sacramento

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Prep Type: Total/NA

TestAmerica Job ID: 320-41619-1

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCSD 320-239788/5

**Matrix: Air** 

**Analysis Batch: 239788** 

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

Prep Type: Total/NA

LCSD LCSD Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 107 70 - 130 1,2-Dichloroethane-d4 (Surr) 128 70 - 130 Toluene-d8 (Surr) 70 - 130 101

Lab Sample ID: LCSD 320-239788/7

**Matrix: Air** 

**Analysis Batch: 239788** 

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

Client Sample ID: Method Blank

Client Sample ID: Lab Control Sample

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	20.0	22.5		ppb v/v		112	68 - 128	8	25
Ethylbenzene	20.0	22.3		ppb v/v		112	64 - 124	5	25
Toluene	20.0	23.4		ppb v/v		117	68 - 128	5	25
m,p-Xylene	40.0	45.3		ppb v/v		113	65 - 125	4	25
o-Xylene	20.0	22.5		ppb v/v		112	65 - 125	4	25

LCSD LCSD Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 114 70 - 130 1,2-Dichloroethane-d4 (Surr) 100 70 - 130 70 - 130 Toluene-d8 (Surr) 103

### Method: D1946 - Fixed Gases in Air (GC)

Lab Sample ID: MB 320-237521/7

**Matrix: Air** 

Analysis Batch: 237521

	MB MB							
Analyte	Result Qualifier	RL	MDL (	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	ND ND	0.50	0.011	% v/v			08/02/18 09:11	1
Methane (TCD)	ND	0.50	0.14	% v/v			08/02/18 09:11	1
Oxygen	ND	0.20	0.0074	% v/v			08/02/18 09:11	1

Lab Sample ID: LCS 320-237521/2

Matrix: Air				Prep Type: Total/NA
Analysis Batch: 237521				
-	Spike	LCS LCS		%Rec.
Analyte	Added	Result Qualifier Unit	D %Rec	Limits

Carbon Dioxide (TCD) 24.0 24.2 % v/v 101 80 - 120 Methane (TCD) 25.6 24.0 93 80 - 120 % v/v

Lab Sample ID: LCS 320-237521/5

**Matrix: Air** 

Analysis Batch: 237521

7 maryolo Batom 201021	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Oxygen	16.2	14.0		% v/v		87	80 - 120	

TestAmerica Sacramento

8/15/2018

Prep Type: Total/NA

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### QC Sample Results

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-41619-1

### Method: D1946 - Fixed Gases in Air (GC) (Continued)

Lab Sample ID: LCSD 320-237521/3 Client Sample ID: Lab Control Sample Dup **Matrix: Air** Prep Type: Total/NA

Analysis Batch: 237521

	Spike	LCSD	LCSD				%Rec.		RPD	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Carbon Dioxide (TCD)	24.0	24.2		% v/v		101	80 - 120	0	20	
Methane (TCD)	25.6	24.1		% v/v		94	80 - 120	1	20	

Lab Sample ID: LCSD 320-237521/6 **Client Sample ID: Lab Control Sample Dup Matrix: Air** Prep Type: Total/NA **Analysis Batch: 237521** 

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Oxygen	16.2	13.9		% v/v		86	80 - 120	1	20

Lab Sample ID: MB 320-238928/5 **Client Sample ID: Method Blank** Prep Type: Total/NA **Matrix: Air** 

Methane (FID)

**Analysis Batch: 238928** 

	MB	МВ							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane (FID)	ND		0.00010	0.000020	% v/v			08/09/18 10:01	1

Lab Sample ID: LCS 320-238928/2 **Client Sample ID: Lab Control Sample Matrix: Air** Prep Type: Total/NA **Analysis Batch: 238928** LCS LCS

Spike %Rec. Analyte Added Result Qualifier Limits Unit Methane (FID) 0.0250 % v/v 0.0251 100 80 - 120

Lab Sample ID: LCSD 320-238928/3 **Client Sample ID: Lab Control Sample Dup Matrix: Air** Prep Type: Total/NA **Analysis Batch: 238928** 

0.0260

% v/v

104

80 - 120

Spike LCSD LCSD %Rec. RPD Added Analyte Result Qualifier Limits Limit Unit D %Rec RPD

0.0250

### **QC Association Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-41619-1

### Air - GC/MS VOA

### **Analysis Batch: 239788**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-41619-1	VSP-801	Total/NA	Air	TO-15	
320-41619-2	VSP-802	Total/NA	Air	TO-15	
MB 320-239788/21	Method Blank	Total/NA	Air	TO-15	
LCS 320-239788/4	Lab Control Sample	Total/NA	Air	TO-15	
LCS 320-239788/6	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-239788/5	Lab Control Sample Dup	Total/NA	Air	TO-15	
LCSD 320-239788/7	Lab Control Sample Dup	Total/NA	Air	TO-15	

### Air - GC VOA

### **Analysis Batch: 237521**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-41619-1	VSP-801	Total/NA	Air	D1946	_
320-41619-2	VSP-802	Total/NA	Air	D1946	
MB 320-237521/7	Method Blank	Total/NA	Air	D1946	
LCS 320-237521/2	Lab Control Sample	Total/NA	Air	D1946	
LCS 320-237521/5	Lab Control Sample	Total/NA	Air	D1946	
LCSD 320-237521/3	Lab Control Sample Dup	Total/NA	Air	D1946	
LCSD 320-237521/6	Lab Control Sample Dup	Total/NA	Air	D1946	

### **Analysis Batch: 238928**

nod Prep Batch
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### **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-41619-1

Client Sample ID: VSP-801 Lab Sample ID: 320-41619-1

Date Collected: 07/26/18 12:45 East Sample 15: 020 41010 1

Date Received: 07/31/18 09:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		15.7	25 mL	250 mL	239788	08/15/18 05:44	AP1	TAL SAC
Total/NA	Analysis	D1946		1.57	50 mL	50 mL	238928	08/09/18 10:19	NS1	TAL SAC
Total/NA	Analysis	D1946		1.57	50 mL	50 mL	237521	08/02/18 09:41	NS1	TAL SAC

Client Sample ID: VSP-802 Lab Sample ID: 320-41619-2

Date Collected: 07/26/18 12:55

Date Received: 07/31/18 09:00

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	415 mL	250 mL	239788	08/15/18 06:41	AP1	TAL SAC
Total/NA	Analysis	D1946		1.66	50 mL	50 mL	238928	08/09/18 10:35	NS1	TAL SAC
Total/NA	Analysis	D1946		1.66	50 mL	50 mL	237521	08/02/18 09:53	NS1	TAL SAC

**Laboratory References:** 

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

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**Matrix: Air** 

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### **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 320-41619-1

Project/Site: Chevron Edmonds Terminal

### **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	<b>Expiration Date</b>
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
llinois	NELAP	5	200060	03-17-19
Kansas	NELAP	7	E-10375	10-31-18
ouisiana	NELAP	6	30612	06-30-19
Maine	State Program	1	CA0004	04-14-20
lichigan	State Program	5	9947	01-31-20
evada	State Program	9	CA00044	07-31-19
ew Hampshire	NELAP	1	2997	04-18-19
ew Jersey	NELAP	2	CA005	06-30-19
ew York	NELAP	2	11666	03-31-19
regon	NELAP	10	4040	01-29-19
ennsylvania	NELAP	3	68-01272	03-31-19
exas	NELAP	6	T104704399	05-31-19
JS Fish & Wildlife	Federal		LE148388-0	07-31-19
JSDA	Federal		P330-18-00239	01-17-21
JSEPA UCMR	Federal	1	CA00044	11-06-18
tah	NELAP	8	CA00044	02-28-19
ermont	State Program	1	VT-4040	04-30-19
irginia	NELAP	3	460278	03-14-19
/ashington	State Program	10	C581	05-05-19
Vest Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	8	8TMS-L	01-28-19

### **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
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

### **Method Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-41619-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL SAC
D1946	Fixed Gases in Air (GC)	ASTM	TAL SAC

### **Protocol References:**

ASTM = ASTM International

EPA = US Environmental Protection Agency

### Laboratory References:

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

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### **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-41619-1

Lab Sample ID	Client Sample ID	Matrix	Collected Received
320-41619-1	VSP-801	Air	07/26/18 12:45 07/31/18 09:00
320-41619-2	VSP-802	Air	07/26/18 12:55 07/31/18 09:00

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	Chevron Northwest Region Analysis Request/Chain of Custody	ves	T T	egi	00	र्	nal	NSI	S	sed	ne	st/(	hain	ot Cus	stody	CONTRACT.
999	Lancaster Laboratories	Acct.#			Grou	Fol tstruction	· Lancas	ter Labo	For Lancaster Laboratories use only Group # Sample # Instructions on reverse side correspond with circled numbers.	use only e # circled nu	/ mbers.					
Θ	Client Information		4)	Matrix	×i		9		Analyses	/ses	Requested	sted		# 000		
Facility #	SJP 117 d		_								6-1	12		30CX #.		
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Chevi	1 +6			iment bnuo	щасе	\$	deN [		] dnue	Methoo	bos //	You X		Must meet lowest detection limits possible for 8260	it detection r 8260	
Const	Sonsultant/Office  \[ \langle				ns	ainera	0928		Gel Cle		~ ta	719	_	compounds    8021 MTBE Confirmation	firmation	
Const	Consultant Project Mgr.					-	□ t	sətes	Silica (	siQ	Hd3	72		Confirm MTBE + Naphthalene Confirm highest hit by 8260	Naphthalene hit by 8260	100
Const	Consultant Phone #		П	aple	S30		Z08 :	ухудеп	L		AW .	{!}		Confirm all hits by 8260	its by 8260 oxv's on highest hit	
Samp	Samples Little	<u></u>	ətisc	Роч	dN	quink	MTBE			stoT				Run	oxy's on all hits	
Pa	Collec	rab	dwo	lio (ater		-	-		H9TW H9TW	ad	HAVA	140 140				
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		-	T			-		320-	320-41619 Chain of Custody	nain of C	ustody					
		Н	H	H	Н	H				H						
-	Turnaround Time Requested (TAT) (please circle) Standard 5 day 4 day	Relinc	Relinquished t	ESS.	CH	(	Date 7/2	3/1	Time   3	600	Received by	) / /	N.	Date 72.8/1/3	Time (9)	9
	48 hour	Relinc	Relinquished by	See	8		Date 7/39	118	7000 J		Received by	Ley Control	kumet	Date 7/31/18	Time 09 : 00	
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8	Lancaster Laboratories, Inc. •	ratories,		2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300	Holland	Pike, L	ancaste	, PA 17	601 - 71	7-656-2	300			Issued by D	Issued by Dept. 40 Management	E

The white copy should accompany samples to Lancaster Laboratories. Ti sow copy should be retained by the client.

7051.01

### **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 320-41619-1

Login Number: 41619 List Source: TestAmerica Sacramento

List Number: 1

Creator: Branscum, Cassie

Creator: Branscum, Cassie		
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	528, 351
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
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.	N/A	
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	

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# Sacramento 1 Liter Canister QC Certification Batch Certification

Date Cleaned/Batch ID:	D 05-29-18	
Date of QC:	6/6/18	320-39811 Chain of Custody
Data File Number:	C: (MGDWEM) ( DATA) 180606)	525-596TF Chairf of Custody

(File ID for certification analysis of canister designated below)

### **CANISTER ID NUMBERS**

*	34002441 Mr9060615.4	34002428
	34001798	34000601
	34000330	34002433
	34001032	34001089
	34001136	8286
	34002451	34000685
	34000914	34000649
	34002002	34001085

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

they be	6/7/18
1st Level Reviewed By	Date
2nd Level Reviewed By	Date

# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-39811-1 SDG No.: Client Sample ID: 34002441 Lab Sample ID: 320-39811-1 Matrix: Air Lab File ID: MS9060615.D Analysis Method: TO-15 Date Collected: 05/29/2018 00:00 Sample wt/vol: 500(mL) Date Analyzed: 06/07/2018 05:49 Soil Aliquot Vol: Dilution Factor: 1 GC Column: RTX-Volatiles ID: 0.32(mm) Soil Extract Vol.: % Moisture: Level: (low/med) Low Analysis Batch No.: 227669 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.77	J	5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.13
71-43-2	Benzene	ND		0.40	0.07
100-44-7	Benzyl chloride	ND		0.80	0.1
75-27-4	Bromodichloromethane	ND		0.30	0.06
75-25-2	Bromoform	ND		0.40	0.07
74-83-9	Bromomethane	ND		0.80	0.3
106-99-0	1,3-Butadiene	ND		0.80	0.1
106-97-8	n-Butane	ND		0.40	0.1
78-93-3	2-Butanone (MEK)	ND		0.80	0.2
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.1
104-51-8	n-Butylbenzene	ND		0.40	0.1
135-98-8	sec-Butylbenzene	ND		0.40	0.07
98-06-6	tert-Butylbenzene	ND		0.80	0.06
75-15-0	Carbon disulfide	ND		0.80	0.07
56-23-5	Carbon tetrachloride	ND		0.80	0.06
108-90-7	Chlorobenzene	ND		0.30	0.06
75-45-6	Chlorodifluoromethane	ND		0.80	0.2
75-00-3	Chloroethane	ND		0.80	0.3
67-66-3	Chloroform	ND		0.30	0.09
74-87-3	Chloromethane	ND		0.80	0.2
95-49-8	2-Chlorotoluene	ND		0.40	0.08
110-82-7	Cyclohexane	ND		0.40	0.08
124-48-1	Dibromochloromethane	ND		0.40	0.07
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.07
74-95-3	Dibromomethane	ND		0.40	0.05
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroetha	ND		0.40	0.1
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.1
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.1
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.1
75-71-8	Dichlorodifluoromethane	ND		0.40	0.1
75-34-3	1,1-Dichloroethane	ND		0.30	0.07
107-06-2	1,2-Dichloroethane	ND		0.80	0.08

# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-39811-1 SDG No.: Client Sample ID: 34002441 Lab Sample ID: 320-39811-1 Matrix: Air Lab File ID: MS9060615.D Analysis Method: TO-15 Date Collected: 05/29/2018 00:00 Sample wt/vol: 500(mL) Date Analyzed: 06/07/2018 05:49 Soil Aliquot Vol: Dilution Factor: 1 GC Column: RTX-Volatiles ID: 0.32(mm) Soil Extract Vol.: % Moisture: Level: (low/med) Low Analysis Batch No.: 227669 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.07
591-78-6	2-Hexanone	ND		0.40	0.08
98-82-8	Isopropylbenzene	ND		0.80	0.1
99-87-6	4-Isopropyltoluene	ND		0.80	0.1
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.1
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.1
75-09-2	Methylene Chloride	0.094	J	0.40	0.07
98-83-9	alpha-Methylstyrene	ND		0.40	0.06
91-20-3	Naphthalene	ND		0.80	0.5
111-65-9	n-Octane	ND		0.40	0.05
109-66-0	n-Pentane	ND		0.80	0.2
115-07-1	Propylene	ND		0.40	0.09
103-65-1	N-Propylbenzene	ND		0.40	0.05
100-42-5	Styrene	ND		0.40	0.05
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.06
127-18-4	Tetrachloroethene	ND		0.40	0.05
109-99-9	Tetrahydrofuran	ND		0.80	0.2
108-88-3	Toluene	ND		0.40	0.05
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethan e	ND		0.40	0.1
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.4
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.06
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.06

Lab Name: TestAmerica Sacramento

SDG No.:

Client Sample ID: 34002441

Lab Sample ID: 320-39811-1

Matrix: Air

Lab File ID: MS9060615.D

Analysis Method: TO-15

Date Collected: 05/29/2018 00:00

Sample wt/vol: 500(mL)

Date Analyzed: 06/07/2018 05:49

Soil Aliquot Vol:

Soil Extract Vol.:

GC Column: RTX-Volatiles ID: 0.32(mm)

% Moisture:

Level: (low/med) Low

Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND	Ī	0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054
1330-20-7	Xylenes, Total	ND		1.2	0.074

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	85		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	100		70-130
2037-26-5	Toluene-d8 (Surr)	98		70-130

Report Date: 07-Jun-2018 15:03:46 Chrom Revision: 2.2 11-May-2018 08:54:46

> TestAmerica Sacramento **Target Compound Quantitation Report**

\\ChromNA\Sacramento\ChromData\ATMS9\20180606-59321.b\MS9060615.D Data File:

Lims ID: 320-39811-A-1 Client ID: 34002441 Sample Type: Client

Inject. Date: 07-Jun-2018 05:49:30 ALS Bottle#: 10 Worklist Smp#: 15

Purge Vol: 5.000 mL Dil. Factor: 1.0000

Sample Info: 320-39811-A-1 Misc. Info.: 500 CAN CERT

Operator ID: LHS Instrument ID: ATMS9

Method: \\ChromNA\Sacramento\ChromData\ATMS9\20180606-59321.b\TO15\_ATMS9N.m

Limit Group: MSA - TO15 - ICAL

Last Update: 07-Jun-2018 15:03:00 Calib Date: 06-Jun-2018 18:21:30 Integrator: **RTE** ID Type: **Deconvolution ID** Quant Method: Internal Standard Quant By: **Initial Calibration** \\ChromNA\Sacramento\ChromData\ATMS9\20180606-59321.b\MS9060603.D Last ICal File:

Column 1: RTX Volatiles (0.32 mm) Det: MS SCAN

Process Host: XAWRK027

First Level Reviewer: vanommens 07-Jun-2018 09:41:24 Date:

This Ecver Reviewer, varionimens			Date.			07-3411-2010-07.41.24		
Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	О	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	12.041	12.041	0.000	94	36144	4.00	
* 21,4-Difluorobenzene	114	14.194	14.194	0.000	100	140967	4.00	
* 3 Chlorobenzene-d5 (IS)	117	20.229	20.229	0.000	99	83515	4.00	
\$ 41,2-Dichloroethane-d4 (Sur	65	13.239	13.245	-0.006	97	51704	3.99	
\$ 5 Toluene-d8 (Surr)	100	17.431	17.425	0.006	99	69980	3.93	
\$ 6 4-Bromofluorobenzene (Surr	174	22.176	22.182	-0.006	98	25230	3.41	
31 Acetone	43	7.168	7.156	0.012	94	15629	0.7692	
47 Methylene Chloride	49	8.482	8.476	0.006	94	1657	0.0935	
54 2-Butanone (MEK)	72	11.006	11.006	0.000	99	813	0.1586	
Reagents:								
VAMSIS20 00175		∆ mount	Added: 5	0.00	- 1	Inits: ml	Run Reager	nt

Amount Added: 50.00 VAMSIS20\_00175 Units: mL Run Reagent

Report Date: 07-Jun-2018 15:03:47

Chrom Revision: 2.2 11-May-2018 08:54:46

TestAmerica Sacramento

\\ChromNA\Sacramento\ChromData\ATMS9\20180606-59321.b\MS9060615.D Data File:

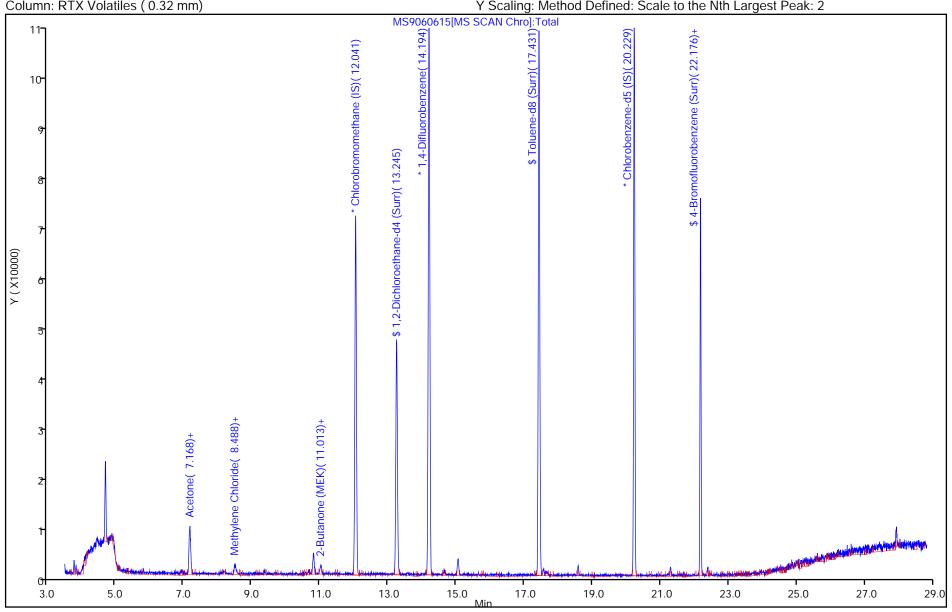
Injection Date: 07-Jun-2018 05:49:30 Instrument ID: ATMS9 Operator ID: LHS Lims ID: 320-39811-1 Worklist Smp#: 320-39811-A-1 Lab Sample ID: 15

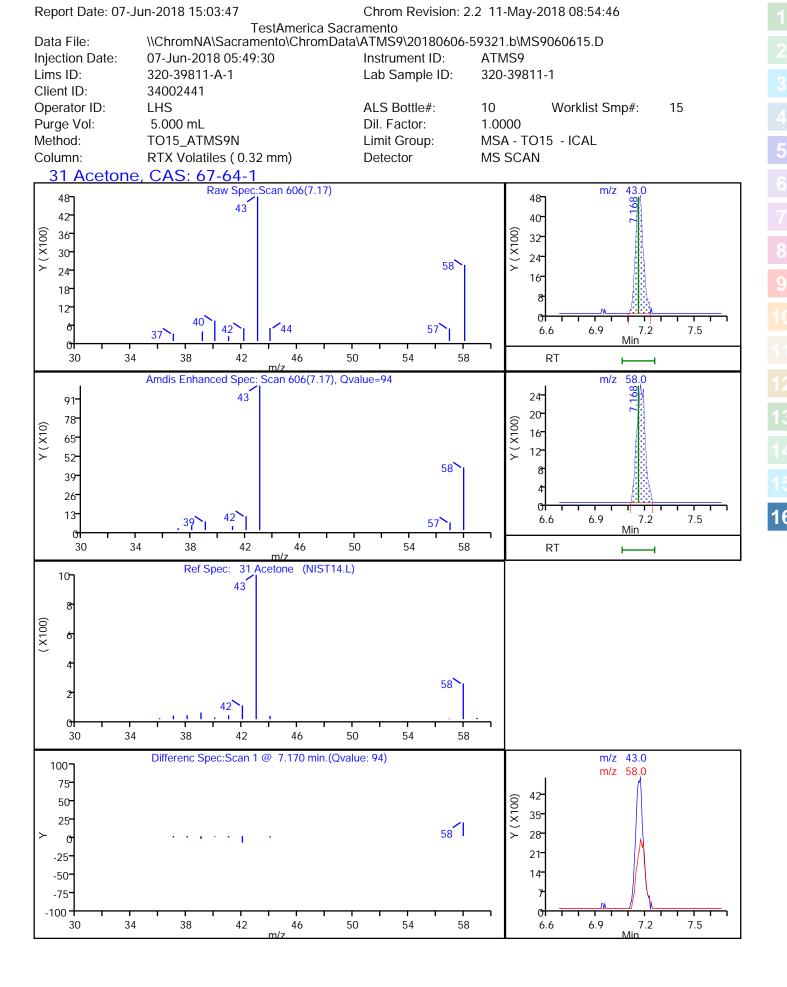
Client ID: 34002441

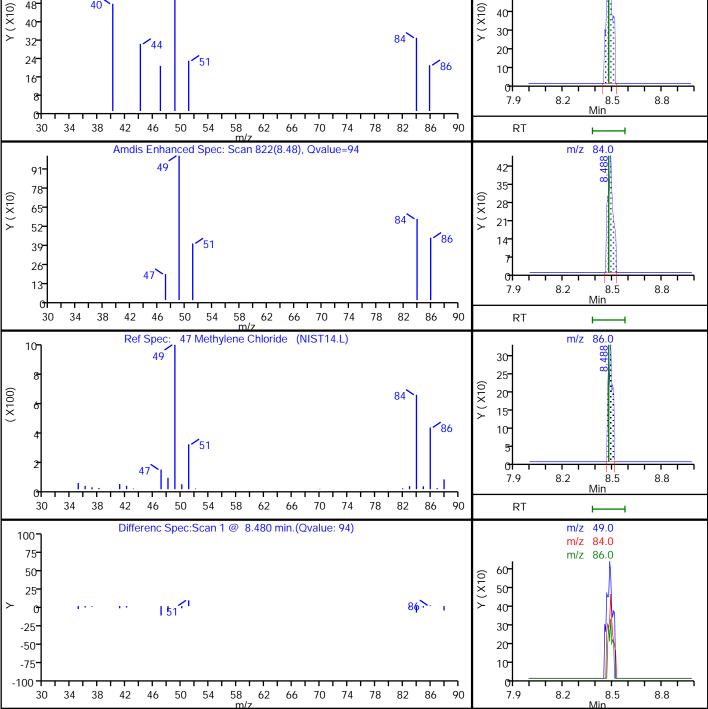
Purge Vol: 5.000 mL Dil. Factor: 1.0000 ALS Bottle#: 10

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Y Scaling: Method Defined: Scale to the Nth Largest Peak: 2







Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180606-59321.b\MS9060615.D

Injection Date: 07-Jun-2018 05:49:30 Instrument ID: ATMS9 Lims ID: 320-39811-A-1 Lab Sample ID: 320-39811-1

Client ID: 34002441

ALS Bottle#: Operator ID: LHS 10 Worklist Smp#: 15

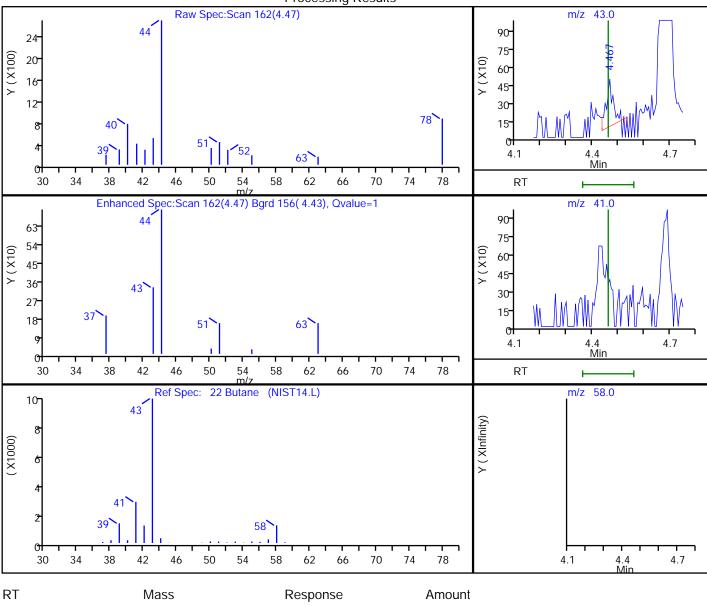
Dil. Factor: Purge Vol: 5.000 mL 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 22 Butane, CAS: 106-97-8

#### **Processing Results**



RT	Mass	Response	Amount
4.47	43.00	658	0.023779
4.46	41.00	0	
4.46	58.00	0	

Reviewer: vanommens, 07-Jun-2018 09:40:43 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180606-59321.b\MS9060615.D

Injection Date: 07-Jun-2018 05:49:30 Instrument ID: ATMS9
Lims ID: 320-39811-A-1 Lab Sample ID: 320-39811-1

Client ID: 34002441

Operator ID: LHS ALS Bottle#: 10 Worklist Smp#: 15

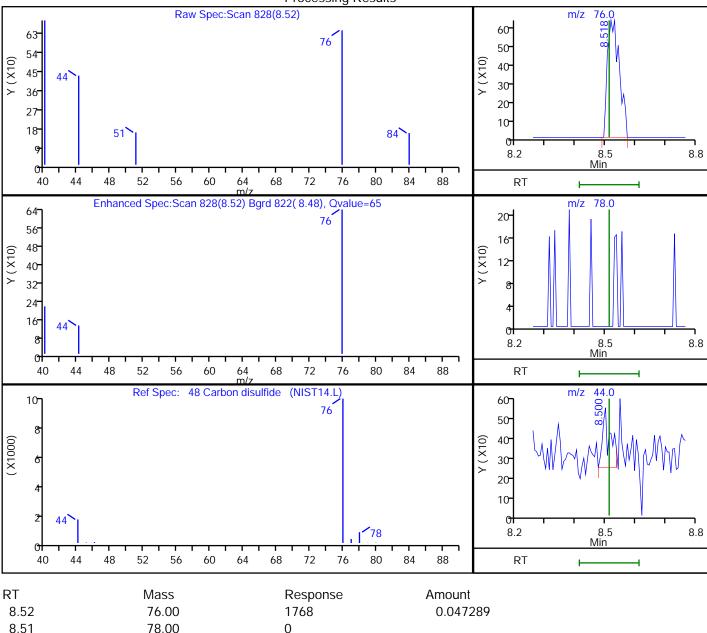
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 48 Carbon disulfide, CAS: 75-15-0

#### **Processing Results**



8.50 44.00 554 Reviewer: vanommens, 07-Jun-2018 09:40:53

Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

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Data File: \ChromNA\Sacramento\ChromData\ATMS9\20180606-59321.b\MS9060615.D

Injection Date: 07-Jun-2018 05:49:30 Instrument ID: ATMS9
Lims ID: 320-39811-A-1 Lab Sample ID: 320-39811-1

Client ID: 34002441

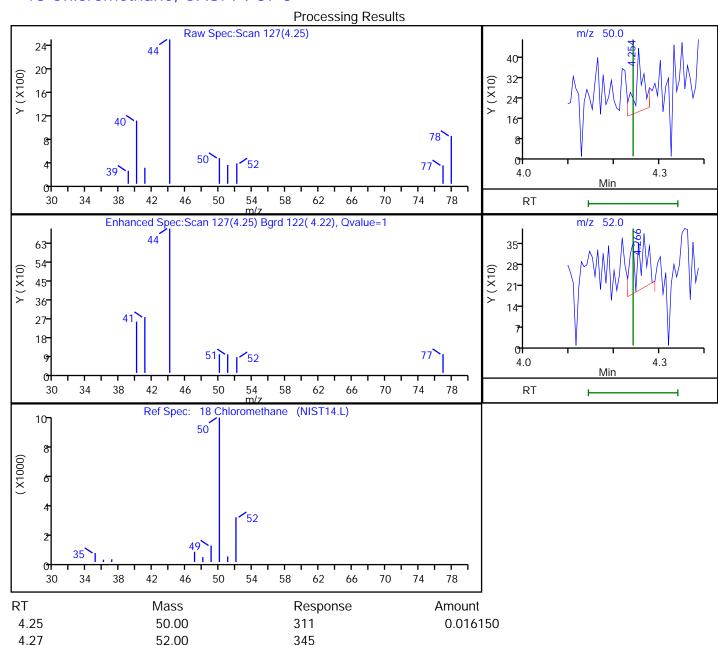
Operator ID: LHS ALS Bottle#: 10 Worklist Smp#: 15

Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 18 Chloromethane, CAS: 74-87-3



Reviewer: vanommens, 07-Jun-2018 09:40:41

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

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Data File: \ChromNA\Sacramento\ChromData\ATMS9\20180606-59321.b\MS9060615.D

Injection Date: 07-Jun-2018 05:49:30 Instrument ID: ATMS9 Lims ID: 320-39811-A-1 Lab Sample ID: 320-39811-1

Client ID: 34002441

ALS Bottle#: Operator ID: LHS 10 Worklist Smp#: 15

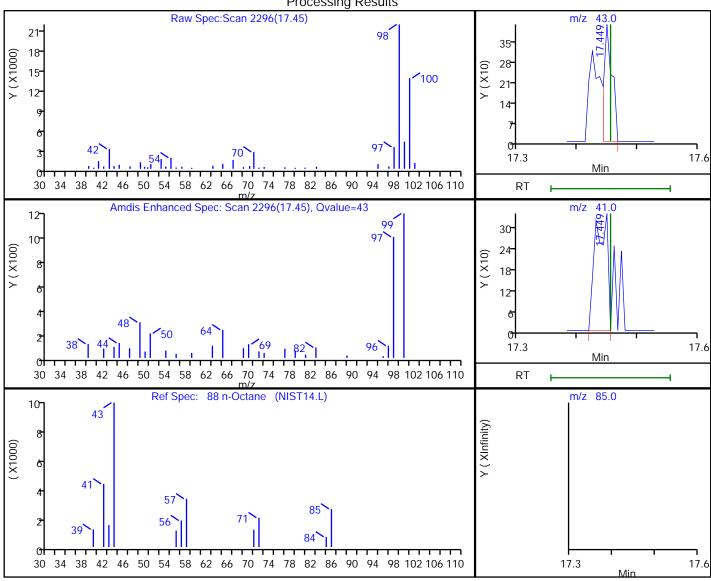
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 88 n-Octane, CAS: 111-65-9

#### **Processing Results**



RT	Mass	Response	Amount
17.45	43.00	381	0.011189
17.45	41.00	480	
17.46	85.00	0	

Reviewer: vanommens, 07-Jun-2018 09:41:09 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180606-59321.b\MS9060615.D

Injection Date: 07-Jun-2018 05:49:30 Instrument ID: ATMS9 Lims ID: 320-39811-A-1 Lab Sample ID: 320-39811-1

Client ID: 34002441

ALS Bottle#: Operator ID: LHS 10 Worklist Smp#: 15

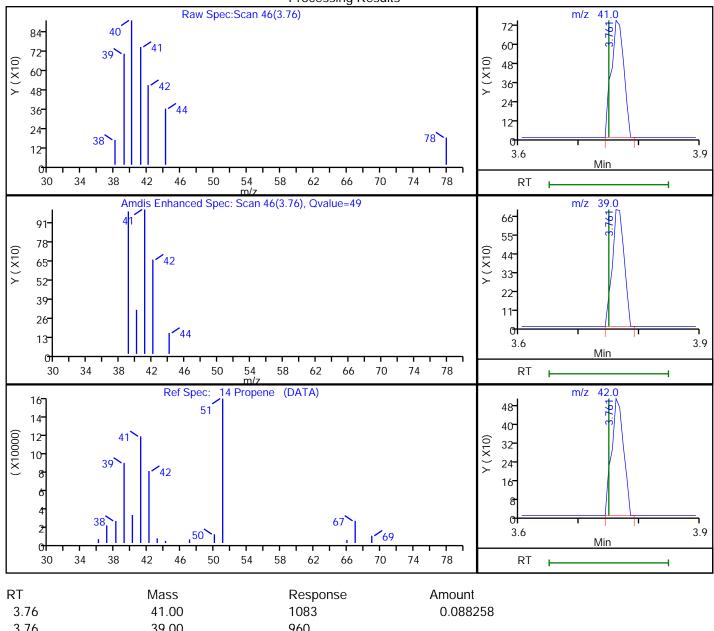
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) MS SCAN Detector

#### 14 Propene, CAS: 115-07-1

#### **Processing Results**





Reviewer: vanommens, 07-Jun-2018 09:40:39

Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID



THE LEADER IN ENVIRONMENTAL TESTING

#### ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento 880 Riverside Parkway West Sacramento, CA 95605 Tel: (916)373-5600

TestAmerica Job ID: 320-44380-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

#### M. Elaine Walker

Authorized for release by: 10/29/2018 1:51:57 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

.....LINKS .....

Review your project results through

Total Access

Have a Question?



Visit us at: www.testamericainc.com The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

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#### **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

#### **Qualifiers**

#### Air - GC/MS VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits
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.

#### Glossary

TEQ

Toxicity Equivalent Quotient (Dioxin)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
a	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)

TestAmerica Sacramento

10/29/2018

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#### **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

Job ID: 320-44380-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-44380-1

#### Receipt

Two samples were received on 10/20/2018 9:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

#### **Receipt Exceptions**

The Chain-of-Custody (COC) was incomplete as received and/or improperly completed. Canister IDs and time stop not listed on COC.

Canister ID for sample 1 is 34000801.

Canister ID for sample 2 is 34000536.

#### Air - GC VOA

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

#### Air - GC/MS VOA

Method(s) TO-15: 1,2-Dichloroethane-d4 (Surrogate) recovery for the following sample was outside control limits: VSP-801 (320-44380-1). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

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

#### **Detection Summary**

Client: ARCADIS U.S. Inc

Client Sample ID: VSP-801

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

Lab Sample ID: 320-44380-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	640		9.1	1.8	ppb v/v	22.8	_	TO-15	Total/NA
Ethylbenzene	99	В	9.1	1.4	ppb v/v	22.8		TO-15	Total/NA
Toluene	4.3	JB	9.1	1.2	ppb v/v	22.8		TO-15	Total/NA
m,p-Xylene	110	В	18	2.3	ppb v/v	22.8		TO-15	Total/NA
o-Xylene	12	В	9.1	1.2	ppb v/v	22.8		TO-15	Total/NA
TPH (as Gasoline)	38000		2300	910	ppb v/v	22.8		TO-15	Total/NA
Carbon Dioxide (TCD)	2.2		1.1	0.024	% v/v	2.28		D1946	Total/NA
Methane (FID)	0.0015		0.00023	0.000046	% v/v	2.28		D1946	Total/NA
Oxygen	16		0.46	0.017	% v/v	2.28		D1946	Total/NA

**Client Sample ID: VSP-802** Lab Sample ID: 320-44380-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.34	J	0.40	0.079	ppb v/v	1	_	TO-15	Total/NA
Ethylbenzene	0.33	JB	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Toluene	1.1	В	0.40	0.051	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.97	В	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.36	JB	0.40	0.054	ppb v/v	1		TO-15	Total/NA
TPH (as Gasoline)	70	J	100	40	ppb v/v	1		TO-15	Total/NA
Carbon Dioxide (TCD)	2.0		0.83	0.018	% v/v	1.66		D1946	Total/NA
Methane (FID)	0.0017		0.00017	0.000033	% v/v	1.66		D1946	Total/NA
Oxygen	16		0.33	0.012	% v/v	1.66		D1946	Total/NA

#### **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

Lab Sample ID: 320-44380-1

Matrix: Air

Date Collected: 10/18/18 15:45 Date Received: 10/20/18 09:25

Client Sample ID: VSP-801

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	640		9.1	1.8	ppb v/v			10/26/18 05:08	22.8
Ethylbenzene	99	В	9.1	1.4	ppb v/v			10/26/18 05:08	22.8
Toluene	4.3	JB	9.1	1.2	ppb v/v			10/26/18 05:08	22.8
m,p-Xylene	110	В	18	2.3	ppb v/v			10/26/18 05:08	22.8
o-Xylene	12	В	9.1	1.2	ppb v/v			10/26/18 05:08	22.8
TPH (as Gasoline)	38000		2300	910	ppb v/v			10/26/18 05:08	22.8
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		70 - 130			•		10/26/18 05:08	22.8
1,2-Dichloroethane-d4 (Surr)	134	X	70 - 130					10/26/18 05:08	22.8
Toluene-d8 (Surr)	101		70 - 130					10/26/18 05:08	22.8
Method: D1946 - Fixed Gas	es in Air (GC)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	2.2		1.1	0.024	% v/v			10/24/18 11:00	2.28
Methane (FID)	0.0015		0.00023	0.000046	% v/v			10/24/18 14:40	2.28
Oxygen	16		0.46	0.017	% v/v			10/24/18 11:00	2.28

**Client Sample ID: VSP-802** Lab Sample ID: 320-44380-2

Date Collected: 10/18/18 15:30

Date Received: 10/20/18 09:25

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.34	J	0.40	0.079	ppb v/v			10/26/18 06:05	1
Ethylbenzene	0.33	JB	0.40	0.063	ppb v/v			10/26/18 06:05	1
Toluene	1.1	В	0.40	0.051	ppb v/v			10/26/18 06:05	1
m,p-Xylene	0.97	В	0.80	0.10	ppb v/v			10/26/18 06:05	1
o-Xylene	0.36	JB	0.40	0.054	ppb v/v			10/26/18 06:05	1
TPH (as Gasoline)	70	J	100	40	ppb v/v			10/26/18 06:05	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130			-		10/26/18 06:05	1
1,2-Dichloroethane-d4 (Surr)	99		70 - 130					10/26/18 06:05	1
Toluene-d8 (Surr)	97		70 - 130					10/26/18 06:05	1
Method: D1946 - Fixed Gas	ses in Air (GC)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	2.0		0.83	0.018	% v/v			10/24/18 11:10	1.66
Methane (FID)	0.0017		0.00017	0.000033	% v/v			10/24/18 14:27	1.66
Oxygen	16		0.33	0.012	% v/v			10/24/18 11:10	1.66

Matrix: Air

#### **Surrogate Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

#### Method: TO-15 - Volatile Organic Compounds in Ambient Air

Matrix: Air Prep Type: Total/NA

			Pe	ercent Surroga	ate Recovery (Acceptance Limits
		BFB	DCA	TOL	
Lab Sample ID	Client Sample ID	(70-130)	(70-130)	(70-130)	
320-44380-1	VSP-801	104	134 X	101	
320-44380-2	VSP-802	98	99	97	
LCS 320-254908/4	Lab Control Sample	110	115	103	
LCS 320-254908/6	Lab Control Sample	116	103	100	
LCSD 320-254908/5	Lab Control Sample Dup	108	109	102	
LCSD 320-254908/7	Lab Control Sample Dup	114	106	100	
MB 320-254908/16	Method Blank	99	101	95	

BFB = 4-Bromofluorobenzene (Surr)

DCA = 1,2-Dichloroethane-d4 (Surr)

TOL = Toluene-d8 (Surr)

10/29/2018

TestAmerica Job ID: 320-44380-1

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

#### Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-254908/16

**Matrix: Air** 

**Analysis Batch: 254908** 

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

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

MB MB Analyte **Result Qualifier** RL MDL Unit Prepared Analyzed Dil Fac Benzene ND 0.40 0.079 ppb v/v 10/26/18 02:31 Ethylbenzene 0.0631 J 10/26/18 02:31 0.40 0.063 ppb v/v Toluene 0.0554 J 0.40 0.051 ppb v/v 10/26/18 02:31 m,p-Xylene 0.258 J 0.80 0.10 ppb v/v 10/26/18 02:31 o-Xylene 0.132 J 0.40 0.054 ppb v/v 10/26/18 02:31 TPH (as Gasoline) ND 100 40 ppb v/v 10/26/18 02:31

MB MB

Surrogate	%Recovery	Qualifier	Limits	Prepared Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130	10/26/18 02:	<del>1</del> 1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130	10/26/18 02:	1 1
Toluene-d8 (Surr)	95		70 - 130	10/26/18 02:	1 1

Lab Sample ID: LCS 320-254908/4

**Matrix: Air** 

**Analysis Batch: 254908** 

LCS LCS Spike %Rec. Added Analyte Result Qualifier Unit D %Rec Limits 2000 TPH (as Gasoline) 1640 82 70 - 130 ppb v/v

LCS LCS Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 110 70 - 130 70 - 130 1,2-Dichloroethane-d4 (Surr) 115 Toluene-d8 (Surr) 103 70 - 130

Lab Sample ID: LCS 320-254908/6

**Client Sample ID: Lab Control Sample Matrix: Air** Prep Type: Total/NA **Analysis Batch: 254908** 

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzene	20.0	21.2		ppb v/v	_	106	68 - 128	
Ethylbenzene	20.0	20.0		ppb v/v		100	64 - 124	
Toluene	20.0	21.6		ppb v/v		108	68 - 128	
m,p-Xylene	40.0	40.6		ppb v/v		101	65 - 125	
o-Xylene	20.0	19.8		ppb v/v		99	65 - 125	

LCS LCS

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	116		70 - 130
1,2-Dichloroethane-d4 (Surr)	103		70 - 130
Toluene-d8 (Surr)	100		70 - 130

Lab Sample ID: LCSD 320-254908/5

**Matrix: Air** 

Analysis Batch: 254908									
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
TPH (as Gasoline)	2000	1690		ppb v/v		84	70 - 130	3	25

TestAmerica Sacramento

Prep Type: Total/NA

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

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TestAmerica Job ID: 320-44380-1

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

#### Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

LCSD LCSD

Lab Sample ID: LCSD 320-254908/5

**Matrix: Air** 

**Analysis Batch: 254908** 

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

**Prep Type: Total/NA** 

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	108		70 - 130
1,2-Dichloroethane-d4 (Surr)	109		70 - 130
Toluene-d8 (Surr)	102		70 - 130

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

Lab Sample ID: LCSD 320-254908/7 **Matrix: Air** 

**Analysis Batch: 254908** 

Prep Type: Total/NA

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	20.0	21.8		ppb v/v	_	109	68 - 128	2	25
Ethylbenzene	20.0	21.0		ppb v/v		105	64 - 124	5	25
Toluene	20.0	22.1		ppb v/v		111	68 - 128	2	25
m,p-Xylene	40.0	41.8		ppb v/v		105	65 - 125	3	25
o-Xylene	20.0	20.6		ppb v/v		103	65 - 125	4	25

LCSD LCSD

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	114		70 - 130
1,2-Dichloroethane-d4 (Surr)	106		70 - 130
Toluene-d8 (Surr)	100		70 - 130

#### Method: D1946 - Fixed Gases in Air (GC)

Lab Sample ID: MB 320-254492/11

**Matrix: Air** 

Analysis Batch: 254492

**Client Sample ID: Method Blank** 

Prep Type: Total/NA

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	ND		0.50	0.011	% v/v			10/24/18 10:08	1
Methane (TCD)	ND		0.50	0.14	% v/v			10/24/18 10:08	1
Oxygen	ND		0.20	0.0074	% v/v			10/24/18 10:08	1

**Analysis Batch: 254492** 

- Oxygen	ND	0.20	0.0074 /0 V/V	10/24/10 10:00
Lab Sample ID: LCS 320-254492/2				Client Sample ID: Lab Control Sample
Matrix: Air				Prep Type: Total/NA

LCS LCS %Rec. Spike Added Analyte Result Qualifier Unit D %Rec Limits Carbon Dioxide (TCD) 23.9 24.5 % v/v 102 80 - 120 Methane (TCD) 25.6 24.3 % v/v 95 80 - 120

Lab Sample ID: LCS 320-254492/5 **Client Sample ID: Lab Control Sample** 

**Matrix: Air** 

**Analysis Batch: 254492** 

LCS LCS Spike %Rec. Added Result Qualifier Analyte Unit D %Rec Limits 16.2 % v/v Oxygen 14.1 87 80 - 120

TestAmerica Sacramento

#### **QC Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

Method: D1946 - Fixed Gases in Air (GC) (Continued)

Lab Sample ID: LCSD 320-254492/3

Client Sample ID: Lab Control Sample Dup
Matrix: Air

Prep Type: Total/NA

Analysis Batch: 254492

Spike LCSD LCSD %Rec. RPD Analyte Added Result Qualifier Unit D %Rec Limits RPD Limit % v/v Carbon Dioxide (TCD) 23.9 24.5 80 - 120 20 102 0 Methane (TCD) 25.6 24.4 % v/v 95 80 - 120 20 0

Lab Sample ID: LCSD 320-254492/6

Matrix: Air

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

Analysis Batch: 254492

LCSD LCSD **RPD** Spike %Rec. Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Oxygen 16.2 14.2 % v/v 88 80 - 120

Lab Sample ID: MB 320-254625/5

Matrix: Air

Client Sample ID: Method Blank
Prep Type: Total/NA

A call ala Datala 05400

Analysis Batch: 254625

 MB MB

 Analyte
 Result Methane (FID)
 Qualifier ND
 RL ND
 MDL Unit ND
 D Prepared No.00010
 Analyzed No.00010
 Dil Fac No.00010

Lab Sample ID: LCS 320-254625/2

Matrix: Air

Prep Type: Total/NA

**Analysis Batch: 254625** 

 Analyte
 Added Methane (FID)
 Result No.0250
 Qualifier Unit No.0218
 Unit No.0218
 Description
 % Rec. Methane (FID)

Lab Sample ID: LCSD 320-254625/3

Client Sample ID: Lab Control Sample Dup
Matrix: Air

Prep Type: Total/NA

**Analysis Batch: 254625** 

LCSD LCSD RPD Spike %Rec. Added Analyte Result Qualifier Unit D %Rec Limits **RPD** Limit Methane (FID) 0.0250 0.0248 % v/v 99 80 - 120 20

TestAmerica Sacramento

10/29/2018

#### **QC Association Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

#### Air - GC/MS VOA

#### **Analysis Batch: 254908**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-44380-1	VSP-801	Total/NA	Air	TO-15	
320-44380-2	VSP-802	Total/NA	Air	TO-15	
MB 320-254908/16	Method Blank	Total/NA	Air	TO-15	
LCS 320-254908/4	Lab Control Sample	Total/NA	Air	TO-15	
LCS 320-254908/6	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-254908/5	Lab Control Sample Dup	Total/NA	Air	TO-15	
LCSD 320-254908/7	Lab Control Sample Dup	Total/NA	Air	TO-15	

#### Air - GC VOA

#### **Analysis Batch: 254492**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-44380-1	VSP-801	Total/NA	Air	D1946	_
320-44380-2	VSP-802	Total/NA	Air	D1946	
MB 320-254492/11	Method Blank	Total/NA	Air	D1946	
LCS 320-254492/2	Lab Control Sample	Total/NA	Air	D1946	
LCS 320-254492/5	Lab Control Sample	Total/NA	Air	D1946	
LCSD 320-254492/3	Lab Control Sample Dup	Total/NA	Air	D1946	
LCSD 320-254492/6	Lab Control Sample Dup	Total/NA	Air	D1946	

#### **Analysis Batch: 254625**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-44380-1	VSP-801	Total/NA	Air	D1946	
320-44380-2	VSP-802	Total/NA	Air	D1946	
MB 320-254625/5	Method Blank	Total/NA	Air	D1946	
LCS 320-254625/2	Lab Control Sample	Total/NA	Air	D1946	
LCSD 320-254625/3	Lab Control Sample Dup	Total/NA	Air	D1946	

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#### **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

Lab Sample ID: 320-44380-1

Client Sample ID: VSP-801 Date Collected: 10/18/18 15:45 Matrix: Air

Date Received: 10/20/18 09:25

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		22.8	25 mL	250 mL	254908	10/26/18 05:08	AP1	TAL SAC
Total/NA	Analysis	D1946		2.28	50 mL	50 mL	254625	10/24/18 14:40	NS1	TAL SAC
Total/NA	Analysis	D1946		2.28	50 mL	50 mL	254492	10/24/18 11:00	NS1	TAL SAC

**Client Sample ID: VSP-802** Lab Sample ID: 320-44380-2

Date Collected: 10/18/18 15:30

Date Received: 10/20/18 09:25

<del>_</del>	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15			415 mL	250 mL	254908	10/26/18 06:05	AP1	TAL SAC
Total/NA	Analysis	D1946		1.66	50 mL	50 mL	254625	10/24/18 14:27	NS1	TAL SAC
Total/NA	Analysis	D1946		1.66	50 mL	50 mL	254492	10/24/18 11:10	NS1	TAL SAC

#### **Laboratory References:**

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

**Matrix: Air** 

#### **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 320-44380-1

Project/Site: Chevron Edmonds Terminal

#### **Laboratory: TestAmerica Sacramento**

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

IAB         DOD ELAP         L2468         01-20-21           zona         State Program         9         A20708         08-11-19           kansas DEQ         State Program         6         88-0691         06-17-19           lifornia         State Program         9         2897         01-31-19           lorado         State Program         8         CA00044         08-31-19           innecticut         State Program         1         PH-0691         06-30-19           prodid         NELAP         4         E87570         06-30-19           prodid         NELAP         4         NA         01-28-19           prodid         State Program         4         N/A         01-29-19           prodid         State Program         9         N/A         01-29-19           prodicis         NELAP         5         200060         03-17-19           prodicis         NELAP         7         E-10375         10-31-18*           prodicis         NELAP         7         E-10375         10-31-18*           prodicis         NELAP         7         E-10375         10-31-18*           prodicis         NELAP         7         E-10375	Authority	Program	EPA Region	Identification Number	<b>Expiration Date</b>
zona         State Program         9         AZ0708         08-11-19           cansas DEQ         State Program         6         88-0691         06-17-19           dilfornia         State Program         9         2897         01-31-19           dilorado         State Program         8         CA00044         08-31-19           ornecticut         State Program         1         PH-0691         06-30-19           orida         NELAP         4         E87570         06-30-19           orida         NELAP         4         NA         01-28-19           vorida         NELAP         4         NA         01-29-19           vorida         State Program         9         N/A         01-29-19           vorida         State Program         9         N/A         01-29-19           vois         NELAP         5         200060         03-17-18           noss         NELAP         7         E-10375         10-31-18*           visitiona         NELAP         6         30612         06-30-19           visitiona         State Program         1         CA0004         04-14-20           chigan         State Program         9	Alaska (UST)	State Program	10	17-020	01-20-21
kansas DEQ         State Program         6         88-0691         06-17-19           Ilifornia         State Program         9         2897         01-31-19           Ilorado         State Program         8         CA00044         08-31-19           Innecticut         State Program         1         PH-0691         06-30-19           Innecticut         State Program         1         PH-0691         06-30-19           Innecticut         State Program         4         NEA         06-30-19           India         NELAP         4         E87570         06-30-19           Invaii         State Program         9         NI/A         01-28-19           Invaii         State Program         9         NI/A         01-29-19           Inois         NELAP         5         200060         03-17-19           Insas         NELAP         7         E-10375         10-31-18*           Inine         State Program         1         CA0004         04-14-20           Inine         State Program         1         CA0004         04-14-20           Ining         State Program         9         CA00044         07-31-19           Ining         State Prog	ANAB	DoD ELAP		L2468	01-20-21
alifornia         State Program         9         2897         01-31-19           clorado         State Program         8         CA00044         08-31-19           clorado         State Program         1         PH-0691         06-30-19           cordia         NELAP         4         E87570         06-30-19           porgia         State Program         4         N/A         01-28-19           porgia         State Program         9         N/A         01-29-19           porgia         State Program         9         N/A         01-29-19           porgia         State Program         9         N/A         01-29-19           porgia         NELAP         5         200060         03-17-19           porgia         NELAP         7         E-10375         10-31-18**           porgia         NELAP         6         30612         06-30-19           price         State Program         1         CA0004         04-14-20           price         State Program         5         9947         01-31-20           price         State Program         9         CA00044         07-31-19           price         NELAP         1         <	Arizona	State Program	9	AZ0708	08-11-19
State Program   8	Arkansas DEQ	State Program	6	88-0691	06-17-19
Innecticut         State Program         1         PH-0691         06-30-19           orida         NELAP         4         E87570         06-30-19           origia         State Program         4         N/A         01-28-19           waii         State Program         9         N/A         01-29-19           nois         NELAP         5         200060         03-17-19           nsas         NELAP         7         E-10375         10-31-18*           uisiana         NELAP         6         30612         06-30-19           state Program         1         CA0004         04-14-20           chigan         State Program         5         9947         01-31-20           chigan         State Program         9         CA0004         04-14-20           chigan         State Program         9         CA0004         07-31-19           wy ada         State Program         9         CA00044         07-31-19           wy ada         State Program         9         CA00044         07-31-19           wy ada         State Program         9         CA00044         07-31-19           wy ada         NELAP         1         2997	California	State Program	9	2897	01-31-19
orida         NELAP         4         E87570         06-30-19           dorgia         State Program         4         N/A         01-28-19           waii         State Program         9         N/A         01-29-19           nois         NELAP         5         200060         03-17-19           nsas         NELAP         7         E-10375         10-31-18         *           usisiana         NELAP         6         30612         06-30-19           usisiana         NELAP         9947         01-31-20           chigan         State Program         9         CA00044         07-31-19           usida         State Program         9         CA00044         07-31-19           w Jersey         NELAP         2         CA005         06-30-19           w York         NELAP         10         4040         01-29-19	Colorado	State Program	8	CA00044	08-31-19
sorgia         State Program         4         N/A         01-28-19           waii         State Program         9         N/A         01-29-19           nois         NELAP         5         200060         03-17-19           nsas         NELAP         7         E-10375         10-31-18 *           uisiana         NELAP         6         30612         06-30-19           sine         State Program         1         CA0004         04-14-20           chiqan         State Program         5         9947         01-31-20           chiqan         State Program         9         CA00044         07-31-19           wada         State Program         9         CA00044         07-31-19           wada         State Program         9         CA00044         07-31-19           wada         NELAP         1         2997         04-18-19           wada         NELAP         2         CA005         06-30-19           wada         NELAP         2         11666         03-31-19           wada         NELAP         3         68-01272         03-31-19           wada         NELAP         6         T104704399         05-31-19<	Connecticut	State Program	1	PH-0691	06-30-19
waii         State Program         9         N/A         01-29-19           nois         NELAP         5         200060         03-17-19           nsas         NELAP         7         E-10375         10-31-18 *           uisiana         NELAP         6         30612         06-30-19           tine         State Program         1         CA0004         04-14-20           chigan         State Program         5         9947         01-31-20           cwada         State Program         9         CA00044         07-31-19           cwada         State Program         9         CA00044         07-31-19           cw Jersey         NELAP         1         2997         04-18-19           cw Jersey         NELAP         2         CA005         06-30-19           cw York         NELAP         2         11666         03-31-19           cegon         NELAP         10         4040         01-29-19           nnsylvania         NELAP         3         68-01272         03-31-19           ce Fish & Wildlife         Federal         LE148388-0         07-31-19           ce Fish & Wildlife         Federal         1         CA00044	Florida	NELAP	4	E87570	06-30-19
nois         NELAP         5         200060         03-17-19           nsas         NELAP         7         E-10375         10-31-18 *           uisiana         NELAP         6         30612         06-30-19           state         State Program         1         CA0004         04-14-20           chigan         State Program         5         9947         01-31-20           cwada         State Program         9         CA00044         07-31-19           cw Hampshire         NELAP         1         2997         04-18-19           cw Jersey         NELAP         2         CA005         06-30-19           cw York         NELAP         2         11666         03-31-19           egon         NELAP         10         4040         01-29-19           nnsylvania         NELAP         3         68-01272         03-31-19           xas         NELAP         6         T104704399         05-31-19           Sieph & Wildlife         Federal         E148388-0         07-31-19           Sieph UCMR         Federal         1         CA00044         12-31-20           cah         NELAP         8         CA00044         02-28-19 <td>Georgia</td> <td>State Program</td> <td>4</td> <td>N/A</td> <td>01-28-19</td>	Georgia	State Program	4	N/A	01-28-19
nsas         NELAP         7         E-10375         10-31-18 *           usisiana         NELAP         6         30612         06-30-19           sine         State Program         1         CA0004         04-14-20           chigan         State Program         5         9947         01-31-20           cwada         State Program         9         CA00044         07-31-19           cw Hampshire         NELAP         1         2997         04-18-19           cw York         NELAP         2         CA005         06-30-19           cw York         NELAP         2         11666         03-31-19           cegon         NELAP         10         4040         01-29-19           nnsylvania         NELAP         3         68-01272         03-31-19           xas         NELAP         6         T104704399         05-31-19           SEPA Wildlife         Federal         LE148388-0         07-31-19           SEPA UCMR         Federal         1         CA00044         12-31-20           Sch         NELAP         8         CA00044         02-28-19           rmont         State Program         1         VT-4040         04-30-	Hawaii	State Program	9	N/A	01-29-19
suisiana         NELAP         6         30612         06-30-19           airine         State Program         1         CA0004         04-14-20           chigan         State Program         5         9947         01-31-20           cwada         State Program         9         CA00044         07-31-19           cw Jersey         NELAP         1         2997         04-18-19           cw Jersey         NELAP         2         CA005         06-30-19           cw York         NELAP         2         11666         03-31-19           cw York         NELAP         10         4040         01-29-19           nnsylvania         NELAP         3         68-01272         03-31-19           xas         NELAP         3         68-01272         03-31-19           xas         NELAP         6         T104704399         05-31-19           xas         NELAP         6         T104704399         05-31-19           xas         Pederal         Pederal         P330-18-00239         01-17-21           xar         Pederal         1         CA00044         12-31-20           xah         NELAP         8         CA00044	Illinois	NELAP	5	200060	03-17-19
state Program         1         CA0004         04-14-20           chigan         State Program         5         9947         01-31-20           choada         State Program         9         CA00044         07-31-19           choada         State Program         9         CA00044         07-31-19           choada         NELAP         1         2997         04-18-19           choada         NELAP         2         CA005         06-30-19           choada         NELAP         2         CA005         06-30-19           choada         NELAP         2         11666         03-31-19           choada         NELAP         10         4040         01-29-19           choada         NELAP         3         68-01272         03-31-19           choada         NELAP         3         68-01272         03-31-19           choada         NELAP         6         T104704399         05-31-19           choada         Federal         LE148388-0         07-31-19           choada         Federal         1         CA00044         12-31-20           choada         Federal         1         CA00044         12-31-20	Kansas	NELAP	7	E-10375	10-31-18 *
State Program         5         9947         01-31-20           Evada         State Program         9         CA00044         07-31-19           Evada         State Program         9         CA00044         07-31-19           Inverse of Manage of	Louisiana	NELAP	6	30612	06-30-19
Avada         State Program         9         CA00044         07-31-19           Avw Hampshire         NELAP         1         2997         04-18-19           Avw Jersey         NELAP         2         CA005         06-30-19           Avw York         NELAP         2         11666         03-31-19           Begon         NELAP         10         4040         01-29-19           Innsylvania         NELAP         3         68-01272         03-31-19           Ivasas         NELAP         6         T104704399         05-31-19           Ivasas         Federal         LE148388-0         07-31-19           Ivasas         Federal         1         CA00044         12-31-20           Ivasas         NELAP         8         CA00044         02-28-19           Ivasas         NELAP         8         CA00044         02-28-19           Ivasas         NELAP         3         460278         03-14-19	Maine	State Program	1	CA0004	04-14-20
w Hampshire         NELAP         1         2997         04-18-19           w Jersey         NELAP         2         CA005         06-30-19           w York         NELAP         2         11666         03-31-19           egon         NELAP         10         4040         01-29-19           nnsylvania         NELAP         3         68-01272         03-31-19           xas         NELAP         6         T104704399         05-31-19           S Fish & Wildlife         Federal         LE148388-0         07-31-19           SDA         Federal         P330-18-00239         01-17-21           SEPA UCMR         Federal         1         CA00044         12-31-20           ah         NELAP         8         CA00044         02-28-19           rmont         State Program         1         VT-4040         04-30-19           ginia         NELAP         3         460278         03-14-19           ashington         State Program         10         C581         05-05-19           est Virginia (DW)         State Program         3         9930C         12-31-18	Michigan	State Program	5	9947	01-31-20
NELAP 2 CA005 06-30-19 NEV YORK NELAP 2 11666 03-31-19 NEGON NELAP 10 4040 01-29-19 NELAP 3 68-01272 03-31-19 NELAP 6 T104704399 05-31-19 SEPA Wildlife Federal LE148388-0 07-31-19 SEPA UCMR Federal 1 CA00044 12-31-20 SEPA UCMR Federal 1 CA00044 12-31-20 SEPA UCMR Federal 1 VT-4040 04-30-19 STATE PROGRAM NELAP 3 460278 03-14-19 SEPA UCMR State Program 10 C581 05-05-19 SESTING STATE PROGRAM 3 9930C 12-31-18	Nevada	State Program	9	CA00044	07-31-19
w York         NELAP         2         11666         03-31-19           egon         NELAP         10         4040         01-29-19           nnsylvania         NELAP         3         68-01272         03-31-19           xas         NELAP         6         T104704399         05-31-19           S Fish & Wildlife         Federal         LE148388-0         07-31-19           SDA         Federal         P330-18-00239         01-17-21           SEPA UCMR         Federal         1         CA00044         12-31-20           ah         NELAP         8         CA00044         02-28-19           rmont         State Program         1         VT-4040         04-30-19           ginia         NELAP         3         460278         03-14-19           ashington         State Program         10         C581         05-05-19           est Virginia (DW)         State Program         3         9930C         12-31-18	New Hampshire	NELAP	1	2997	04-18-19
egon         NELAP         10         4040         01-29-19           nnsylvania         NELAP         3         68-01272         03-31-19           xas         NELAP         6         T104704399         05-31-19           & Fish & Wildlife         Federal         LE148388-0         07-31-19           &DA         Federal         P330-18-00239         01-17-21           &EPA UCMR         Federal         1         CA00044         12-31-20           ah         NELAP         8         CA00044         02-28-19           rmont         State Program         1         VT-4040         04-30-19           ginia         NELAP         3         460278         03-14-19           ashington         State Program         10         C581         05-05-19           est Virginia (DW)         State Program         3         9930C         12-31-18	New Jersey	NELAP	2	CA005	06-30-19
nnsylvania         NELAP         3         68-01272         03-31-19           xas         NELAP         6         T104704399         05-31-19           5 Fish & Wildlife         Federal         LE148388-0         07-31-19           SDA         Federal         P330-18-00239         01-17-21           SEPA UCMR         Federal         1         CA00044         12-31-20           ah         NELAP         8         CA00044         02-28-19           rmont         State Program         1         VT-4040         04-30-19           ginia         NELAP         3         460278         03-14-19           ashington         State Program         10         C581         05-05-19           est Virginia (DW)         State Program         3         9930C         12-31-18	New York	NELAP	2	11666	03-31-19
xas         NELAP         6         T104704399         05-31-19           6 Fish & Wildlife         Federal         LE148388-0         07-31-19           6DA         Federal         P330-18-00239         01-17-21           6EPA UCMR         Federal         1         CA00044         12-31-20           ah         NELAP         8         CA00044         02-28-19           rmont         State Program         1         VT-4040         04-30-19           ginia         NELAP         3         460278         03-14-19           ashington         State Program         10         C581         05-05-19           est Virginia (DW)         State Program         3         9930C         12-31-18	Oregon	NELAP	10	4040	01-29-19
S Fish & Wildlife         Federal         LE148388-0         07-31-19           SDA         Federal         P330-18-00239         01-17-21           SEPA UCMR         Federal         1         CA00044         12-31-20           ah         NELAP         8         CA00044         02-28-19           rmont         State Program         1         VT-4040         04-30-19           ginia         NELAP         3         460278         03-14-19           ashington         State Program         10         C581         05-05-19           est Virginia (DW)         State Program         3         9930C         12-31-18	Pennsylvania	NELAP	3	68-01272	03-31-19
SDA         Federal         P330-18-00239         01-17-21           SEPA UCMR         Federal         1         CA00044         12-31-20           ah         NELAP         8         CA00044         02-28-19           rmont         State Program         1         VT-4040         04-30-19           iginia         NELAP         3         460278         03-14-19           ashington         State Program         10         C581         05-05-19           est Virginia (DW)         State Program         3         9930C         12-31-18	Texas	NELAP	6	T104704399	05-31-19
SEPA UCMR         Federal         1         CA00044         12-31-20           ah         NELAP         8         CA00044         02-28-19           rmont         State Program         1         VT-4040         04-30-19           ginia         NELAP         3         460278         03-14-19           ashington         State Program         10         C581         05-05-19           est Virginia (DW)         State Program         3         9930C         12-31-18	JS Fish & Wildlife	Federal		LE148388-0	07-31-19
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rmont         State Program         1         VT-4040         04-30-19           iginia         NELAP         3         460278         03-14-19           ashington         State Program         10         C581         05-05-19           est Virginia (DW)         State Program         3         9930C         12-31-18	USEPA UCMR	Federal	1	CA00044	12-31-20
ginia         NELAP         3         460278         03-14-19           ashington         State Program         10         C581         05-05-19           est Virginia (DW)         State Program         3         9930C         12-31-18	Utah	NELAP	8	CA00044	02-28-19
State Program         10         C581         05-05-19           est Virginia (DW)         State Program         3         9930C         12-31-18	/ermont	State Program	1	VT-4040	04-30-19
est Virginia (DW) State Program 3 9930C 12-31-18	Virginia	NELAP	3	460278	03-14-19
	Washington	State Program	10	C581	05-05-19
oming State Program 8 8TMS-L 01-28-19	West Virginia (DW)	State Program	3	9930C	12-31-18
	Wyoming	State Program	8	8TMS-L	01-28-19

#### **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

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

#### **Method Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL SAC
D1946	Fixed Gases in Air (GC)	ASTM	TAL SAC

#### **Protocol References:**

ASTM = ASTM International

EPA = US Environmental Protection Agency

#### Laboratory References:

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

#### **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-44380-1	VSP-801	Air	10/18/18 15:45	10/20/18 09:25
320-44380-2	VSP-802	Air	10/18/18 15:30	10/20/18 09:25

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(2) Canister 15 is 34000536

# Canister Samples Chain of Custody Record

TestAmerica Sacramento				Canis	ter Sai	Canister Samples Chain of Custody Record	Chain o	S S	ustc	dy	Rec	ord					TectAmerico	7
880 Riverside Parkway			TestAme	ica Laborato	ries, Inc. ass	TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.	ly with respect	to the c	ollection	and st	ipment c	f these	sample	46			THE LEADER IN ENVIRONMENTAL TESTING	S NO
West Sacramento, CA 95605 phone 916.374.4378 fax 916.372.1059																	TestAmerica Laboratories, Inc	nc.
Client Contact Information	Project Manager:	fanager:				Samples (	Samples Collected By:		10	2050	3	いまる				l	COC No:	Γ
Company Name: A.C. C. A.S.	Phone:																C of 1 cocs	T
Address: 1100 01100 004 50 12 50	Email:							L	F		F	-		1	F	H	*	T
City/State/Zip Scattic, w.t. b/8121									_		(	- (					For Lab Use Only:	Γ
Phone:		tact:						(1			9	notton		_		dogo	-	П
	TA Contact:					_		NIS	_			05.8				,,,	Lab Sampling:	
Project Name: Edmoinds Terminal		Anayis	Anaylsis Turnarour	ound Time				; / N	_		_	etor	1000			0,00		
ation: 1172c Liverold		Standard (Specific):	scific):	5TA1	1	. 1		, רסו				ı ui v				, O1 19	Job/	
PO#,	Ru	Rush (Specifiy):	()					/ P1S	_	8	_	lioecit	_	_		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(See below for Add'l Items)	7
Sample Identification	Sample Date(s)	Time Start	Time	Canister Vacuum in Field, 'Hg (Start)'	r Canister in Vacuum in g Field, 'Hg (Stop)'	Flow Controller	Canister	2 \ b9M) 21-OT	EPA 3C	EPA 25C / 25.3	81/21 ATSA	TO-3 Other (Please sp	Sample Type	Indcot Air Ambient Air	Soli Gas	Landfill Gas Other (Please sp	Sample Specific Notes:	
152-401	lofisjig	1545									X	$\times$	L,	-			EN TO-15 For BTE	X
158-802	10/18/18/153C	(1530									X	X					1	
																	Other Fixed bus	
									-			-	L	-	F	F		-
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				-					-			r						T
			Temper	perature (	rature (Fahrenheit)													
	Start	Interior		Ambient				_										
	Stop			4					,									T
			Temper	perature (	rature (Fahrenheit)			_										-
	Start	Interior		Ambient	-			_										
	Stop															=		
Special Instructions/QC Requirements & Comments:							<b>.</b>			320	320-44380 Chain of Custody	Chain	of Cu	stody				
Samples Shipped by:		Date / Time:	ne:			Samples	Samples Received by:									-		T
Samples Relinquished by:	1	Date / Ti	ne:	2	_	Received by:	by:									Г	1 DO	
Relinquished by	1	Date/Ti	200	1	74	Perceived	100						1		1	T	)	_
Lab Use Office Shipper Name:		Opened by	30 %	2	22	Condition:	F0											
() 201 : 1200 ()	V	34000801	800	10					NA	I	2	100101	X	1	For	No.	Form No. CA-C-WI-003, Rev. 1, dated 05/10/2013	2013
Control				-					(10)	1 1		1	-	)	2:2	9		

(2) Canister 15 is 34000536

## Canister Samples Chain of Custody Record

TestAmerica Sacramento				Canis	ter Sar	nister Samples Chain of Custody Record	Chain o	Σ δ	rsto	dy F	Seco	ord					Toct	TectAmerica
880 Riverside Parkway			TestAme	ica Laborat	ories, Inc. assu	Test America Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples	ty with respec	t to the a	ollection	and ship	oment o	these	samples				THE LEADER	THE LEADER IN ENVIRONMENTAL TESTING
West Sacramento, CA 95605 phone 916.374,4378 fax 916.372,1059																	TestA	TestAmerica Laboratories, Inc.
Client Contact Information	Project Manager:	anager:				Samples C	Samples Collected By:		30505	50	いい	いった				l	COC No:	
Company Name: ACCCAS	Phone:																	of 1 cocs
Address: 1100 Olive wax, Suite &	Email:								F	H		H		-				
City/State/Zip SCATTIC, W. & bisic!											(	(1		-			_	se Only:
Phone:	Site Contact:	act:						(W			7- <del>1</del>	ottoes					Walk-in Client:	ent
Ho was Named		Amondo	Torne	Time of Time		_		IS /		883		S S 8		-			_	
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PO#		Standard (Spec Rush (Specifiy):	y):	314				רן / pi		-	V276	ecity it	_				1000	See below for Add" Items)
Sample Identification	Sample Date(s)	Time Start	Time	Canister Vacuum in Field, 'Hg (Start)'	ir Canister in Vacuum in ig Field, 'Hg	Flow Controller ID	Canister	S \ b9M) 21-OT H9A-AM	EPA 3C	EPA 25C / 25.3 ASTM D-1946 /		TO-3	Sample Type	Indcot Air Ambient Air	Soli Gas	Landfill Gas	Other (Please ap	Sample Specific Notes:
159-401	10/18/18	1545									X	$\times$					E24 TO-15	TIS for BTEX\$
728-802	10/18/18/153C	1530								-	X	X	,				TPH-	
												-					Other	Fixtd has
																	( :M/H	Cank Go
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	Start	Interior		Ambient	#			_										
	Stop															_		
			Ten	perature (	Temperature (Fahrenheit)											_		
	Start	Interior		Ambient	+													
	Stop															=		
Special Instructions/QC Requirements & Comments:										320-4	320-44380 Chain of Custody	Chain	of Cus	stody			l t	
Samples Shipped by:		Date / Time:	me:			Samples F	Samples Received by							1			1	
Samples Relinquished by:	1	Date/Ti	le:	2(1)	_	Received by:	.ko									Г	T	Sac
Religionalished Ame.		Date / Time Opened by	9 in	120	45	Receipted by Condition:	£0		1	100							88888	
O conister 11	15	34000801	200	10					NSH	I	10)	to 12c1	18	0	For	N. S.	A-C-WI-003,	Form No. CA-C-WI-003, Rev. 1, dated 05/10/2013

#### **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 320-44380-1

Login Number: 44380 List Source: TestAmerica Sacramento

List Number: 1

Creator: Sharifi, Nooshin

Creator. Snarm, Noosimi		
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	478967
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
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.	False	Canister IDs not listed on COC.
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.	N/A	
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	



## Sacramento 1 Liter Canister QC Certification Batch Certification

Date Cleaned/Batch ID	1-24-18 320-35358	
Date of QC	2/8/18	
Data File Number	18020819	320-35358 Chain of Custody
(File ID for certification an	alysis of canister designated below)	

#### **CANISTER ID NUMBERS**

31000801	340009
8522	7566
34000238	340000974
34000611	34001229
34001634	34001940
34001203	39001000
34001953	34000773
34000931	34001652

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"\*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

1st level Reviewed By:

2/9/18

Date:

Zlake

Znd level Reviewed By:

Date:

Q:\DOCUMENT-MANAGEMENT\FORMS\QA-814A 1-LITER BATCH CAN QC 20171023.DOC QA-814 A

RE 10232017



### Sacramento 1 Liter Canister QC Certification Batch Certification

Date Cleaned/Batch ID	2-13-18 320-3603	3
Date of QC	2/23/18	3
Data File Number	MS9022319	320-36031 Chain of Custody

(File ID for certification analysis of canister designated below)

#### **CANISTER ID NUMBERS**

of 34000536	34001056
34002055	34001950
34000753	34001190
8937	31001077
8967	34000951
34000625	34001093
34000732	8514
31000731	34001946

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

#### "\*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

RG FOY AP	2/26/18
1 <sup>st</sup> level Reviewed By:	Date:
non	3/5/18
2nd level Reviewed By:	Date:

Q:\DOCUMENT-MANAGEMENT\FORMS\QA-814A 1-LITER BATCH CAN QC 20171023.DOC QA-814 A

RE 10232017

Lab Name: TestAmerica Sacramento Job No.: 320-35358-1 SDG No.: Client Sample ID: 34000801 Lab Sample ID: 320-35358-1 Matrix: Air Lab File ID: 18020819.D Analysis Method: TO-15 Date Collected: 01/24/2018 00:00 Sample wt/vol: 250(mL) Date Analyzed: 02/09/2018 01:50 Soil Aliquot Vol: Dilution Factor: 1 GC Column: RTX-Volatiles ID: 0.32(mm) Soil Extract Vol.: % Moisture: Level: (low/med) Low Analysis Batch No.: 207546 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	ND		5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.13
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	0.27	J	0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.2
75-00-3	Chloroethane	ND		0.80	0.33
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.08
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.05
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroetha ne	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.13
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.1
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.08

Lab Name: TestAmerica Sacramento Job No.: 320-35358-1 SDG No.: Client Sample ID: 34000801 Lab Sample ID: 320-35358-1 Matrix: Air Lab File ID: 18020819.D Analysis Method: TO-15 Date Collected: 01/24/2018 00:00 Sample wt/vol: 250(mL) Date Analyzed: 02/09/2018 01:50 Soil Aliquot Vol: Dilution Factor: 1 GC Column: RTX-Volatiles ID: 0.32(mm) Soil Extract Vol.: % Moisture: Level: (low/med) Low Analysis Batch No.: 207546 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.08
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.1
75-09-2	Methylene Chloride	ND		0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	ND		0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethan e	ND		0.40	0.10
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.06

FORM I TO-15

 Lab Name: TestAmerica Sacramento
 Job No.: 320-35358-1

 SDG No.:
 Lab Sample ID: 320-35358-1

 Matrix: Air
 Lab File ID: 18020819.D

 Analysis Method: TO-15
 Date Collected: 01/24/2018 00:00

 Sample wt/vol: 250(mL)
 Date Analyzed: 02/09/2018 01:50

 Soil Aliquot Vol:
 Dilution Factor: 1

 Soil Extract Vol.:
 GC Column: RTX-Volatiles ID: 0.32(mm)

 % Moisture:
 Level: (low/med) Low

 Analysis Batch No.: 207546
 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054
1330-20-7	Xylenes, Total	ND		1.2	0.074

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	97		70-130
17060-07-0	-0 1,2-Dichloroethane-d4 (Surr)			70-130
2037-26-5	Toluene-d8 (Surr)	98		70-130

Report Date: 09-Feb-2018 17:58:06 Chrom Revision: 2.2 24-Jan-2018 15:37:30

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\18020819.D

Lims ID: 320-35358-A-1
Client ID: 34000801
Sample Type: Client

Inject. Date: 09-Feb-2018 01:50:30 ALS Bottle#: 13 Worklist Smp#: 18

Purge Vol: 250.000 mL Dil. Factor: 1.0000

Sample Info: 320-35385-A-1

Misc. Info.: 500mL

Operator ID: SV Instrument ID: ATMS2

Method: \ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\TO15\_ATMS2N.m

Limit Group: MSA - TO15 - ICAL

Last Update:09-Feb-2018 17:58:06Calib Date:06-Feb-2018 23:01:30Integrator:RTEID Type:Deconvolution IDQuant Method:Internal StandardQuant By:Initial CalibrationLast ICal File:\ChromNA\Sacramento\ChromData\ATMS2\20180206-53757.b\18020612.D

Column 1: RTX Volatiles (0.32 mm) Det: MS SCAN

Process Host: XAWRK008

First Level Reviewer: phanthasena Date: 09-Feb-2018 17:58:06

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	11.386	11.380	0.006	98	56144	4.00	
* 2 1,4-Difluorobenzene	114	13.472	13.472	0.000	99	242149	4.00	
* 3 Chlorobenzene-d5 (IS)	117	19.532	19.532	0.000	99	227675	4.00	
\$ 41,2-Dichloroethane-d4 (Sur	65	12.536	12.536	0.000	39	84932	4.00	
\$ 5 Toluene-d8 (Surr)	100	16.697	16.697	0.000	100	151453	3.91	
\$ 6 4-Bromofluorobenzene (Surr	95	21.551	21.551	0.000	99	162330	3.88	
10 Propene	41	3.933	3.927	0.006	90	942	0.0593	
18 Butane	43	4.560	4.560	0.000	85	559	0.0200	
32 Acetone	43	6.957	6.896	0.061	99	10139	-0.3448	
39 Methylene Chloride	49	8.095	8.088	0.007	89	1284	0.0657	
40 Carbon disulfide	76	8.131	8.131	0.000	99	8667	0.2661	
123 1,2,4-Trichlorobenzene	180	25.974	25.974	0.000	82	425	0.0139	
Reagents:								

Reagents:

VAMSIS20\_00106 Amount Added: 50.00 Units: mL Run Reagent

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Report Date: 09-Feb-2018 17:58:06 Chrom Revision: 2.2 24-Jan-2018 15:37:30

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\18020819.D

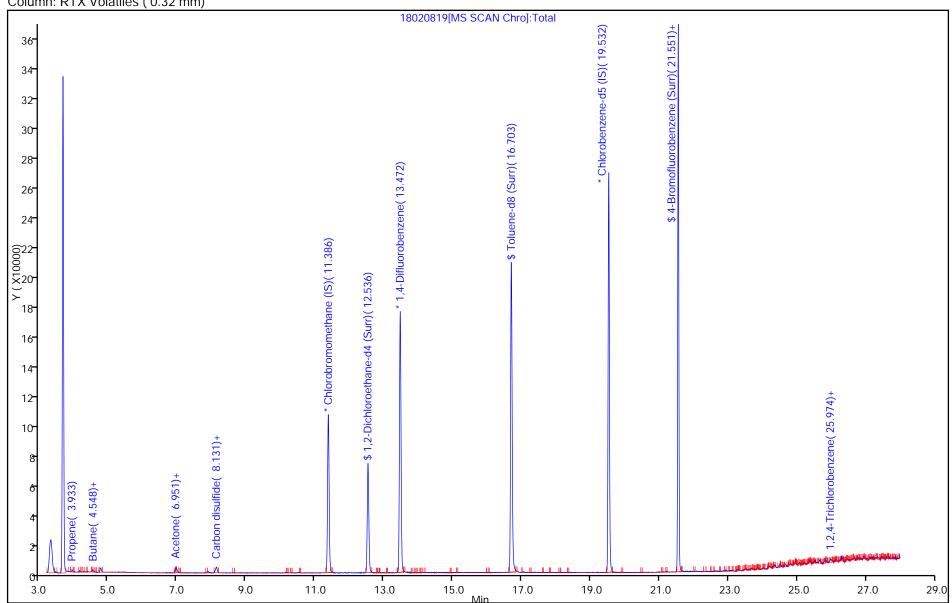
Injection Date: 09-Feb-2018 01:50:30 Instrument ID: ATMS2 Operator ID: SV Lims ID: Worklist Smp#: 320-35358-A-1 Lab Sample ID: 320-35358-1 18

Client ID: 34000801

Purge Vol: 250.000 mL Dil. Factor: ALS Bottle#: 13 1.0000

Method: TO15\_ATMS2N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)



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Data File: \\ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\18020819.D

Injection Date: 09-Feb-2018 01:50:30 Instrument ID: ATMS2 Lims ID: 320-35358-A-1 Lab Sample ID: 320-35358-1

34000801 Client ID:

SV ALS Bottle#: Operator ID: 13 Worklist Smp#: 18

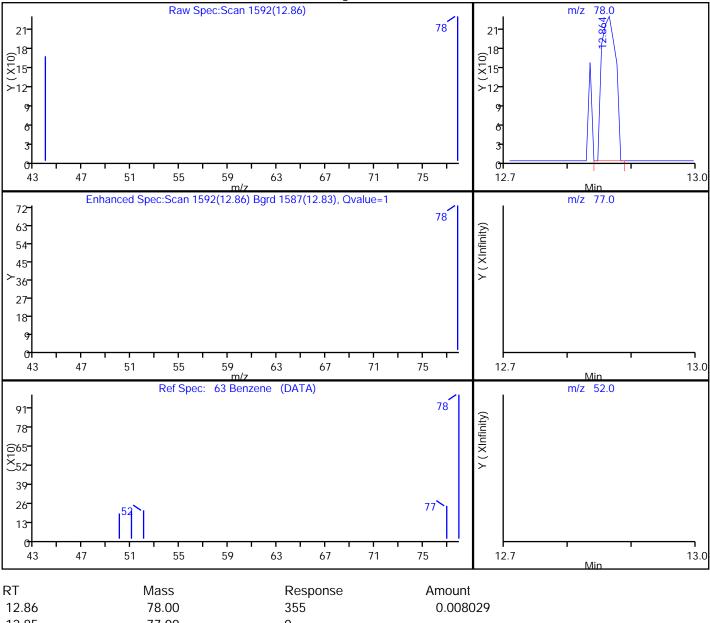
Purge Vol: 250.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS2N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

# 63 Benzene, CAS: 71-43-2

# **Processing Results**



12.85 77.00 0 12.85 52.00 0

Reviewer: phanthasena, 09-Feb-2018 17:58:06 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

10/29/2018

Data File: \\ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\18020819.D

Client ID: 34000801

Operator ID: SV ALS Bottle#: 13 Worklist Smp#: 18

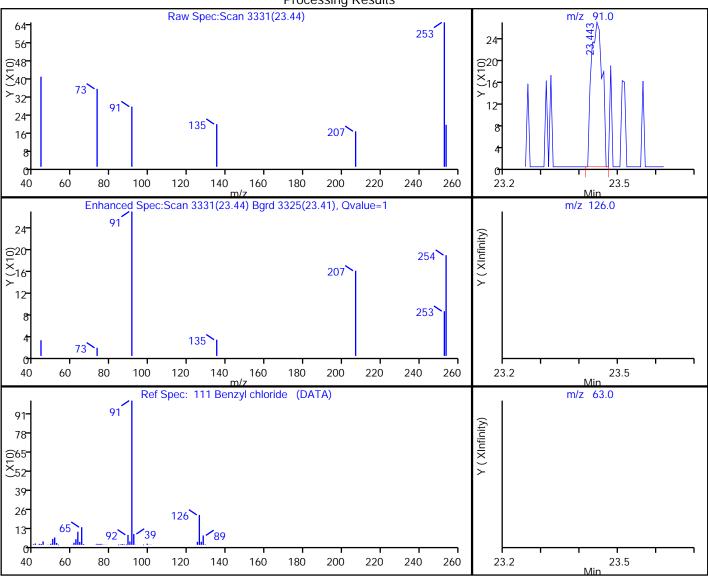
Purge Vol: 250.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS2N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

# 111 Benzyl chloride, CAS: 100-44-7

# **Processing Results**



RT	Mass	Response	Amount
23.44	91.00	538	0.008091
23.44	126.00	0	
23.44	63.00	0	

Reviewer: phanthasena, 09-Feb-2018 17:58:06

Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

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Data File: \\ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\18020819.D

Injection Date: 09-Feb-2018 01:50:30 Instrument ID: ATMS2 Lims ID: 320-35358-A-1 Lab Sample ID: 320-35358-1

Client ID: 34000801

SV ALS Bottle#: Operator ID: 13 Worklist Smp#: 18

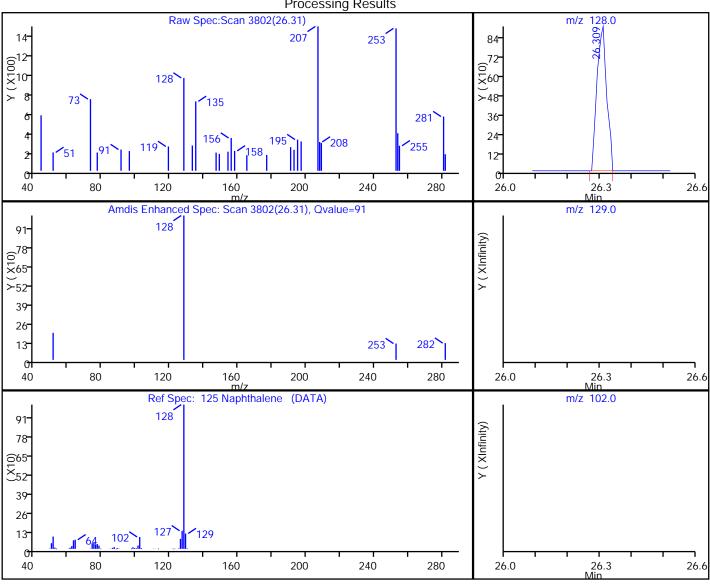
Purge Vol: 250.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS2N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

# 125 Naphthalene, CAS: 91-20-3

# **Processing Results**



RT	Mass	Response	Amount
26.31	128.00	1941	0.026443
26.30	129.00	0	
26.30	102.00	0	

Reviewer: phanthasena, 09-Feb-2018 17:58:06

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

Data File: \\ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\18020819.D

Injection Date: 09-Feb-2018 01:50:30 Instrument ID: ATMS2
Lims ID: 320-35358-A-1 Lab Sample ID: 320-35358-1

Client ID: 34000801

Operator ID: SV ALS Bottle#: 13 Worklist Smp#: 18

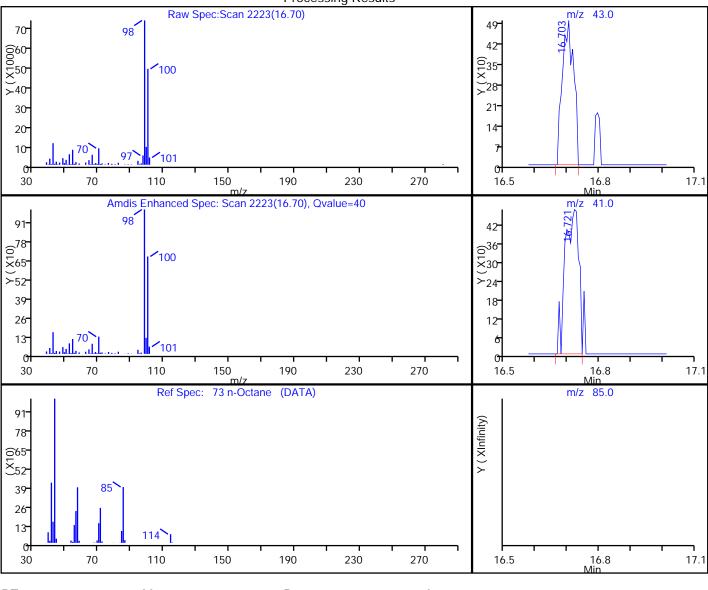
Purge Vol: 250.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS2N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

# 73 n-Octane, CAS: 111-65-9

# **Processing Results**



RT	Mass	Response	Amount
16.70	43.00	1244	0.027068
16.72	41.00	1409	
16.79	85.00	0	

Reviewer: phanthasena, 09-Feb-2018 17:58:06 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

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# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-36031-1 SDG No.: Client Sample ID: 34000536 Lab Sample ID: 320-36031-1 Matrix: Air Lab File ID: MS9022319.D Analysis Method: TO-15 Date Collected: 02/13/2018 00:00 Sample wt/vol: 250(mL) Date Analyzed: 02/24/2018 03:41 Soil Aliquot Vol: Dilution Factor: 1 Soil Extract Vol.: GC Column: RTX-Volatiles ID: 0.32(mm) Level: (low/med) Low % Moisture: Analysis Batch No.: 209817 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.43	J	5.0	0.1
107-02-8	Acrolein	ND		2.0	0.2
107-13-1	Acrylonitrile	ND		2.0	0.1
107-05-1	Allyl chloride	ND		0.80	0.1
71-43-2	Benzene	ND		0.40	0.07
100-44-7	Benzyl chloride	ND		0.80	0.1
75-27-4	Bromodichloromethane	ND		0.30	0.06
75-25-2	Bromoform	ND		0.40	0.07
74-83-9	Bromomethane	ND		0.80	0.3
106-99-0	1,3-Butadiene	ND		0.80	0.1
106-97-8	n-Butane	ND		0.40	0.1
78-93-3	2-Butanone (MEK)	ND		0.80	0.2
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.1
104-51-8	n-Butylbenzene	ND		0.40	0.1
135-98-8	sec-Butylbenzene	ND		0.40	0.07
98-06-6	tert-Butylbenzene	ND		0.80	0.06
75-15-0	Carbon disulfide	0.12	J	0.80	0.07
56-23-5	Carbon tetrachloride	ND		0.80	0.06
108-90-7	Chlorobenzene	ND		0.30	0.06
75-45-6	Chlorodifluoromethane	ND		0.80	0.2
75-00-3	Chloroethane	ND		0.80	0.3
67-66-3	Chloroform	ND		0.30	0.09
74-87-3	Chloromethane	ND		0.80	0.2
95-49-8	2-Chlorotoluene	ND		0.40	0.08
110-82-7	Cyclohexane	ND		0.40	0.08
124-48-1	Dibromochloromethane	ND		0.40	0.07
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.07
74-95-3	Dibromomethane	ND		0.40	0.05
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroetha	ND		0.40	0.1
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.1
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.1
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.1
75-71-8	Dichlorodifluoromethane	ND		0.40	0.1
75-34-3	1,1-Dichloroethane	ND		0.30	0.07
107-06-2	1,2-Dichloroethane	ND		0.80	0.08

# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: TestAmerica Sacramento Job No.: 320-36031-1 SDG No.: Client Sample ID: 34000536 Lab Sample ID: 320-36031-1 Matrix: Air Lab File ID: MS9022319.D Analysis Method: TO-15 Date Collected: 02/13/2018 00:00 Sample wt/vol: 250(mL) Date Analyzed: 02/24/2018 03:41 Soil Aliquot Vol: Dilution Factor: 1 Soil Extract Vol.: GC Column: RTX-Volatiles ID: 0.32(mm) Level: (low/med) Low % Moisture: Analysis Batch No.: 209817 Units: ppb v/v

156-59-2         cis-1,2-Dichloroethene         ND         0.40         0.0           156-60-5         trans-1,2-Dichloroethene         ND         0.40         0.           78-87-5         1,2-Dichloropropane         ND         0.40         0.           10061-01-5         cis-1,3-Dichloropropene         ND         0.40         0.           10061-02-6         trans-1,3-Dichloropropene         ND         0.40         0.0           123-91-1         1,4-Dioxane         ND         0.30         0.           141-78-6         Ethyl acetate         ND         0.30         0.           100-41-4         Ethylbenzene         ND         0.40         0.0           622-96-8         4-Ethyltoluene         ND         0.40         0.           87-68-3         Hexachlorobutadiene         ND         0.40         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Isopropylbenzene         ND         0.80         0.           89-82-8			<del></del>			
156-59-2         cis-1,2-Dichloroethene         ND         0.40         0.0           156-60-5         trans-1,2-Dichloroethene         ND         0.40         0.           78-87-5         1,2-Dichloropropane         ND         0.40         0.           10061-01-5         cis-1,3-Dichloropropene         ND         0.40         0.           10061-02-6         trans-1,3-Dichloropropene         ND         0.40         0.0           123-91-1         1,4-Dioxane         ND         0.30         0.           141-78-6         Ethyl acetate         ND         0.30         0.           100-41-4         Ethylbenzene         ND         0.40         0.0           622-96-8         4-Ethyltoluene         ND         0.40         0.           87-68-3         Hexachlorobutadiene         ND         0.40         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Isopropylbenzene         ND         0.80         0.           89-82-8	CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
156-60-5	75-35-4	1,1-Dichloroethene	ND		0.80	0.1
1,2-Dichloropropane	156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
10061-01-5	156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.1
10061-02-6   trans-1,3-Dichloropropene	78-87-5	1,2-Dichloropropane	ND		0.40	0.2
123-91-1	10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.1
141-78-6	10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.08
100-41-4	123-91-1	1,4-Dioxane	ND		0.80	0.1
A=Ethyltoluene	141-78-6	Ethyl acetate	ND		0.30	0.1
142-82-5	100-41-4	Ethylbenzene	ND		0.40	0.063
87-68-3         Hexachlorobutadiene         ND         2.0         0.           110-54-3         n-Hexane         ND         0.80         0.0           591-78-6         2-Hexanone         ND         0.40         0.0           98-82-8         Isopropylboluene         ND         0.80         0.           99-87-6         4-Isopropyltoluene         ND         0.80         0.           1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.           80-62-6         Methyl methacrylate         ND         0.80         0.           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.           75-09-2         Methylene Chloride         ND         0.40         0.           98-83-9         alpha-Methylstyrene         ND         0.40         0.           91-20-3         Naphthalene         ND         0.40         0.           111-65-9         n-Octane         ND         0.40         0.           109-66-0         n-Pentane         ND         0.40         0.           103-65-1         N-Propylbenzene         ND         0.40         0.           100-42-5         Styrene         ND<	622-96-8	4-Ethyltoluene	ND		0.40	0.1
110-54-3	142-82-5	n-Heptane	ND		0.80	0.063
Section	87-68-3	Hexachlorobutadiene	ND		2.0	0.43
98-82-8         Isopropylbenzene         ND         0.80         0.80           99-87-6         4-Isopropyltoluene         ND         0.80         0.           1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.           80-62-6         Methyl methacrylate         ND         0.80         0.           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.           75-09-2         Methylene Chloride         ND         0.40         0.0           98-83-9         alpha-Methylstyrene         ND         0.40         0.0           99-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           109-88-3         Toluene	110-54-3	n-Hexane	ND		0.80	0.07
99-87-6 4-Isopropyltoluene ND 0.80 0.  1634-04-4 Methyl-t-Butyl Ether (MTBE) ND 0.80 0.  80-62-6 Methyl methacrylate ND 0.80 0.  108-10-1 4-Methyl-2-pentanone (MIBK) ND 0.40 0.0  75-09-2 Methylene Chloride ND 0.40 0.0  98-83-9 alpha-Methylstyrene ND 0.40 0.0  91-20-3 Naphthalene ND 0.80 0.  111-65-9 n-Octane ND 0.40 0.0  109-66-0 n-Pentane ND 0.80 0.  155-07-1 Propylene ND 0.40 0.0  100-42-5 Styrene ND 0.40 0.0  100-42-5 Styrene ND 0.40 0.0  127-18-4 Tetrachloroethane ND 0.40 0.0  109-99-9 Tetrahydrofuran ND 0.80 0.  108-88-3 Toluene ND 0.40 0.0  76-13-1 1,1,2-Trichloro-1,2,2-trifluoroethane ND 0.40 0.0  120-82-1 1,2,4-Trichlorobenzene ND 0.30 0.0  71-55-6 1,1,1-Trichloroethane ND 0.30 0.0	591-78-6	2-Hexanone	ND		0.40	0.08
1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.80           80-62-6         Methyl methacrylate         ND         0.80         0.           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.           75-09-2         Methylene Chloride         ND         0.40         0.0           98-83-9         alpha-Methylstyrene         ND         0.40         0.0           91-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.40         0.0           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoro	98-82-8	Isopropylbenzene	ND		0.80	0.1
80-62-6         Methyl methacrylate         ND         0.80         0.           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.           75-09-2         Methylene Chloride         ND         0.40         0.0           98-83-9         alpha-Methylstyrene         ND         0.40         0.0           91-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           127-18-4         Tetrachloroethane         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           1-1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.0           120-82-1         1,2,4-Trichlorobenzene         ND	99-87-6	4-Isopropyltoluene	ND		0.80	0.1
108-10-1       4-Methyl-2-pentanone (MIBK)       ND       0.40       0.         75-09-2       Methylene Chloride       ND       0.40       0.0         98-83-9       alpha-Methylstyrene       ND       0.40       0.0         91-20-3       Naphthalene       ND       0.80       0.         111-65-9       n-Octane       ND       0.40       0.0         109-66-0       n-Pentane       ND       0.80       0.         115-07-1       Propylene       ND       0.40       0.0         103-65-1       N-Propylbenzene       ND       0.40       0.0         100-42-5       Styrene       ND       0.40       0.0         79-34-5       1,1,2,2-Tetrachloroethane       ND       0.40       0.0         127-18-4       Tetrachloroethene       ND       0.40       0.0         108-88-3       Toluene       ND       0.40       0.0         76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan       ND       0.40       0.         120-82-1       1,2,4-Trichlorobenzene       ND       0.30       0.0         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
75-09-2         Methylene Chloride         ND         0.40         0.0           98-83-9         alpha-Methylstyrene         ND         0.40         0.0           91-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.0           120-82-1         1,2,4-Trichlorobenzene         ND         0.30         0.0           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	80-62-6	Methyl methacrylate	ND		0.80	0.1
98-83-9         alpha-Methylstyrene         ND         0.40         0.0           91-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           109-99-9         Tetrachloroethene         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.0           120-82-1         1,2,4-Trichlorobenzene         ND         0.30         0.0           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.1
91-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.0           120-82-1         1,2,4-Trichlorobenzene         ND         0.30         0.0           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	75-09-2	Methylene Chloride	ND		0.40	0.07
111-65-9       n-Octane       ND       0.40       0.0         109-66-0       n-Pentane       ND       0.80       0.         115-07-1       Propylene       ND       0.40       0.0         103-65-1       N-Propylbenzene       ND       0.40       0.0         100-42-5       Styrene       ND       0.40       0.0         79-34-5       1,1,2,2-Tetrachloroethane       ND       0.40       0.0         109-99-9       Tetrachloroethene       ND       0.40       0.0         108-88-3       Toluene       ND       0.40       0.0         76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan e       ND       0.40       0.         120-82-1       1,2,4-Trichlorobenzene       ND       2.0       0.         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	98-83-9	alpha-Methylstyrene	ND		0.40	0.06
109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.0           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	91-20-3	Naphthalene	ND		0.80	0.5
115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.0           76-13-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	111-65-9	n-Octane	ND		0.40	0.05
103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.0           71-55-6         1,1,1-Trichlorobenzene         ND         0.30         0.0           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	109-66-0	n-Pentane	ND		0.80	0.2
100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.80         0.           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	115-07-1	Propylene	ND		0.40	0.09
79-34-5       1,1,2,2-Tetrachloroethane       ND       0.40       0.0         127-18-4       Tetrachloroethene       ND       0.40       0.0         109-99-9       Tetrahydrofuran       ND       0.80       0.         108-88-3       Toluene       ND       0.40       0.0         76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan e       ND       0.40       0.         120-82-1       1,2,4-Trichlorobenzene       ND       2.0       0.         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	103-65-1	N-Propylbenzene	ND		0.40	0.05
127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.80         0.           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	100-42-5	Styrene	ND		0.40	0.05
127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.80         0.           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.06
108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	127-18-4		ND		0.40	0.05
76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan e       ND       0.40       0.         120-82-1       1,2,4-Trichlorobenzene       ND       2.0       0.         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	109-99-9	Tetrahydrofuran	ND		0.80	0.2
76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan e       ND       0.40       0.         120-82-1       1,2,4-Trichlorobenzene       ND       2.0       0.         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	108-88-3	_	ND		0.40	0.05
120-82-1       1,2,4-Trichlorobenzene       ND       2.0       0.         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	76-13-1		ND		0.40	0.1
	120-82-1		ND		2.0	0.4
79-00-5 1,1,2-Trichloroethane ND 0.40 0.0	71-55-6	1,1,1-Trichloroethane	ND		0.30	0.06
	79-00-5	1,1,2-Trichloroethane	ND		0.40	0.06

# FORM I AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

 Lab Name: TestAmerica Sacramento
 Job No.: 320-36031-1

 SDG No.:
 Lab Sample ID: 320-36031-1

 Matrix: Air
 Lab File ID: MS9022319.D

 Analysis Method: TO-15
 Date Collected: 02/13/2018 00:00

 Sample wt/vol: 250(mL)
 Date Analyzed: 02/24/2018 03:41

 Soil Aliquot Vol:
 Dilution Factor: 1

 Soil Extract Vol.:
 GC Column: RTX-Volatiles ID: 0.32(mm)

 % Moisture:
 Level: (low/med) Low

 Analysis Batch No.: 209817
 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054
1330-20-7	Xylenes, Total	ND		1.2	0.074

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	88		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	101		70-130
2037-26-5	Toluene-d8 (Surr)	95		70-130

# TestAmerica Sacramento **Target Compound Quantitation Report**

\\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D Data File:

Lims ID: 320-36031-A-1 Client ID: 34000536 Sample Type: Client

Inject. Date: 24-Feb-2018 03:41:30 ALS Bottle#: 14 Worklist Smp#: 34

Purge Vol: 5.000 mL Dil. Factor: 1.0000

Sample Info: 320-36031-A-1

Misc. Info.: 500

Operator ID: RG Instrument ID: ATMS9

Method: \\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\TO15\_ATMS9N.m

Limit Group: MSA - TO15 - ICAL

Last Update: 26-Feb-2018 11:17:19 Calib Date: 09-Feb-2018 00:05:30 Integrator: RTE ID Type: **Deconvolution ID** Quant By: Quant Method: Internal Standard **Initial Calibration** Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS9\20180208-53859.b\MS9020812.D

Column 1: RTX Volatiles (0.32 mm) Det: MS SCAN

Process Host: XAWRK007

al David

First Level Reviewer: phanthasena			Date:			26-Feb-2018 11:17:19		
		RT	Adj RT	DIt RT			OnCol Amt	
Compound	Sig	(min.)	(min.)	(min.)	Q	Response	ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	12.312	12.312	0.000	94	73992	4.00	
* 2 1,4-Difluorobenzene	114	14.405	14.405	0.000	99	305569	4.00	
* 3 Chlorobenzene-d5 (IS)	117	20.324	20.324	0.000	98	192153	4.00	
\$ 41,2-Dichloroethane-d4 (Sur	65	13.480	13.480	0.000	97	119516	4.02	
\$ 5 Toluene-d8 (Surr)	100	17.562	17.569	-0.007	98	146869	3.78	
\$ 6 4-Bromofluorobenzene (Surr	174	22.253	22.259	-0.006	98	89197	3.53	
18 Chloromethane	50	4.793	4.763	0.030	36	1256	0.0621	
31 Acetone	43	7.689	7.634	0.055	95	13246	0.4284	
47 Methylene Chloride	49	8.881	8.899	-0.018	78	1106	0.0426	
48 Carbon disulfide	76	8.936	8.942	-0.006	99	5311	0.1177	
62 Tetrahydrofuran	42	12.586	12.513	0.073	25	804	0.0324	
85 Toluene	91	17.708	17.726	-0.019	75	1747	0.0199	
87 2-Hexanone	58	18.402	18.371	0.037	68	607	0.0176	
93 Tetrachloroethene	166	18.992	19.010	-0.018	85	1287	0.0332	
98 m-Xylene & p-Xylene	91	20.659	20.665	-0.006	0	5783	0.0667	
101 o-Xylene	91	21.359	21.365	-0.007	94	2695	0.0308	
107 N-Propylbenzene	91	22.533	22.539	-0.006	95	1753	0.0115	
110 4-Ethyltoluene	120	22.709	22.697	0.006	90	386	0.0103	
111 1,3,5-Trimethylbenzene	120	22.770	22.770	0.000	86	639	0.0122	
114 tert-Butylbenzene	91	23.269	23.281	-0.012	22	1007	0.0133	
115 1,2,4-Trimethylbenzene	120	23.324	23.323	0.000	90	915	0.0178	
116 sec-Butylbenzene	105	23.579	23.579	0.000	88	1182	0.007750	
121 4-Isopropyltoluene	119	23.755	23.755	0.000	92	1223	0.009246	
117 1,3-Dichlorobenzene	146	23.853	23.853	0.000	66	733	0.0106	
120 1,4-Dichlorobenzene	146	23.981	23.987	-0.006	84	1046	0.0150	
123 n-Butylbenzene	92	24.291	24.297	-0.006	87	354	0.004893	
122 1,2-Dichlorobenzene	146	24.467	24.473	-0.006	85	568	0.008525	
126 1,2,4-Trichlorobenzene	180	26.694	26.700	-0.006	37	930	0.0460	
127 Naphthalene	128	27.065	27.065	0.000	97	5089	0.0289	
S 155 Xylenes, Total	91				0		0.0975	
<i>j</i>					-			

10/29/2018

Report Date: 26-Feb-2018 11:17:19 Chrom Revision: 2.2 08-Feb-2018 13:38:42

Reagents:

VAMSIS20\_00109 Amount Added: 50.00 Units: mL Run Reagent

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Chrom Revision: 2.2 08-Feb-2018 13:38:42

TestAmerica Sacramento

\\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D Data File:

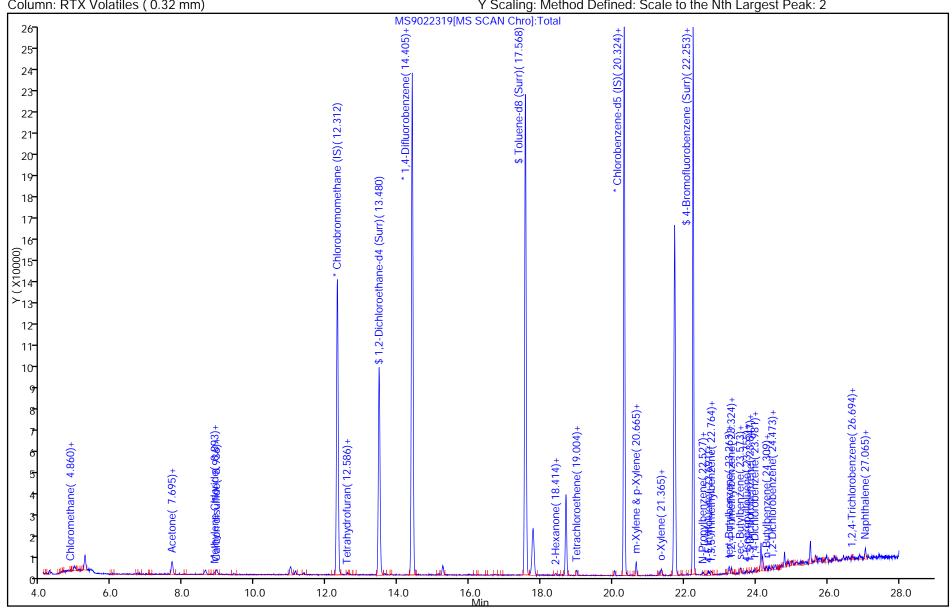
Injection Date: 24-Feb-2018 03:41:30 Instrument ID: ATMS9 Operator ID: RG Lims ID: Worklist Smp#: 320-36031-A-1 Lab Sample ID: 320-36031-1 34

34000536 Client ID:

Purge Vol: 5.000 mL Dil. Factor: ALS Bottle#: 14 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Y Scaling: Method Defined: Scale to the Nth Largest Peak: 2



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10/29/2018

TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D Injection Date: 24-Feb-2018 03:41:30 Instrument ID: ATMS9 Lims ID: 320-36031-A-1 320-36031-1 Lab Sample ID: Client ID: 34000536 RG ALS Bottle#: Worklist Smp#: Operator ID: 14 34 Dil. Factor: Purge Vol: 5.000 mL 1.0000 MSA - TO15 - ICAL Method: TO15\_ATMS9N Limit Group: Column: RTX Volatiles (0.32 mm) Detector MS SCAN 31 Acetone, CAS: 67-64-1 Raw Spec:Scan 593(7.69) 43.0 m/z 43 35 35 ©30<sup>-</sup> ×25<sup>-</sup> **≻**20 58 15 15 40 10 10 0 40 44 48 52 56 7.1 7.4 7.7 8.0 36 58.0 Amdis Enhanced Spec: Scan 593(7.69), Qvalue=95 m/z 16 43 91 ⊙<sup>78</sup> ×65 ∑<sub>10</sub> ≻52 58 39 26<del>-</del> 13 0 0 8.0 44 52 7.4 7.7 36 40 48 56 7.1 Ref Spec: 31 Acetone (NIST14.L) 43 91-78 865 . ≿<sub>52</sub> 39 26 58 13 40 44 48 52 56 36 Differenc Spec:Scan 1 @ 7.690 min.(Qvalue: 95) m/z 43.0 100m/z 58.0 75 50 25 <sub>58</sub>/I 0 18 -25 12 -50**-**-75 100 ┪ 0 36 40 44 48 52 56 7.1 7.4 7.7 0.8

Chrom Revision: 2.2 08-Feb-2018 13:38:42

Report Date: 26-Feb-2018 11:17:19

Chrom Revision: 2.2 08-Feb-2018 13:38:42

Report Date: 26-Feb-2018 11:17:20

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D

Injection Date: 24-Feb-2018 03:41:30 Instrument ID: ATMS9 Lims ID: 320-36031-A-1 Lab Sample ID: 320-36031-1

Client ID: 34000536

ALS Bottle#: Operator ID: RG 14 Worklist Smp#: 34

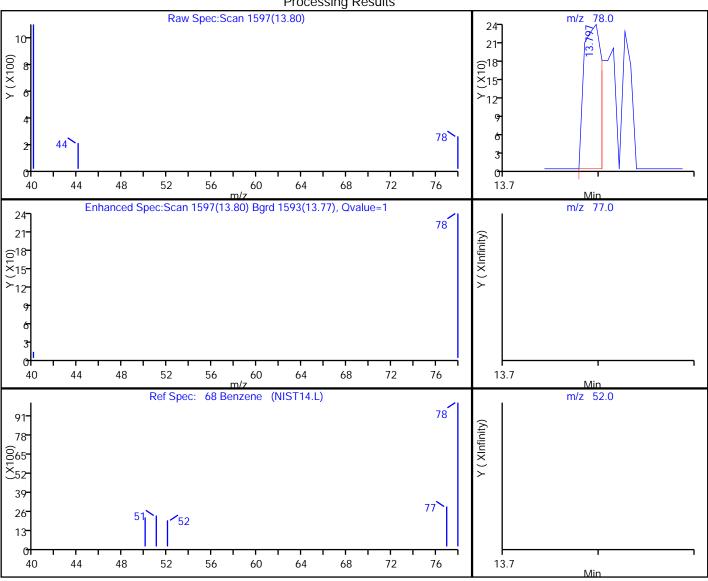
Dil. Factor: Purge Vol: 5.000 mL 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

# 68 Benzene, CAS: 71-43-2

# **Processing Results**



RT	Mass	Response	Amount
13.80	78.00	310	0.004506
13.81	77.00	0	
13.81	52.00	0	

Reviewer: phanthasena, 26-Feb-2018 11:17:19 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D

Client ID: 34000536

Operator ID: RG ALS Bottle#: 14 Worklist Smp#: 34

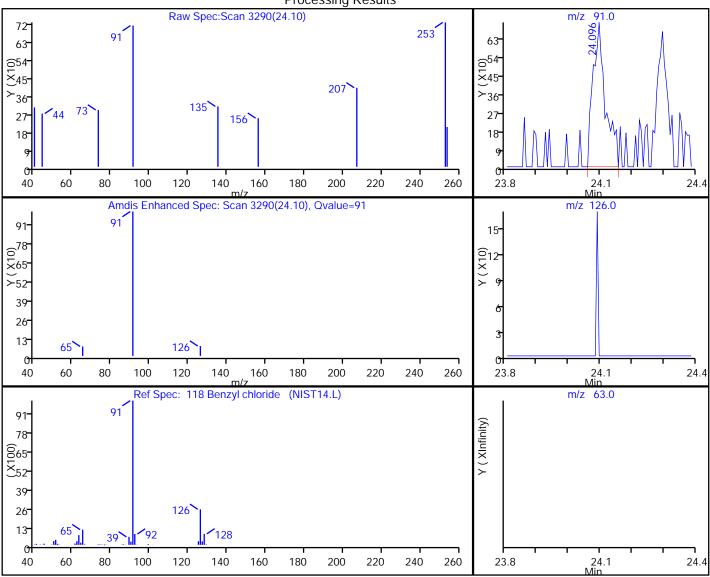
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

# 118 Benzyl chloride, CAS: 100-44-7

# **Processing Results**



RT	Mass	Response	Amount
24.10	91.00	1956	0.014991
24.10	126.00	0	
24.10	63.00	0	

Reviewer: phanthasena, 26-Feb-2018 11:17:19 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

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Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D

Injection Date: 24-Feb-2018 03:41:30 Instrument ID: ATMS9 Lims ID: 320-36031-A-1 Lab Sample ID: 320-36031-1

Client ID: 34000536

ALS Bottle#: Operator ID: RG 14 Worklist Smp#: 34

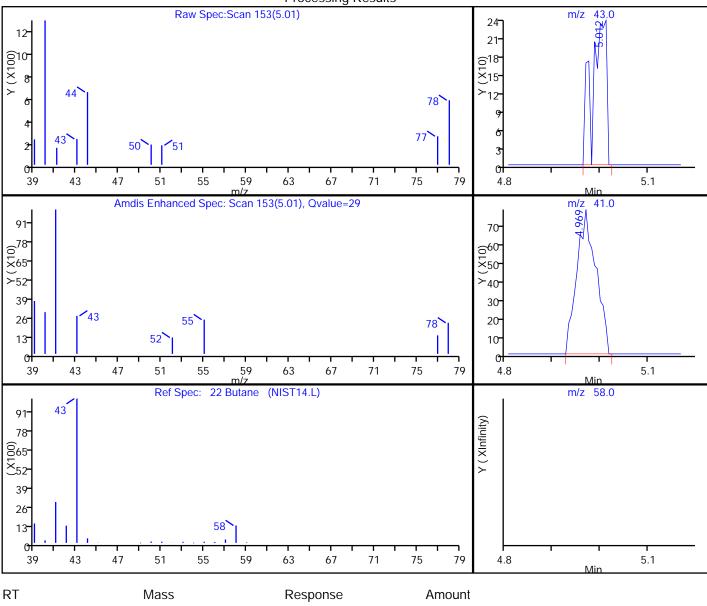
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

# 22 Butane, CAS: 106-97-8

# **Processing Results**



RT	Mass	Response	Amount
5.01	43.00	495	0.013432
4.97	41.00	2209	
4.99	58.00	0	

Reviewer: phanthasena, 26-Feb-2018 11:17:19

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D

Injection Date: 24-Feb-2018 03:41:30 Instrument ID: ATMS9 Lims ID: 320-36031-A-1 Lab Sample ID: 320-36031-1

Client ID: 34000536

ALS Bottle#: Operator ID: RG 14 Worklist Smp#: 34

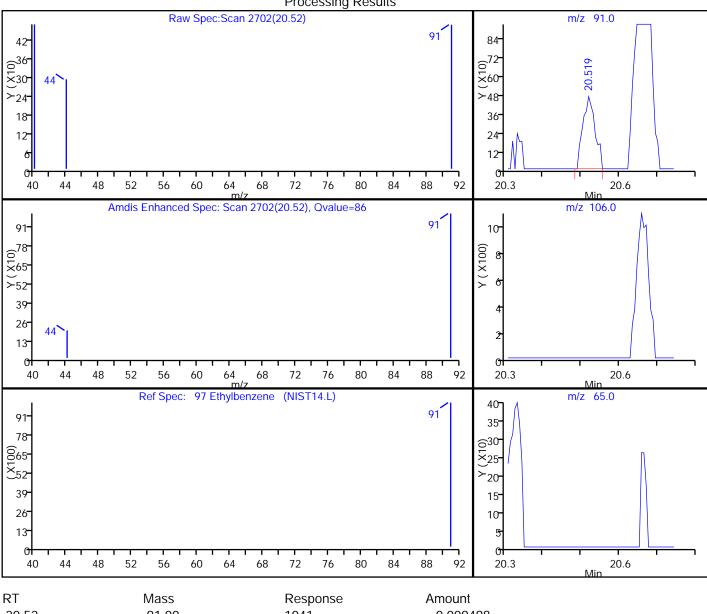
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Detector Column: RTX Volatiles (0.32 mm) MS SCAN

# 97 Ethylbenzene, CAS: 100-41-4

### **Processing Results**



RT	Mass	Response	Amount
20.52	91.00	1041	0.009498
20.53	106.00	0	
20.53	65.00	0	

Reviewer: phanthasena, 26-Feb-2018 11:17:19 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D

Injection Date: 24-Feb-2018 03:41:30 Instrument ID: ATMS9 Lims ID: 320-36031-A-1 Lab Sample ID: 320-36031-1

34000536 Client ID:

ALS Bottle#: Operator ID: RG 14 Worklist Smp#: 34

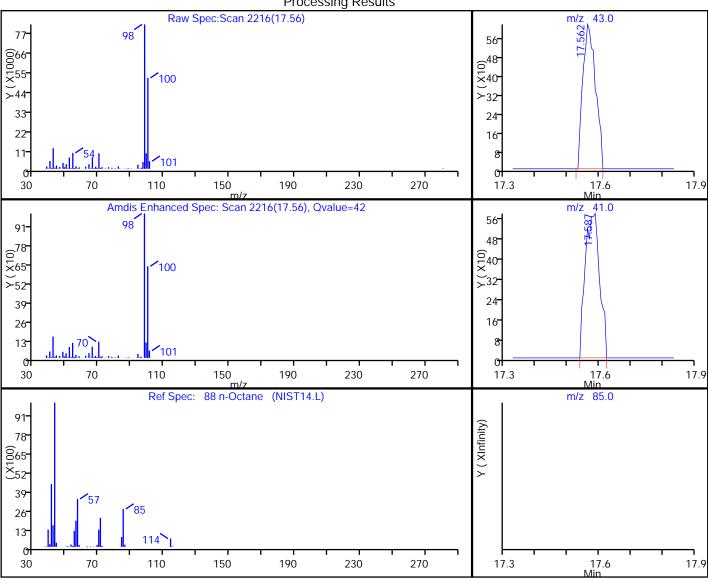
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

# 88 n-Octane, CAS: 111-65-9

# **Processing Results**



RT	Mass	Response	Amount
17.56	43.00	1719	0.031107
17.59	41.00	1808	
17.58	85.00	0	

Reviewer: phanthasena, 26-Feb-2018 11:17:19 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

Data File: \ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D

Client ID: 34000536

Operator ID: RG ALS Bottle#: 14 Worklist Smp#: 34

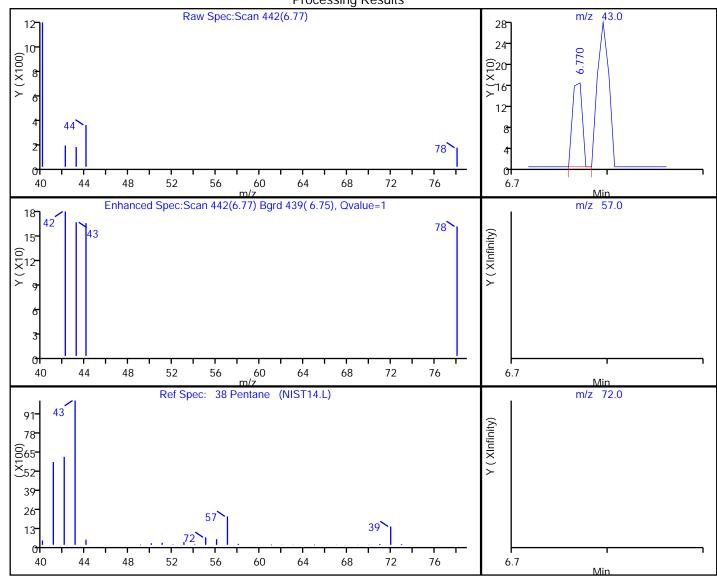
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

# 38 Pentane, CAS: 109-66-0

# **Processing Results**



RT	Mass	Response	Amount
6.77	43.00	115	0.003164
6.79	57.00	0	
6.79	72.00	0	

Reviewer: phanthasena, 26-Feb-2018 11:17:19 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

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10/29/2018



THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento 880 Riverside Parkway West Sacramento, CA 95605 Tel: (916)373-5600

TestAmerica Job ID: 320-44380-1

Client Project/Site: Chevron Edmonds Terminal

For:

ARCADIS U.S. Inc 1100 Olive Way Suite 800 Seattle, Washington 98101

Attn: Samuel Miles

# M. Elaine Walker

Authorized for release by: 10/29/2018 1:51:57 PM

Elaine Walker, Project Manager II (253)248-4972

elaine.walker@testamericainc.com

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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.

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# **Definitions/Glossary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

# **Qualifiers**

# Air - GC/MS VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits
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.

# Glossary

TEQ

Toxicity Equivalent Quotient (Dioxin)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
a	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)

TestAmerica Sacramento

10/29/2018

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# **Case Narrative**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

Job ID: 320-44380-1

**Laboratory: TestAmerica Sacramento** 

**Narrative** 

Job Narrative 320-44380-1

### Receipt

Two samples were received on 10/20/2018 9:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

### **Receipt Exceptions**

The Chain-of-Custody (COC) was incomplete as received and/or improperly completed. Canister IDs and time stop not listed on COC.

Canister ID for sample 1 is 34000801.

Canister ID for sample 2 is 34000536.

### Air - GC VOA

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

### Air - GC/MS VOA

Method(s) TO-15: 1,2-Dichloroethane-d4 (Surrogate) recovery for the following sample was outside control limits: VSP-801 (320-44380-1). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

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

# **Detection Summary**

Client: ARCADIS U.S. Inc

Client Sample ID: VSP-801

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

Lab Sample ID: 320-44380-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	640		9.1	1.8	ppb v/v	22.8	_	TO-15	Total/NA
Ethylbenzene	99	В	9.1	1.4	ppb v/v	22.8		TO-15	Total/NA
Toluene	4.3	JB	9.1	1.2	ppb v/v	22.8		TO-15	Total/NA
m,p-Xylene	110	В	18	2.3	ppb v/v	22.8		TO-15	Total/NA
o-Xylene	12	В	9.1	1.2	ppb v/v	22.8		TO-15	Total/NA
TPH (as Gasoline)	38000		2300	910	ppb v/v	22.8		TO-15	Total/NA
Carbon Dioxide (TCD)	2.2		1.1	0.024	% v/v	2.28		D1946	Total/NA
Methane (FID)	0.0015		0.00023	0.000046	% v/v	2.28		D1946	Total/NA
Oxygen	16		0.46	0.017	% v/v	2.28		D1946	Total/NA

**Client Sample ID: VSP-802** Lab Sample ID: 320-44380-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.34	J	0.40	0.079	ppb v/v	1	_	TO-15	Total/NA
Ethylbenzene	0.33	JB	0.40	0.063	ppb v/v	1		TO-15	Total/NA
Toluene	1.1	В	0.40	0.051	ppb v/v	1		TO-15	Total/NA
m,p-Xylene	0.97	В	0.80	0.10	ppb v/v	1		TO-15	Total/NA
o-Xylene	0.36	JB	0.40	0.054	ppb v/v	1		TO-15	Total/NA
TPH (as Gasoline)	70	J	100	40	ppb v/v	1		TO-15	Total/NA
Carbon Dioxide (TCD)	2.0		0.83	0.018	% v/v	1.66		D1946	Total/NA
Methane (FID)	0.0017		0.00017	0.000033	% v/v	1.66		D1946	Total/NA
Oxygen	16		0.33	0.012	% v/v	1.66		D1946	Total/NA

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

Lab Sample ID: 320-44380-1

Matrix: Air

Date Collected: 10/18/18 15:45 Date Received: 10/20/18 09:25

Client Sample ID: VSP-801

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	640		9.1	1.8	ppb v/v			10/26/18 05:08	22.8
Ethylbenzene	99	В	9.1	1.4	ppb v/v			10/26/18 05:08	22.8
Toluene	4.3	JB	9.1	1.2	ppb v/v			10/26/18 05:08	22.8
m,p-Xylene	110	В	18	2.3	ppb v/v			10/26/18 05:08	22.8
o-Xylene	12	В	9.1	1.2	ppb v/v			10/26/18 05:08	22.8
TPH (as Gasoline)	38000		2300	910	ppb v/v			10/26/18 05:08	22.8
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		70 - 130			•		10/26/18 05:08	22.8
1,2-Dichloroethane-d4 (Surr)	134	X	70 - 130					10/26/18 05:08	22.8
Toluene-d8 (Surr)	101		70 - 130					10/26/18 05:08	22.8
Method: D1946 - Fixed Gas	es in Air (GC)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	2.2		1.1	0.024	% v/v			10/24/18 11:00	2.28
Methane (FID)	0.0015		0.00023	0.000046	% v/v			10/24/18 14:40	2.28
Oxygen	16		0.46	0.017	% v/v			10/24/18 11:00	2.28

**Client Sample ID: VSP-802** Lab Sample ID: 320-44380-2

Date Collected: 10/18/18 15:30

Date Received: 10/20/18 09:25

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.34	J	0.40	0.079	ppb v/v			10/26/18 06:05	1
Ethylbenzene	0.33	JB	0.40	0.063	ppb v/v			10/26/18 06:05	1
Toluene	1.1	В	0.40	0.051	ppb v/v			10/26/18 06:05	1
m,p-Xylene	0.97	В	0.80	0.10	ppb v/v			10/26/18 06:05	1
o-Xylene	0.36	JB	0.40	0.054	ppb v/v			10/26/18 06:05	1
TPH (as Gasoline)	70	J	100	40	ppb v/v			10/26/18 06:05	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130			-		10/26/18 06:05	1
1,2-Dichloroethane-d4 (Surr)	99		70 - 130					10/26/18 06:05	1
Toluene-d8 (Surr)	97		70 - 130					10/26/18 06:05	1
Method: D1946 - Fixed Gas	ses in Air (GC)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	2.0		0.83	0.018	% v/v			10/24/18 11:10	1.66
Methane (FID)	0.0017		0.00017	0.000033	% v/v			10/24/18 14:27	1.66
Oxygen	16		0.33	0.012	% v/v			10/24/18 11:10	1.66

Matrix: Air

# **Surrogate Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

# Method: TO-15 - Volatile Organic Compounds in Ambient Air

Matrix: Air Prep Type: Total/NA

			Pe	ercent Surroga	ate Recovery (Acceptance Limits
		BFB	DCA	TOL	
Lab Sample ID	Client Sample ID	(70-130)	(70-130)	(70-130)	
320-44380-1	VSP-801	104	134 X	101	
320-44380-2	VSP-802	98	99	97	
LCS 320-254908/4	Lab Control Sample	110	115	103	
LCS 320-254908/6	Lab Control Sample	116	103	100	
LCSD 320-254908/5	Lab Control Sample Dup	108	109	102	
LCSD 320-254908/7	Lab Control Sample Dup	114	106	100	
MB 320-254908/16	Method Blank	99	101	95	

BFB = 4-Bromofluorobenzene (Surr)

DCA = 1,2-Dichloroethane-d4 (Surr)

TOL = Toluene-d8 (Surr)

10/29/2018

TestAmerica Job ID: 320-44380-1

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

# Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 320-254908/16

**Matrix: Air** 

**Analysis Batch: 254908** 

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

**Client Sample ID: Lab Control Sample** 

Prep Type: Total/NA

MB MB Analyte **Result Qualifier** RL MDL Unit Prepared Analyzed Dil Fac Benzene ND 0.40 0.079 ppb v/v 10/26/18 02:31 Ethylbenzene 0.0631 J 10/26/18 02:31 0.40 0.063 ppb v/v Toluene 0.0554 J 0.40 0.051 ppb v/v 10/26/18 02:31 m,p-Xylene 0.258 J 0.80 0.10 ppb v/v 10/26/18 02:31 o-Xylene 0.132 J 0.40 0.054 ppb v/v 10/26/18 02:31 TPH (as Gasoline) ND 100 40 ppb v/v 10/26/18 02:31

MB MB

Surrogate	%Recovery	Qualifier	Limits	Prepared Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		70 - 130	10/26/18 02:	<del>1</del> 1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130	10/26/18 02:	1 1
Toluene-d8 (Surr)	95		70 - 130	10/26/18 02:	1 1

Lab Sample ID: LCS 320-254908/4

**Matrix: Air** 

**Analysis Batch: 254908** 

LCS LCS Spike %Rec. Added Analyte Result Qualifier Unit D %Rec Limits 2000 TPH (as Gasoline) 1640 82 70 - 130 ppb v/v

LCS LCS Surrogate %Recovery Qualifier Limits 4-Bromofluorobenzene (Surr) 110 70 - 130 70 - 130 1,2-Dichloroethane-d4 (Surr) 115 Toluene-d8 (Surr) 103 70 - 130

Lab Sample ID: LCS 320-254908/6

**Client Sample ID: Lab Control Sample Matrix: Air** Prep Type: Total/NA **Analysis Batch: 254908** 

	Spike	LCS	LCS				%Rec.	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Benzene	20.0	21.2		ppb v/v	_	106	68 - 128	
Ethylbenzene	20.0	20.0		ppb v/v		100	64 - 124	
Toluene	20.0	21.6		ppb v/v		108	68 - 128	
m,p-Xylene	40.0	40.6		ppb v/v		101	65 - 125	
o-Xylene	20.0	19.8		ppb v/v		99	65 - 125	

LCS LCS

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	116		70 - 130
1,2-Dichloroethane-d4 (Surr)	103		70 - 130
Toluene-d8 (Surr)	100		70 - 130

Lab Sample ID: LCSD 320-254908/5

**Matrix: Air** 

Analysis Batch: 254908									
	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
TPH (as Gasoline)	2000	1690		ppb v/v		84	70 - 130	3	25

TestAmerica Sacramento

Prep Type: Total/NA

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

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TestAmerica Job ID: 320-44380-1

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

# Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

LCSD LCSD

Lab Sample ID: LCSD 320-254908/5

**Matrix: Air** 

**Analysis Batch: 254908** 

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

**Prep Type: Total/NA** 

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	108		70 - 130
1,2-Dichloroethane-d4 (Surr)	109		70 - 130
Toluene-d8 (Surr)	102		70 - 130

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

Lab Sample ID: LCSD 320-254908/7 **Matrix: Air** 

**Analysis Batch: 254908** 

Prep Type: Total/NA

	Spike	LCSD	LCSD				%Rec.		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Benzene	20.0	21.8		ppb v/v	_	109	68 - 128	2	25
Ethylbenzene	20.0	21.0		ppb v/v		105	64 - 124	5	25
Toluene	20.0	22.1		ppb v/v		111	68 - 128	2	25
m,p-Xylene	40.0	41.8		ppb v/v		105	65 - 125	3	25
o-Xylene	20.0	20.6		ppb v/v		103	65 - 125	4	25

LCSD LCSD

Surrogate	%Recovery	Qualifier	Limits
4-Bromofluorobenzene (Surr)	114		70 - 130
1,2-Dichloroethane-d4 (Surr)	106		70 - 130
Toluene-d8 (Surr)	100		70 - 130

# Method: D1946 - Fixed Gases in Air (GC)

Lab Sample ID: MB 320-254492/11

**Matrix: Air** 

Analysis Batch: 254492

**Client Sample ID: Method Blank** 

Prep Type: Total/NA

	IVID	IVID							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	ND		0.50	0.011	% v/v			10/24/18 10:08	1
Methane (TCD)	ND		0.50	0.14	% v/v			10/24/18 10:08	1
Oxygen	ND		0.20	0.0074	% v/v			10/24/18 10:08	1

**Analysis Batch: 254492** 

- Oxygen	ND	0.20	0.0074 /0 V/V	10/24/18 10:08
Lab Sample ID: LCS 320-254492/2				Client Sample ID: Lab Control Sample
Matrix: Air				Prep Type: Total/NA

LCS LCS %Rec. Spike Added Analyte Result Qualifier Unit D %Rec Limits Carbon Dioxide (TCD) 23.9 24.5 % v/v 102 80 - 120 Methane (TCD) 25.6 24.3 % v/v 95 80 - 120

Lab Sample ID: LCS 320-254492/5 **Client Sample ID: Lab Control Sample** 

**Matrix: Air** 

**Analysis Batch: 254492** 

LCS LCS Spike %Rec. Added Result Qualifier Analyte Unit D %Rec Limits 16.2 % v/v Oxygen 14.1 87 80 - 120

TestAmerica Sacramento

# **QC Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

Method: D1946 - Fixed Gases in Air (GC) (Continued)

Lab Sample ID: LCSD 320-254492/3

Client Sample ID: Lab Control Sample Dup
Matrix: Air

Prep Type: Total/NA

Analysis Batch: 254492

Spike LCSD LCSD %Rec. RPD Analyte Added Result Qualifier Unit D %Rec Limits RPD Limit % v/v Carbon Dioxide (TCD) 23.9 24.5 80 - 120 20 102 0 Methane (TCD) 25.6 24.4 % v/v 95 80 - 120 20 0

Lab Sample ID: LCSD 320-254492/6

Matrix: Air

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

**Analysis Batch: 254492** 

LCSD LCSD **RPD** Spike %Rec. Analyte Added Result Qualifier Unit %Rec Limits **RPD** Limit Oxygen 16.2 14.2 % v/v 88 80 - 120

Lab Sample ID: MB 320-254625/5

Matrix: Air

Client Sample ID: Method Blank
Prep Type: Total/NA

A call ala Datala 05400

Analysis Batch: 254625

Lab Sample ID: LCS 320-254625/2

Matrix: Air

Prep Type: Total/NA

**Analysis Batch: 254625** 

 Analyte
 Added Methane (FID)
 Result No.0250
 Qualifier Unit No.0218
 Unit No.0218
 Description
 % Rec. Methane (FID)

Lab Sample ID: LCSD 320-254625/3

Client Sample ID: Lab Control Sample Dup
Matrix: Air

Prep Type: Total/NA

**Analysis Batch: 254625** 

LCSD LCSD RPD Spike %Rec. Added Analyte Result Qualifier Unit D %Rec Limits **RPD** Limit Methane (FID) 0.0250 0.0248 % v/v 99 80 - 120 20

TestAmerica Sacramento

10/29/2018

# **QC Association Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

# Air - GC/MS VOA

# Analysis Batch: 254908

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-44380-1	VSP-801	Total/NA	Air	TO-15	
320-44380-2	VSP-802	Total/NA	Air	TO-15	
MB 320-254908/16	Method Blank	Total/NA	Air	TO-15	
LCS 320-254908/4	Lab Control Sample	Total/NA	Air	TO-15	
LCS 320-254908/6	Lab Control Sample	Total/NA	Air	TO-15	
LCSD 320-254908/5	Lab Control Sample Dup	Total/NA	Air	TO-15	
LCSD 320-254908/7	Lab Control Sample Dup	Total/NA	Air	TO-15	

# Air - GC VOA

# **Analysis Batch: 254492**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-44380-1	VSP-801	Total/NA	Air	D1946	_
320-44380-2	VSP-802	Total/NA	Air	D1946	
MB 320-254492/11	Method Blank	Total/NA	Air	D1946	
LCS 320-254492/2	Lab Control Sample	Total/NA	Air	D1946	
LCS 320-254492/5	Lab Control Sample	Total/NA	Air	D1946	
LCSD 320-254492/3	Lab Control Sample Dup	Total/NA	Air	D1946	
LCSD 320-254492/6	Lab Control Sample Dup	Total/NA	Air	D1946	

# **Analysis Batch: 254625**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-44380-1	VSP-801	Total/NA	Air	D1946	
320-44380-2	VSP-802	Total/NA	Air	D1946	
MB 320-254625/5	Method Blank	Total/NA	Air	D1946	
LCS 320-254625/2	Lab Control Sample	Total/NA	Air	D1946	
LCSD 320-254625/3	Lab Control Sample Dup	Total/NA	Air	D1946	

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# **Lab Chronicle**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

Lab Sample ID: 320-44380-1

Client Sample ID: VSP-801 Date Collected: 10/18/18 15:45 Matrix: Air

Date Received: 10/20/18 09:25

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		22.8	25 mL	250 mL	254908	10/26/18 05:08	AP1	TAL SAC
Total/NA	Analysis	D1946		2.28	50 mL	50 mL	254625	10/24/18 14:40	NS1	TAL SAC
Total/NA	Analysis	D1946		2.28	50 mL	50 mL	254492	10/24/18 11:00	NS1	TAL SAC

**Client Sample ID: VSP-802** Lab Sample ID: 320-44380-2

Date Collected: 10/18/18 15:30

Date Received: 10/20/18 09:25

<del>_</del>	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15			415 mL	250 mL	254908	10/26/18 06:05	AP1	TAL SAC
Total/NA	Analysis	D1946		1.66	50 mL	50 mL	254625	10/24/18 14:27	NS1	TAL SAC
Total/NA	Analysis	D1946		1.66	50 mL	50 mL	254492	10/24/18 11:10	NS1	TAL SAC

### **Laboratory References:**

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

**Matrix: Air** 

# **Accreditation/Certification Summary**

Client: ARCADIS U.S. Inc TestAmerica Job ID: 320-44380-1

Project/Site: Chevron Edmonds Terminal

# **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	12-31-20
Utah	NELAP	8	CA00044	02-28-19
/ermont	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

# **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

<sup>\*</sup> Accreditation/Certification renewal pending - accreditation/certification considered valid.

# **Method Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL SAC
D1946	Fixed Gases in Air (GC)	ASTM	TAL SAC

### **Protocol References:**

ASTM = ASTM International

EPA = US Environmental Protection Agency

### Laboratory References:

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

# **Sample Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-44380-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-44380-1	VSP-801	Air	10/18/18 15:45	10/20/18 09:25
320-44380-2	VSP-802	Air	10/18/18 15:30	10/20/18 09:25

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(2) Canister 15 is 34000536

# Canister Samples Chain of Custody Record

TestAmerica Sacramento				Canis	ter Sai	Canister Samples Chain of Custody Record	Chain o	S S S	ustc	dy	Rec	ord					TectAmerico	7
880 Riverside Parkway			TestAme	ica Laborato	ries, Inc. ass	TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples.	ly with respect	to the c	ollection	and st	ipment c	d these	sample	46			THE LEADER IN ENVIRONMENTAL TESTING	S NO
West Sacramento, CA 95605 phone 916.374.4378 fax 916.372.1059																	TestAmerica Laboratories, Inc	nc.
Client Contact Information	Project Manager:	fanager:				Samples	Samples Collected By:		10	2050	3	いまれ				l	COC No:	Γ
Company Name: A.C. C. A.S.	Phone:																C of 1 cocs	T
Address: 1100 01100 004 50 12 50	Email:							L	F		F	1		1	F	H	*	T
City/State/Zip Scattic, w.t. b/8121									_		(	,					For Lab Use Only:	Γ
Phone:		tact:						(			9	notto				dogo	-	П
	TA Contact:					_		NIS	_			15.5				,,,	Lab Sampling:	
Project Name: Edmoinds Terminal		Anayis	Anaylsis Turnarour	ound Time				; / N	_		_	atoc	1000			0,00		
ation: 1172c Liverold		Standard (Specific):	scific):	5TA1	1	. 1		107				Juj				, O1 19	Job/	
PO#,	Ru	Rush (Specifiy):	()					/ P1S	_	8	_	lipeo	_	_		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(See below for Add'l Items)	7
Sample Identification	Sample Date(s)	Time Start	Time	Canister Vacuum in Field, 'Hg (Start)'	r Canister in Vacuum in g Field, 'Hg (Stop)'	Flow Controller	Canister	2 \ b9M) 21-OT	EPA 3C	EPA 25C / 25.3	81/21 ATSA	TO-3 Other (Please sp	Sample Type	Indcot Air Ambient Air	Soli Gas	Landfill Gas Other (Please sp	Sample Specific Notes:	
108-801	lofisjig	1545									X	×	L,	-			EN TO-15 For BTE	X
158-802	10/18/18/153C	(1530									X	X					1	
																	Other Fixed bus	
									-			-	L	-	F	F		-
				-				1	+	1	+	+	1	+	1	$\dagger$	רייו בדתמונק כל ריינ	7
				-	1				-	1	-	+	1	+	1			1
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				-					-			r						T
			Temper	perature (	rature (Fahrenheit)													
	Start	Interior		Ambient				_										
	Stop			4					,									T
			Temper	perature (	rature (Fahrenheit)			_										-
	Start	Interior		Ambient	-			_										
	Stop															=		
Special Instructions/QC Requirements & Comments:							<b>.</b>			320	320-44380 Chain of Custody	Chain	of Cu	stody				
Samples Shipped by:		Date / Time:	ne:			Samples F	Samples Received by:									-		T
Samples Relinquished by:	1	Date / Ti	ne:	2	_	Received by:	by:									Г	1 DO	
Relinquished by	1	Date/Ti	200	1	74	Perceived	100					1	1			T	)	_
Lab Use Office Shipper Name:		Opened by	30 %	2	22	Condition:	F0											
() 201 S. C.C.C.	V	34000801	800	10					NA	I	2	100101	X	1	For	No.	Form No. CA-C-WI-003, Rev. 1, dated 05/10/2013	2013
Control				-					(10)	1 1	2	1	-	)	2:2	9		

(2) Canister 15 is 34000536

# Canister Samples Chain of Custody Record

TestAmerica Sacramento				Canis	ter Sar	nister Samples Chain of Custody Record	Chain o	Σ δ	rsto	dy F	Seco	ord					Toct	TectAmerica
880 Riverside Parkway			TestAme	ica Laborat	ories, Inc. assu	Test America Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples	y with respec	t to the a	ollection	and ship	oment o	these	samples				IHE LEADER	THE LEADER IN ENVIRONMENTAL TESTING
West Sacramento, CA 95605 phone 916.374,4378 fax 916.372,1059																	TestA	TestAmerica Laboratories, Inc.
Client Contact Information	Project Manager:	anager:				Samples C	Samples Collected By:		30505	5	いい	いった				l	COC No:	
Company Name: ACCCAS	Phone:																4	of 1 cocs
Address: 1100 Olive wax, Suite &	Email:								F	H		H		H				
City/State/Zip SCATTIC, W. & bisic!											(	(1		-			_	se Only:
Phone:	Site Contact:	act:						(W			7- <del>1</del>	ottoes					Walk-in Client:	ent
Ho was Named		Amondo	Torne	Time of Time		_		IS /		883		S S 8		-			_	
Site A continuing the Committee of the C		Charded (Capific):	is i urnar	Anayisis lurnaround lime	1	_		/ MO			_	lon r		-	_		Lat / COO Mar	
PO#		Standard (Spec Rush (Specifiy):	y):	314				7 / PI		-	V276	ecity it	_				1000	See below for Add" Items)
Sample Identification	Sample Date(s)	Time Start	Time	Canister Vacuum in Field, 'Hg (Start)'	ir Canister in Vacuum in ig Field, 'Hg	Flow Controller ID	Canister	S \ b9M) 21-OT H9A-AM	EPA 3C	EPA 25C / 25.3 ASTM D-1946 /		TO-3	Sample Type	Indcot Air sid InsidmA	Soli Gas	Landfill Gas	Other (Please ap	Sample Specific Notes:
159-401	10/18/18	1545									X	$\times$					E24 TO-15	TIS for BTEX\$
728-802	10/18/18/153C	1530								-	X	X	,				TPH-	
												-					Other	Fixtd has
																	( :n / in	Cank Go
			L	-					-	-		-	L	+		1	2	+
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												$\vdash$						
			Ten	Derature (	Temperature (Fahrenheit)							-						
	Start	Interior		Ambient	#			_										
	Stop															=		
			Ten	perature (	Temperature (Fahrenheit)											_		
	Start	Interior		Ambient	1													
	Stop															=		
Special Instructions/QC Requirements & Comments:										320-4	320-44380 Chain of Custody	Chain	of Cus	tody			l.	
Samples Shipped by:		Date / Time:	me:			Samples F	Samples Received by							1			1	
Samples Relinquished by:	1	Date/Ti	le:	2(1)	_	Received by:	:ke									Г	T	Sac
Religionalished Ame.		Date / Time Opened by	9 in	120	45	Persisted by Condition:	FO		2	100								
O conister 11	15	34000801	200	10					NSH	I	10)	to 12c1	18	0	For	N. S.	.A-C-WI-003,	Form No. CA-C-WI-003, Rev. 1, dated 05/10/2013

# **Login Sample Receipt Checklist**

Client: ARCADIS U.S. Inc Job Number: 320-44380-1

Login Number: 44380 List Source: TestAmerica Sacramento

List Number: 1

Creator: Sharifi, Nooshin

Creator. Snarm, Noosimi		
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	478967
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	N/A	
Cooler Temperature is recorded.	N/A	
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.	False	Canister IDs not listed on COC.
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.	N/A	
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	



## Sacramento 1 Liter Canister QC Certification Batch Certification

Date Cleaned/Batch ID	1-24-18 320-35358	
Date of QC	2/8/18	
Data File Number	18020819	320-35358 Chain of Custody
(File ID for certification and	alysis of canister designated below)	

#### **CANISTER ID NUMBERS**

21000801	34000909
8522	7566
34000238	34000974
34000611	34001229
34001634	34001940
34001203	39001000
34001953	34600773
34000931	34001652

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

"\*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

1st level Reviewed By:

2/4/18

Zlake

Zlake

Zlake

Date:

Q:\DOCUMENT-MANAGEMENT\FORMS\QA-814A 1-LITER BATCH CAN QC 20171023.DOC QA-814 A

RE 10232017



### Sacramento 1 Liter Canister QC Certification Batch Certification

Date Cleaned/Batch ID	2-13-18 320-36031	
Date of QC	2/23/18	
Data File Number	MS9022319	320-36031 Chain of Custody

(File ID for certification analysis of canister designated below)

#### **CANISTER ID NUMBERS**

£ 34000536	34001056
34002055	34001950
34000753	34001190
8937	34001077
8967	34000951
34000625	34001093
34000732	8514
34000731	34001946

The above canisters were cleaned as a batch. This certifies this batch contains no target analyte concentration greater than or equal to the method criteria for the "Certification Type" indicated above.

#### "\*" INDICATES THE CAN OR CANS WHICH WERE SCREENED.

RG FOY AP	2/26/18
1 <sup>st</sup> level Reviewed By:	Date:
non	3/5/18
2nd level Reviewed By:	Date:

Q:\DOCUMENT-MANAGEMENT\FORMS\QA-814A 1-LITER BATCH CAN QC 20171023.DOC QA-814 A

RE 10232017

Lab Name: TestAmerica Sacramento Job No.: 320-35358-1 SDG No.: Client Sample ID: 34000801 Lab Sample ID: 320-35358-1 Matrix: Air Lab File ID: 18020819.D Analysis Method: TO-15 Date Collected: 01/24/2018 00:00 Sample wt/vol: 250(mL) Date Analyzed: 02/09/2018 01:50 Soil Aliquot Vol: Dilution Factor: 1 GC Column: RTX-Volatiles ID: 0.32(mm) Soil Extract Vol.: % Moisture: Level: (low/med) Low Analysis Batch No.: 207546 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	ND		5.0	0.18
107-02-8	Acrolein	ND		2.0	0.22
107-13-1	Acrylonitrile	ND		2.0	0.19
107-05-1	Allyl chloride	ND		0.80	0.11
71-43-2	Benzene	ND		0.40	0.079
100-44-7	Benzyl chloride	ND		0.80	0.16
75-27-4	Bromodichloromethane	ND		0.30	0.066
75-25-2	Bromoform	ND		0.40	0.070
74-83-9	Bromomethane	ND		0.80	0.34
106-99-0	1,3-Butadiene	ND		0.80	0.15
106-97-8	n-Butane	ND		0.40	0.15
78-93-3	2-Butanone (MEK)	ND		0.80	0.20
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.13
104-51-8	n-Butylbenzene	ND		0.40	0.18
135-98-8	sec-Butylbenzene	ND		0.40	0.070
98-06-6	tert-Butylbenzene	ND		0.80	0.068
75-15-0	Carbon disulfide	0.27	J	0.80	0.078
56-23-5	Carbon tetrachloride	ND		0.80	0.064
108-90-7	Chlorobenzene	ND		0.30	0.064
75-45-6	Chlorodifluoromethane	ND		0.80	0.2
75-00-3	Chloroethane	ND		0.80	0.33
67-66-3	Chloroform	ND		0.30	0.095
74-87-3	Chloromethane	ND		0.80	0.20
95-49-8	2-Chlorotoluene	ND		0.40	0.080
110-82-7	Cyclohexane	ND		0.40	0.08
124-48-1	Dibromochloromethane	ND		0.40	0.079
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.075
74-95-3	Dibromomethane	ND		0.40	0.05
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroetha ne	ND		0.40	0.16
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.13
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.13
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.1
75-71-8	Dichlorodifluoromethane	ND		0.40	0.15
75-34-3	1,1-Dichloroethane	ND		0.30	0.072
107-06-2	1,2-Dichloroethane	ND		0.80	0.08

Lab Name: TestAmerica Sacramento Job No.: 320-35358-1 SDG No.: Client Sample ID: 34000801 Lab Sample ID: 320-35358-1 Matrix: Air Lab File ID: 18020819.D Analysis Method: TO-15 Date Collected: 01/24/2018 00:00 Sample wt/vol: 250(mL) Date Analyzed: 02/09/2018 01:50 Soil Aliquot Vol: Dilution Factor: 1 GC Column: RTX-Volatiles ID: 0.32(mm) Soil Extract Vol.: % Moisture: Level: (low/med) Low Analysis Batch No.: 207546 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
75-35-4	1,1-Dichloroethene	ND		0.80	0.13
156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.10
78-87-5	1,2-Dichloropropane	ND		0.40	0.24
10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.10
10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.088
123-91-1	1,4-Dioxane	ND		0.80	0.10
141-78-6	Ethyl acetate	ND		0.30	0.18
100-41-4	Ethylbenzene	ND		0.40	0.063
622-96-8	4-Ethyltoluene	ND		0.40	0.19
142-82-5	n-Heptane	ND		0.80	0.063
87-68-3	Hexachlorobutadiene	ND		2.0	0.43
110-54-3	n-Hexane	ND		0.80	0.075
591-78-6	2-Hexanone	ND		0.40	0.08
98-82-8	Isopropylbenzene	ND		0.80	0.10
99-87-6	4-Isopropyltoluene	ND		0.80	0.12
1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
80-62-6	Methyl methacrylate	ND		0.80	0.16
108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.1
75-09-2	Methylene Chloride	ND		0.40	0.072
98-83-9	alpha-Methylstyrene	ND		0.40	0.065
91-20-3	Naphthalene	ND		0.80	0.56
111-65-9	n-Octane	ND		0.40	0.055
109-66-0	n-Pentane	ND		0.80	0.26
115-07-1	Propylene	ND		0.40	0.099
103-65-1	N-Propylbenzene	ND		0.40	0.059
100-42-5	Styrene	ND		0.40	0.059
79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.069
127-18-4	Tetrachloroethene	ND		0.40	0.051
109-99-9	Tetrahydrofuran	ND		0.80	0.21
108-88-3	Toluene	ND		0.40	0.051
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethan e	ND		0.40	0.16
120-82-1	1,2,4-Trichlorobenzene	ND		2.0	0.43
71-55-6	1,1,1-Trichloroethane	ND		0.30	0.065
79-00-5	1,1,2-Trichloroethane	ND		0.40	0.06

FORM I TO-15

 Lab Name: TestAmerica Sacramento
 Job No.: 320-35358-1

 SDG No.:
 Lab Sample ID: 320-35358-1

 Matrix: Air
 Lab File ID: 18020819.D

 Analysis Method: TO-15
 Date Collected: 01/24/2018 00:00

 Sample wt/vol: 250(mL)
 Date Analyzed: 02/09/2018 01:50

 Soil Aliquot Vol:
 Dilution Factor: 1

 Soil Extract Vol.:
 GC Column: RTX-Volatiles ID: 0.32(mm)

 % Moisture:
 Level: (low/med) Low

 Analysis Batch No.: 207546
 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054
1330-20-7	Xylenes, Total	ND		1.2	0.074

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	97		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	100		70-130
2037-26-5	Toluene-d8 (Surr)	98		70-130

Report Date: 09-Feb-2018 17:58:06 Chrom Revision: 2.2 24-Jan-2018 15:37:30

TestAmerica Sacramento
Target Compound Quantitation Report

Data File: \\ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\18020819.D

Lims ID: 320-35358-A-1
Client ID: 34000801
Sample Type: Client

Inject. Date: 09-Feb-2018 01:50:30 ALS Bottle#: 13 Worklist Smp#: 18

Purge Vol: 250.000 mL Dil. Factor: 1.0000

Sample Info: 320-35385-A-1

Misc. Info.: 500mL

Operator ID: SV Instrument ID: ATMS2

Method: \ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\TO15\_ATMS2N.m

Limit Group: MSA - TO15 - ICAL

Last Update:09-Feb-2018 17:58:06Calib Date:06-Feb-2018 23:01:30Integrator:RTEID Type:Deconvolution IDQuant Method:Internal StandardQuant By:Initial CalibrationLast ICal File:\ChromNA\Sacramento\ChromData\ATMS2\20180206-53757.b\18020612.D

Column 1 : RTX Volatiles (0.32 mm) Det: MS SCAN

Process Host: XAWRK008

First Level Reviewer: phanthasena Date: 09-Feb-2018 17:58:06

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	O	Response	OnCol Amt ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	11.386	11.380	0.006	98	56144	4.00	
* 2 1,4-Difluorobenzene	114	13.472	13.472	0.000	99	242149	4.00	
* 3 Chlorobenzene-d5 (IS)	117	19.532	19.532	0.000	99	227675	4.00	
\$ 41,2-Dichloroethane-d4 (Sur	65	12.536	12.536	0.000	39	84932	4.00	
\$ 5 Toluene-d8 (Surr)	100	16.697	16.697	0.000	100	151453	3.91	
\$ 6 4-Bromofluorobenzene (Surr	95	21.551	21.551	0.000	99	162330	3.88	
10 Propene	41	3.933	3.927	0.006	90	942	0.0593	
18 Butane	43	4.560	4.560	0.000	85	559	0.0200	
32 Acetone	43	6.957	6.896	0.061	99	10139	-0.3448	
39 Methylene Chloride	49	8.095	8.088	0.007	89	1284	0.0657	
40 Carbon disulfide	76	8.131	8.131	0.000	99	8667	0.2661	
123 1,2,4-Trichlorobenzene	180	25.974	25.974	0.000	82	425	0.0139	
Reagents:								

Reagents:

VAMSIS20\_00106 Amount Added: 50.00 Units: mL Run Reagent

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Report Date: 09-Feb-2018 17:58:06 Chrom Revision: 2.2 24-Jan-2018 15:37:30

TestAmerica Sacramento

Data File: \\ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\18020819.D

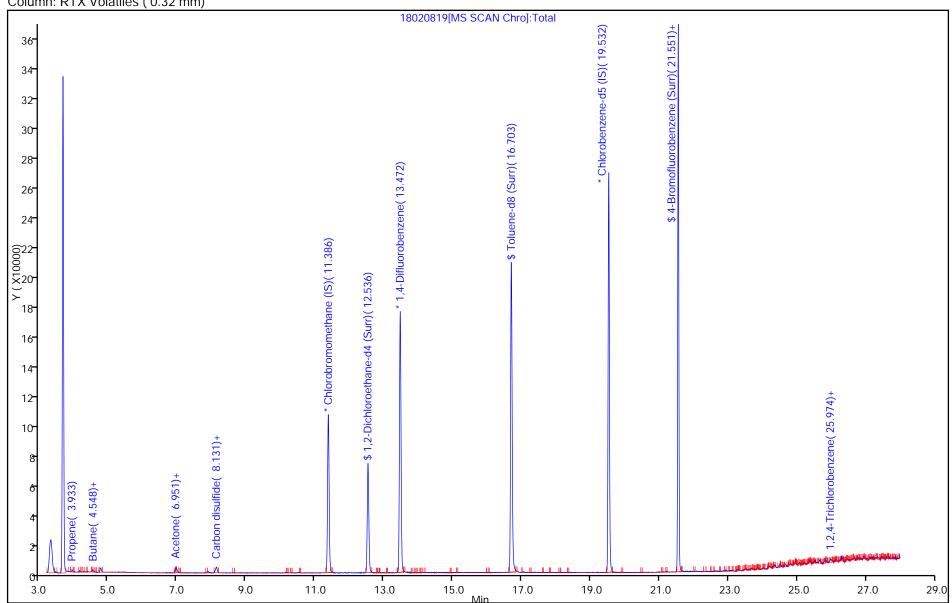
Injection Date: 09-Feb-2018 01:50:30 Instrument ID: ATMS2 Operator ID: SV Lims ID: Worklist Smp#: 320-35358-A-1 Lab Sample ID: 320-35358-1 18

Client ID: 34000801

Purge Vol: 250.000 mL Dil. Factor: ALS Bottle#: 13 1.0000

Method: TO15\_ATMS2N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm)



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Data File: \\ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\18020819.D

Injection Date: 09-Feb-2018 01:50:30 Instrument ID: ATMS2 Lims ID: 320-35358-A-1 Lab Sample ID: 320-35358-1

34000801 Client ID:

SV ALS Bottle#: Operator ID: 13 Worklist Smp#: 18

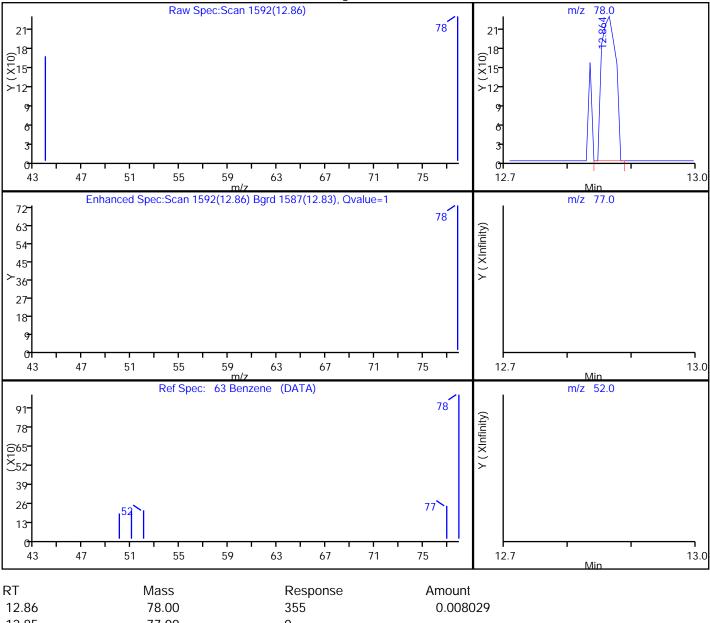
Purge Vol: 250.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS2N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 63 Benzene, CAS: 71-43-2

#### **Processing Results**



12.85 77.00 0 12.85 52.00 0

Reviewer: phanthasena, 09-Feb-2018 17:58:06 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

10/29/2018

Data File: \\ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\18020819.D

Client ID: 34000801

Operator ID: SV ALS Bottle#: 13 Worklist Smp#: 18

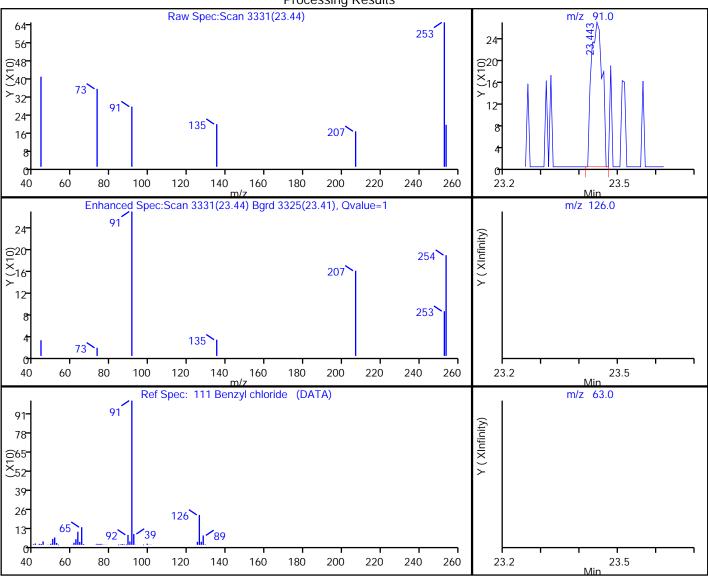
Purge Vol: 250.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS2N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 111 Benzyl chloride, CAS: 100-44-7

#### **Processing Results**



RT	Mass	Response	Amount
23.44	91.00	538	0.008091
23.44	126.00	0	
23.44	63.00	0	

Reviewer: phanthasena, 09-Feb-2018 17:58:06

Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

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Data File: \\ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\18020819.D

Injection Date: 09-Feb-2018 01:50:30 Instrument ID: ATMS2 Lims ID: 320-35358-A-1 Lab Sample ID: 320-35358-1

Client ID: 34000801

SV ALS Bottle#: Operator ID: 13 Worklist Smp#: 18

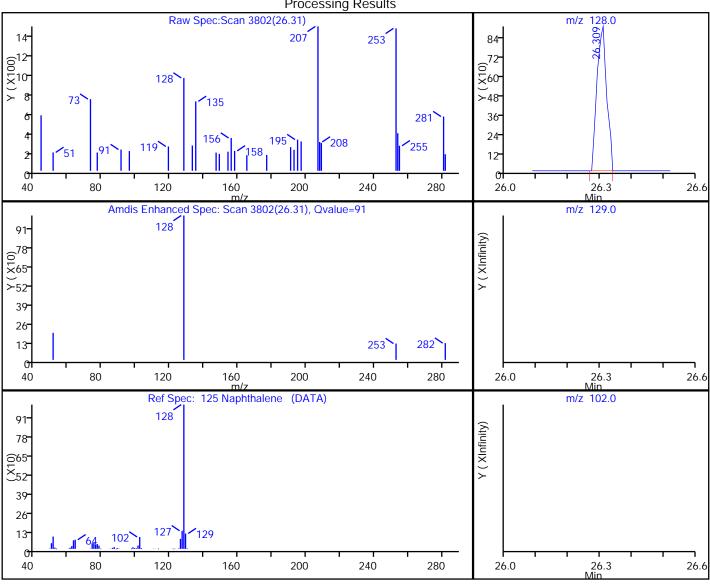
Purge Vol: 250.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS2N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 125 Naphthalene, CAS: 91-20-3

#### **Processing Results**



RT	Mass	Response	Amount
26.31	128.00	1941	0.026443
26.30	129.00	0	
26.30	102.00	0	

Reviewer: phanthasena, 09-Feb-2018 17:58:06

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

Data File: \\ChromNA\Sacramento\ChromData\ATMS2\20180208-53836.b\18020819.D

Injection Date: 09-Feb-2018 01:50:30 Instrument ID: ATMS2
Lims ID: 320-35358-A-1 Lab Sample ID: 320-35358-1

Client ID: 34000801

Operator ID: SV ALS Bottle#: 13 Worklist Smp#: 18

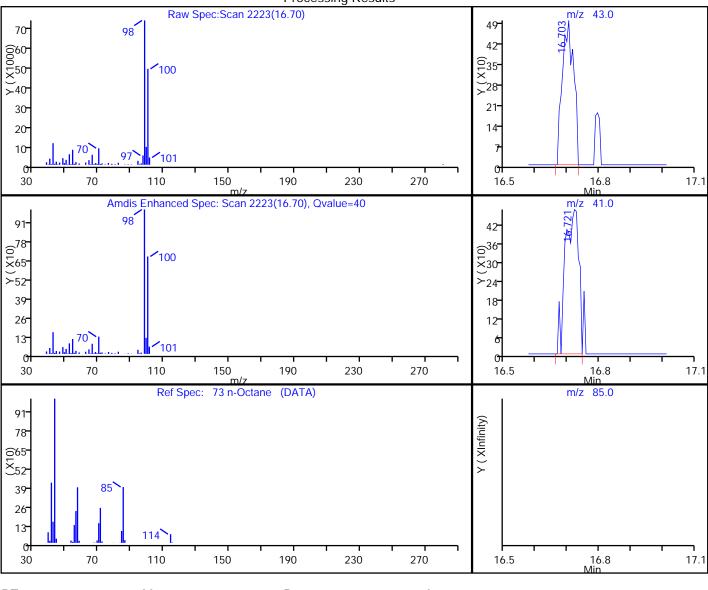
Purge Vol: 250.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS2N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 73 n-Octane, CAS: 111-65-9

#### **Processing Results**



RT	Mass	Response	Amount
16.70	43.00	1244	0.027068
16.72	41.00	1409	
16.79	85.00	0	

Reviewer: phanthasena, 09-Feb-2018 17:58:06 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

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Lab Name: TestAmerica Sacramento Job No.: 320-36031-1 SDG No.: Client Sample ID: 34000536 Lab Sample ID: 320-36031-1 Matrix: Air Lab File ID: MS9022319.D Analysis Method: TO-15 Date Collected: 02/13/2018 00:00 Sample wt/vol: 250(mL) Date Analyzed: 02/24/2018 03:41 Soil Aliquot Vol: Dilution Factor: 1 Soil Extract Vol.: GC Column: RTX-Volatiles ID: 0.32(mm) Level: (low/med) Low % Moisture: Analysis Batch No.: 209817 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
67-64-1	Acetone	0.43	J	5.0	0.1
107-02-8	Acrolein	ND		2.0	0.2
107-13-1	Acrylonitrile	ND		2.0	0.1
107-05-1	Allyl chloride	ND		0.80	0.1
71-43-2	Benzene	ND		0.40	0.07
100-44-7	Benzyl chloride	ND		0.80	0.1
75-27-4	Bromodichloromethane	ND		0.30	0.06
75-25-2	Bromoform	ND		0.40	0.07
74-83-9	Bromomethane	ND		0.80	0.3
106-99-0	1,3-Butadiene	ND		0.80	0.1
106-97-8	n-Butane	ND		0.40	0.1
78-93-3	2-Butanone (MEK)	ND		0.80	0.2
75-65-0	tert-Butyl alcohol (TBA)	ND		2.0	0.1
104-51-8	n-Butylbenzene	ND		0.40	0.1
135-98-8	sec-Butylbenzene	ND		0.40	0.07
98-06-6	tert-Butylbenzene	ND		0.80	0.06
75-15-0	Carbon disulfide	0.12	J	0.80	0.07
56-23-5	Carbon tetrachloride	ND		0.80	0.06
108-90-7	Chlorobenzene	ND		0.30	0.06
75-45-6	Chlorodifluoromethane	ND		0.80	0.2
75-00-3	Chloroethane	ND		0.80	0.3
67-66-3	Chloroform	ND		0.30	0.09
74-87-3	Chloromethane	ND		0.80	0.2
95-49-8	2-Chlorotoluene	ND		0.40	0.08
110-82-7	Cyclohexane	ND		0.40	0.08
124-48-1	Dibromochloromethane	ND		0.40	0.07
106-93-4	1,2-Dibromoethane (EDB)	ND		0.80	0.07
74-95-3	Dibromomethane	ND		0.40	0.05
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroetha	ND		0.40	0.1
95-50-1	1,2-Dichlorobenzene	ND		0.40	0.1
541-73-1	1,3-Dichlorobenzene	ND		0.40	0.1
106-46-7	1,4-Dichlorobenzene	ND		0.40	0.1
75-71-8	Dichlorodifluoromethane	ND		0.40	0.1
75-34-3	1,1-Dichloroethane	ND		0.30	0.07
107-06-2	1,2-Dichloroethane	ND		0.80	0.08

Lab Name: TestAmerica Sacramento Job No.: 320-36031-1 SDG No.: Client Sample ID: 34000536 Lab Sample ID: 320-36031-1 Matrix: Air Lab File ID: MS9022319.D Analysis Method: TO-15 Date Collected: 02/13/2018 00:00 Sample wt/vol: 250(mL) Date Analyzed: 02/24/2018 03:41 Soil Aliquot Vol: Dilution Factor: 1 Soil Extract Vol.: GC Column: RTX-Volatiles ID: 0.32(mm) Level: (low/med) Low % Moisture: Analysis Batch No.: 209817 Units: ppb v/v

156-59-2         cis-1,2-Dichloroethene         ND         0.40         0.0           156-60-5         trans-1,2-Dichloroethene         ND         0.40         0.           78-87-5         1,2-Dichloropropane         ND         0.40         0.           10061-01-5         cis-1,3-Dichloropropene         ND         0.40         0.           10061-02-6         trans-1,3-Dichloropropene         ND         0.40         0.0           123-91-1         1,4-Dioxane         ND         0.30         0.           141-78-6         Ethyl acetate         ND         0.30         0.           100-41-4         Ethylbenzene         ND         0.40         0.0           622-96-8         4-Ethyltoluene         ND         0.40         0.           87-68-3         Hexachlorobutadiene         ND         0.40         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Isopropylbenzene         ND         0.80         0.           89-82-8			<del></del>			
156-59-2         cis-1,2-Dichloroethene         ND         0.40         0.0           156-60-5         trans-1,2-Dichloroethene         ND         0.40         0.           78-87-5         1,2-Dichloropropane         ND         0.40         0.           10061-01-5         cis-1,3-Dichloropropene         ND         0.40         0.           10061-02-6         trans-1,3-Dichloropropene         ND         0.40         0.0           123-91-1         1,4-Dioxane         ND         0.30         0.           141-78-6         Ethyl acetate         ND         0.30         0.           100-41-4         Ethylbenzene         ND         0.40         0.0           622-96-8         4-Ethyltoluene         ND         0.40         0.           87-68-3         Hexachlorobutadiene         ND         0.40         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Hexachlorobutadiene         ND         0.80         0.           87-68-3         Isopropylbenzene         ND         0.80         0.           89-82-8	CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
156-60-5	75-35-4	1,1-Dichloroethene	ND		0.80	0.1
1,2-Dichloropropane	156-59-2	cis-1,2-Dichloroethene	ND		0.40	0.089
10061-01-5	156-60-5	trans-1,2-Dichloroethene	ND		0.40	0.1
10061-02-6   trans-1,3-Dichloropropene	78-87-5	1,2-Dichloropropane	ND		0.40	0.2
123-91-1	10061-01-5	cis-1,3-Dichloropropene	ND		0.40	0.1
141-78-6	10061-02-6	trans-1,3-Dichloropropene	ND		0.40	0.08
100-41-4	123-91-1	1,4-Dioxane	ND		0.80	0.1
A=Ethyltoluene	141-78-6	Ethyl acetate	ND		0.30	0.1
142-82-5	100-41-4	Ethylbenzene	ND		0.40	0.063
87-68-3         Hexachlorobutadiene         ND         2.0         0.           110-54-3         n-Hexane         ND         0.80         0.0           591-78-6         2-Hexanone         ND         0.40         0.0           98-82-8         Isopropylboluene         ND         0.80         0.           99-87-6         4-Isopropyltoluene         ND         0.80         0.           1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.           80-62-6         Methyl methacrylate         ND         0.80         0.           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.           75-09-2         Methylene Chloride         ND         0.40         0.           98-83-9         alpha-Methylstyrene         ND         0.40         0.           91-20-3         Naphthalene         ND         0.40         0.           111-65-9         n-Octane         ND         0.40         0.           109-66-0         n-Pentane         ND         0.40         0.           103-65-1         N-Propylbenzene         ND         0.40         0.           100-42-5         Styrene         ND<	622-96-8	4-Ethyltoluene	ND		0.40	0.1
110-54-3	142-82-5	n-Heptane	ND		0.80	0.063
Section	87-68-3	Hexachlorobutadiene	ND		2.0	0.43
98-82-8         Isopropylbenzene         ND         0.80         0.80           99-87-6         4-Isopropyltoluene         ND         0.80         0.           1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.           80-62-6         Methyl methacrylate         ND         0.80         0.           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.           75-09-2         Methylene Chloride         ND         0.40         0.0           98-83-9         alpha-Methylstyrene         ND         0.40         0.0           99-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           109-88-3         Toluene	110-54-3	n-Hexane	ND		0.80	0.07
99-87-6 4-Isopropyltoluene ND 0.80 0.  1634-04-4 Methyl-t-Butyl Ether (MTBE) ND 0.80 0.  80-62-6 Methyl methacrylate ND 0.80 0.  108-10-1 4-Methyl-2-pentanone (MIBK) ND 0.40 0.0  75-09-2 Methylene Chloride ND 0.40 0.0  98-83-9 alpha-Methylstyrene ND 0.40 0.0  91-20-3 Naphthalene ND 0.80 0.  111-65-9 n-Octane ND 0.40 0.0  109-66-0 n-Pentane ND 0.80 0.  155-07-1 Propylene ND 0.40 0.0  100-42-5 Styrene ND 0.40 0.0  100-42-5 Styrene ND 0.40 0.0  127-18-4 Tetrachloroethane ND 0.40 0.0  109-99-9 Tetrahydrofuran ND 0.80 0.  108-88-3 Toluene ND 0.40 0.0  76-13-1 1,1,2-Trichloro-1,2,2-trifluoroethane ND 0.40 0.0  120-82-1 1,2,4-Trichlorobenzene ND 0.30 0.0  71-55-6 1,1,1-Trichloroethane ND 0.30 0.0	591-78-6	2-Hexanone	ND		0.40	0.08
1634-04-4         Methyl-t-Butyl Ether (MTBE)         ND         0.80         0.80           80-62-6         Methyl methacrylate         ND         0.80         0.           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.           75-09-2         Methylene Chloride         ND         0.40         0.0           98-83-9         alpha-Methylstyrene         ND         0.40         0.0           91-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.40         0.0           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoro	98-82-8	Isopropylbenzene	ND		0.80	0.1
80-62-6         Methyl methacrylate         ND         0.80         0.           108-10-1         4-Methyl-2-pentanone (MIBK)         ND         0.40         0.           75-09-2         Methylene Chloride         ND         0.40         0.0           98-83-9         alpha-Methylstyrene         ND         0.40         0.0           91-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           127-18-4         Tetrachloroethane         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           1-1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.0           120-82-1         1,2,4-Trichlorobenzene         ND	99-87-6	4-Isopropyltoluene	ND		0.80	0.1
108-10-1       4-Methyl-2-pentanone (MIBK)       ND       0.40       0.         75-09-2       Methylene Chloride       ND       0.40       0.0         98-83-9       alpha-Methylstyrene       ND       0.40       0.0         91-20-3       Naphthalene       ND       0.80       0.         111-65-9       n-Octane       ND       0.40       0.0         109-66-0       n-Pentane       ND       0.80       0.         115-07-1       Propylene       ND       0.40       0.0         103-65-1       N-Propylbenzene       ND       0.40       0.0         100-42-5       Styrene       ND       0.40       0.0         79-34-5       1,1,2,2-Tetrachloroethane       ND       0.40       0.0         127-18-4       Tetrachloroethene       ND       0.40       0.0         108-88-3       Toluene       ND       0.40       0.0         76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan       ND       0.40       0.         120-82-1       1,2,4-Trichlorobenzene       ND       0.30       0.0         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	1634-04-4	Methyl-t-Butyl Ether (MTBE)	ND		0.80	0.12
75-09-2         Methylene Chloride         ND         0.40         0.0           98-83-9         alpha-Methylstyrene         ND         0.40         0.0           91-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.0           120-82-1         1,2,4-Trichlorobenzene         ND         0.30         0.0           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	80-62-6	Methyl methacrylate	ND		0.80	0.1
98-83-9         alpha-Methylstyrene         ND         0.40         0.0           91-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           109-99-9         Tetrachloroethene         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.0           120-82-1         1,2,4-Trichlorobenzene         ND         0.30         0.0           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	108-10-1	4-Methyl-2-pentanone (MIBK)	ND		0.40	0.1
91-20-3         Naphthalene         ND         0.80         0.           111-65-9         n-Octane         ND         0.40         0.0           109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.0           120-82-1         1,2,4-Trichlorobenzene         ND         0.30         0.0           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	75-09-2	Methylene Chloride	ND		0.40	0.07
111-65-9       n-Octane       ND       0.40       0.0         109-66-0       n-Pentane       ND       0.80       0.         115-07-1       Propylene       ND       0.40       0.0         103-65-1       N-Propylbenzene       ND       0.40       0.0         100-42-5       Styrene       ND       0.40       0.0         79-34-5       1,1,2,2-Tetrachloroethane       ND       0.40       0.0         109-99-9       Tetrachloroethene       ND       0.40       0.0         108-88-3       Toluene       ND       0.40       0.0         76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan e       ND       0.40       0.         120-82-1       1,2,4-Trichlorobenzene       ND       2.0       0.         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	98-83-9	alpha-Methylstyrene	ND		0.40	0.06
109-66-0         n-Pentane         ND         0.80         0.           115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.0           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	91-20-3	Naphthalene	ND		0.80	0.5
115-07-1         Propylene         ND         0.40         0.0           103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.0           76-13-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	111-65-9	n-Octane	ND		0.40	0.05
103-65-1         N-Propylbenzene         ND         0.40         0.0           100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.0           71-55-6         1,1,1-Trichlorobenzene         ND         0.30         0.0           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	109-66-0	n-Pentane	ND		0.80	0.2
100-42-5         Styrene         ND         0.40         0.0           79-34-5         1,1,2,2-Tetrachloroethane         ND         0.40         0.0           127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.80         0.           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	115-07-1	Propylene	ND		0.40	0.09
79-34-5       1,1,2,2-Tetrachloroethane       ND       0.40       0.0         127-18-4       Tetrachloroethene       ND       0.40       0.0         109-99-9       Tetrahydrofuran       ND       0.80       0.         108-88-3       Toluene       ND       0.40       0.0         76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan e       ND       0.40       0.         120-82-1       1,2,4-Trichlorobenzene       ND       2.0       0.         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	103-65-1	N-Propylbenzene	ND		0.40	0.05
127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.80         0.           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	100-42-5	Styrene	ND		0.40	0.05
127-18-4         Tetrachloroethene         ND         0.40         0.0           109-99-9         Tetrahydrofuran         ND         0.80         0.           108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan e         ND         0.40         0.           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	79-34-5	1,1,2,2-Tetrachloroethane	ND		0.40	0.06
108-88-3         Toluene         ND         0.40         0.0           76-13-1         1,1,2-Trichloro-1,2,2-trifluoroethan         ND         0.40         0.           120-82-1         1,2,4-Trichlorobenzene         ND         2.0         0.           71-55-6         1,1,1-Trichloroethane         ND         0.30         0.0	127-18-4		ND		0.40	0.05
76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan e       ND       0.40       0.         120-82-1       1,2,4-Trichlorobenzene       ND       2.0       0.         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	109-99-9	Tetrahydrofuran	ND		0.80	0.2
76-13-1       1,1,2-Trichloro-1,2,2-trifluoroethan e       ND       0.40       0.         120-82-1       1,2,4-Trichlorobenzene       ND       2.0       0.         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	108-88-3	_	ND		0.40	0.05
120-82-1       1,2,4-Trichlorobenzene       ND       2.0       0.         71-55-6       1,1,1-Trichloroethane       ND       0.30       0.0	76-13-1		ND		0.40	0.1
	120-82-1		ND		2.0	0.4
79-00-5 1,1,2-Trichloroethane ND 0.40 0.0	71-55-6	1,1,1-Trichloroethane	ND		0.30	0.06
	79-00-5	1,1,2-Trichloroethane	ND		0.40	0.06

 Lab Name: TestAmerica Sacramento
 Job No.: 320-36031-1

 SDG No.:
 Lab Sample ID: 320-36031-1

 Matrix: Air
 Lab File ID: MS9022319.D

 Analysis Method: TO-15
 Date Collected: 02/13/2018 00:00

 Sample wt/vol: 250 (mL)
 Date Analyzed: 02/24/2018 03:41

 Soil Aliquot Vol:
 Dilution Factor: 1

 Soil Extract Vol.:
 GC Column: RTX-Volatiles ID: 0.32 (mm)

 % Moisture:
 Level: (low/med) Low

 Analysis Batch No.: 209817
 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
79-01-6	Trichloroethene	ND		0.40	0.11
75-69-4	Trichlorofluoromethane	ND		0.40	0.20
96-18-4	1,2,3-Trichloropropane	ND		0.40	0.17
95-63-6	1,2,4-Trimethylbenzene	ND		0.80	0.16
108-67-8	1,3,5-Trimethylbenzene	ND		0.40	0.13
540-84-1	2,2,4-Trimethylpentane	ND		0.40	0.071
108-05-4	Vinyl acetate	ND		0.80	0.15
593-60-2	Vinyl bromide	ND		0.80	0.26
75-01-4	Vinyl chloride	ND		0.40	0.12
179601-23-1	m,p-Xylene	ND		0.80	0.10
95-47-6	o-Xylene	ND		0.40	0.054
1330-20-7	Xylenes, Total	ND		1.2	0.074

CAS NO.	SURROGATE	%REC	Q	LIMITS
460-00-4	4-Bromofluorobenzene (Surr)	88		70-130
17060-07-0	1,2-Dichloroethane-d4 (Surr)	101		70-130
2037-26-5	Toluene-d8 (Surr)	95		70-130

#### TestAmerica Sacramento **Target Compound Quantitation Report**

\\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D Data File:

Lims ID: 320-36031-A-1 Client ID: 34000536 Sample Type: Client

Inject. Date: 24-Feb-2018 03:41:30 ALS Bottle#: 14 Worklist Smp#: 34

Purge Vol: 5.000 mL Dil. Factor: 1.0000

Sample Info: 320-36031-A-1

Misc. Info.: 500

Operator ID: RG Instrument ID: ATMS9

Method: \\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\TO15\_ATMS9N.m

Limit Group: MSA - TO15 - ICAL

Last Update: 26-Feb-2018 11:17:19 Calib Date: 09-Feb-2018 00:05:30 Integrator: RTE ID Type: **Deconvolution ID** Quant By: Quant Method: Internal Standard **Initial Calibration** Last ICal File: \\ChromNA\Sacramento\ChromData\ATMS9\20180208-53859.b\MS9020812.D

Column 1: RTX Volatiles (0.32 mm) Det: MS SCAN

Process Host: XAWRK007

al David

First Level Reviewer: phanthasena			Date:			26-Feb-2018 11:17:19		
		RT	Adj RT	DIt RT			OnCol Amt	
Compound	Sig	(min.)	(min.)	(min.)	Q	Response	ppb v/v	Flags
* 1 Chlorobromomethane (IS)	130	12.312	12.312	0.000	94	73992	4.00	
* 2 1,4-Difluorobenzene	114	14.405	14.405	0.000	99	305569	4.00	
* 3 Chlorobenzene-d5 (IS)	117	20.324	20.324	0.000	98	192153	4.00	
\$ 41,2-Dichloroethane-d4 (Sur	65	13.480	13.480	0.000	97	119516	4.02	
\$ 5 Toluene-d8 (Surr)	100	17.562	17.569	-0.007	98	146869	3.78	
\$ 6 4-Bromofluorobenzene (Surr	174	22.253	22.259	-0.006	98	89197	3.53	
18 Chloromethane	50	4.793	4.763	0.030	36	1256	0.0621	
31 Acetone	43	7.689	7.634	0.055	95	13246	0.4284	
47 Methylene Chloride	49	8.881	8.899	-0.018	78	1106	0.0426	
48 Carbon disulfide	76	8.936	8.942	-0.006	99	5311	0.1177	
62 Tetrahydrofuran	42	12.586	12.513	0.073	25	804	0.0324	
85 Toluene	91	17.708	17.726	-0.019	75	1747	0.0199	
87 2-Hexanone	58	18.402	18.371	0.037	68	607	0.0176	
93 Tetrachloroethene	166	18.992	19.010	-0.018	85	1287	0.0332	
98 m-Xylene & p-Xylene	91	20.659	20.665	-0.006	0	5783	0.0667	
101 o-Xylene	91	21.359	21.365	-0.007	94	2695	0.0308	
107 N-Propylbenzene	91	22.533	22.539	-0.006	95	1753	0.0115	
110 4-Ethyltoluene	120	22.709	22.697	0.006	90	386	0.0103	
111 1,3,5-Trimethylbenzene	120	22.770	22.770	0.000	86	639	0.0122	
114 tert-Butylbenzene	91	23.269	23.281	-0.012	22	1007	0.0133	
115 1,2,4-Trimethylbenzene	120	23.324	23.323	0.000	90	915	0.0178	
116 sec-Butylbenzene	105	23.579	23.579	0.000	88	1182	0.007750	
121 4-Isopropyltoluene	119	23.755	23.755	0.000	92	1223	0.009246	
117 1,3-Dichlorobenzene	146	23.853	23.853	0.000	66	733	0.0106	
120 1,4-Dichlorobenzene	146	23.981	23.987	-0.006	84	1046	0.0150	
123 n-Butylbenzene	92	24.291	24.297	-0.006	87	354	0.004893	
122 1,2-Dichlorobenzene	146	24.467	24.473	-0.006	85	568	0.008525	
126 1,2,4-Trichlorobenzene	180	26.694	26.700	-0.006	37	930	0.0460	
127 Naphthalene	128	27.065	27.065	0.000	97	5089	0.0289	
S 155 Xylenes, Total	91				0		0.0975	
<i>j</i>					-			

10/29/2018

Report Date: 26-Feb-2018 11:17:19 Chrom Revision: 2.2 08-Feb-2018 13:38:42

Reagents:

VAMSIS20\_00109 Amount Added: 50.00 Units: mL Run Reagent

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Chrom Revision: 2.2 08-Feb-2018 13:38:42

320-36031-1

Operator ID:

Worklist Smp#:

RG

34

TestAmerica Sacramento

Data File:

\\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D

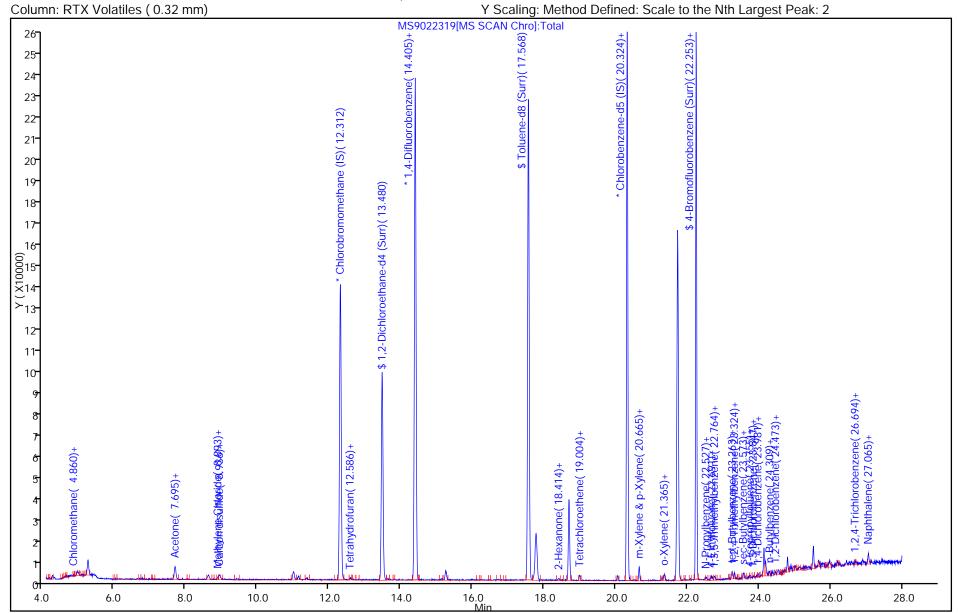
Injection Date: 24-Feb-2018 03:41:30 Instrument ID: ATMS9

Lims ID: 320-36031-A-1 34000536 Client ID:

Purge Vol: 5.000 mL Dil. Factor: ALS Bottle#: 14 1.0000

Lab Sample ID:

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL



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10/29/2018

TestAmerica Sacramento Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D Injection Date: 24-Feb-2018 03:41:30 Instrument ID: ATMS9 Lims ID: 320-36031-A-1 320-36031-1 Lab Sample ID: Client ID: 34000536 RG ALS Bottle#: Worklist Smp#: Operator ID: 14 34 Dil. Factor: Purge Vol: 5.000 mL 1.0000 MSA - TO15 - ICAL Method: TO15\_ATMS9N Limit Group: Column: RTX Volatiles (0.32 mm) Detector MS SCAN 31 Acetone, CAS: 67-64-1 Raw Spec:Scan 593(7.69) 43.0 m/z 43 35 35 ©30<sup>-</sup> ×25<sup>-</sup> **≻**20 58 15 15 40 10 10 0 40 44 48 52 56 7.1 7.4 7.7 8.0 36 58.0 Amdis Enhanced Spec: Scan 593(7.69), Qvalue=95 m/z 16 43 91 ⊙<sup>78</sup> ×65 ∑<sub>10</sub> ≻52 58 39 26<del>-</del> 13 0 0 8.0 44 52 7.4 7.7 36 40 48 56 7.1 Ref Spec: 31 Acetone (NIST14.L) 43 91-78 865 . ≿<sub>52</sub> 39 26 58 13 40 44 48 52 56 36 Differenc Spec:Scan 1 @ 7.690 min.(Qvalue: 95) m/z 43.0 100m/z 58.0 75 50 25 <sub>58</sub>/I 0 18 -25 12 -50**-**-75 100 ┪ 0 36 40 44 48 52 56 7.1 7.4 7.7 0.8

Chrom Revision: 2.2 08-Feb-2018 13:38:42

Report Date: 26-Feb-2018 11:17:19

Chrom Revision: 2.2 08-Feb-2018 13:38:42

Report Date: 26-Feb-2018 11:17:20

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D

Injection Date: 24-Feb-2018 03:41:30 Instrument ID: ATMS9 Lims ID: 320-36031-A-1 Lab Sample ID: 320-36031-1

Client ID: 34000536

ALS Bottle#: Operator ID: RG 14 Worklist Smp#: 34

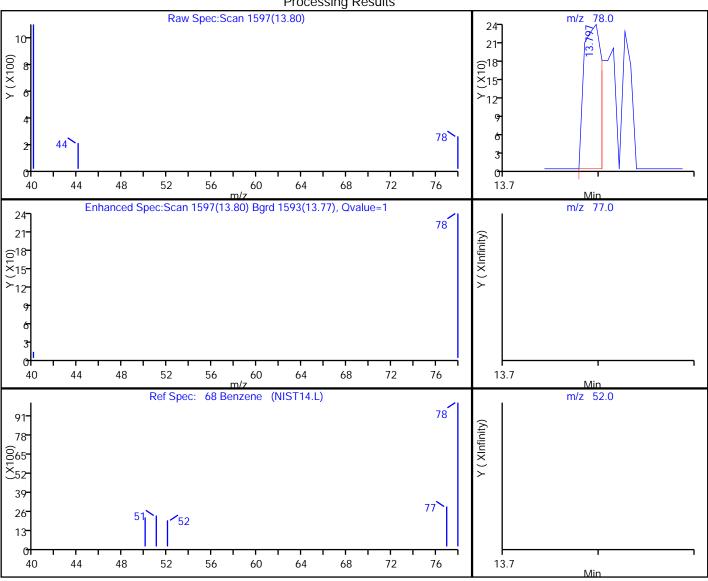
Dil. Factor: Purge Vol: 5.000 mL 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 68 Benzene, CAS: 71-43-2

#### **Processing Results**



RT	Mass	Response	Amount
13.80	78.00	310	0.004506
13.81	77.00	0	
13.81	52.00	0	

Reviewer: phanthasena, 26-Feb-2018 11:17:19 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D

Client ID: 34000536

Operator ID: RG ALS Bottle#: 14 Worklist Smp#: 34

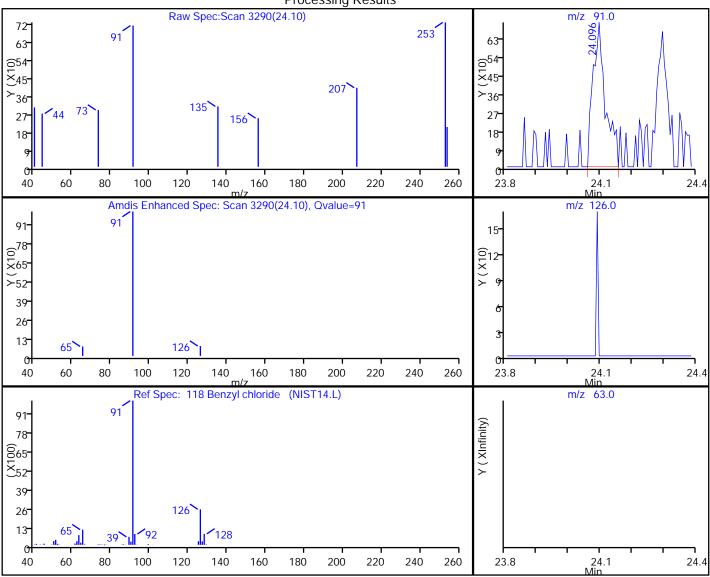
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 118 Benzyl chloride, CAS: 100-44-7

#### **Processing Results**



RT	Mass	Response	Amount
24.10	91.00	1956	0.014991
24.10	126.00	0	
24.10	63.00	0	

Reviewer: phanthasena, 26-Feb-2018 11:17:19 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

Page 40 of 44

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14

4.0

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D

Injection Date: 24-Feb-2018 03:41:30 Instrument ID: ATMS9 Lims ID: 320-36031-A-1 Lab Sample ID: 320-36031-1

Client ID: 34000536

ALS Bottle#: Operator ID: RG 14 Worklist Smp#: 34

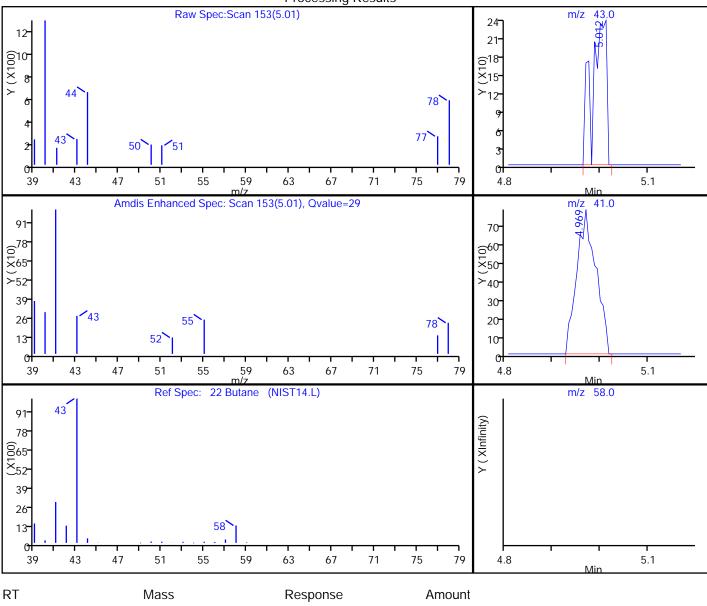
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 22 Butane, CAS: 106-97-8

#### **Processing Results**



RT	Mass	Response	Amount
5.01	43.00	495	0.013432
4.97	41.00	2209	
4.99	58.00	0	

Reviewer: phanthasena, 26-Feb-2018 11:17:19

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D

Injection Date: 24-Feb-2018 03:41:30 Instrument ID: ATMS9 Lims ID: 320-36031-A-1 Lab Sample ID: 320-36031-1

Client ID: 34000536

ALS Bottle#: Operator ID: RG 14 Worklist Smp#: 34

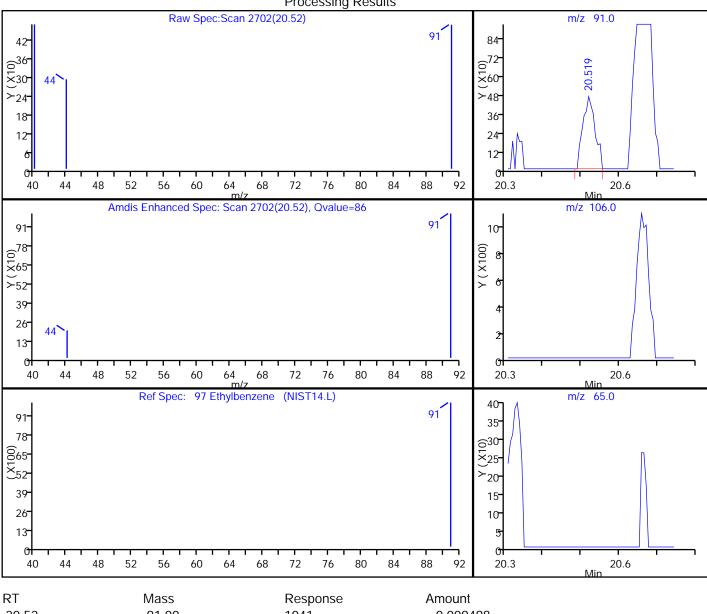
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Detector Column: RTX Volatiles (0.32 mm) MS SCAN

#### 97 Ethylbenzene, CAS: 100-41-4

#### **Processing Results**



RT	Mass	Response	Amount
20.52	91.00	1041	0.009498
20.53	106.00	0	
20.53	65.00	0	

Reviewer: phanthasena, 26-Feb-2018 11:17:19 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

Data File: \\ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D

Injection Date: 24-Feb-2018 03:41:30 Instrument ID: ATMS9 Lims ID: 320-36031-A-1 Lab Sample ID: 320-36031-1

34000536 Client ID:

ALS Bottle#: Operator ID: RG 14 Worklist Smp#: 34

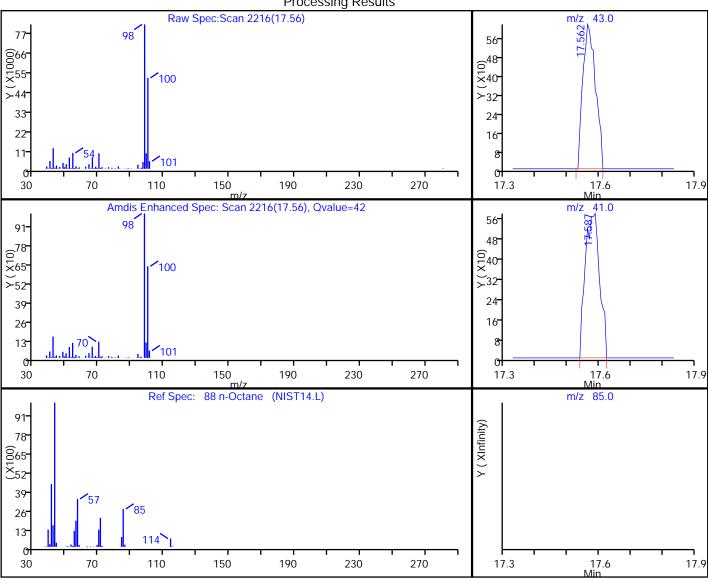
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 88 n-Octane, CAS: 111-65-9

#### **Processing Results**



RT	Mass	Response	Amount
17.56	43.00	1719	0.031107
17.59	41.00	1808	
17.58	85.00	0	

Reviewer: phanthasena, 26-Feb-2018 11:17:19 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

Data File: \ChromNA\Sacramento\ChromData\ATMS9\20180223-54469.b\MS9022319.D

Client ID: 34000536

Operator ID: RG ALS Bottle#: 14 Worklist Smp#: 34

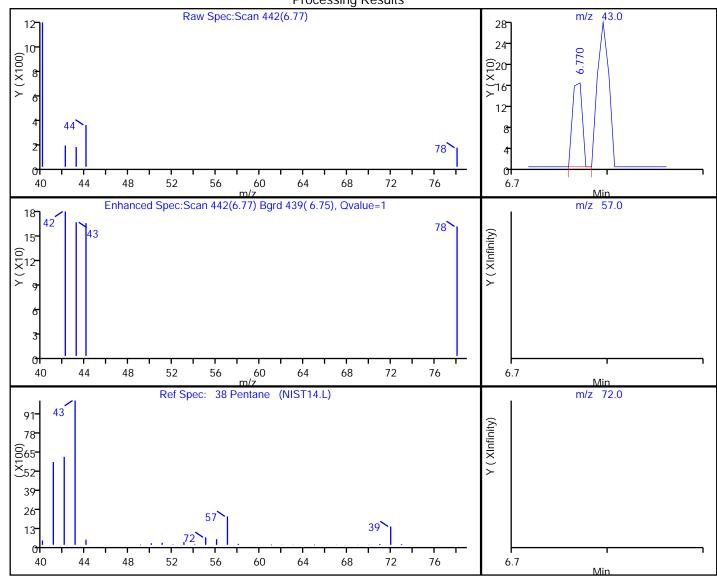
Purge Vol: 5.000 mL Dil. Factor: 1.0000

Method: TO15\_ATMS9N Limit Group: MSA - TO15 - ICAL

Column: RTX Volatiles (0.32 mm) Detector MS SCAN

#### 38 Pentane, CAS: 109-66-0

#### **Processing Results**



RT	Mass	Response	Amount
6.77	43.00	115	0.003164
6.79	57.00	0	
6.79	72.00	0	

Reviewer: phanthasena, 26-Feb-2018 11:17:19 Audit Action: Marked Compound Undetected

Audit Reason: Invalid Compound ID

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10/29/2018

# **APPENDIX K DPE System Data Validation Memorandums**

#### Data Validation Memorandum

TO: Ophélie Encelle SDG: 320-36324-1

FROM: Dilip Kumar Former Unocal

DATE: March 28, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

#### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 320-36324-1 for 2 air samples collected on February 20, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the requirement of the Compliance Monitoring Plan (CMP), which is provided as Appendix B of the Draft Cleanup Action Plan (CAP) submitted to Ecology on July 31, 2017 (Arcadis 2017). Air samples are collected monthly from the pre-treatment and post-treatment effluent stack and samples are analyzed for the following compounds:

- Benzene, toluene, ethylbenzene, xylenes, (BTEX collectively)
- Gasoline range organics (GRO)
- Fixed Gases (carbon dioxide, oxygen and methane)

#### **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data.

The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)

- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Air samples were analyzed for BTEX and GRO (USEPA method TO-15) and Fixed Gases in air (ASTM method D1946).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

#### **Data Completeness**

Air sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested air sample analyses and the deliverable data reports were complete.

#### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

I	Method	Holding Time	Date Sampled	Date of Analysis	Exceedance	
	NE	NE	NE	NE	NE	

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks are prepared to identify any contamination which may have been introduced into the samples.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

A method blank was analyzed for each method. No method blank contamination was detected.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### **Deuterated Monitoring Compounds (Surrogates)**

Appropriate numbers of surrogate compounds were spiked into each sample for USEPA method TO-15 analyses. All surrogate compound recoveries were within the laboratory's acceptance criteria except for sample VSP-801, the surrogate recovery for TO-15 analysis was above the upper control limit (2%) and all associated detected sample results were qualified as estimated "J".

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit	
VSP-801	1,2-Dichloroethane-d4	132	70-130	

#### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

#### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 320-36324-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 320-36324-1.

#### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 320-36324-1.

#### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. One sample
  results were qualified as estimated for high surrogate recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blank samples were free of
  contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

#### **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

#### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

Table 1: Sample Summary

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
VSP-801	320-36324-1	02/20/2018	15:30	Regular
VSP-802	320-36324-2	02/20/2018	15:45	Regular

**Table 2: Qualified Results Summary** 

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
320-36324-1	VSP-801	REG	320-36324-1	TO-15	Benzene	280	ppb v/v		J	SURH	Υ
320-36324-1	VSP-801	REG	320-36324-1	TO-15	Ethylbenzene	26	ppb v/v		J	SURH	Υ
320-36324-1	VSP-801	REG	320-36324-1	TO-15	Toluene	1.2	ppb v/v	J	J	SURH	Υ
320-36324-1	VSP-801	REG	320-36324-1	TO-15	m, p-Xylene	25	ppb v/v		J	SURH	Υ
320-36324-1	VSP-801	REG	320-36324-1	TO-15	o-Xylene	3.0	ppb v/v		J	SURH	Υ
320-36324-1	VSP-801	REG	320-36324-1	TO-15	GRO	18,000	ppb v/v		J	SURH	Υ

Notes:

REG: regular

SDG: sample delivery group
GRO: gasoline range organics reported as TPH (as Gasoline)
ppb v/v: parts per billion volume/volume

J: the concentration is an approximate value SURH: surrogate recovery above upper acceptance limit

Y: analyte detected

Form No. CA-C-WI-003, Rev. 1, dated 05/10/2013

## Canister Samples Chain of Custody Record

TestAmerica Sacramento

880 Riverside Parkway

**TestAmerica** 

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples

Otiner: Fixed 4as (methane, 02 EPATO-15 for BTEX 8 TRH-6 TestAmerica Laboratories, Inc. (See below for Add'l Items) Sample Specific Notes: COCs 320-36324 Chain of Custody or Lab Use Only: of lob / SDG No.: Walk-in Client: ab Sampling: Office (Please specify in notes section) andfill Gas Sell Gas 122/18 ndoor Air Sample Type Office specify in notes section) 0000 Jason Little 81\8/0A9∃ 4-HUL 'X-1a 888E / Stet / 9tet-d MTSA EPA 25C / 25.3 Lymed SPA 3C H9A-AM LO-15 (Med / Std / Low / SIM) Samples Collected By: Samples Received by: 34001936 34000 66 Canister Received by:
Received by:
CMAA
Condition: Flow Controller ID Canister Canister Vacuum in Vacuum in Field, 'Hg Field, 'Hg (Start)' (Stop)' Temperature (Fahrenheit) Temperature (Fahrenheit) Ambient Ambient Anaylsis Turnaround Time Standard (Specific): STAT Time Date / Time: Date / Time: Date / Time: Opened by: Rush (Specifiy) Time Start 1530 525 Interior Interior Project Manager: Site Contact: TA Contact: 2/20/18 81/00/2 Sample Date(s) Phone: Suite 800 Email: Start Start Stop Stop Special Instructions/QC Requirements & Comments: Site/Location: 11720 unit ci2d, Edwards w.A. Project Name: Edmonds Termina City/State/Zip Scattle/WA/4810 Shipper Name: West Sacramento, CA 95605 phone 916.374,4378 fax 916.372,1059 Sample Identification Address: 1100 Olive way Avecadi 150-802 Samples Relinquished by: Client Contact Information USP-801 Samples Shipped by: Relinquished by: Company Name: Lab Use Only: # O d

#### **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-36324-1

02/26/18 13:22

Lab Sample ID: 320-36324-2

Lab Sample ID: 320-36324-1

Matrix: Air

6

1.68

Matrix: Air

Date Collected: 02/20/18 15:30 Date Received: 02/22/18 09:00

Client Sample ID: VSP - 801

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Or	ganic Compo	u <mark>nds in A</mark> n	nbient Air						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	280	J	2.6	0.51	ppb v/v			03/01/18 22:22	6.45
Ethylbenzene	26	J	2.6	0.41	ppb v/v			03/01/18 22:22	6.45
Toluene	1.2	<b>ታ</b> J	2.6	0.33	ppb v/v			03/01/18 22:22	6.45
m,p-Xylene	25	J	5.2	0.65	ppb v/v			03/01/18 22:22	6.45
o-Xylene	3.0	J	2.6	0.35	ppb v/v			03/01/18 22:22	6.45
TPH (as Gasoline)	18000	J	650	260	ppb v/v			03/01/18 22:22	6.45
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
4-Bromofluorobenzene (Surr)	96		70 - 130			-		03/01/18 22:22	6.4
1,2-Dichloroethane-d4 (Surr)	132	X	70 - 130					03/01/18 22:22	6.4
Toluene-d8 (Surr)	101		70 - 130					03/01/18 22:22	6.4
Method: D1946 - Fixed Gas	es in Air (GC)								
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Carbon Dioxide (TCD)	0.50	J	0.84	0.018	% v/v			02/26/18 13:22	1.6
Methane (FID)	0.016		0.00017	0.000034	% v/v			02/26/18 14:47	1.6
Methane (TCD)	ND		0.84	0.23	% v/v			02/26/18 13:22	1.68

0.34

0.012 % v/v

Client Sample ID: VSP - 802 Date Collected: 02/20/18 15:45

Date Received: 02/22/18 09:00

Oxygen

Sample Container: Summa Canister 1L

18

Method: TO-15 - Volatile O Analyte	•	unds in An Qualifier	nbient Air RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.17	J	0.40	0.079	ppb v/v			03/01/18 23:14	1
Ethylbenzene	0.83		0.40	0.063	ppb v/v			03/01/18 23:14	1
Toluene	0.66		0.40	0.051	ppb v/v			03/01/18 23:14	1
m,p-Xylene	1.9		0.80	0.10	ppb v/v			03/01/18 23:14	1
o-Xylene	0.49		0.40	0.054	ppb v/v			03/01/18 23:14	1
TPH (as Gasoline)	320		100	40	ppb v/v			03/01/18 23:14	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		70 - 130					03/01/18 23:14	1
1,2-Dichloroethane-d4 (Surr)	88		70 - 130					03/01/18 23:14	1
Toluene-d8 (Surr)	96		70 - 130					03/01/18 23:14	1
Method: D1946 - Fixed Gas	ses in Air (GC)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.35	J	1.0	0.022	% v/v			02/26/18 13:32	2.08
Methane (FID)	0.0030		0.00021	0.000042	% v/v			02/26/18 15:07	2.08
Methane (TCD)	ND		1.0	0.28	% v/v			02/26/18 13:32	2.08
Oxygen	18		0.42	0.015	% v/v			02/26/18 13:32	2.08

#### Data Validation Memorandum

TO: Ophélie Encelle SDG: 320-37147-1

FROM: Dilip Kumar Former Unocal

DATE: April 10, 2018

SITE: Edmonds Bulk Fuel Terminal Edmonds,

Washington

#### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1<sup>st</sup>, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 320-37147-1 for 2 air samples collected on March 14, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the requirement of the Compliance Monitoring Plan (CMP), which is provided as Appendix B of the Draft Cleanup Action Plan (CAP) submitted to Ecology on July 31, 2017 (Arcadis 2017). Air samples are collected monthly from the pre-treatment and post-treatment effluent stack and samples are analyzed for the following compounds:

- Benzene, toluene, ethylbenzene, xylenes (BTEX collectively)
- Gasoline Range Organics (GRO)
- Fixed Gases (carbon dioxide, oxygen and methane)

#### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- · Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)

- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Air samples were analyzed for BTEX and GRO (USEPA method TO-15) and Fixed Gases in air (ASTM method D1946).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

#### **Data Completeness**

Air sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested air sample analyses and the deliverable data reports were complete.

#### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks are prepared to identify any contamination which may have been introduced into the samples.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

A method blank was analyzed for each method. No method blank contamination was detected.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### **Deuterated Monitoring Compounds (Surrogates)**

Appropriate numbers of surrogate compounds were spiked into each sample for USEPA method TO-15 analyses. All surrogate compound recoveries were within the laboratory's acceptance criteria except for sample VSP-801, the surrogate recovery for TO-15 analysis was above the upper control limit (5%) and all associated detected sample results were qualified as estimated "J".

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
VSP-801	1,2-Dichloroethane-d4	135	70-130

#### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

#### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 320-37147-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 320-37147-1.

#### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 320-37147-1.

#### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Sample results of VSP-801 were qualified as estimated for high surrogate recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note discrepancies with sample collection, storage or preservation procedures. All data were reported
  from analyses within the recommended holding time. The method blank samples were free of
  contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

# **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

# **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

Table 1: Sample Summary

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
VSP-801	320-37147-1	03/14/2018	10:10	Regular
VSP-802	320-37147-2	03/14/2018	10:20	Regular

**Table 2: Qualified Results Summary** 

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
320-37147-1	VSP-801	REG	320-37147-1	TO-15	Benzene	170	ppb v/v		J	SURH	Υ
320-37147-1	VSP-801	REG	320-37147-1	TO-15	Ethylbenzene	260	ppb v/v		J	SURH	Υ
320-37147-1	VSP-801	REG	320-37147-1	TO-15	Toluene	17	ppb v/v		J	SURH	Υ
320-37147-1	VSP-801	REG	320-37147-1	TO-15	m, p-Xylene	440	ppb v/v		J	SURH	Υ
320-37147-1	VSP-801	REG	320-37147-1	TO-15	o-Xylene	60	ppb v/v		J	SURH	Υ
320-37147-1	VSP-801	REG	320-37147-1	TO-15	GRO	20,000	ppb v/v		J	SURH	Υ

Notes:

REG: regular

SDG: sample delivery group
GRO: gasoline range organics reported as TPH (as Gasoline)
ppb v/v: parts per billion volume/volume

J: the concentration is an approximate value SURH: surrogate recovery above upper acceptance limit

Y: analyte detected

Sypophs at

# **TestAmerica Sacramento**

880 Riverside Parkway

Company Name:

# O d

Canister Samples Chain of Custody Record

restAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples

**TestAmerica** 

Fixed Gas! Methane TestAmerica Laboratories, Inc. (See below for Add'l Items) Sample Specific Notes: cocs or Lab Use Only: 0, \$ (0, Job / SDG No .: Valk-in Client: .ab Sampling: Other (Please specify in notes section) Landfill Gas 11A InsidmA 1A 100bn edyT elqme2 Ofher (Please specify in notes section) Jason Little 81/81 A93 888E / Spet / 94et-d MTSA EPA 25C / 25.3 EPA 3C HAA-AM A-HYT H9A-AM Samples Collected By: 320-32458 328-358 Canister ₽ Controller 0 Vacuum in Vacuum in Field, 'Hg (Start)' (Stop)' Email: SCOtt. 20rn @ orcodis. COM Canister Project Manager: 5c0tt 2000 Anaylsis Turnaround Time Site Contact: Peter Coumpinell TA Contact: Plainne Wolfker STAT Time Standard (Specific): Rush (Specifiy) 1020 Time Start 1010 3/14/18 3/4/8 Sample Date(s) 500.48800 1 98101 Project Name: Edundands Termina West Sacramento, CA 95605 phone 916.374.4378 fax 916.372.1059 Sample Identification Site/Location: 11720 WMOLD PLA Address: [100 Oll of work City/State/Zip Scoutte with Arcodis VSP-802 Client Contact Information 158-301

Form No. CA-C-WI-003, Rev. 1, dated 05/10/2013 として 3060 romer Samples Received by: Received by: Received by: Condition: 430 37000684 Date / Time: 3/14/ 3 Date / Time: Date / Time: Opened by: I no on times Shipper Name Samples Relinquished by: Relinguished by: Samples Shipped by: ab Use Only:

Any questions call 303-519-7192

Temperature (Fahrenheit)

Ambient

Interior

Start

Stop

Special Instructions/QC Requirements & Comments:

Temperature (Fahrenheit)

Ambient

Interior

Start

Stop

2

320-37147 Chain of Custody

# **Detection Summary**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

**Client Sample ID: VSP-801** 

TestAmerica Job ID: 320-37147-1

Lab Sample ID: 320-37147-1

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D Method	Prep Type
Benzene	170	2.0	0.39	ppb v/v	4.93	TO-15	Total/NA
Ethylbenzene	260	2.0	0.31	ppb v/v	4.93	TO-15	Total/NA
Toluene	17	2.0	0.25	ppb v/v	4.93	TO-15	Total/NA
m,p-Xylene	440	3.9	0.49	ppb v/v	4.93	TO-15	Total/NA
o-Xylene	60	2.0	0.27	ppb v/v	4.93	TO-15	Total/NA
TPH (as Gasoline)	20000	490	200	ppb v/v	4.93	TO-15	Total/NA
Methane (FID)	0.0044	0.00064	0.00013	% v/v	6.38	D1946	Total/NA
Oxygen	17	1.3	0.047	% v/v	6.38	D1946	Total/NA

Client Sample ID: VSP-802 Lab Sample ID: 320-37147-2

Analyte	Result Qualifi	ier RL	MDL	Unit	Dil Fac	D Method	Prep Type
Benzene	0.11 J	0.40	0.079	ppb v/v		TO-15	Total/NA
Ethylbenzene	0.47	0.40	0.063	ppb v/v	1	TO-15	Total/NA
Toluene	0.99	0.40	0.051	ppb v/v	1	TO-15	Total/NA
m,p-Xylene	1.8	0.80	0.10	ppb v/v	1	TO-15	Total/NA
o-Xylene	0.60	0.40	0.054	ppb v/v	1	TO-15	Total/NA
TPH (as Gasoline)	220	100	40	ppb v/v	1	TO-15	Total/NA
Methane (FID)	0.0041	0.0014	0.00029	% v/v	14.33	D1946	Total/NA
Oxygen	20	2.9	0.11	% v/v	14.33	D1946	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

4/3/2018

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# **Client Sample Results**

Client: ARCADIS U.S. Inc

**Client Sample ID: VSP-801** 

Date Collected: 03/14/18 10:10

Date Received: 03/16/18 09:05

Project/Site: Chevron Edmonds Terminal

Sample Container: Summa Canister 1L

TestAmerica Job ID: 320-37147-1

Lab Sample ID: 320-37147-1

Matrix: Air

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3	6
3	
3	

6.38

6.38

Matrix: Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	170	J	2.0	0.39	ppb v/v			03/27/18 23:26	4.93
Ethylbenzene	260	J	2.0	0.31	ppb v/v			03/27/18 23:26	4.93
Toluene	17	J	2.0	0.25	ppb v/v			03/27/18 23:26	4.93
m,p-Xylene	440	J	3.9	0.49	ppb v/v			03/27/18 23:26	4.93
o-Xylene	60	J	2.0	0.27	ppb v/v			03/27/18 23:26	4.93
TPH (as Gasoline)	20000	J	490	200	ppb v/v			03/27/18 23:26	4.93
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	110		70 - 130					03/27/18 23:26	4.93
1,2-Dichloroethane-d4 (Surr)	135	X	70 - 130					03/27/18 23:26	4.93
Toluene-d8 (Surr)	108		70 - 130					03/27/18 23:26	4.93
Method: D1946 - Fixed Gas	ses in Air (GC)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac

3.2

1.3

0.00064

ND

17

0.0044

0.068 % v/v

0.047 % v/v

0.00013 % v/v

Client Sample ID: VSP-802

Date Collected: 03/14/18 10:20

Carbon Dioxide (TCD)

Methane (FID)

**Oxygen** 

Sample Container: Summa Canister 1L

Lab Sample ID: 320-371	147.0
03/28/18 16:11	6.38

03/28/18 16:11

03/29/18 11:21

Date Received: 03/16/18 09:05

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.11	J	0.40	0.079	ppb v/v			03/28/18 00:29	1
Ethylbenzene	0.47		0.40	0.063	ppb v/v			03/28/18 00:29	1
Toluene	0.99		0.40	0.051	ppb v/v			03/28/18 00:29	1
m,p-Xylene	1.8		0.80	0.10	ppb v/v			03/28/18 00:29	1
o-Xylene	0.60		0.40	0.054	ppb v/v			03/28/18 00:29	1
TPH (as Gasoline)	220		100	40	ppb v/v			03/28/18 00:29	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		70 - 130			•		03/28/18 00:29	1
1,2-Dichloroethane-d4 (Surr)	95		70 - 130					03/28/18 00:29	1
Toluene-d8 (Surr)	102		70 - 130					03/28/18 00:29	1
Method: D1946 - Fixed Gas	ses in Air (GC)								
Analyto	, ,	Qualifier	DI		Linit	n	Dropared	Analyzod	Dil Esc

Method: D1946 - Fixed Gases	in Air (GC)							
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	ND	7.2	0.15	% v/v			03/28/18 16:21	14.33
Methane (FID)	0.0041	0.0014	0.00029	% v/v			03/29/18 11:36	14.33
Oxygen	20	2.9	0.11	% v/v			03/28/18 16:21	14.33

# Data Validation Memorandum

TO: Ophélie Encelle SDG: 320-39559-1

FROM: Dilip Kumar Former Unocal

DATE: June 19, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

#### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 320-39559-1 for 2 air samples collected on May 17, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the requirement of the Compliance Monitoring Plan (CMP), which is provided as Appendix B of the Draft Cleanup Action Plan (CAP) submitted to Ecology on July 31, 2017 (Arcadis 2017). Air samples are collected monthly from the pre-treatment and post-treatment effluent stack and samples are analyzed for the following compounds:

- Benzene, toluene, ethylbenzene, xylenes (BTEX collectively)
- Gasoline Range Organics (GRO)
- Fixed Gases (carbon dioxide, oxygen and methane)

#### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- · Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)

- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Air samples were analyzed for BTEX and GRO (USEPA method TO-15) and Fixed Gases in air (ASTM method D1946).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

#### **Data Completeness**

Air sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested air sample analyses and the deliverable data reports were complete.

#### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks are prepared to identify any contamination which may have been introduced into the samples.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

A method blank was analyzed for each method. No method blank contamination was detected.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### **Deuterated Monitoring Compounds (Surrogates)**

Appropriate numbers of surrogate compounds were spiked into each sample for USEPA method TO-15 analyses. All surrogate compound recoveries were within the laboratory's acceptance criteria except for sample VSP-801, the surrogate recovery for TO-15 analysis was above the upper control limit (96%-121%) and all associated detected sample results were qualified as estimated "J".

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
VSP-801	4-Bromofluorobenzene	251	70-130
VSP-801	1,2-Dichloroethane-d4	226	70-130

#### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

#### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 320-39559-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 320-39559-1.

#### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 320-39559-1.

#### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. One sample
  results were qualified as estimated for high surrogate recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blank samples were free of
  contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number of measurements planned. Completeness is expressed as the percentage of valid or usable

measurements compared to planned measurements. Valid data are defined as all data that are not rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

#### **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

#### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

Table 1: Sample Summary

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
VSP-801	320-39559-1	05/17/2018	17:00	Regular
VSP-802	320-39559-2	05/17/2018	17:05	Regular

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
320-39559-1	VSP-801	REG	320-39559-1	TO-15	Benzene	1.1	ppb v/v		J	SURH	Υ
320-39559-1	VSP-801	REG	320-39559-1	TO-15	Ethylbenzene	1.9	ppb v/v		J	SURH	Υ
320-39559-1	VSP-801	REG	320-39559-1	TO-15	Toluene	1.1	ppb v/v		J	SURH	Υ
320-39559-1	VSP-801	REG	320-39559-1	TO-15	m, p-Xylene	8.3	ppb v/v		J	SURH	Υ
320-39559-1	VSP-801	REG	320-39559-1	TO-15	o-Xylene	2.1	ppb v/v		J	SURH	Υ

Notes: REG: regular

SDG: sample delivery group ppb v/v: parts per billion volume/volume J: the concentration is an approximate value

SURH: surrogate recovery above upper acceptance limit

Y: analyte detected

Form No. CA-C-WI-003, Rev. 1, dated 05/10/2013

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Canister Canister

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# Canister Samples Chain of Custody Record

TestAmerica Sacramento

880 Riverside Parkway

TestAmerica THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc. assumes no liability with respect to the collection and shipment of these samples

TestAmerica Laboratories, Inc. methane, Dz, CO2 Other= Fixed bas (See below for Add'l Items) \$ TPH-6 Sample Specific Notes: Fox COCS EPA TO-15 For Lab Use Only: l of Job / SDG No.: Walk-in Client: ab Sampling: BTEX TA-54C COC No: 320-39559 Chain of Custody Ofher (Please specify in notes section) 51:60 81/61/6 eso liitbas. 5.18.18 05.80 TIA InsidmA F Sample Type エナン Office section) in notes section) 1 Sala STAPES 大田の C-O. 81/S1 A 43 888E / Stef / 94et-d MTSA Jason EPA 25C / 25.3 Se Le EPA 3C amet HAA-AM O-12 (Weq / Stq / FOM / SIW) Samples Received by: Samples Collected By: FF00 | 853 \$202 Canister Received by: Received by: Flow 9 Canister Canister Vacuum in Vacuum in Field, 'Hg Field, 'Hg (Start)' (Stop)' Temperature (Fahrenheit) Temperature (Fahrenheit) いって F Ambient Ambient Anaylsis Turnaround Time Scott Time Standard (Specific): Date/Time: Date / Time: Date / Time: Opened by: Rush (Specifiy): Time Start 5/14/18/1705 Project Manager: 5/14/18 1700 Interior Interior Site Contact: TA Contact: Sample Date(s) Phone: Email: Start Start Stop Stop 5 Suresoo Special Instructions/QC Requirements & Comments: おはら Project Name: Edwonds Terming Site/Location: 1770 United Pd Address: WOO BLINE WAY 9.8101 City/State/Zip Scottle WAY 9.8101 Shipper Name 3 Sample Identification West Sacramento, CA 95605 phone 916.374.4378 fax 916.372.1059 Company Name: A Irc ad is 802 Client Contact Information USP-821 Samples Relinquished by: Samples Shipped by 150 ab Use Only: Phone: # O d -AX: 光

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Client Sample ID: VSP-801 Lab Sample ID: 320-39559-1

Date Collected: 05/17/18 17:00 Matrix: Air

Date Received: 05/19/18 09:15

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	1.1	J	0.40	0.079	ppb v/v			05/31/18 01:01	1
Ethylbenzene	1.9	J	0.40	0.063	ppb v/v			05/31/18 01:01	1
Toluene	1.1	J	0.40	0.051	ppb v/v			05/31/18 01:01	1
m,p-Xylene	8.3	J	0.80	0.10	ppb v/v			05/31/18 01:01	1
o-Xylene	2.1	J	0.40	0.054	ppb v/v			05/31/18 01:01	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	251	X	70 - 130					05/31/18 01:01	1
1,2-Dichloroethane-d4 (Surr)	226	X	70 - 130					05/31/18 01:01	1
Toluene-d8 (Surr)	106		70 - 130					05/31/18 01:01	1

Method: TO-15 - Volatile Or	ganic Compo	u <mark>nds in A</mark> r	nbient Air - D	L					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TPH (as Gasoline)	34000		990	400	ppb v/v			05/31/18 08:27	9.92
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	115		70 - 130			•		05/31/18 08:27	9.92
1,2-Dichloroethane-d4 (Surr)	107		70 - 130					05/31/18 08:27	9.92
Toluene-d8 (Surr)	98		70 - 130					05/31/18 08:27	9.92

Method: D1946 - Fixed Gases	in Air (GC)							
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.35 J	0.90	0.019	% v/v			05/23/18 09:53	1.79
Methane (FID)	0.0011	0.00018	0.000036	% v/v			05/23/18 13:20	1.79
Oxygen	18	0.36	0.013	% v/v			05/23/18 09:53	1.79

Client Sample ID: VSP-802

Date Collected: 05/17/18 17:05

Lab Sample ID: 320-39559-2

Matrix: Air

Date Collected: 05/17/18 17:05 Date Received: 05/19/18 09:15

Oxygen

Sample Container: Summa Canister 11

Method: TO-15 - Volatile O Analyte	•	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.087	J	0.40	0.079	ppb v/v			05/31/18 01:59	1
Ethylbenzene	0.12	J	0.40	0.063	ppb v/v			05/31/18 01:59	1
Toluene	0.14	J	0.40	0.051	ppb v/v			05/31/18 01:59	1
m,p-Xylene	0.23	J	0.80	0.10	ppb v/v			05/31/18 01:59	1
o-Xylene	0.069	J	0.40	0.054	ppb v/v			05/31/18 01:59	1
TPH (as Gasoline)	280		100	40	ppb v/v			05/31/18 01:59	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		70 - 130			-		05/31/18 01:59	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 130					05/31/18 01:59	1
Toluene-d8 (Surr)	101		70 - 130					05/31/18 01:59	1
Method: D1946 - Fixed Gas	ses in Air (GC)								
Analyte	, ,	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.39	J	1.1	0.024	% v/v			05/23/18 10:07	2.22
	0.0010		0.00022	0.000044				05/23/18 13:33	2.22

0.44

18

0.016 % v/v

TestAmerica Sacramento

2.22

05/23/18 10:07

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TestAmerica Job ID: 320-39559-1

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# Data Validation Memorandum

TO: Ophélie Encelle SDG: 320-41619-1

FROM: Dilip Kumar Former Unocal

DATE: September 05, 2018

SITE: Edmonds Bulk Fuel Terminal Edmonds,

Washington

#### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1<sup>st</sup>, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 320-41619-1 for 2 air samples collected on July 26, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the requirement of the Compliance Monitoring Plan (CMP), which is provided as Appendix B of the Draft Cleanup Action Plan (CAP) submitted to Ecology on July 31, 2017 (Arcadis 2017). Air samples are collected monthly from the pre-treatment and post-treatment effluent stack and samples are analyzed for the following compounds:

- Benzene, toluene, ethylbenzene, xylenes (BTEX collectively)
- Gasoline Range Organics (GRO)
- Fixed Gases (carbon dioxide, oxygen and methane)

#### **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data.

The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)

- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Air samples were analyzed for BTEX and GRO (USEPA method TO-15) and Fixed Gases in air (ASTM method D1946).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

#### **Data Completeness**

Air sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested air sample analyses and the deliverable data reports were complete.

#### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks are prepared to identify any contamination which may have been introduced into the samples.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

A method blank was analyzed for each method. No method blank contamination was detected.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for USEPA method TO-15 analyses. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

#### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

#### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 320-41619-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 320-41619-1.

#### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 320-41619-1.

#### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blank samples were free of
  contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

# **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

# **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

Table 1: Sample Summary

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
VSP-801	320-41619-1	07/26/2018	12:45	Regular
VSP-802	320-41619-2	07/26/2018	12:55	Regular

# **Table 2: Qualified Results Summary**

 ooratory mple ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

SDG: sample delivery group NE: not encountered

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# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 320-41619-1

Lab Sample ID: 320-41619-1

Matrix: Air

Date Collected: 07/26/18 12:45 Date Received: 07/31/18 09:00

Client Sample ID: VSP-801

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	46		6.3	1.2	ppb v/v			08/15/18 05:44	15.7
Ethylbenzene	51		6.3	0.99	ppb v/v			08/15/18 05:44	15.7
Toluene	ND		6.3	0.80	ppb v/v			08/15/18 05:44	15.7
m,p-Xylene	170		13	1.6	ppb v/v			08/15/18 05:44	15.7
o-Xylene	28		6.3	0.85	ppb v/v			08/15/18 05:44	15.7
TPH (as Gasoline)	17000		1600	630	ppb v/v			08/15/18 05:44	15.7
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		70 - 130			-		08/15/18 05:44	15.7
1,2-Dichloroethane-d4 (Surr)	93		70 - 130					08/15/18 05:44	15.7
Toluene-d8 (Surr)	98		70 - 130					08/15/18 05:44	15.7
Method: D1946 - Fixed Gas	ses in Air (GC)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.45	J	0.79	0.017	% v/v			08/02/18 09:41	1.57
Methane (FID)	0.00080		0.00016	0.000031	% v/v			08/09/18 10:19	1.57
Oxygen	18		0.31	0.012	% v/v			08/02/18 09:41	1.57

**Client Sample ID: VSP-802** Lab Sample ID: 320-41619-2 Matrix: Air

Date Collected: 07/26/18 12:55 Date Received: 07/31/18 09:00

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.21	J	0.40	0.079	ppb v/v			08/15/18 06:41	1
Ethylbenzene	1.3		0.40	0.063	ppb v/v			08/15/18 06:41	1
Toluene	1.6		0.40	0.051	ppb v/v			08/15/18 06:41	1
m,p-Xylene	5.3		0.80	0.10	ppb v/v			08/15/18 06:41	1
o-Xylene	1.9		0.40	0.054	ppb v/v			08/15/18 06:41	1
TPH (as Gasoline)	280		100	40	ppb v/v			08/15/18 06:41	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	106		70 - 130			•		08/15/18 06:41	1
1,2-Dichloroethane-d4 (Surr)	86		70 - 130					08/15/18 06:41	1
Toluene-d8 (Surr)	102		70 - 130					08/15/18 06:41	1
Method: D1946 - Fixed Gas	ses in Air (GC)								
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.75	J	0.83	0.018	% v/v			08/02/18 09:53	1.66
Methane (FID)	0.0025		0.00017	0.000033	% v/v			08/09/18 10:35	1.66
Oxygen	17		0.33	0.012	% v/v			08/02/18 09:53	1.66

# Data Validation Memorandum

TO: Ophélie Encelle SDG: 320-44380-1

FROM: Dilip Kumar Former Unocal

DATE: January 31, 2019

Edmonds Bulk Fuel Terminal Edmonds,

Washington

#### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 320-44380-1 for 2 air samples collected on October 18, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the requirement of the Compliance Monitoring Plan (CMP), which is provided as Appendix B of the Draft Cleanup Action Plan (CAP) submitted to Ecology on July 31, 2017 (Arcadis 2017). Air samples are collected monthly from the pre-treatment and post-treatment effluent stack and samples are analyzed for the following compounds:

- Benzene, toluene, ethylbenzene, xylenes (BTEX collectively)
- Gasoline Range Organics (GRO)
- Fixed Gases (carbon dioxide, oxygen and methane)

#### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- · Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)

- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Air samples were analyzed for BTEX and GRO (USEPA method TO-15) and Fixed Gases in air (ASTM method D1946).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

#### **Data Completeness**

Air sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested air sample analyses and the deliverable data reports were complete.

#### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks are prepared to identify any contamination which may have been introduced into the samples.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Four BTEX compounds, ethylbenzene, toluene, m,p-xylene and o-xylene were detected at concentration greater than the MDL in method blank MB 320-254908/16 associated with samples VSP-801 and VSP-802.

- The VSP-801 sample results for ethylbenzene and m, p-xylene were greater than five times the blank action level, therefore not qualified.
- The VSP-801 sample results for toluene and o-xylene were less than five times the blank value (taking in consideration the dilution factor of 22.8), therefore associated sample results were qualified as non-detect (U). Sample VSP-801 was already qualified as estimated "J" for high surrogate recoveries, therefore validation qualifier updated as "UJ" instead of "U" for blank contamination.
- The VSP-802 sample results for ethylbenzene and toluene were greater than five times the blank action level, therefore not qualified.

• The VSP-802 sample results for m, p-xylene and o-xylene were less than five times the blank value, therefore associated sample results were qualified as non-detect (U).

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
VSP-801	MB	TO-15	Toluene	ug/L	0.0554	4.3*	UJ
VSP-801	MB	TO-15	o-xylene	ug/L	0.132	12*	UJ
VSP-802	MB	TO-15	m,p-xylene	ug/L	0.258	0.97	U
VSP-802	MB	TO-15	o-xylene	ug/L	0.132	0.36	U

Notes:

MB: method blank U: non-detect

UJ: the analyte was analyzed for, but was not detected and the reported quantitation limit is approximate ug/L: micrograms per liter

#### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for USEPA method TO-15 analyses. All surrogate compound recoveries were within the laboratory's acceptance criteria except for sample VSP-801, the surrogate recovery for TO-15 analysis was above the upper control limit (4%) and compounds benzene, ethylbenzene, toluene, m, p-Xylene, o-Xylene and GRO, reported as TPH (as Gasoline), results were qualified as estimated "J".

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
VSP-801	1,2-Dichloroethane-d4	134	70-130

#### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

#### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 320-44380-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 320-44380-1.

#### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 320-44380-1.

<sup>\*:</sup> Sample VSP-801 was diluted with a dilution factor of 22.8.

# CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. One sample
  results were qualified as estimated for high surrogate recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time. Toluene and o-xylene in sample VSP-801, m, p-xylene and o-xylene in sample VSP-802 were detected in the associated laboratory method blank; this laboratory method blank detects resulted in associated samples detected data qualified as non-detect. The trip blank was free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

#### REFERENCES

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

#### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
VSP-801	320-44380-1	10/18/2018	15:45	Regular
VSP-802	320-44380-2	10/18/2018	15:30	Regular

**Table 2: Qualified Results Summary** 

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
320-44380-1	VSP-801	REG	320-44380-1	TO-15	Benzene	640	ppb v/v		J	SURH	Υ
320-44380-1	VSP-801	REG	320-44380-1	TO-15	Ethylbenzene	99	ppb v/v	В	J	SURH	Υ
320-44380-1	VSP-801	REG	320-44380-1	TO-15	Toluene	4.3	ppb v/v	JB	UJ	SURH, BL1	N
320-44380-1	VSP-801	REG	320-44380-1	TO-15	m, p-Xylene	110	ppb v/v	В	J	SURH	Υ
320-44380-1	VSP-801	REG	320-44380-1	TO-15	o-Xylene	12	ppb v/v	В	UJ	SURH, BL1	N
320-44380-1	VSP-801	REG	320-44380-1	TO-15	GRO	38000	ppb v/v		J	SURH	Υ
320-44380-2	VSP-802	REG	320-44380-1	TO-15	m, p-Xylene	0.97	ppb v/v	В	U	BL1	N
320-44380-2	VSP-802	REG	320-44380-1	TO-15	o-Xylene	0.36	ppb v/v	JB	U	BL1	N

Notes:

REG: regular

SDG: sample delivery group

GRO: gasoline range organics reported as TPH (as Gasoline)

ppb v/v: parts per billion volume/volume

J: the concentration is an approximate value

SURH: surrogate recovery above upper acceptance limit

B: compound was found in the laboratory method blank and sample

U: non-detect

UJ: the analyte was analyzed for, but was not detected and the reported quantitation limit is approximate

BL1: result less than some multiple of that found in laboratory method blank

Y: analyte detected N: analyte not detected

# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-73288-2

FROM: Dilip Kumar Former Unocal

DATE: March 30, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

#### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-73288-2 for 1 water sample, 1 field duplicate and 1 trip blank collected on December 01, 2017. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

#### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

#### **Data Completeness**

The SDG 580-73288-2 contains results for the discharged water sample Outfall 002 and quality control samples (Dup-1 and Trip Blank) recorded in the chain-of-custody documentations (COC). The intermediate treatment water samples results (GWSP series) recorded in the COC are for DPE system operation, monitoring and maintenance purposes and reported under separate cover. Analyses were performed as requested on the COC. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

#### Holding Times and Preservation

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

One of the cPAHs, reported as benzo(a)anthracene was detected at concentration greater than the MDL in method blank MB 580-262722/1-A. The associated sample result was less than five times the blank value, therefore associated sample result was qualified as non-detect (U).

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
Outfall 002	MB	8270C SIM	benzo(a)anthracene	ug/L	0.00551	0.0067	U
DUP-1	MB	8270C SIM	benzo(a)anthracene	ug/L	000551	0.0086	U

Notes:

MB: method blank

SIM: selective ion monitoring

U: non-detect

ug/L: micrograms per liter

Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

#### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

#### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

#### Matrix spike/Matrix spike duplicates

Matrix spikes were prepared in duplicate and analyzed. MS and MSD analysis must exhibit a percent recoveries and relative percent differences within the laboratory's acceptance criteria.

The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where compound concentration detected in the parent sample exceeds the MS/MSD concentration by factor four.

A MS/MSD was performed using sample Outfall 002 and the results were observed within the acceptance criteria besides for two cPAHs, benzo[a]anthracene and benzo[a]pyrene. The MSD recovery results for cPAHs were observed with a range of 3%-4% recovery low bias compared to the acceptance criteria. The associated non-detected parent sample and duplicate sample results for benzo[a]pyrene were qualified as "UJ" and "J" respectively. Benzo[a]anthracene parent sample and duplicate sample results were qualified for blank contamination as "U"; therefore, not changed as UJ.

Samples associated with MS/MSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	MS Recovery	MSD Recovery	RPD	Validation Qualifier	Laboratory Limit
Outfall 002	Benzo[a]anthracene	73	68	7	U	71-120
Outfall 002	Benzo[a]pyrene	80	72	11	UJ	76-120

Notes:

U: non-detect

UJ: the analyte was analyzed for, but was not detected and the reported quantitation limit is approximate Field Duplicates

Field duplicates were collected for SDG 580-73288-2 and all precision criteria were met.

Duplicate sample ID and Parent field sample ID were updated in the following table:

Duplicate Sample ID	Field Sample ID
DUP-1	Outfall 002

# **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-73288-2.

#### **CONCLUSION**

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was
  acceptable. Two MSD exhibited low recoveries by the range of 3%-4% therefore results were qualified as
  estimated and the data is considered as valid. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time. One of the cPAHs, reported as benzo(a)anthracene was detected in the associated laboratory method blank; this laboratory method blank detects resulted in associated samples detected data qualified as non-detects. The trip blank was free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.

Completeness is a measure of the number of valid measurements obtained in relation to the total number
of measurements planned. Completeness is expressed as the percentage of valid or usable
measurements compared to planned measurements. Valid data are defined as all data that are not
rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

# **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

#### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall 002	580-73288-7	12/01/2017	12:00	Regular
DUP-1	580-73288-8	12/01/2017	NA	Field Duplicate
Trip Blank	580-73288-9	12/01/2017	NA	Trip Blank

Note: NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
580-73288-7	Outfall 002	REG	580-73288-2	8270C SIM	benzo[a]anthracene	0.0067	ug/L	JBF1	U	BL1, MSDL	N
580-73288-8	DUP-1	FD	580-73288-2	8270C SIM	benzo[a]anthracene	0.0086	ug/L	JВ	U	BL1, MSDL	N
580-73288-7	Outfall 002	REG	580-73288-2	8270C SIM	benzo[a]pyrene	0.020 U	ug/L	F1	UJ	MSDL	N
580-73288-8	DUP-1	FD	580-73288-2	8270C SIM	benzo[a]pyrene	0.0058	ug/L	J	J	MSDL	Y

Notes:

REG: regular

SDG: sample delivery group SIM: selective ion monitoring

J: the concentration is an approximate value

B: compound was found in the laboratory method blank and sample

U: non-detect

F1: MS and/or MSD Recovery is outside acceptance limits

UJ: the analyte was analyzed for, but was not detected and the reported quantitation limit is approximate

BL1: result less than some multiple of that found in laboratory method blank

MSDL: MSD recovery was below the lower control limit

ug/L: micrograms per liter
N: analyte not detected
Y: analyte detected

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Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Lab Sample ID: 580-73288-7

Client Sample ID: Outfall 002 Date Collected: 12/01/17 12:00

Matrix: Water

Date Received: 12/01/17 13:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/04/17 20:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123					12/04/17 20:03	1
Toluene-d8 (Surr)	97		79 - 122					12/04/17 20:03	1
4-Bromofluorobenzene (Surr)	91		78 - 119					12/04/17 20:03	1
Dibromofluoromethane (Surr)	104		70 - 120					12/04/17 20:03	1
1,2-Dichloroethane-d4 (Surr)	114		70 - 120					12/04/17 20:03	1

Method: 8270C SIM - Sen	nivolatile Organi	c Com <sub>l</sub>	poun	ds (GC/MS	SIM)					
Analyte	Result	Qualifie	r	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0067	JBF1	U	0.020	0.0020	ug/L		12/04/17 09:07	12/07/17 03:23	1
Chrysene	ND			0.020	0.0060	ug/L		12/04/17 09:07	12/07/17 03:23	1
Benzo[b]fluoranthene	ND			0.020	0.0081	ug/L		12/04/17 09:07	12/07/17 03:23	1
Benzo[k]fluoranthene	ND			0.030	0.0091	ug/L		12/04/17 09:07	12/07/17 03:23	1
Benzo[a]pyrene	ND	F1	UJ	0.020	0.0030	ug/L		12/04/17 09:07	12/07/17 03:23	1
Indeno[1,2,3-cd]pyrene	ND			0.020	0.0071	ug/L		12/04/17 09:07	12/07/17 03:23	1
Dibenz(a,h)anthracene	ND			0.020	0.0020	ug/L		12/04/17 09:07	12/07/17 03:23	1
Surrogate	%Recovery	Qualifie	er	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	70			53 - 112				12/04/17 09:07	12/07/17 03:23	1

Method: NWTPH-Gx - Northw	est - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			12/05/17 19:52	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		58 - 133			•		12/05/17 19:52	1

Method. NWTPH-DX - Northwe	est - Seiiii-v	Claule Peu	oleulli Prou	นษเร (ษั	<b>~)</b>				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.024	J	0.10	0.019	mg/L		12/04/17 14:02	12/05/17 18:44	1
Motor Oil (>C24-C36)	ND	E2	0.25	0.078	mg/L		12/04/17 14:02	12/05/17 18:44	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	63		50 - 150				12/04/17 14:02	12/05/17 18:44	

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Lab Sample ID: 580-73288-8

**Client Sample ID: DUP-1** Date Collected: 12/01/17 00:01 **Matrix: Water** 

Date Received: 12/01/17 13:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/04/17 21:17	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	97		74 - 123			•		12/04/17 21:17	1
Toluene-d8 (Surr)	98		79 - 122					12/04/17 21:17	1
4-Bromofluorobenzene (Surr)	83		78 - 119					12/04/17 21:17	1
Dibromofluoromethane (Surr)	104		70 - 120					12/04/17 21:17	1
1,2-Dichloroethane-d4 (Surr)	114		70 - 120					12/04/17 21:17	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0086	<del>JB</del> U	0.020	0.0020	ug/L		12/04/17 09:07	12/07/17 04:29	1
Chrysene	ND		0.020	0.0061	ug/L		12/04/17 09:07	12/07/17 04:29	1
Benzo[b]fluoranthene	ND		0.020	0.0081	ug/L		12/04/17 09:07	12/07/17 04:29	1
Benzo[k]fluoranthene	ND		0.030	0.0091	ug/L		12/04/17 09:07	12/07/17 04:29	1
Benzo[a]pyrene	0.0058	J J	0.020	0.0030	ug/L		12/04/17 09:07	12/07/17 04:29	1
Indeno[1,2,3-cd]pyrene	ND		0.020	0.0071	ug/L		12/04/17 09:07	12/07/17 04:29	1
Dibenz(a,h)anthracene	0.0055	J	0.020	0.0020	ug/L		12/04/17 09:07	12/07/17 04:29	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	61		53 - 112				12/04/17 09:07	12/07/17 04:29	1

Method: NWTPH-Gx - Northw	est - Volatile	Petroleur	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			12/05/17 22:31	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		58 - 133					12/05/17 22:31	1

Method. NWTPH-DX - Northw	est - Seiiii-v	Olathe Peti	oleulli Prou	นษเร (ษา	(د				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.027	J	0.10	0.019	mg/L		12/04/17 14:02	12/05/17 20:12	1
Motor Oil (>C24-C36)	ND		0.25	0.078	mg/L		12/04/17 14:02	12/05/17 20:12	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	72		50 - 150				12/04/17 14:02	12/05/17 20:12	

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73288-2

Lab Sample ID: 580-73288-9

**Matrix: Water** 

Client Sample ID: Trip Blank Date Collected: 12/01/17 00:01

Date Received: 12/01/17 13:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/04/17 16:19	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	99		74 - 123			•		12/04/17 16:19	1
Toluene-d8 (Surr)	98		79 - 122					12/04/17 16:19	1
4-Bromofluorobenzene (Surr)	89		78 - 119					12/04/17 16:19	1
Dibromofluoromethane (Surr)	104		70 - 120					12/04/17 16:19	1
1,2-Dichloroethane-d4 (Surr)	112		70 - 120					12/04/17 16:19	1

Analyte	hwest - Volatile Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			12/05/17 16:40	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		58 - 133			=		12/05/17 16:40	1
Trifluorotoluene (Surr)	107		77 - 128					12/05/17 16:40	

TestAmerica Seattle

# Data Validation Memorandum

TO: Ophélie Encelle SDG: 580-73407-1

FROM: Dilip Kumar Former Unocal

DATE: March 16, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

# INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-73407-1 for 1 water sample and 1 trip blank collected on December 05, 2017. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

## DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water Samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

## **Data Completeness**

Water sample analyses were performed as requested on COC. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

## **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

## Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

One of the cPAHs, reported as benzo(k)fluoranthene, was detected at concentration greater than the MDL in method blank MB 580-263163/1-A. The associated sample result was non-detect, therefore not qualified.

Five of the cPAHs, reported as benzo[a]anthracene, chrysene, benzo[a]pyrene, indeno[1,2,3-cd]pyrene and dibenz(a,h)anthracene were detected at concentration greater than the MDL in method blank MB 580-

263163/1-A. The associated sample results were less than five times the blank value, therefore associated sample results were qualified as non-detect (U).

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
Outfall #002	MB	8270C SIM	Benzo[a]anthracene	ug/L	0.00660	0.0090	U
Outfall #002	MB	8270C SIM	Chrysene	ug/L	0.00715	0.0079	U
Outfall #002	MB	8270C SIM	Benzo[a]pyrene	ug/L	0.00606	0.0089	U
Outfall #002	MB	8270C SIM	Indeno[1,2,3-cd]pyrene	ug/L	0.00833	0.0078	U
Outfall #002	MB	8270C SIM	Dibenz(a,h)anthracene	ug/L	0.00783	0.0083	U

Notes:

MB: method blank

SIM: Selective Ion Monitoring ug/L: microgram per liter

U: non-detect

Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

# **Deuterated Monitoring Compounds (Surrogates)**

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

## Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria except one of the cPAHs, reported as benzo[a]pyrene exhibit LCSD recovery 3% greater than upper control limit; however, benzo[a]pyrene was qualified for laboratory blank detect as U., So no qualification is required.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
Outfall-120517	Benzo[a]pyrene	116	123	6	C

## Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-73407-1.

### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-73407-1.

## **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-73407-1.

# **CONCLUSION**

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. cPAHs, reported as benzo[a]anthracene,
  chrysene, benzo[a]pyrene, indeno[1,2,3-cd]pyrene and dibenz(a,h)anthracene were detected in the
  associated laboratory method blank; this laboratory method blank detects resulted in associated samples
  detected data qualified as non-detect. The trip blank was free of contamination with no qualification
  required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

# **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

# **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall-120517	580-73407-1	12/05/2017	15:30	Regular
Trip Blank	580-73407-2	12/05/2017	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag	
580-73407-1	Outfall-120517	REG	580-73407-1	8270C SIM	Benzo[a]anthracene	0.0090	ug/L	JВ	U	BL1	N	
580-73407-1	Outfall-120517	REG	580-73407-1	8270C SIM	Chrysene	0.0079	ug/L	JB	U	BL1	N	
580-73407-1	Outfall-120517	REG	580-73407-1	8270C SIM	Benzo[a]pyrene	0.0089	ug/L	J * B	U	BL1	N	
580-73407-1	Outfall-120517	REG	580-73407-1	8270C SIM	Indeno[1,2,3-cd]pyrene	0.0078	ug/L	JВ	U	BL1	N	
580-73407-1	Outfall-120517	REG	580-73407-1	8270C SIM	Dibenz(a,h)anthracene	0.0083	ug/L	JB	U	BL1	N	

Notes:

REG: regular

SDG: sample delivery group SIM: Selective Ion Monitoring ug/L: microgram per liter

J: the concentration is an approximate value

B: compound was found in the laboratory method blank and sample

U: non-detect

BL1: result less than some multiple of that found in laboratory method blank

N: analyte not detected

\*: LCS or LCSD is outside acceptance limits.



TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

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Short Hold

Chain of Custody Record

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# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73407-1

Lab Sample ID: 580-73407-1

**Matrix: Water** 

Client Sample ID: Outfall-120517
Date Collected: 12/05/17 15:30
Date Received: 12/06/17 11:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/09/17 21:37	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123					12/09/17 21:37	1
Toluene-d8 (Surr)	104		79 - 122					12/09/17 21:37	1
4-Bromofluorobenzene (Surr)	102		78 - 119					12/09/17 21:37	1
Dibromofluoromethane (Surr)	102		70 - 120					12/09/17 21:37	1
1,2-Dichloroethane-d4 (Surr)	98		70 - 120					12/09/17 21:37	1

Method: 8270C SIM - Sem	_		•		11:4	_	Duna and	A a b a al	Dil Faa
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0090	JB II	0.020	0.0020	ug/L		12/11/17 09:32	12/13/17 11:58	1
Chrysene	0.0079	JB (j	0.020	0.0061	ug/L		12/11/17 09:32	12/13/17 11:58	1
Benzo[b]fluoranthene	0.0098	J	0.020	0.0081	ug/L		12/11/17 09:32	12/13/17 11:58	1
Benzo[k]fluoranthene	ND		0.031	0.0092	ug/L		12/11/17 09:32	12/13/17 11:58	1
Benzo[a]pyrene	0.0089	J*B []	0.020	0.0031	ug/L		12/11/17 09:32	12/13/17 11:58	1
Indeno[1,2,3-cd]pyrene	0.0078	JB ()	0.020	0.0071	ug/L		12/11/17 09:32	12/13/17 11:58	1
Dibenz(a,h)anthracene	0.0083	₽B Ŭ	0.020	0.0020	ug/L		12/11/17 09:32	12/13/17 11:58	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	60		53 - 112				12/11/17 09:32	12/13/17 11:58	1

Method: NWTPH-Gx - Northw	est - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			12/09/17 03:04	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		58 - 133					12/09/17 03:04	1

Method: NWTPH-DX - Northwo	est - Semi-v	olatile Petr	oleum Prod	ucts (G	<b>-</b> )				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.024	J	0.10	0.019	mg/L		12/07/17 09:33	12/09/17 03:11	1
Motor Oil (>C24-C36)	ND		0.25	0.078	mg/L		12/07/17 09:33	12/09/17 03:11	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	73		50 - 150				12/07/17 09:33	12/09/17 03:11	1

12/13/2017

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73407-1

Lab Sample ID: 580-73407-2

Matrix: Water

Client Sample ID: Trip Blank Date Collected: 12/05/17 15:30 Date Received: 12/06/17 11:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/09/17 15:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123					12/09/17 15:54	1
Toluene-d8 (Surr)	103		79 - 122					12/09/17 15:54	1
4-Bromofluorobenzene (Surr)	100		78 - 119					12/09/17 15:54	1
Dibromofluoromethane (Surr)	102		70 - 120					12/09/17 15:54	1
1,2-Dichloroethane-d4 (Surr)	98		70 - 120					12/09/17 15:54	1

Method: NWTPH-Gx - North	nwest - Volatile	Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			12/12/17 13:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		58 - 133			=		12/12/17 13:48	1
Trifluorotoluene (Surr)	97		77 - 128					12/12/17 13:48	1

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# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-73617-1

FROM: Dilip Kumar Former Unocal

DATE: March 13, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

# INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1<sup>st</sup>, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-73617-1 for 2 air samples collected on December 14, 2017. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the requirement of the Compliance Monitoring Plan (CMP), which is provided as Appendix B of the Draft Cleanup Action Plan (CAP) submitted to Ecology on July 31, 2017 (Arcadis 2017). Air samples are collected monthly from the pre-treatment and post-treatment effluent stack and samples are analyzed for the following compounds:

- Benzene, toluene, ethylbenzene, xylenes, (BTEX collectively)
- Gasoline range organics (GRO)
- Fixed Gases (carbon dioxide, oxygen and methane)

# **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data.

The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)

- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Air samples were analyzed for BTEX and GRO (USEPA method TO-15) and Fixed Gases in air (ASTM method D1946).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

## **Data Completeness**

The SDG 580-73617-1 contains results for the air samples recorded in the chain-of-custody documentations (COC). The water sample results recorded in the COC are reported under separate cover in the SDG 580-73617-2. Air sample analyses were performed as requested on COC. The laboratory reported all requested air sample analyses and the deliverable data reports were complete.

## **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks are prepared to identify any contamination which may have been introduced into the samples.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

No detections were observed in the laboratory method blanks therefore no samples contamination is suspected during laboratory analysis and results are meeting QA requirements.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

# **Deuterated Monitoring Compounds (Surrogates)**

Appropriate numbers of surrogate compounds were spiked into each sample for USEPA method TO-15 analyses. All surrogate compound recoveries were within the laboratory's acceptance criteria except for sample VSP-801, the surrogate recovery for TO-15 analysis was above the upper control limit (37%) and all associated detected sample results were qualified as estimated "J".

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
VSP 801	1,2-Dichloroethane-d4	167	70-130

# Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

#### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-73617-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-73617-1.

#### Laboratory Duplicates

Laboratory duplicate was not performed for SDG 580-73617-1.

# CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. One sample
  results were qualified as estimated for high surrogate recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not

note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time.

- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

## REFERENCES

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

# **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
VSP 801	580-73617-3	12/14/2017	09:35	Regular
VSP 802	580-73617-4	12/14/2017	09:45	Regular

**Table 2: Qualified Results Summary** 

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
580-73617-3	VSP 801	REG	580-73617-1	TO-15	Benzene	2,400	ppb v/v		J	SURH	Υ
580-73617-3	VSP 801	REG	580-73617-1	TO-15	Ethylbenzene	3,600	ppb v/v		J	SURH	Υ
580-73617-3	VSP 801	REG	580-73617-1	TO-15	Toluene	29	ppb v/v		J	SURH	Υ
580-73617-3	VSP 801	REG	580-73617-1	TO-15	m, p-Xylene	2,500	ppb v/v		J	SURH	Υ
580-73617-3	VSP 801	REG	580-73617-1	TO-15	o-Xylene	240	ppb v/v		J	SURH	Υ
580-73617-3	VSP 801	REG	580-73617-1	TO-15	GRO	290,000	ppb v/v		J	SURH	Y

Notes:

REG: regular

SDG: sample delivery group

GRO: gasoline range organics reported as TPH (as Gasoline) ppb v/v: parts per billion volume/volume
J: the concentration is an approximate value

SURH: surrogate recovery above upper acceptance limit

Y: analyte detected

#### TestAmerica Seattle

5755 8th Street East Tacoma, WA 98424

# **Chain of Custody Record**



THE LEADER IN ENVIRONMENTAL TESTING

Phone (253) 922-2310 Fax (253) 922-5047																									
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Non-Hazard Flammable Skin Irritant Pois	on B Unkn	own L F	Radiologica	<u> </u>					Clier			⊃ <sub>Dis</sub>		By I	Lab			Arch.	ive F	or		Moi	nths		
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Allow Allow

Ver: 0/22/2018 (Rev. 1)

Ver; 09/20/2016

Cooler Temperature(s) °C and Other Remarks

TestAmerica

# Chain of Custody Record

**TestAmerica Seattle** 

5755 8th Street East Tacoma, WA 98424	Cha	ain o	iin of Custody Record	tody F	ecor	D				lest <sup>A</sup>	lestAmerica
Phone (253) 922-2310 Fax (253) 922-5047	Campler			M de II	. William	1		Carrier Tracking Note	No(e)	COC No.	
Client Information (Sub Contract Lab)	gambier			Wal	Walker, Elaine M	e M		Carrier Liac	ng No(s).	580-52003.1	
Client Contact Shipping/Receiving	Phone			E-Mail: elaine	ne.walker	@testa	E-Mail: elaine.walker@testamericainc.com	State of Origin: Washington	E E	Page 1 of 1	
Company. TestAmerica Laboratories, Inc.					Accredita	ions Req	Accreditations Required (See note):			Job# 580-73617-1	
Address 880 Riverside Parkway	Due Date Requested: 12/21/2017						Analy	Analysis Requested		Preservation Codes:	1
City West Sacramento	TAT Requested (days):					-				B - NaOH C - Zn Acetate	M - Hexane N - None O - AsNaO2
State, 2.p. CA, 95605					200	p				E - NaHSO4	D - Na2045
Phone 916-373-5600(Tel) 916-372-1059(Fax)	PO#,				(0	400				G - Amchlor H - Ascorbic Acid	S - H2SO4 T - TSP Dodecahvdrate
Email:	WO#					-					
Project Name: Chevron Edmonds Terminal	Project #. 58011413									K-EDTA L-EDA	W - pH 4-5 Z - other (specify)
Site. Chevron Edmonds Terminal	SSOW#.									of con	
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	X	X	7 00	Preservation Code:	×	-					mad definition and the
VSP 801 (580-73617-3)	12/14/17	09:35 Parific		Air		×				-	
VSP 802 (580-73617-4)	12/14/17	09:45		Air		×				-	
		racino								4	
						+					
Note: Since laboratory accreditations are subject to change. TestAmerica Laboratores, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This samples shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/lessta/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratories 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.	Laboratorres, inc. places the ow ysis/lests/matrix being analyzed e current to date, return the sign.	nership of m the sample ed Chain of	ethod, analyte s must be ship Custody attest	& accreditations & accr	on compliar ie TestAme inplicance to	ce upon o	out subcontract lab atory or other instru erica Laboratories,	oratories This sample s octions will be provided inc.	nipment is forwarded in Any changes to accre	under chain-of-custody. ditation status should be	If the laboratory does not s brought to TestAmerica
Possible Hazard Identification					San	ple Dis	sposal (A fee	Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)	samples are re	ained longer than	1 month)
Unconfirmed					1	Retui	Return To Client	Disposal By Lab		Archive For	Months
Deliverable Requested: I, II, III, IV, Other (specify)	Primary Deliverable	le Rank: 2			Spe	cial Inst	Special Instructions/QC Requirements	equirements:			
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Custody Seals Intact: A Yes A No

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-1

Lab Sample ID: 580-73617-3

Matrix: Air

Date Collected: 12/14/17 09:35 Date Received: 12/14/17 15:40

**Client Sample ID: VSP 801** 

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	2400	J	25	5.0	ppb v/v			12/21/17 17:22	62.9
Ethylbenzene	3600	Ĵ	25	4.0	ppb v/v			12/21/17 17:22	62.9
Toluene	29	J	25	3.2	ppb v/v			12/21/17 17:22	62.9
m,p-Xylene	2500	J	50	6.3	ppb v/v			12/21/17 17:22	62.9
o-Xylene	240	Ĵ	25	3.4	ppb v/v			12/21/17 17:22	62.9
TPH (as Gasoline)	290000	Ĵ	6300	2500	ppb v/v			12/21/17 17:22	62.9
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	105		70 - 130			-		12/21/17 17:22	62.9
1,2-Dichloroethane-d4 (Surr)	167	Χ	70 - 130					12/21/17 17:22	62.9
Toluene-d8 (Surr)	100		70 - 130					12/21/17 17:22	62.9

_ Method: D1946 - Fixed Gas	ses in Air (GC)							
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.34 J	0.77	0.016	% v/v			12/18/17 11:49	1.54
Methane (FID)	0.0072	0.00015	0.000031	% v/v			12/19/17 10:27	1.54
Oxygen	19	0.31	0.011	% v/v			12/18/17 11:49	1.54

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# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-1

Lab Sample ID: 580-73617-4

Matrix: Air

Date Collected: 12/14/17 09:45 Date Received: 12/14/17 15:40

Client Sample ID: VSP 802

Sample Container: Summa Canister 1L

Method: D1946 - Fixed Gases in Air (GC)

Analyte

**O**xygen

Methane (FID)

Carbon Dioxide (TCD)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	2.0		0.40	0.079	ppb v/v			12/21/17 18:13	1
Ethylbenzene	11		0.40	0.063	ppb v/v			12/21/17 18:13	1
Toluene	1.5		0.40	0.051	ppb v/v			12/21/17 18:13	1
m,p-Xylene	12		0.80	0.10	ppb v/v			12/21/17 18:13	1
o-Xylene	1.8		0.40	0.054	ppb v/v			12/21/17 18:13	1
TPH (as Gasoline)	570		100	40	ppb v/v			12/21/17 18:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)			70 - 130			-		12/21/17 18:13	1
1,2-Dichloroethane-d4 (Surr)	108		70 - 130					12/21/17 18:13	1
Toluene-d8 (Surr)	101		70 - 130					12/21/17 18:13	1

RL

0.77

0.31

0.00015

MDL Unit

0.016 % v/v

0.011 % v/v

0.000031 % v/v

D

Prepared

Analyzed

12/18/17 12:02

12/19/17 10:46

12/18/17 12:02

Result Qualifier

0.57 J

18

0.0061

TestAmerica Seattle

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1.53

# Data Validation Memorandum

TO: Ophélie Encelle SDG: 580-73617-2

FROM: Dilip Kumar Former Unocal

DATE: March 13, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

# INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1<sup>st</sup>, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-73617-2 for 1 water sample and 1 trip blank collected on December 14, 2017. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

## DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water Samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270D SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

## **Data Completeness**

The SDG 580-73617-2 contains results for the water samples recorded in the chain-of-custody documentations (COC). The air sample results recorded in the COC are reported under separate cover in the SDG 580-73617-1. Water sample analyses were performed as requested on COC. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

## **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### Blanks

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Two of the cPAHs, reported as Dibenz(a,h)anthracene and Indeno[1,2,3-cd]pyrene were detected at concentration greater than the MDL in method blank MB 580-263608/1-A. The associated sample results

were less than five times the blank value, therefore associated sample results were qualified as non-detect (U).

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
Outfall #002	MB	8270D SIM	Dibenz(a,h)anthracene	ug/L	0.00486	0.0078	U
Outfall #002	MB	8270D SIM	Indeno[1,2,3-cd]pyrene	ug/L	0.00727	0.0080	U

Notes:

MB: method blank U: non-detect

SIM: Selective Ion Monitoring

Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270D SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria except.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

# Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

# Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-73617-2.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-73617-2.

#### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-73617-2.

# **CONCLUSION**

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time. cPAHs, reported as Dibenz(a,h)anthracene and Indeno[1,2,3-cd]pyrene were detected in the associated laboratory method blank; this laboratory method blank detects resulted in associated samples detected data qualified as non-detect. The trip blank was free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

## **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

# **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-73617-1	12/14/2017	09:00	Regular
Trip Blank - 2	580-73617-2	12/14/2017	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
580-73617-1	Outfall #002	REG	580-73617-2	8270D SIM	Dibenz(a,h)anthracene	0.0078	ug/L	JВ	U	BL1	N
580-73617-1	Outfall #002	REG	580-73617-2	8270D SIM	Indeno[1,2,3-cd]pyrene	0.0080	ug/L	JB	U	BL1	N

Notes:

REG: regular

SDG: sample delivery group SIM: Selective Ion Monitoring

J: the concentration is an approximate value
B: compound was found in the laboratory method blank and sample

U: non-detect

BL1: result less than some multiple of that found in laboratory method blank

N: analyte not detected

#### TestAmerica Seattle

5755 8th Street East Tacoma, WA 98424

# **Chain of Custody Record**



THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Evill	Krizge	esc.	Lab Wa	РМ: ker, El	aine N	1					Carrier	Trackin	g No(s)	C		COC No: 580-27035-	3908.1
Client Contact: Jason Little	Phone: 303-	519-	+192	E-M ela	ail: ne.wall	ker@t	estan	nerica	inc.co	om		1					Page: Page 1 of 1	
Company:		<u> </u>			T						- Roc	quest	ed.				Job #:	73617
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City: Seattle	- Fivedays																C - Zn Acetate	
State, Zip: WA, 98101	71000-4	•								100	, 6						D - Nitric Acid E - NaHSO4	P - Na2O4S Q - Na2SO3
Phone:	PO#:				11				r	- 15				ĺ			F - MeOH G - Amchlor	R - Na2S2O3 S - H2SO4
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Sample Identification	Sample Date	Time		BT=Tissue, A=Air	Secretary Vision	7 開発機	Ž A	Δ	3   -	, ,	, 17					╮	Speci	al Instructions/Note:
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Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Client Sample ID: Outfall #002

Date Collected: 12/14/17 09:00 Date Received: 12/14/17 15:40 Lab Sample ID: 580-73617-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/15/17 19:37	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	103		74 - 123					12/15/17 19:37	1
Toluene-d8 (Surr)	97		79 - 122					12/15/17 19:37	1
4-Bromofluorobenzene (Surr)	103		78 - 119					12/15/17 19:37	1
Dibromofluoromethane (Surr)	103		70 - 120					12/15/17 19:37	1
1,2-Dichloroethane-d4 (Surr)	102		70 - 120					12/15/17 19:37	1

Method: 8270D SIM - Sem Analyte		Qualifier	RL	•	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0039	J	0.021	0.0021	ug/L		12/18/17 09:31	12/18/17 15:32	1
Benzo[a]pyrene	0.0062	J	0.021	0.0031	ug/L		12/18/17 09:31	12/18/17 15:32	1
Benzo[b]fluoranthene	ND		0.021	0.0083	ug/L		12/18/17 09:31	12/18/17 15:32	1
Benzo[k]fluoranthene	ND		0.031	0.0093	ug/L		12/18/17 09:31	12/18/17 15:32	1
Chrysene	ND		0.021	0.0062	ug/L		12/18/17 09:31	12/18/17 15:32	1
Dibenz(a,h)anthracene	0.0078	JB []	0.021	0.0021	ug/L		12/18/17 09:31	12/18/17 15:32	1
Indeno[1,2,3-cd]pyrene	0.0080	Դ <del>B</del> Ŭ	0.021	0.0072	ug/L		12/18/17 09:31	12/18/17 15:32	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	74		53 - 112				12/18/17 09:31	12/18/17 15:32	1

Method: NWTPH-Gx - Northw	est - Volatile	e Petroleui	m Products	(GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			12/15/17 17:51	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		<del>58 - 133</del>					12/15/17 17:51	1

wethod: NWTPH-DX - Northw	est - Semi-v	olatile Peti	roleum Prod	ucts (G	J)				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.028	J	0.10	0.020	mg/L		12/19/17 14:12	12/19/17 22:27	1
Motor Oil (>C24-C36)	ND		0.26	0.081	mg/L		12/19/17 14:12	12/19/17 22:27	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	75		50 - 150				12/19/17 14:12	12/19/17 22:27	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73617-2

Lab Sample ID: 580-73617-2

**Matrix: Water** 

Client Sample ID: Trip Blank - 2 Date Collected: 12/14/17 00:01

Date Received: 12/14/17 15:40

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/15/17 19:12	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	99		74 - 123					12/15/17 19:12	1
Toluene-d8 (Surr)	97		79 - 122					12/15/17 19:12	1
4-Bromofluorobenzene (Surr)	101		78 - 119					12/15/17 19:12	1
Dibromofluoromethane (Surr)	104		70 - 120					12/15/17 19:12	1
1,2-Dichloroethane-d4 (Surr)	102		70 - 120					12/15/17 19:12	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			12/15/17 17:19	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		58 - 133			-		12/15/17 17:19	1
, ,									

1/22/2018

# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-73804-1

FROM: Dilip Kumar Former Unocal

DATE: March 14, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-73804-1 for 2 air samples collected on December 20, 2017. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the requirement of the Compliance Monitoring Plan (CMP), which is provided as Appendix B of the Draft Cleanup Action Plan (CAP) submitted to Ecology on July 31, 2017 (Arcadis 2017). Air samples are collected monthly from the pre-treatment and post-treatment effluent stack and samples are analyzed for the following compounds:

- Benzene, toluene, ethylbenzene, xylenes, (BTEX collectively)
- Gasoline range organics (GRO)
- Fixed Gases (carbon dioxide, oxygen and methane)

## **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data.

The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)

- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Air samples were analyzed for BTEX and GRO (USEPA method TO-15) and Fixed Gases in air (ASTM method D1946).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

## **Data Completeness**

The SDG 580-73804-1 contains results for the air samples recorded in the chain-of-custody documentations (COC). The water sample results recorded in the COC are reported under separate cover in the SDG 580-73804-2. Air sample analyses were performed as requested on COC. The laboratory reported all requested air sample analyses and the deliverable data reports were complete.

## **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks are prepared to identify any contamination which may have been introduced into the samples.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

No detections were observed in the laboratory method blanks therefore no samples contamination is suspected during laboratory analysis and results are meeting QA requirements.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

## **Deuterated Monitoring Compounds (Surrogates)**

Appropriate numbers of surrogate compounds were spiked into each sample for USEPA method TO-15 analyses. All surrogate compound recoveries were within the laboratory's acceptance criteria except for sample VSP-801, the surrogate recovery for TO-15 analysis was above the upper control limit (4%) and all associated detected sample results were qualified as estimated "J".

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
VSP 801	1,2-Dichloroethane-d4	134	70-130

## Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

#### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-73804-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-73804-1.

#### Laboratory Duplicates

Laboratory duplicate was not performed for SDG 580-73804-1.

## CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. One sample
  results were qualified as estimated for high surrogate recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not

note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time.

- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

## REFERENCES

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

## **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

Table 1: Sample Summary

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
VSP-801	580-73804-3	12/20/2017	16:30	Regular
VSP-802	580-73804-4	12/20/2017	16:45	Regular

**Table 2: Qualified Results Summary** 

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
580-73804-3	VSP-801	REG	580-73804-1	TO-15	Benzene	910	ppb v/v		J	SURH	Υ
580-73804-3	VSP-801	REG	580-73804-1	TO-15	Ethylbenzene	2,500	ppb v/v		J	SURH	Υ
580-73804-3	VSP-801	REG	580-73804-1	TO-15	Toluene	13	ppb v/v		J	SURH	Υ
580-73804-3	VSP-801	REG	580-73804-1	TO-15	m, p-Xylene	1,600	ppb v/v		J	SURH	Υ
580-73804-3	VSP-801	REG	580-73804-1	TO-15	o-Xylene	160	ppb v/v		J	SURH	Υ
580-73804-3	VSP-801	REG	580-73804-1	TO-15	GRO	160,000	ppb v/v		J	SURH	Υ

Notes:

REG: regular

SDG: sample delivery group

GRO: gasoline range organics reported as TPH (as Gasoline) ppb v/v: parts per billion volume/volume
J: the concentration is an approximate value

SURH: surrogate recovery above upper acceptance limit

Y: analyte detected

**TestAmerica Seattle** 

5755 8th Street East

Loc: 580 73804

## **Chain of Custody Record**



Tacoma, WA 98424 Phone (253) 922-2310 Fax (253) 922-5047 THE LEADER IN ENVIRONMENTAL TESTING Sampler: Bric Voucger Carrier Tracking No(s): COC No: Client Information Walker, Elaine M 580-27035-8908.1 Client Contact: 363-519-7192 E-Mail: Jason Little elaine.walker@testamericainc.com Page 1 of 1 Company: ARCADIS U.S. Inc. Analysis Requested Address: Due Date Requested: Preservation Codes: 19-15 1100 Olive Way Suite 800 A - HCL M - Hexane City: TAT Requested (days): B - NaOH N - None Seattle Ç 5 days C - Zn Acetate O - AsNaO2 State, Zip: D - Nitric Acid P - Na2O4S WA. 98101 Ö E - NaHSO4 Q - Na2SQ3 624 Phone: F - MeOH R - Na2S2O3 Metterp G - Amchior 206-726-4720(Tel) B0045362.0010 S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate NWTPH\_Dx - Northwest - DRO/RRO W0#: EA. U - Acetone t-lce Jason.Little@arcadis.com 0015254061 J - DI Water V - MCAA K - EDTA W - pH 4-5 Project #: Chevron Edmonds Terminal 1 - FDA Z - other (specify) 58011413 Benzeneby 7PPI gasolne 22 SSOW#: Other: 624\_5ml, NWTPH\_Gx Washington Matrix Sample Type S≂solid, O≃waste/oji, Sample (C=comp. 87 Sample Identification Sample Date Time G=grab) BT=Yissue, A=Ai Special Instructions/Note: Preservation Code: Outfall #002 600 Water Trìo blank 6 Water Water 108-92V 12/20/17 1630 6 air  $|\times|$ × VSP-802 12/20/17 645 dir Therm. ID A Cor S. 2 Under Cooler Dsc Swill @Lab 1325 Wet Packs Packing Will L Custody Seal: Yes Note Possible Hazard Identification Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month) Non-Hazard Flammable Skin Irritant Poison B Unknown Radiological Return To Client Disposal By Lab Archive For Deliverable Requested: I, II, III, IV, Other (specify) Special Instructions/QC Requirements: Empty Kit Relinquished by: Date: Method of Shipment Time: Refinquished by: Company Relinquished by: Company Relinquished by: Date/Time: Company Received by: Date/Time: Company Custody Seals Intact: Custody Seal No.: Cooler Temperature(s) °C and Other Remarks: Δ Yes Δ No

TestAmerica Seattle			Toch Amorio
5755 8th Street East Tacoma, WA 98424	Chain of Custody Record		
Phone (253) 922-2310 Fax (253) 922-5047			THE LEADER IN ENVIRONMENTAL TESTING
	Sampler Lab PM:	Carrier Tracking No(s):	COC No:

Phone   Phon	Title Walker (Nos or No)  Rield Filtered Sample (Yes or No)  Reduint MSMASD (Yes or No)  Reduinted (Restanced (NoD) MBTEX Only)  X X TO15/Air_Pass_Can (MOD) MBTEX Only  X X TO15/Air_PassCan_14D  X X General Management (Not of the stance of	Analysis Requested  Analys	1 of 1  Vation Codes:  Nonne None Acetate O-AsNaO2 Ic Acid P. Na2CO4S SSO4 O-Na2CO3 OH R. Na2S2O3 OH R. Na2S2O3 OH R. Na2S2O3 Chilor T. TSP Dodecahydrate U. Acetane U. Acetane V. MCAA TA W. PH 4-5 A Z. other (specify)
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Matrix   14/2018   14/20	Field Filtered Sample (Yes or No)  Perform MS/MS/D (Yes or No)  Perform MS/MS/D (Yes or No)  X X D1946/Nr_Pass_Can (MOD) MBTEX Only  A X D1946/Nr_PassG_n (MOD) MBTEX Only	Programmers And Mumber of containers And Andrews Andre	
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Sample Identification - Client ID (Lab ID)  Sample Date Time G=grab) In-rises. Ann. L. D. Clecomp.  VSP-802 (580-73804-4)  Note: Since laboratory accreditations are subject to change. TestAmerica Laboratories, inc. places the ownership of method, analyte & accreditation compliance. Laboratories, inc. attention immediately. If all requested accreditations are cultum to date, return the signed Chain of Custody attesting to said compliance.	boretil Fliteld Fliteld Man Man Man Man Man Man Man Man Man Man		ial Instructions/Note:
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## **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-1

Lab Sample ID: 580-73804-3

Matrix: Air

Date Collected: 12/20/17 16:30 Date Received: 12/21/17 13:55

**Client Sample ID: VSP-801** 

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile O	•	unds in Ar Qualifier	nbient Air RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	910		6.2	1.2	ppb v/v			12/27/17 21:56	15.6
Toluene	13	J	6.2	0.80	ppb v/v			12/27/17 21:56	15.6
m,p-Xylene	1600	Ĵ	12	1.6	ppb v/v			12/27/17 21:56	15.6
o-Xylene	160	<del>0</del>	6.2	0.84	ppb v/v			12/27/17 21:56	15.6
TPH (as Gasoline)	160000	J	1600	620	ppb v/v			12/27/17 21:56	15.6
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	113		70 - 130					12/27/17 21:56	15.6
1,2-Dichloroethane-d4 (Surr)	134	Χ	70 - 130					12/27/17 21:56	15.6
Toluene-d8 (Surr)	100		70 - 130					12/27/17 21:56	15.6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	2500	-	23	3.7	ppb v/v			12/28/17 09:20	58.5
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		70 - 130			•		12/28/17 09:20	58.5
1,2-Dichloroethane-d4 (Surr)	127		70 - 130					12/28/17 09:20	58.5

Method: D1946 - Fixed Gases	in Air (GC)								
Analyte	Result C	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.32 J	J	0.78	0.017	% v/v			12/26/17 10:09	1.56
Methane (FID)	0.0048		0.00047	0.000094	% v/v			12/28/17 09:28	4.68
Oxygen	19		0.31	0.012	% v/v			12/26/17 10:09	1.56

7

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12

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## **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-1

Lab Sample ID: 580-73804-4

Matrix: Air

Date Collected: 12/20/17 16:45 Date Received: 12/21/17 13:55

**Client Sample ID: VSP-802** 

Sample Container: Summa Canister 1L

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.67		0.40	0.079	ppb v/v			12/27/17 22:47	1
Ethylbenzene	8.2		0.40	0.063	ppb v/v			12/27/17 22:47	1
Toluene	0.60		0.40	0.051	ppb v/v			12/27/17 22:47	1
m,p-Xylene	8.6		0.80	0.10	ppb v/v			12/27/17 22:47	1
o-Xylene	1.2		0.40	0.054	ppb v/v			12/27/17 22:47	1
TPH (as Gasoline)	600		100	40	ppb v/v			12/27/17 22:47	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)			70 - 130			-		12/27/17 22:47	1
1,2-Dichloroethane-d4 (Surr)	99		70 - 130					12/27/17 22:47	1
Toluene-d8 (Surr)	100		70 - 130					12/27/17 22:47	1

Method: D1946 - Fixed Gase	s in Air (GC)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.43	J	0.74	0.016	% v/v			12/26/17 10:21	1.47
Methane (FID)	0.0033		0.00026	0.000052	% v/v			12/28/17 09:49	2.58
Oxygen	19		0.29	0.011	% v/v			12/26/17 10:21	1.47

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# Data Validation Memorandum

TO: Ophélie Encelle SDG: 580-73804-2

FROM: Dilip Kumar Former Unocal

DATE: March 14, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

## INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-73804-2 for 1 water sample and 1 trip blank collected on December 20, 2017. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

## DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water Samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

## **Data Completeness**

The SDG 580-73804-2 contains results for the water samples recorded in the chain-of-custody documentations (COC). The air sample results recorded in the COC are reported under separate cover in the SDG 580-73804-1. Water sample analyses were performed as requested on COC. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

## **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Two of the cPAHs, reported as benzo[a]pyrene and dibenz(a,h)anthracene were detected at concentration greater than the MDL in method blank MB 580-263972/1-A. The associated sample result was non-detect, therefore not qualified.

One of the cPAHs, reported as benzo(a)anthracene was detected at concentration greater than the MDL in method blank MB 580-263972/1-A. The associated sample results were less than five times the blank value, therefore associated sample results were qualified as non-detect (U).

DRO, reported as #2 diesel (C10-C24), was detected at concentration greater than the MDL in method blank MB 580-264046/1-B. The associated sample result was less than five times the blank value, therefore associated sample result was qualified as non-detect (U).

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
Outfall #002	MB	8270C SIM	Benzo(a)anthracene	ug/L	0.00697	0.0038	U
Outfall #002	MB	Ecology NWTPH-Dx	DRO	mg/L	0.0426	0.081	U

Notes:

MB: method blank

SIM: Selective Ion Monitoring

DRO: reported as #2 diesel (C10-C24)

ug/L: microgram per liter mg/L: milligram per liter

U: non-detect Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

#### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria except.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

## Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

## Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-73804-2.

### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-73804-2.

### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-73804-2.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time. cPAHs, reported as benzo(a)anthracene and DRO, reported as #2 diesel (C10-C24) were detected in the associated laboratory method blank; this laboratory method blank detects resulted in associated samples detected data qualified as non-detect. The trip blank was free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### REFERENCES

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

## **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-73804-1	12/20/2017	16:00	Regular
Trip Blank	580-73804-2	12/20/2017	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
580-73804-1	Outfall #002	REG	580-73804-2	8270C SIM	Benzo[a]anthracene	0.0038	ug/L	JВ	U	BL1	N
580-73804-1	Outfall #002	REG	580-73804-2	Ecology NWTPH-Dx	DRO	0.081	mg/L	JВ	U	BL1	N

Notes:

REG: regular

SDG: sample delivery group SIM: selective ion monitoring

DRO: diesel range organics reported as #2 diesel (C10-C24) Ecology: Washington State Department of Ecology

ug/L: microgram per liter mg/L: milligram per liter

J: the concentration is an approximate value

B: compound was found in the laboratory method blank and sample

U: non-detect

BL1: result less than some multiple of that found in laboratory method blank

N: analyte not detected

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**TestAmerica Seattle** 

5755 8th Street East

Loc: 580 **73804** 

## **Chain of Custody Record**



Phone (253) 922-2310 Fax (253) 922-5047														THE LEADER IN	ENVIRONMENTA	L TESTING
Client Information	Sampler:	Loue	ejet		ь РМ: /aiker, Ela	ine M					Carrier Track	ing No(s):		COC No: 580-27035-890	08.1	,
Client Contact: Jason Little	Phone: 303	-519-7	192		Mail: aine.walki	er@te:	stame	ricainc.	com					Page: Page 1 of 1		
Company: ARCADIS U.S. Inc								Ar	nalvs	is Req	uested			Job #:		
ddress: 100 Olive Way Suite 800	Due Date Reques									<u>-</u>				Preservation Co		
city: Seattle tate, Zip: VA, 98101 hone: 106-726-4720(Tel)	PO#: B0045362.001	lays			0)			h29	$\sim$	CEPA-10-15	The state of the s			A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid	M - Hexane N - None O - AsNaO2 P - Na2O45 O - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodeo	ahydrate
mali: ason.Little@arcadis.com roject Name: Chevron Edmonds Terminal ite: Vashington	WO #: 0015254061 Project #: 58011413 SSOW#:				mple (Ves. or A	i 1	hwest - DRO/RRO Gx		4	Salve CongCC	77770	an take	containers	t - łoe J - DI Water K - EDTA t - EDA Other:	U - Acetone V - MCAA W - pH 4-5 Z - other (spec	
sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G≃grab)		(r) [E]	CONTRACTOR AND	NWTPH_Dx - Northwest 624 5ml, NWTPH Gx	Benzenci	875/	Fixe day			Total Number of	Special I	nstructions/N	ote:
Outfall #1002	12/20/17	1600	(5	Water	+	N A	/ <del> </del>	$\langle \nabla  $					+ +	PH=	7.30	
Trip blank			6	Water			X	X							1:-0	
108-921	12/20/17	10.50	73	Water				-							a_	
N21-8,55	12/20/17	1630	6	air		_	-	++		<  X				P10 - 0	172	.4
N.J.		7						+++	7					1710 - 0	<i>J</i> , <i>O</i>	
			5	80-73804	4 Chain c	of Cus	tody					Theri Coole Wer/I	m. ID_er Dsc_Packs	Current Cor Packing Custody Se	S. 2 Unc @Lab\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	bell ps ioA
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Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Client Sample ID: Outfall #002

Date Collected: 12/20/17 16:00 Date Received: 12/21/17 13:55 Lab Sample ID: 580-73804-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/27/17 23:44	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123					12/27/17 23:44	1
Toluene-d8 (Surr)	101		79 - 122					12/27/17 23:44	1
4-Bromofluorobenzene (Surr)	96		78 - 119					12/27/17 23:44	1
Dibromofluoromethane (Surr)	100		70 - 120					12/27/17 23:44	1
1.2-Dichloroethane-d4 (Surr)	103		70 - 120					12/27/17 23:44	1

Method: 8270C SIM - Ser Analyte	_	Qualifier	` RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0038	<del>}</del> ∪	0.021	0.0021	ug/L		12/21/17 14:55	12/26/17 13:42	1
Chrysene	ND		0.021	0.0063	ug/L		12/21/17 14:55	12/26/17 13:42	1
Benzo[b]fluoranthene	ND		0.021	0.0084	ug/L		12/21/17 14:55	12/26/17 13:42	1
Benzo[k]fluoranthene	ND		0.032	0.0095	ug/L		12/21/17 14:55	12/26/17 13:42	1
Benzo[a]pyrene	ND		0.021	0.0032	ug/L		12/21/17 14:55	12/26/17 13:42	1
Indeno[1,2,3-cd]pyrene	ND		0.021	0.0074	ug/L		12/21/17 14:55	12/26/17 13:42	1
Dibenz(a,h)anthracene	ND		0.021	0.0021	ug/L		12/21/17 14:55	12/26/17 13:42	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	78		53 - 112				12/21/17 14:55	12/26/17 13:42	1

Method: NWTPH-Gx - Northw	est - Volatile P	Petroleun	n Products (	GC)					
Analyte	Result Q	ualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			12/23/17 18:24	1
Surrogate	%Recovery Q	ualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		58 - 133					12/23/17 18:24	1
Trifluorotoluene (Surr)	109		77 - 128					12/23/17 18:24	_

Method: NWTPH-Dx - Nor	thwest - Semi-V	olatile Pet	roleum Prod	lucts (G0	C)				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.081	JB U	0.10	0.019	mg/L		12/22/17 13:07	12/26/17 21:54	1
Motor Oil (>C24-C36)	ND		0.26	0.079	mg/L		12/22/17 13:07	12/26/17 21:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	81	<del></del>	50 - 150				12/22/17 13:07	12/26/17 21:54	1
n-Decanoic Acid (Surr)							12/22/17 13:07	12/26/17 21:54	1

## **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-73804-2

Lab Sample ID: 580-73804-2

**Matrix: Water** 

Client Sample ID: Trip Blank Date Collected: 12/20/17 00:01

Date Received: 12/21/17 13:55

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			12/27/17 23:15	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	98		74 - 123			•		12/27/17 23:15	1
Toluene-d8 (Surr)	101		79 - 122					12/27/17 23:15	1
4-Bromofluorobenzene (Surr)	100		78 - 119					12/27/17 23:15	1
Dibromofluoromethane (Surr)	99		70 - 120					12/27/17 23:15	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 120					12/27/17 23:15	1

Method: NWTPH-Gx - North	rwest - Volatile	Petroleu	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			12/23/17 16:49	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	92		58 - 133			=		12/23/17 16:49	1
Trifluorotoluene (Surr)	97		77 - 128					12/23/17 16:49	1

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## **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-73946-1

FROM: Dilip Kumar Former Unocal

DATE: March 21, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-73946-1 for 2 air samples collected on December 28, 2017. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the requirement of the Compliance Monitoring Plan (CMP), which is provided as Appendix B of the Draft Cleanup Action Plan (CAP) submitted to Ecology on July 31, 2017 (Arcadis 2017). Air samples are collected monthly from the pre-treatment and post-treatment effluent stack and samples are analyzed for the following compounds:

- Benzene, toluene, ethylbenzene, xylenes, (BTEX collectively)
- Gasoline range organics (GRO)
- Fixed Gases (carbon dioxide, oxygen and methane)

## **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data.

The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)

- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Air samples were analyzed for BTEX and GRO (USEPA method TO-15) and Fixed Gases in air (ASTM method D1946).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

## **Data Completeness**

The SDG 580-73946-1 contains results for the air samples recorded in the chain-of-custody documentations (COC). The water sample results recorded in the COC are reported under separate cover in the SDG 580-73946-2. Air sample analyses were performed as requested on COC. The laboratory reported all requested air sample analyses and the deliverable data reports were complete.

## **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks are prepared to identify any contamination which may have been introduced into the samples.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

No detections were observed in the laboratory method blanks therefore no samples contamination is suspected during laboratory analysis and results are meeting QA requirements.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

## **Deuterated Monitoring Compounds (Surrogates)**

Appropriate numbers of surrogate compounds were spiked into each sample for USEPA method TO-15 analyses. All surrogate compound recoveries were within the laboratory's acceptance criteria except for sample VSP-801, the surrogate recovery for TO-15 analysis was above the upper control limit (25%) and all associated detected sample results were qualified as estimated "J".

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
VSP-801	1,2-Dichloroethane-d4	165	70-130

## Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

## Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-73946-1.

## Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-73946-1.

## **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-73946-1.

## **CONCLUSION**

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. One sample
  results were qualified as estimated for high surrogate recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not

note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time.

- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

## REFERENCES

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

## **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

Table 1: Sample Summary

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
VSP-801	580-73946-3	12/28/2017	11:20	Regular
VSP-802	580-73946-4	12/28/2017	11:15	Regular

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
580-73946-3	VSP-801	REG	580-73946-1	TO-15	Benzene	480	ppb v/v		J	SURH	Υ
580-73946-3	VSP-801	REG	580-73946-1	TO-15	Ethylbenzene	1,300	ppb v/v	Е	J	SURH	Υ
580-73946-3	VSP-801	REG	580-73946-1	TO-15	Toluene	8.1	ppb v/v		J	SURH	Υ
580-73946-3	VSP-801	REG	580-73946-1	TO-15	m, p-Xylene	1,100	ppb v/v		J	SURH	Υ
580-73946-3	VSP-801	REG	580-73946-1	TO-15	o-Xylene	110	ppb v/v		J	SURH	Υ
580-73946-3	VSP-801	REG	580-73946-1	TO-15	GRO	100,000	ppb v/v		J	SURH	Υ

Notes:

REG: regular

SDG: sample delivery group

GRO: gasoline range organics reported as TPH (as Gasoline) Ecology: Washington State Department of Ecology ppb v/v: parts per billion volume/volume

E: result exceeded calibration range

J: the concentration is an approximate value

SURH: surrogate recovery above upper acceptance limit

Y: analyte detected

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## **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73946-1

Lab Sample ID: 580-73946-3

01/02/18 13:25

Matrix: Air

Date Collected: 12/28/17 11:20 Date Received: 12/28/17 14:55

**Oxygen** 

Client Sample ID: VSP-801

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile O Analyte	•	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	480	J	7.5	1.5	ppb v/v			01/04/18 00:47	18.78
Ethylbenzene	1300	<b>₽</b> J	7.5	1.2	ppb v/v			01/04/18 00:47	18.78
Toluene	8.1	J	7.5	0.96	ppb v/v			01/04/18 00:47	18.78
m,p-Xylene	1100	J	15	1.9	ppb v/v			01/04/18 00:47	18.78
o-Xylene	110	J	7.5	1.0	ppb v/v			01/04/18 00:47	18.78
TPH (as Gasoline)	100000	J	1900	750	ppb v/v			01/04/18 00:47	18.78
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	110		70 - 130					01/04/18 00:47	18.78
1,2-Dichloroethane-d4 (Surr)	165	X	70 - 130					01/04/18 00:47	18.78
Toluene-d8 (Surr)	101		70 - 130					01/04/18 00:47	18.78
Method: D1946 - Fixed Gas	ses in Air (GC)								
Analyte	, ,	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon Dioxide (TCD)	0.39	J	0.73	0.016	% v/v	— - ·		01/02/18 13:25	1.45
Jai DUI DIUXIUE (TCD)	0.55	•	00					o . o=o	

0.29

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## **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

**Client Sample ID: VSP-802** 

TestAmerica Job ID: 580-73946-1

Lab Sample ID: 580-73946-4

01/03/18 09:45

01/02/18 13:40

Matrix: Air

Date Collected: 12/28/17 11:15 Date Received: 12/28/17 14:55

Methane (FID)

**Oxygen** 

Sample Container: Summa Canister 1L

Method: TO-15 - Volatile O	•		nbient Air						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.58		0.40	0.079	ppb v/v			01/04/18 01:38	1
Ethylbenzene	5.7		0.40	0.063	ppb v/v			01/04/18 01:38	1
Toluene	1.4		0.40	0.051	ppb v/v			01/04/18 01:38	1
m,p-Xylene	7.8		0.80	0.10	ppb v/v			01/04/18 01:38	1
o-Xylene	1.5		0.40	0.054	ppb v/v			01/04/18 01:38	1
TPH (as Gasoline)	180		100	40	ppb v/v			01/04/18 01:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	101		70 - 130			-		01/04/18 01:38	1
1,2-Dichloroethane-d4 (Surr)	96		70 - 130					01/04/18 01:38	1
Toluene-d8 (Surr)	104		70 - 130					01/04/18 01:38	1
_									
Method: D1946 - Fixed Gas	ses in Air (GC)								
Method: D1946 - Fixed Gas Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac

0.29

0.000029 % v/v

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TestAmerica Seattle

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## **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-73946-2

FROM: Dilip Kumar Former Unocal

DATE: March 5, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

## INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-73946-2 for 1 water sample and 1 trip blank collected on December 28, 2017. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

## DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water Samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

## **Data Completeness**

The SDG 580-73946-2 contains results for the water samples recorded in the chain-of-custody documentations (COC). The air sample results recorded in the COC are reported under separate cover in the SDG 580-73946-1. Water sample analyses were performed as requested on COC. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

## **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### Blanks

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

One of the cPAHs, reported as benzo[a]anthracene was detected at concentration greater than the MDL in method blank MB 580-264392/1-A. The associated sample result was non-detect, therefore not qualified.

DRO, reported as #2 diesel (C10-C24), was detected at concentration greater than the MDL in method blank MB 580-264464/1-B. The associated sample result was less than five times the blank value, therefore associated sample result was qualified as non-detect (U).

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
Outfall #002	MB	Ecology NWTPH-Dx	DRO	mg/L	0.0299	0.077	U

Notes:

MB: method blank

DRO: reported as #2 diesel (C10-C24)

mg/L: milligrams per liter

U: non-detect

Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria except.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

## Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-73946-2.

## Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-73946-2.

## **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-73946-2.

## **CONCLUSION**

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. DRO, reported as #2 diesel (C10-C24)
  was detected in the associated laboratory method blank; this laboratory method blank detects resulted in
  associated samples detected data qualified as non-detect. The trip blank was free of contamination with
  no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

## **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

## **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-73946-1	12/28/2017	10:20	Regular
Trip Blank	580-73946-2	12/28/2017	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
580-73946-1	Outfall #002	REG	580-73946-2	Ecology NWTPH-Dx	DRO	0.077	mg/L	JB	U	BL1	N

Notes:

REG: regular

SDG: sample delivery group

DRO: diesel range organics reported as #2 diesel (C10-C24)

Ecology: Washington State Department of Ecology J: the concentration is an approximate value

B: compound was found in the laboratory method blank and sample

U: non-detect

BL1: result less than some multiple of that found in laboratory method blank

mg/L: milligrams per liter N: analyte not detected

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Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Client Sample ID: Outfall #002

Date Collected: 12/28/17 10:20 Date Received: 12/28/17 14:55 Lab Sample ID: 580-73946-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			01/03/18 17:02	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	91		74 - 123					01/03/18 17:02	1
Toluene-d8 (Surr)	105		79 - 122					01/03/18 17:02	1
4-Bromofluorobenzene (Surr)	101		78 - 119					01/03/18 17:02	1
Dibromofluoromethane (Surr)	91		70 - 120					01/03/18 17:02	1
1,2-Dichloroethane-d4 (Surr)	100		70 - 120					01/03/18 17:02	1

Method: 8270C SIM - Sei Analyte	Result Qualifie	•	•	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND	0.22	0.022	ug/L		01/02/18 09:08	01/02/18 17:55	10
Chrysene	ND	0.22	0.067	ug/L		01/02/18 09:08	01/02/18 17:55	10
Benzo[b]fluoranthene	ND	0.22	0.089	ug/L		01/02/18 09:08	01/02/18 17:55	10
Benzo[k]fluoranthene	ND	0.33	0.10	ug/L		01/02/18 09:08	01/02/18 17:55	10
Benzo[a]pyrene	ND	0.22	0.033	ug/L		01/02/18 09:08	01/02/18 17:55	10
Indeno[1,2,3-cd]pyrene	ND	0.22	0.078	ug/L		01/02/18 09:08	01/02/18 17:55	10
Dibenz(a,h)anthracene	ND	0.22	0.022	ug/L		01/02/18 09:08	01/02/18 17:55	10
Surrogate	%Recovery Qualifie	er Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	82	53 - 112				01/02/18 09:08	01/02/18 17:55	10

Method: NWTPH-Gx - Northy	west - Volatile	Petroleur	n Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			01/02/18 16:21	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93		58 - 133					01/02/18 16:21	1
Trifluorotoluene (Surr)	98		77 - 128					01/02/18 16:21	1

Method: NW I PH-DX - Northwe	st - Semi-v	olatile Pet	roleum Prod	aucts (GC	(د				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.077	<del>J-B</del> []	0.11	0.021	mg/L		01/03/18 08:30	01/05/18 13:59	1
Motor Oil (>C24-C36)	0.19	J	0.27	0.085	mg/L		01/03/18 08:30	01/05/18 13:59	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	75		50 - 150				01/03/18 08:30	01/05/18 13:59	1
n-Decanoic Acid (Surr)							01/03/18 08:30	01/05/18 13:59	1

## **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-73946-2

**Client Sample ID: Trip Blank** 

Date Collected: 12/28/17 00:01 Date Received: 12/28/17 14:55 Lab Sample ID: 580-73946-2

**Matrix: Water** 

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			01/02/18 17:32	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	95		74 - 123					01/02/18 17:32	1
Toluene-d8 (Surr)	106		79 - 122					01/02/18 17:32	1
4-Bromofluorobenzene (Surr)	101		78 - 119					01/02/18 17:32	1
Dibromofluoromethane (Surr)	91		70 - 120					01/02/18 17:32	1
1,2-Dichloroethane-d4 (Surr)	96		70 - 120					01/02/18 17:32	1

Method: NWTPH-Gx - Nort	west - Volatile Petroleum Products (GC)								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			12/29/17 21:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91		58 - 133			-		12/29/17 21:48	1
Trifluorotoluene (Surr)	109		77 - 128					12/29/17 21:48	1

1/23/2018

# Data Validation Memorandum

TO: Ophélie Encelle SDG: 580-74109-1

FROM: Dilip Kumar Former Unocal

DATE: March 20, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1<sup>st</sup>, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-74109-1 for 1 water sample and 1 trip blank collected on January 05, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water Samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentations (COC). The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Three of the cPAHs, reported as benzo[a]anthracene, benzo[a]pyrene and dibenz(a,h)anthracene were detected at concentration greater than the MDL in method blank MB 580-264742/1-A. The associated sample results were not detected, therefore associated sample results were not qualified.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### **Deuterated Monitoring Compounds (Surrogates)**

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit	
NE	NE	NE	NE	

### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-74109-1.

### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-74109-1.

### Laboratory Duplicates

Laboratory duplicate was not performed for SDG 580-74109-1.

## CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

 Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.

- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method/field blank samples were
  generally free of contamination with no qualification required. The trip blank was free of contamination
  with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

## REFERENCES

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

## **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-74109-1	01/05/2018	11:15	Regular
Trip Blank	580-74109-2	01/05/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

SDG: sample delivery group

# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-74216-1

FROM: Dilip Kumar Former Unocal

DATE: March 20, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-74216-1 for 1 water sample and 1 trip blank collected on January 09, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

### **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water Samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentations (COC). The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

One of the cPAHs, reported as benzo(a)anthracene was detected at concentration greater than the MDL in method blank MB 580-265037/1-A. The associated sample result was non-detect, therefore not qualified.

DRO, reported as #2 diesel (C10-C24) and HO, reported as motor oil (>C24-C36), were detected at concentrations greater than the MDL in method blank MB 580-265035/1-B. The associated sample results

were less than five times the blank value, therefore associated sample results were qualified as non-detect (U).

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
Outfall #002	MB	Ecology NWTPH-Dx	DRO	mg/L	0.0356	0.046	U
Outfall #002	MB	Ecology NWTPH-Dx	НО	mg/L	0.0841	0.14	U

Notes:

MB: method blank U: non-detect

DRO: reported as #2 diesel (C10-C24) HO: reported as motor oil (>C24-C36)

mg/L: milligrams per liter

Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### **Deuterated Monitoring Compounds (Surrogates)**

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria except.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit	
NE	NE	NE	NE	

### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-74216-1.

### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-74216-1.

### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-74216-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. DRO, reported as #2 diesel (C10-C24)
  and HO, reported as motor oil (>C24-C36) were detected in the associated laboratory method blank; this
  laboratory method blank detects resulted in associated samples detected data qualified as non-detect.
  The trip blank was free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

# **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-74216-1	01/09/2018	11:10	Regular
Trip Blank	580-74216-2	01/09/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
580-74216-1	Outfall #002	REG	580-74216-1	Ecology NWTPH-Dx	DRO	0.046	mg/L	JВ	U	BL1	N
580-74216-1	Outfall #002	REG	580-74216-1	Ecology NWTPH-Dx	НО	0.14	mg/L	J B	U	BL1	N

Notes:

REG: regular

SDG: sample delivery group

DRO: diesel range organics reported as #2 diesel (C10-C24)

HO: reported as motor oil (>C24-C36)

Ecology: Washington State Department of Ecology

J: the concentration is an approximate value

B: compound was found in the laboratory method blank and sample

U: non-detect

BL1: result less than some multiple of that found in laboratory method blank

mg/L: milligrams per liter N: analyte not detected

# Data Validation Memorandum

TO: Ophélie Encelle SDG: 580-74473-1

FROM: Dilip Kumar Former Unocal

DATE: March 20, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-74473-1 for 1 water sample and 1 trip blank collected on January 18, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- · Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water Samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270D SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentations (COC) besides for benzene analyses. The COC requested benzene to be analyzed by USEPA method 624. Benzene was analyzed by USEPA method 8260C with a detection limit of 0.42 microgram per liter (ug/L) and a reporting limit of 2 ug/L but both methods are comparable for the constituent analysed. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### Holding Times and Preservation

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Five of the cPAHs, reported as benzo(a)anthracene, benzo[a]pyrene, chrysene, dibenz(a,h)anthracene and indeno[1,2,3-cd]pyrene were detected at concentration greater than the MDL in method blank MB 580-

265687/1-A. The associated sample results were less than five times the blank value, therefore associated sample results were qualified as non-detect (U).

DRO, reported as #2 diesel (C10-C24) and HO, reported as motor oil (>C24-C36), were detected at concentration greater than the MDL in method blank MB 580-265742/1-B. The associated sample results were less than five times the blank value, therefore associated sample results were qualified as non-detect (U).

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
Outfall #002	MB	8270D SIM	Benzo[a]anthracene	ug/L	0.00596	0.0078	U
Outfall #002	MB	8270D SIM	Benzo[a]pyrene	ug/L	0.00450	0.0063	U
Outfall #002	MB	8270D SIM	Chrysene	ug/L	0.00728	0.0065	U
Outfall #002	MB	8270D SIM	Dibenz(a,h)anthracene	ug/L	0.00627	0.0053	U
Outfall #002	MB	8270D SIM	Indeno[1,2,3-cd]pyrene	ug/L	0.00790	0.0075	U
Outfall #002	MB	Ecology NWTPH-Dx	DRO	mg/L	0.0349	0.058	U
Outfall #002	MB	Ecology NWTPH-Dx	НО	mg/L	0.365	0.13	U

Notes:

MB: method blank U: non-detect

DRO: reported as #2 diesel (C10-C24) HO: reported as motor oil (>C24-C36)

SIM: selective ion monitoring ug/L: micrograms per liter mg/L: milligrams per liter

Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270D SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria except.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit	
NE	NE	NE	NE	

# Laboratory Control Sample/ Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-74473-1.

### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-74473-1.

### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-74473-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time. cPAHs, reported as benzo(a)anthracene, benzo[a]pyrene, chrysene, dibenz(a,h)anthracene and indeno[1,2,3-cd]pyrene; DRO, reported as #2 diesel (C10-C24) and; HO, reported as motor oil (>C24-C36) were detected in the associated laboratory method blank; this laboratory method blank detects resulted in associated samples detected data qualified as non-detect. The trip blank was free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. USEPA 624 and USEPA 8260C methods are comparable for the constituent analysed. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### REFERENCES

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

# **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-74473-1	01/18/2018	10:30	Regular
Trip Blank	580-74473-2	01/18/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
580-74473-1	Outfall #002	REG	580-74473-1	8270D SIM	Benzo[a]anthracene	0.0078	ug/L	JВ	U	BL1	N
580-74473-1	Outfall #002	REG	580-74473-1	8270D SIM	Benzo[a]pyrene	0.0063	ug/L	JB	U	BL1	N
580-74473-1	Outfall #002	REG	580-74473-1	8270D SIM	Chrysene	0.0065	ug/L	JВ	U	BL1	N
580-74473-1	Outfall #002	REG	580-74473-1	8270D SIM	Dibenz(a,h)anthracene	0.0053	ug/L	JB	U	BL1	N
580-74473-1	Outfall #002	REG	580-74473-1	8270D SIM	Indeno[1,2,3-cd]pyrene	0.0075	ug/L	JB	U	BL1	N
580-74473-1	Outfall #002	REG	580-74473-1	Ecology NWTPH-Dx	DRO	0.058	mg/L	JB	U	BL1	N
580-74473-1	Outfall #002	REG	580-74473-1	Ecology NWTPH-Dx	НО	0.13	mg/L	JB	U	BL1	N

Notes:

REG: regular

SDG: sample delivery group SIM: selective ion monitoring

DRO: diesel range organics reported as #2 diesel (C10-C24)

HO: reported as motor oil (>C24-C36)

Ecology: Washington State Department of Ecology J: the concentration is an approximate value

B: compound was found in the laboratory method blank and sample

U: non-detect

BL1: result less than some multiple of that found in laboratory method blank

ug/L: micrograms per liter mg/L: milligrams per liter N: analyte not detected

# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-74658-1

FROM: Dilip Kumar Former Unocal

DATE: March 26, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-74658-1 for 1 water sample and 1 trip blank collected on January 24, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water Samples were analyzed for benzene (USEPA method 8260C), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270D SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentations (COC) besides for benzene analyses. The COC requested benzene to be analyzed by USEPA method 624. Benzene was analyzed by USEPA method 8260C with a detection limit of 0.42 microgram per liter (ug/L) and a reporting limit of 2 ug/L. USEPA 624 method is a wastewater method while USEPA 8260C method is applicable to nearly all types of samples and matrices but both methods are comparable for the constituent analysed. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

One of the cPAHs, reported as benzo[k]fluoranthene was detected at concentration greater than the MDL in method blank MB 580-266194/1-A. The associated sample result was non-detect, therefore not qualified.

Five of the cPAHs, reported as benzo[a]anthracene, benzo[a]pyrene, chrysene, dibenz(a,h)anthracene and indeno[1,2,3-cd]pyrene was detected at concentrations greater than the MDLs in method blank MB 580-266194/1-A. The associated sample results were less than five times the blank value, therefore associated sample results were qualified as non-detect (U).

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
Outfall #002	MB	8270D SIM	benzo[a]anthracene	ug/L	0.00608	0.0079	U
Outfall #002	MB	8270D SIM	benzo[a]pyrene	ug/L	0.00544	0.0070	U
Outfall #002	МВ	8270D SIM	chrysene	ug/L	0.0101	0.0073	U
Outfall #002	MB	8270D SIM	dibenz(a,h)anthracene	ug/L	0.00702	0.0060	U
Outfall #002	MB	8270D SIM	indeno[1,2,3-cd] pyrene	ug/L	0.00936	0.0075	U

Notes:

MB: method blank

SIM: selective ion monitoring

U: non-detect

ug/L: micrograms per liter

Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 8260C, USEPA method 8270D SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria except.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

## Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS	LCSD	RPD	Validation Qualifier
Field Salliple ID	Parameter	Recovery	Recovery	KFD	Validation Qualifier

NE	NE	NE	NE	NE	NE

### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-74658-1.

### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-74658-1.

### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-74658-1.

## CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time. Five of the cPAHs, reported as benzo[a]anthracene, benzo[a]pyrene, chrysene, dibenz(a,h)anthracene and indeno[1,2,3-cd]pyrene were detected in the associated laboratory method blank; this laboratory method blank detects resulted in associated samples detected data qualified as non-detect. The trip blank was free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. USEPA 624 and USEPA 8260C methods are comparable for the constituent
  analysed. Completeness is expressed as the percentage of valid or usable measurements compared to
  planned measurements. Valid data are defined as all data that are not rejected for project use. All data
  were considered valid. The completeness goal was met for all analytes.

## **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

# **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-74658-1	01/24/2018	10:20	Regular
Trip Blank	580-74658-2	01/24/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
580-74658-1	Outfall #002	REG	580-74658-1	8270D SIM	Benzo[a]anthracene	0.0079	ug/L	JВ	U	BL1	N
580-74658-1	Outfall #002	REG	580-74658-1	8270D SIM	Benzo[a]pyrene	0.0070	ug/L	JВ	U	BL1	N
580-74658-1	Outfall #002	REG	580-74658-1	8270D SIM	Chrysene	0.0073	ug/L	JВ	U	BL1	N
580-74658-1	Outfall #002	REG	580-74658-1	8270D SIM	Dibenz(a,h)anthracene	0.0060	ug/L	JВ	U	BL1	N
580-74658-1	Outfall #002	REG	580-74658-1	8270D SIM	Indeno[1,2,3-cd]pyrene	0.0075	ug/L	JВ	U	BL1	N

Notes:

REG: regular

SDG: sample delivery group SIM: selective ion monitoring

J: the concentration is an approximate value

B: compound was found in the laboratory method blank and sample

U: non-detect

BL1: result less than some multiple of that found in laboratory method blank

ug/L: micrograms per liter N: analyte not detected



TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

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# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74658-1

Lab Sample ID: 580-74658-1

**Matrix: Water** 

Client Sample ID: Outfall #002 Date Collected: 01/24/18 10:20

Date Received: 01/25/18 14:10

Analyte	Result	Qua	lifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND			2.0	0.42	ug/L			01/31/18 20:17	
Surrogate	%Recovery	Qua	lifier	Limits				Prepared	Analyzed	Dil Fa
Trifluorotoluene (Surr)	103			80 - 120					01/31/18 20:17	
Toluene-d8 (Surr)	100			80 - 122					01/31/18 20:17	
1,2-Dichloroethane-d4 (Surr)	98			80 - 126					01/31/18 20:17	
4-Bromofluorobenzene (Surr)	103			75 - 125					01/31/18 20:17	
Dibromofluoromethane (Surr)	99			77 - 120					01/31/18 20:17	
Method: 8270D SIM - Semivo	Result	Qua		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
				•		l lmi4	_	Dranavad	Analysed	Dil Es
Analyte	Result	Qua		RL	MDL		D		Analyzed 01/30/18 23:34	Dil Fa
Analyte Benzo[a]anthracene	Result 0.0079	Qua		RL 0.021	MDL 0.0021	ug/L	<u>D</u>	01/29/18 14:21	01/30/18 23:34	Dil Fa
Analyte Benzo[a]anthracene Benzo[a]pyrene	Result 0.0079 0.0070	Qua	lifier	0.021 0.021	0.0021 0.0031	ug/L ug/L	<u>D</u>	01/29/18 14:21 01/29/18 14:21	01/30/18 23:34 01/30/18 23:34	Dil Fac
Analyte  Benzo[a]anthracene  Benzo[a]pyrene  Benzo[b]fluoranthene	Result 0.0079	Qua	lifier	RL 0.021	MDL 0.0021	ug/L ug/L ug/L	<u>D</u>	01/29/18 14:21	01/30/18 23:34	Dil Fac
Analyte Benzo[a]anthracene Benzo[a]pyrene	0.0079 0.0070 ND	Qua →B →B	lifier	0.021 0.021 0.021 0.021	0.0021 0.0031 0.0082	ug/L ug/L ug/L ug/L	<u>D</u>	01/29/18 14:21 01/29/18 14:21 01/29/18 14:21	01/30/18 23:34 01/30/18 23:34 01/30/18 23:34	Dil Fac
Analyte  Benzo[a]anthracene  Benzo[a]pyrene  Benzo[b]fluoranthene  Benzo[k]fluoranthene	0.0079 0.0070 ND	Qua →B →B	U U	0.021 0.021 0.021 0.021 0.031	0.0021 0.0031 0.0082 0.0092	ug/L ug/L ug/L ug/L ug/L	<u>D</u>	01/29/18 14:21 01/29/18 14:21 01/29/18 14:21 01/29/18 14:21	01/30/18 23:34 01/30/18 23:34 01/30/18 23:34 01/30/18 23:34 01/30/18 23:34	Dil Fa
Analyte  Benzo[a]anthracene  Benzo[a]pyrene  Benzo[b]fluoranthene  Benzo[k]fluoranthene  Chrysene	Result 0.0079 0.0070 ND ND 0.0073	Qua HB HB	U U	0.021 0.021 0.021 0.021 0.031 0.021	0.0021 0.0031 0.0082 0.0092 0.0062	ug/L ug/L ug/L ug/L ug/L ug/L	<u>D</u>	01/29/18 14:21 01/29/18 14:21 01/29/18 14:21 01/29/18 14:21 01/29/18 14:21 01/29/18 14:21	01/30/18 23:34 01/30/18 23:34 01/30/18 23:34 01/30/18 23:34 01/30/18 23:34	Dil Fa
Analyte  Benzo[a]anthracene  Benzo[a]pyrene  Benzo[b]fluoranthene  Benzo[k]fluoranthene  Chrysene  Dibenz(a,h)anthracene	Result 0.0079 0.0070 ND ND 0.0073 0.0060	Qua JB JB JB	U U U	0.021 0.021 0.021 0.021 0.031 0.021 0.021	0.0021 0.0031 0.0082 0.0092 0.0062 0.0021	ug/L ug/L ug/L ug/L ug/L ug/L	<u>D</u>	01/29/18 14:21 01/29/18 14:21 01/29/18 14:21 01/29/18 14:21 01/29/18 14:21 01/29/18 14:21	01/30/18 23:34 01/30/18 23:34 01/30/18 23:34 01/30/18 23:34 01/30/18 23:34 01/30/18 23:34	Dil Fa

Method: NWTPH-Gx - North	nwest - Volatile	<b>Petroleu</b> i	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			01/26/18 16:41	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	95		58 - 133			,		01/26/18 16:41	1
Trifluorotoluene (Surr)	106		77 - 128					01/26/18 16:41	

Method. NWTPH-DX - North	west - Seiiii-v	orathe Pet	roleulli Prou	นษเร (ษา	<b>~)</b>				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11	0.067	mg/L		01/30/18 14:37	01/31/18 17:52	1
Motor Oil (>C24-C36)	ND		0.36	0.099	mg/L		01/30/18 14:37	01/31/18 17:52	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	59		50 - 150				01/30/18 14:37	01/31/18 17:52	1

2/6/2018

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-74658-1

Lab Sample ID: 580-74658-2

Matrix: Water

Client Sample ID: Trip Blank Date Collected: 01/24/18 10:20

Date Received: 01/25/18 14:10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0	0.42	ug/L			01/30/18 21:33	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		80 - 120					01/30/18 21:33	1
Toluene-d8 (Surr)	100		80 - 122					01/30/18 21:33	1
1,2-Dichloroethane-d4 (Surr)	100		80 - 126					01/30/18 21:33	1
4-Bromofluorobenzene (Surr)	103		75 - 125					01/30/18 21:33	1
Dibromofluoromethane (Surr)	101		77 - 120					01/30/18 21:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			01/26/18 15:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		58 - 133			•		01/26/18 15:38	1
	107		77 - 128					01/26/18 15:38	

2/6/2018

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# optionData Validation Memorandum

TO: Ophélie Encelle SDG: 580-74854-1

FROM: Dilip Kumar Former Unocal

DATE: March 26, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-74854-1 for 1 water sample, 1 field duplicate and 1 trip blank collected on February 01, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data.

The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270D SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results, MS/MSD results, field duplicate results and surrogate recoveries.

Each category is further described in the following sections.

### Data Completeness

Water sample analyses were performed as requested on chain-of-custody documentations. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### Blanks

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

A method blank was analyzed for each method. No method blank contamination was detected.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### **Deuterated Monitoring Compounds (Surrogates)**

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270D SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria except.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

## Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	Parameter LCS Recovery		RPD	Validation Qualifier	
NE	NE	NE	NE	NE	NE	

### Matrix spike/Matrix spike duplicates

Matrix spikes were prepared in duplicate and analyzed. MS and MSD analysis must exhibit a percent recoveries and relative percent differences within the laboratory's acceptance criteria.

The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where compound concentration detected in the parent sample exceeds the MS/MSD concentration by factor four.

Samples associated with MS/MSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	Method	MS Recovery	MSD Recovery	RPD	Validation Qualifier	Laboratory Limit
NE	NE	NE	NE	NE	NE	NE	NE

## Field Duplicates

Field duplicates were collected for SDG 580-74854-1 and all precision criteria were met.

Duplicate sample ID and Parent field sample ID were updated in the following table:

Duplicate Sample ID	Field Sample ID				
DUP-1	Outfall #002				

### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-74854-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD, MS/MSD and FD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate, LCS and MS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blank and trip blank samples
  were free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### REFERENCES

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-74854-1	02/01/2018	15:00	Regular
Dup-1	580-74854-2	02/01/2018	NA	Field Duplicate
Trip Blank	580-74854-3	02/01/2018	NA	Trip Blank

Note: NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

SDG: sample delivery group

# Data Validation Memorandum

TO: Ophélie Encelle SDG: 580-74956-1

FROM: Dilip Kumar Former Unocal

DATE: March 26, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-74956-1 for 1 water sample and 1 trip blank collected on February 06, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270D SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

## **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentations. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

#### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	ysis Exceedance		
NE	NE	NE	NE	NE		

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

A method blank was analyzed for each method. No method blank contamination was detected.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

#### **Deuterated Monitoring Compounds (Surrogates)**

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270D SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria except.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

## Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

#### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-74956-1.

#### Field Duplicates

According to the SAP, Field duplicate was not collected for SDG 580-74956-1.

#### Laboratory Duplicates

Laboratory duplicate was not performed for SDG 580-74956-1.

#### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS. Accuracy was acceptable.

- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blank and trip blank samples
  were free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

#### REFERENCES

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

## **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-74956-1	02/06/2018	10:30	Regular
Trip Blank	580-74956-2	02/06/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

SDG: sample delivery group

# Data Validation Memorandum

TO: Ophélie Encelle SDG: 580-75109-1

FROM: Dilip Kumar Former Unocal

DATE: March 26, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

#### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1<sup>st</sup>, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-75109-1 for 1 water sample and 1 trip blank collected on February 13, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

#### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270D SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

#### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentations. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

#### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance	
NE	NE	NE	NE	NE	

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

One of the cPAHs, reported as benzo(a)anthracene was detected at concentration greater than the MDL in method blank MB 580-267557/1-A. The associated sample result was less than five times the blank value, therefore associated sample result was qualified as non-detect (U).

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
Outfall #002	MB	8270D SIM	benzo(a)anthracene	ug/L	0.00255	0.0043	U

Notes:

MB: method blank

SIM: selective ion monitoring

U: non-detect

ug/L: micrograms per liter

Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

#### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270D SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria except.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

#### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier	
NE	NE	NE	NE	NE	NE	

## Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-75109-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-75109-1.

#### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-75109-1.

## **CONCLUSION**

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. One of the cPAHs, reported as
  benzo(a)anthracene was detected in the associated laboratory method blank; this laboratory method
  blank detect resulted in associated sample detected data qualified as non-detect. The trip blank was free
  of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

#### **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

## **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-75109-1	02/13/2018	11:30	Regular
Trip Blank	580-75109-2	02/13/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
580-75109-1	Outfall #002	REG	580-75109-1	8270D SIM	benzo[a]anthracene	0.0043	ug/L	JВ	U	BL1	N

Notes:

REG: regular

SDG: sample delivery group SIM: selective ion monitoring

J: the concentration is an approximate value
B: compound was found in the laboratory method blank and sample

U: non-detect

BL1: result less than some multiple of that found in laboratory method blank

ug/L: micrograms per liter N: analyte not detected

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Rush	
Short Hold	

Chain of **Custody Record** 

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## **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Client Sample ID: Outfall #002

TestAmerica Job ID: 580-75109-1

Lab Sample ID: 580-75109-1

Matrix: Water

Date Collected: 02/13/18 11:30 Date Received: 02/14/18 12:20

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			02/15/18 23:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	105		74 - 123			-		02/15/18 23:03	1
Toluene-d8 (Surr)	99		79 - 122					02/15/18 23:03	1
4-Bromofluorobenzene (Surr)	106		78 - 119					02/15/18 23:03	1
Dibromofluoromethane (Surr)	110		70 - 120					02/15/18 23:03	1
1,2-Dichloroethane-d4 (Surr)	106		70 - 120					02/15/18 23:03	1

Method: 8270D SIM - Sei Analyte	mivolatile Organic Compo Result Qualifier	ounds (GC/MS RL	S SIM) MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0043 JB U	0.020	0.0020	ug/L		02/19/18 08:56	02/19/18 15:18	1
Benzo[a]pyrene	ND	0.020	0.0030	ug/L		02/19/18 08:56	02/19/18 15:18	1
Benzo[b]fluoranthene	ND	0.020	0.0081	ug/L		02/19/18 08:56	02/19/18 15:18	1
Benzo[k]fluoranthene	ND	0.030	0.0091	ug/L		02/19/18 08:56	02/19/18 15:18	1
Chrysene	ND	0.020	0.0061	ug/L		02/19/18 08:56	02/19/18 15:18	1
Dibenz(a,h)anthracene	ND	0.020	0.0020	ug/L		02/19/18 08:56	02/19/18 15:18	1
Indeno[1,2,3-cd]pyrene	ND	0.020	0.0071	ug/L		02/19/18 08:56	02/19/18 15:18	1
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	83	53 - 112				02/19/18 08:56	02/19/18 15:18	1

Method: NWTPH-Gx - Northw	est - Volatile	Petroleur	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			02/15/18 15:49	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	86		58 - 133					02/15/18 15:49	1
Trifluorotoluene (Surr)	117		77 - 128					02/15/18 15:49	

Method: NW I PH-DX - Northwe	est - Semi-v	olatile Petr	oleum Proc	iucts (GC	(د				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11	0.066	mg/L		02/15/18 13:17	02/16/18 01:30	1
Motor Oil (>C24-C36)	ND		0.36	0.097	mg/L		02/15/18 13:17	02/16/18 01:30	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	62		50 - 150				02/15/18 13:17	02/16/18 01:30	1

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## **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75109-1

Lab Sample ID: 580-75109-2

Matrix: Water

Client Sample ID: Trip Blank Date Collected: 02/13/18 00:01 Date Received: 02/14/18 12:20

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.42	ug/L			02/15/18 15:28	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	105		74 - 123					02/15/18 15:28	1
Toluene-d8 (Surr)	96		79 - 122					02/15/18 15:28	1
4-Bromofluorobenzene (Surr)	102		78 - 119					02/15/18 15:28	1
Dibromofluoromethane (Surr)	104		70 - 120					02/15/18 15:28	1
1,2-Dichloroethane-d4 (Surr)	107		70 - 120					02/15/18 15:28	1

Method: NWTPH-Gx - Nort	hwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			02/15/18 14:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		58 - 133			-		02/15/18 14:48	1

2/20/2018

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# Data Validation Memorandum

TO: Ophélie Encelle SDG: 580-75387-1

FROM: Dilip Kumar Former Unocal

DATE: April 06, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

## INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-75387-1 for 1 water sample and 1 trip blank collected on February 27, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

#### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data.

The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

#### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

#### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

A method blank was analyzed for each method. No method blank contamination was detected.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

#### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria except.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Sample ID Surrogates		Laboratory Limit
NE	NE	NE	NE

#### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

#### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-75387-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-75387-1.

## **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-75387-1.

#### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

 Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.

- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blank and trip blank samples
  were free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

## REFERENCES

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

## **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-75387-1	02/27/2018	10:00	Regular
Trip Blank	580-75387-2	02/27/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

SDG: sample delivery group

## **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-75584-1

FROM: Dilip Kumar Former Unocal

DATE: April 06, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

## INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-75584-1 for 1 water sample and 1 trip blank collected on March 05, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

#### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

#### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

#### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Five of the cPAHs, reported as chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene and indeno[1,2,3-cd] pyrene were detected at concentration greater than the MDL in method blank MB 580-268855/1-A. The associated sample results were non-detect, therefore not qualified.

Two of the cPAHs, reported as benzo(a)anthracene and dibenz(a,h)anthracene were detected at concentration greater than the MDL in method blank MB 580-268855/1-A. The associated sample results were less than five times the blank value, therefore associated sample results were qualified as non-detect (U).

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
Outfall #002	MB	8270C SIM	benzo(a)anthracene	ug/L	0.0111	0.0044	C
Outfall #002	MB	8270C SIM	dibenz(a,h)anthracene	ug/L	0.0108	0.0021	U

Notes:

MB: method blank

SIM: selective ion monitoring

U: non-detect

ug/L: micrograms per liter

Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

#### **Deuterated Monitoring Compounds (Surrogates)**

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria except.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

#### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria besides for benzene.

LCS/LCSD for analysis batch 268906, RPD was exceeding the acceptance criteria. The associated sample result was non-detect therefore associated sample result was not qualified.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter   _   _	LCSD Recovery	RPD	Validation Qualifier	
NE	NE	NE	NE	NE	NE

## Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-755584-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-75584-1.

#### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-75584-1.

#### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time. Two of the cPAHs, reported as benzo(a)anthracene and dibenz(a,h)anthracene were detected in the associated laboratory method blank; this laboratory method blank detects resulted in associated samples detected data qualified as non-detect. The trip blank was free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

## **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

## **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-75584-1	03/05/2018	10:30	Regular
Trip Blank	580-75584-2	03/05/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
580-75584-1	Outfall #002	REG	580-75584-1	8270C SIM	benzo[a]anthracene	0.0044	ug/L	JВ	U	BL1	N
580-75584-1	Outfall #002	REG	580-75584-1	8270C SIM	dibenz(a,h)anthracene	0.0021	ug/L	JB	U	BL1	N

Notes:

REG: regular

SDG: sample delivery group SIM: selective ion monitoring

J: the concentration is an approximate value
B: compound was found in the laboratory method blank and sample

U: non-detect

BL1: result less than some multiple of that found in laboratory method blank

ug/L: micrograms per liter N: analyte not detected

# **TestAmerica**

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Rush
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Short Hold

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Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Client Sample ID: Outfall #002

Date Collected: 03/05/18 10:30 Date Received: 03/06/18 12:50

Lab Sample ID: 580-75584-1

Matrix: Water

Method: 624 - Volatile Orga	nic Compoun	ds (GC/MS	5)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND	*	1.0	0.53	ug/L			03/13/18 21:10	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	99		74 - 123					03/13/18 21:10	1
Toluene-d8 (Surr)	98		79 - 122					03/13/18 21:10	1
4-Bromofluorobenzene (Surr)	105		78 - 119					03/13/18 21:10	1
Dibromofluoromethane (Surr)	103		70 - 120					03/13/18 21:10	1
1,2-Dichloroethane-d4 (Surr)	99		70 - 120					03/13/18 21:10	1

Method: 8270C SIM - Sem	iivolatile Organic Compοι	ınds (GC/MS	SIM)					
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0044 JB U	0.021	0.0021	ug/L		03/12/18 13:31	03/13/18 19:26	1
Chrysene	ND	0.021	0.0064	ug/L		03/12/18 13:31	03/13/18 19:26	1
Benzo[b]fluoranthene	ND	0.021	0.0085	ug/L		03/12/18 13:31	03/13/18 19:26	1
Benzo[k]fluoranthene	ND	0.032	0.0096	ug/L		03/12/18 13:31	03/13/18 19:26	1
Benzo[a]pyrene	ND	0.021	0.0032	ug/L		03/12/18 13:31	03/13/18 19:26	1
Indeno[1,2,3-cd]pyrene	ND	0.021	0.0074	ug/L		03/12/18 13:31	03/13/18 19:26	1
Dibenz(a,h)anthracene	0.0021 JB U	0.021	0.0021	ug/L		03/12/18 13:31	03/13/18 19:26	1
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	72	53 - 112				03/12/18 13:31	03/13/18 19:26	1

Method: NWTPH-Gx - Northy	vest - Volatile I	Petroleun	n Products (	GC)					
Analyte	Result C	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			03/10/18 22:06	1
Surrogate	%Recovery C	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		58 - 133					03/10/18 22:06	1
Trifluorotoluene (Surr)	109		77 - 128					03/10/18 22:06	1

Method: NWTPH-Dx - Se	emi-Volatile Petroleum Pro	ducts by NW	TPH with	Silica G	el Cle	eanup		
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND	0.11	0.067	mg/L		03/15/18 13:34	03/17/18 00:25	1
Motor Oil (>C24-C36)	ND	0.36	0.099	mg/L		03/15/18 13:34	03/17/18 00:25	1
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	53	50 - 150				03/15/18 13:34	03/17/18 00:25	1

## **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-75584-1

Lab Sample ID: 580-75584-2

Matrix: Water

Client Sample ID: Trip Blank Date Collected: 03/05/18 00:01

Date Received: 03/06/18 12:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND	*	1.0	0.53	ug/L			03/13/18 14:30	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	104		74 - 123					03/13/18 14:30	1
Toluene-d8 (Surr)	101		79 - 122					03/13/18 14:30	1
4-Bromofluorobenzene (Surr)	106		78 - 119					03/13/18 14:30	1
Dibromofluoromethane (Surr)	106		70 - 120					03/13/18 14:30	1
1,2-Dichloroethane-d4 (Surr)	105		70 - 120					03/13/18 14:30	1

Method: NWTPH-Gx - Nortl	nwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L			03/10/18 14:09	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	90		58 - 133			•		03/10/18 14:09	1
Trifluorotoluene (Surr)	109		77 - 128					03/10/18 14:09	

3/19/2018

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## **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-75831-1

FROM: Dilip Kumar Former Unocal

DATE: April 06, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

## INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP.

Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-75831-1 for 1 water sample and 1 trip blank collected on March 14, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

#### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

#### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

#### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

One of the cPAHs, reported as benzo(a)anthracene was detected at concentration greater than the MDL in method blank MB 580-269355/1-A. The associated sample result was non-detect, therefore not qualified.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

#### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria except.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

## Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria except benzene.

LCS/LCSD for analysis batch 269460, RPD was exceeding the acceptance criteria. The associated sample result was non-detect therefore associated sample result was not qualified.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

## Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-75831-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-75831-1.

#### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-75831-1.

#### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blanks and trip blank samples
  were free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

#### REFERENCES

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

## **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-75831-1	03/14/2018	10:00	Regular
Trip Blank	580-75831-2	03/14/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

SDG: sample delivery group

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

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# Chain of Custody Record

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Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Client Sample ID: Outfall #002

Date Collected: 03/14/18 10:00 Date Received: 03/14/18 13:45 Lab Sample ID: 580-75831-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			03/20/18 22:20	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	103		74 - 123					03/20/18 22:20	
Toluene-d8 (Surr)	102		79 - 122					03/20/18 22:20	1
4-Bromofluorobenzene (Surr)	101		78 - 119					03/20/18 22:20	1
Dibromofluoromethane (Surr)	99		70 - 120					03/20/18 22:20	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 120					03/20/18 22:20	1

Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND ND	0.020	0.0020	ug/L		03/19/18 10:06	03/19/18 19:26	1
Chrysene	ND	0.020	0.0061	ug/L		03/19/18 10:06	03/19/18 19:26	1
Benzo[b]fluoranthene	ND	0.020	0.0082	ug/L		03/19/18 10:06	03/19/18 19:26	1
Benzo[k]fluoranthene	ND	0.031	0.0092	ug/L		03/19/18 10:06	03/19/18 19:26	1
Benzo[a]pyrene	ND	0.020	0.0031	ug/L		03/19/18 10:06	03/19/18 19:26	1
Indeno[1,2,3-cd]pyrene	ND	0.020	0.0072	ug/L		03/19/18 10:06	03/19/18 19:26	1
Dibenz(a,h)anthracene	ND	0.020	0.0020	ug/L		03/19/18 10:06	03/19/18 19:26	1
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	<u></u>	53 - 112				03/19/18 10:06	03/19/18 19:26	1

Method: NWTPH-Gx - North	hwest - Volatile	Petroleui	m Products (	GC)					
Analyte	Result (	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND ND		0.25	0.050	mg/L			03/17/18 23:19	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		58 - 133					03/17/18 23:19	1
Trifluorotoluene (Surr)	111		77 - 128					03/17/18 23:19	1

Method: NWTPH-Dx - Se	mi-Volatile Petroleum Prod	ucts by NW1	PH with	Silica G	Gel Cle	eanup		
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND ND	0.11	0.067	mg/L		03/19/18 14:21	03/21/18 12:45	1
Motor Oil (>C24-C36)	ND	0.36	0.099	mg/L		03/19/18 14:21	03/21/18 12:45	1
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	63	50 - 150				03/19/18 14:21	03/21/18 12:45	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Received: 03/14/18 13:45

TestAmerica Job ID: 580-75831-1

Lab Sample ID: 580-75831-2

**Matrix: Water** 

Client Sample ID: Trip Blank Date Collected: 03/14/18 00:01

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND	*	1.0	0.53	ug/L			03/20/18 17:02	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	117		74 - 123					03/20/18 17:02	1
Toluene-d8 (Surr)	95		79 - 122					03/20/18 17:02	1
4-Bromofluorobenzene (Surr)	112		78 - 119					03/20/18 17:02	1
Dibromofluoromethane (Surr)	120		70 - 120					03/20/18 17:02	1
1,2-Dichloroethane-d4 (Surr)	125	X	70 - 120					03/20/18 17:02	1

Analyte	hwest - Volatile Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.050	mg/L		<u>-</u>	03/17/18 21:44	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		58 - 133			-		03/17/18 21:44	1
								03/17/18 21:44	

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# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-77215-1

FROM: Dilip Kumar Former Unocal

DATE: May 21, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

#### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-77215-1 for 1 water sample and 1 trip blank collected on May 08, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

### **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

## **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

#### Holding Times and Preservation

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	<b>Holding Time</b>	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Four of the cPAHs, reported as benzo(a)anthracene, chrysene, dibenz(a,h)anthracene and indeno[1,2,3-cd] pyrene were detected at concentration greater than the MDL in method blank MB 580-273742/1-A. The associated sample results were non-detect, therefore not qualified.

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

#### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

#### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria besides for DRO reported as #2 Diesel (C10-C24) in SDG 580-77215-1.

LCS/LCSD for analysis batch 273587, RPD was exceeding the acceptance criteria. The associated sample result was non-detect therefore associated sample result was not qualified.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

# Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-77215-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-77215-1.

#### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-77215-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.

- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blank and trip blank samples
  were free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

## **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

## **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-77215-1	05/08/2018	9:00	Regular
Trip Blank	580-77215-2	05/08/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

SDG: sample delivery group

# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-77414-1

FROM: Dilip Kumar Former Unocal

DATE: June 19, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

#### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-77414-1 for 1 water sample and 1 trip blank collected on May 17, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

# **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

#### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

#### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Six of the seven cPAHs, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenz(a,h)anthracene and indeno[1,2,3-cd]pyrene, were detected at concentrations greater than the MDL in method blank MB 580-274341/1-A. The associated sample results were non-detect, therefore not qualified.

The seventh benzo[a]anthracene was also detected at concentration greater than the MDL in method blank MB 580-274341/1-A. The associated sample result was less than the blank value, therefore the associated sample result was qualified as non-detect (U).

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
Outfall #002	МВ	8270C SIM	benzo(a)anthracene	ug/L	0.0160	0.0045	U

Notes:

MB: method blank

SIM: selective ion monitoring

U: non-detect

ug/L: micrograms per liter

Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

#### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria except.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

## Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

#### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-77414-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-77414-1.

#### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-77414-1.

## CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time. One of the cPAH, reported as benzo(a)anthracene was detected in the associated laboratory method blank; this laboratory method blank detect resulted in associated sample detected data qualified as non-detect. The trip blank was free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

## **REFERENCES**

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USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

## **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-77414-1	05/17/2018	14:30	Regular
Trip Blank	580-77414-2	05/17/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
580-77414-1	Outfall #002	REG	580-77414-1	8270C SIM	benzo[a]anthracene	0.0045	ug/L	JB	U	BL1	N

Notes:

REG: regular

SDG: sample delivery group SIM: selective ion monitoring

J: the concentration is an approximate value
B: compound was found in the laboratory method blank and sample

U: non-detect

BL1: result less than some multiple of that found in laboratory method blank

ug/L: micrograms per liter N: analyte not detected

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

 Short	니시스
Short	Hold

Rush

Chain of Custody Record

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Arcadis		Client Contact	Peter	campbell		Date 5/17/18	Chain of Custody N	36775
Address 1100 office way. Su	ite 800	Telephone Num	ber (Area Code)/			Lab Number	Page \	of \
city Seattle W	te Zip Code A 98101	Sampler JUSON		Lab Contact Elaine Wal	16 7 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	nalysis (Attach list if ore space is needed)		
Project Name and Location (State) Edwords Termin		Billing Contact			OX W PAGE 30CS	Loc: 580	Special	Instructions/
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	nssible Hazard Identification  Non-Hazard ☐ Flamma	ble □ Skin Iri	ritant 🗆 Poi	ison B 🔲 Unknown		☐ Disposal By Lab ☐ Archive For Month		ssessed if samples ger than 1 month)
Turn Around Time Required (business days) □ 24 Hours □ 48 Hours ☑ 5 Days	10 Days 🗆 15 Days	□ Other		OC Requirements (Spe			o aro rotamos song	or than I monny
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2. Relinguished By Sign/Print	may sifam	. Date	Time 1434	2. Received By Sign/ Yeary W 3. Received By Sign/			5-18-18	Time 1434
3. Relinquished By Sign/Print		Date	Time	3. Received By Sign/	77.11 V41-19		Date	Time
Comments			1					

Terphenyl-d14

TestAmerica Job ID: 580-77414-1

Client Sample ID: Outfall #002

Date Collected: 05/17/18 14:30 Date Received: 05/18/18 14:34 Lab Sample ID: 580-77414-1

05/22/18 09:41 05/23/18 14:54

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			05/23/18 16:02	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123					05/23/18 16:02	1
Toluene-d8 (Surr)	106		79 - 122					05/23/18 16:02	1
4-Bromofluorobenzene (Surr)	97		78 - 119					05/23/18 16:02	1
Dibromofluoromethane (Surr)	101		70 - 120					05/23/18 16:02	1
1,2-Dichloroethane-d4 (Surr)	105		70 - 120					05/23/18 16:02	1

Method: 8270C SIM - Semivolatile Organic Compounds (GC/MS SIM) Analyte Result Qualifier RL MDL Unit Prepared Analyzed Dil Fac JB 0.020 0.0020 ug/L 05/22/18 09:41 05/23/18 14:54 Benzo[a]anthracene 0.0045 Benzo[a]pyrene ND 0.020 0.0030 ug/L 05/22/18 09:41 05/23/18 14:54 Benzo[b]fluoranthene ND 0.020 0.0081 ug/L 05/22/18 09:41 05/23/18 14:54 Benzo[k]fluoranthene ND 0.030 0.0091 ug/L 05/22/18 09:41 05/23/18 14:54 0.0061 ug/L Chrysene ND 0.020 05/22/18 09:41 05/23/18 14:54 Dibenz(a,h)anthracene ND 0.020 0.0020 ug/L 05/22/18 09:41 05/23/18 14:54 Indeno[1,2,3-cd]pyrene ND 0.020 0.0071 ug/L 05/22/18 09:41 05/23/18 14:54 Dil Fac Surrogate %Recovery Qualifier Limits Prepared Analyzed

Method: NWTPH-Gx - Northw	vest - Volatile	e Petroleu	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			05/22/18 15:49	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		50 - 150					05/22/18 15:49	1
								05/22/18 15:49	

53 - 120

71

Method: NWTPH-Dx - Se	emi-Volatile Petrol	eum Prod	ucts by NWT	PH with	Silica C	Sel Cle	eanup		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND ·		0.11	0.065	mg/L		05/23/18 09:49	05/24/18 14:47	1
Motor Oil (>C24-C36)	ND		0.35	0.096	mg/L		05/23/18 09:49	05/24/18 14:47	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	67		50 - 150				05/23/18 09:49	05/24/18 14:47	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-77414-1

Lab Sample ID: 580-77414-2

**Matrix: Water** 

**Client Sample ID: Trip Blank** Date Collected: 05/17/18 00:00

Date Received: 05/18/18 14:34

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			05/23/18 15:12	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123					05/23/18 15:12	1
Toluene-d8 (Surr)	107		79 - 122					05/23/18 15:12	1
4-Bromofluorobenzene (Surr)	96		78 - 119					05/23/18 15:12	1
Dibromofluoromethane (Surr)	102		70 - 120					05/23/18 15:12	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 120					05/23/18 15:12	1

Method: NWTPH-Gx - Nort	hwest - Volatile	e Petroleu	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			05/20/18 00:22	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		50 - 150			•		05/20/18 00:22	1

5/25/2018

# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-77584-1

FROM: Dilip Kumar Former Unocal

DATE: June 19, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

#### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-77584-1 for 1 water sample and 1 trip blank collected on May 23, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

# **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

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- Holding Times and Preservation
- Blanks

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Each category is further described in the following sections.

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Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Two of the cPAHs, reported as benzo(a)anthracene and dibenz(a,h)anthracene were detected at concentrations greater than the MDL in method blank MB 580-274804/1-A. The associated sample results were non-detect, therefore not qualified.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria except.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

## Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

#### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-77584-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-77584-1.

#### Laboratory Duplicates

Laboratory duplicate was not performed for SDG 580-77584-1.

## CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

 Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.

- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blank and trip blank samples
  were free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

## REFERENCES

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

## **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-77584-1	05/23/2018	09:00	Regular
Trip Blank	580-77584-2	05/23/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

SDG: sample delivery group

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Loc: 580 77584

Short Hold

Rush

Chain of **Custody Record** 

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# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77584-1

Client Sample ID: Outfall #002

Lab Sample ID: 580-77584-1 Date Collected: 05/23/18 09:00 Date Received: 05/26/18 11:00

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			05/29/18 20:27	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123			-		05/29/18 20:27	1
Toluene-d8 (Surr)	105		79 - 122					05/29/18 20:27	1
4-Bromofluorobenzene (Surr)	99		78 - 119					05/29/18 20:27	1
Dibromofluoromethane (Surr)	100		70 - 120					05/29/18 20:27	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 120					05/29/18 20:27	1

	Dil Fac	
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Method: 8270C SIM - Semive	olatile Organic Comp	oounds (G	C/MS SIM)						
Analyte	Result (	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.022	0.0022	ug/L		05/26/18 12:15	05/29/18 14:38	1
Benzo[a]pyrene	ND		0.022	0.0032	ug/L		05/26/18 12:15	05/29/18 14:38	1
Benzo[b]fluoranthene	ND		0.022	0.0087	ug/L		05/26/18 12:15	05/29/18 14:38	1
Benzo[k]fluoranthene	ND		0.032	0.0097	ug/L		05/26/18 12:15	05/29/18 14:38	1
Chrysene	ND		0.022	0.0065	ug/L		05/26/18 12:15	05/29/18 14:38	1
Dibenz(a,h)anthracene	ND		0.022	0.0022	ug/L		05/26/18 12:15	05/29/18 14:38	1
Indeno[1,2,3-cd]pyrene	ND		0.022	0.0076	ug/L		05/26/18 12:15	05/29/18 14:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	63		53 _ 120				05/26/18 12:15	05/29/18 14:38	1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)											
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac		
Gasoline	ND		0.25	0.10	mg/L			05/26/18 16:40	1		
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac		
4-Bromofluorobenzene (Surr)	91		50 - 150			_		05/26/18 16:40	1		
Trifluorotoluene (Surr)	95		50 - 150					05/26/18 16:40	1		

Method: NWTPH-Dx - Semi-V	olatile Petroleum I	Products by	y NWTPH with	Silica Gel	l Cleanup				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11	0.066	mg/L		05/30/18 09:16	05/31/18 15:25	1
Motor Oil (>C24-C36)	ND		0.36	0.098	mg/L		05/30/18 09:16	05/31/18 15:25	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	78		50 - 150				05/30/18 09:16	05/31/18 15:25	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77584-1

\_\_\_\_

Client Sample ID: Trip Blank

Date Collected: 05/23/18 00:01 Date Received: 05/26/18 11:00 Lab Sample ID: 580-77584-2

Matrix: Water

Analyte	Compounds (GC : Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			05/29/18 15:00	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)			74 - 123			-		05/29/18 15:00	1
Toluene-d8 (Surr)	106		79 - 122					05/29/18 15:00	1
4-Bromofluorobenzene (Surr)	99		78 - 119					05/29/18 15:00	1
Dibromofluoromethane (Surr)	99		70 - 120					05/29/18 15:00	1
1,2-Dichloroethane-d4 (Surr)	105		70 - 120					05/29/18 15:00	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			05/26/18 16:08	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	93	-	50 - 150			=		05/26/18 16:08	1
Trifluorotoluene (Surr)	104		50 - 150					05/26/18 16:08	1

6/1/2018

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# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-77727-1

FROM: Dilip Kumar Former Unocal

DATE: June 19, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

## INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-77727-1 for 1 water sample, 1 field duplicate and 1 trip blank collected on May 29, 2018. Matrix spike/matrix spike duplicates (MS/MSD) were prepared for 1 water sample. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

## **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results, MS/MSD results and surrogate recoveries.

Each category is further described in the following sections.

#### Data Completeness

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

## **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### Blanks

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

One of the cPAH, reported as benzo(a)anthracene was detected at concentration greater than the MDL in method blank MB 580-275384/1-A. The associated sample results were less than five times the blank value, therefore associated sample results were qualified as non-detect (U).

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
Outfall #002	МВ	8270C SIM	benzo(a)anthracene	ug/L	0.00274	0.0049	U
DUP-1	МВ	8270C SIM	benzo(a)anthracene	ug/L	0.00274	0.0050	U

Notes:

MB: method blank

SIM: selective ion monitoring

U: non-detect

ug/L: micrograms per liter

Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

#### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit			
NE	NE	NE	NE			

## Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

## Matrix spike/Matrix spike duplicates

MS and MSD analysis must exhibit a percent recoveries and relative percent differences within the laboratory's acceptance criteria. The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where compound concentration detected in the parent sample exceeds the MS/MSD concentration by factor four.

A MS/MSD was performed using sample Outfall #002 and the results were observed within the acceptance criteria besides for one cPAH, benzo[a]anthracene. The MS recovery result for benzo[a]anthracene was observed 2% low bias compared to the acceptance criteria. The associated benzo[a]anthracene parent

sample and duplicate sample results were already qualified for blank contamination as "U"; therefore, not changed as UJ.

Samples associated with MS/MSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	MS Recovery	MSD Recovery	RPD	Validation Qualifier	Laboratory Limit
Outfall #002	Benzo[a]anthracene	59%	68%	13	U	61-120

Note:

U: non-detect

#### Field Duplicates

Field duplicate was collected for SDG 580-77727-1 and all precision criteria were met.

Duplicate sample ID and Parent field sample ID were updated in the following table:

Duplicate Sample ID	Field Sample ID
DUP-1	Outfall #002

## **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-77727-1.

## **CONCLUSION**

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD, MS/MSD and FD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate, LCS and MS recoveries. Accuracy
  was acceptable. One MS result exhibited low recovery by 2%, therefore results were qualified as
  estimated and the data is considered as valid. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time. One of the cPAH, reported as benzo(a)anthracene was detected in the associated laboratory method blank; this laboratory method blank detect resulted in associated samples detected data qualified as non-detect. The trip blank was free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

# **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

# **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-77727-1	05/29/2018	16:00	Regular
DUP-1	580-77727-2	05/29/2018	16:10	Field Duplicate
Trip Blank	580-77727-3	05/29/2018	NA	Trip Blank

Note: NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
580-77727-1	Outfall #002	REG	580-77727-1	8270C SIM	benzo[a]anthracene	0.0049	ug/L	JBF1	U	BL1, MSL	N
580-77727-2	DUP-1	FD	580-77727-1	8270C SIM	benzo[a]anthracene	0.0050	ug/L	J B	U	BL1, MSL	N

Notes:

REG: regular FD: field duplicate

SDG: sample delivery group SIM: selective ion monitoring

J: the concentration is an approximate value

B: compound was found in the laboratory method blank and sample

F1: MS and/or MSD recovery is outside acceptance limits

U: non-detect

BL1: result less than some multiple of that found in laboratory method blank

MSL: MS recovery was below the lower control limit

ug/L: micrograms per liter N: analyte not detected



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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Short	Hold	

Rush

Chain of **Custody Record** 

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# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77727-1

Client Sample ID: Outfall #002 Lab Sample ID: 580-77727-1 Date Collected: 05/29/18 16:00

**Matrix: Water** 

Date Received: 05/31/18 14:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			06/06/18 17:21	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123					06/06/18 17:21	1
Toluene-d8 (Surr)	103		79 - 122					06/06/18 17:21	1
4-Bromofluorobenzene (Surr)	99		78 - 119					06/06/18 17:21	1
Dibromofluoromethane (Surr)	96		70 - 120					06/06/18 17:21	1
1,2-Dichloroethane-d4 (Surr)	103		70 - 120					06/06/18 17:21	1

Method: 8270C SIM - Semivolatile Organic Compounds (GC/MS SIM)  Analyte Result Qualifier RL MDL Unit D Prepared Analyzed Dil										
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
Benzo[a]anthracene	0.0049	JBF1 U	0.022	0.0022	ug/L		06/05/18 09:44	06/07/18 10:53	1	
Benzo[a]pyrene	ND		0.022	0.0032	ug/L		06/05/18 09:44	06/07/18 10:53	1	
Benzo[b]fluoranthene	ND		0.022	0.0087	ug/L		06/05/18 09:44	06/07/18 10:53	1	
Benzo[k]fluoranthene	ND		0.032	0.0097	ug/L		06/05/18 09:44	06/07/18 10:53	1	
Chrysene	ND		0.022	0.0065	ug/L		06/05/18 09:44	06/07/18 10:53	1	
Dibenz(a,h)anthracene	0.0061	J	0.022	0.0022	ug/L		06/05/18 09:44	06/07/18 10:53	1	
Indeno[1,2,3-cd]pyrene	ND		0.022	0.0076	ug/L		06/05/18 09:44	06/07/18 10:53	1	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac	
Terphenyl-d14	74		53 - 120				06/05/18 09:44	06/07/18 10:53	1	

Method: NWTPH-Gx - Northw	est - Volatile	Petroleur	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			06/02/18 19:56	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
							•	•	
4-Bromofluorobenzene (Surr)	90		50 - 150				<u> </u>	06/02/18 19:56	1

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup										
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
#2 Diesel (C10-C24)	ND		0.12	0.072	mg/L		06/04/18 10:56	06/06/18 15:47	1	
Motor Oil (>C24-C36)	ND		0.39	0.11	mg/L		06/04/18 10:56	06/06/18 15:47	1	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac	
o-Terphenyl	68		50 - 150				06/04/18 10:56	06/06/18 15:47	1	

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77727-1

7-2

Client Sample ID: DUP-1
Date Collected: 05/29/18 16:10

Lab Sample ID: 580-77727-2

**Matrix: Water** 

Date	Received:	05/31/18	14:00
Date	Conecteu.	03/23/10	10.10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			06/06/18 18:35	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	103		74 - 123					06/06/18 18:35	1
Toluene-d8 (Surr)	105		79 - 122					06/06/18 18:35	1
4-Bromofluorobenzene (Surr)	102		78 - 119					06/06/18 18:35	1
Dibromofluoromethane (Surr)	101		70 - 120					06/06/18 18:35	1
1,2-Dichloroethane-d4 (Surr)	104		70 - 120					06/06/18 18:35	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	0.0050	JB U	0.022	0.0022	ug/L		06/05/18 09:44	06/07/18 11:59	1
Benzo[a]pyrene	ND		0.022	0.0032	ug/L		06/05/18 09:44	06/07/18 11:59	1
Benzo[b]fluoranthene	ND		0.022	0.0086	ug/L		06/05/18 09:44	06/07/18 11:59	1
Benzo[k]fluoranthene	ND		0.032	0.0097	ug/L		06/05/18 09:44	06/07/18 11:59	1
Chrysene	ND		0.022	0.0065	ug/L		06/05/18 09:44	06/07/18 11:59	1
Dibenz(a,h)anthracene	0.0060	J	0.022	0.0022	ug/L		06/05/18 09:44	06/07/18 11:59	1
Indeno[1,2,3-cd]pyrene	ND		0.022	0.0075	ug/L		06/05/18 09:44	06/07/18 11:59	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	65		53 - 120				06/05/18 09:44	06/07/18 11:59	1

Method: NWTPH-Gx - North	west - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			06/02/18 17:21	1
0	0/ Daggy (2011)	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Surrogate	%Recovery	Qualifier	LIIIIII				rrepared	Allalyzeu	Diriac
4-Bromofluorobenzene (Surr)	90	Qualifier	50 - 150				Trepared	06/02/18 17:21	1

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup										
Analyte	Result Qu	ıalifier RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac		
#2 Diesel (C10-C24)	ND	0.11	0.067	mg/L		06/04/18 10:56	06/06/18 16:53	1		
Motor Oil (>C24-C36)	ND	0.36	0.099	mg/L		06/04/18 10:56	06/06/18 16:53	1		
Surrogate	%Recovery Qu	ualifier Limits				Prepared	Analyzed	Dil Fac		
o-Terphenyl	72	50 - 150				06/04/18 10:56	06/06/18 16:53	1		

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77727-1

**Client Sample ID: Trip Blank** 

Lab Sample ID: 580-77727-3

Matrix: Water

Date Collected: 05/29/18 00:01 Date Received: 05/31/18 14:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			06/06/18 16:08	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123					06/06/18 16:08	1
Toluene-d8 (Surr)	104		79 - 122					06/06/18 16:08	1
4-Bromofluorobenzene (Surr)	102		78 - 119					06/06/18 16:08	1
Dibromofluoromethane (Surr)	98		70 - 120					06/06/18 16:08	1
1,2-Dichloroethane-d4 (Surr)	101		70 - 120					06/06/18 16:08	1

Method: NWTPH-Gx - Nortl	hwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			06/02/18 14:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		50 - 150			-		06/02/18 14:46	1
Trifluorotoluene (Surr)	100		50 - 150					06/02/18 14:46	

# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-77886-1

FROM: Dilip Kumar Former Unocal

DATE: June 19, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-77886-1 for 1 water sample and 1 trip blank collected on June 07, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

#### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

A method blank was analyzed for each method. No method blank contamination was detected.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier	
NE	NE	NE	NE	NE	NE	NE	NE	

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-77886-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-77886-1.

#### Laboratory Duplicates

Laboratory duplicate was not performed for SDG 580-77886-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not

note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time. The method blank and trip blank samples were free of contamination with no qualification required.

- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-77886-1	06/07/2018	08:45	Regular
Trip Blank	580-77886-2	06/07/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

SDG: sample delivery group



TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

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# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77886-1

Client Sample ID: Outfall #002 Lab Sample ID: 580-77886-1 Date Collected: 06/07/18 08:45

Matrix: Water

Date Received: 06/07/18 11:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	2.9		1.0	0.53	ug/L			06/11/18 14:34	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123			-		06/11/18 14:34	1
Toluene-d8 (Surr)	107		79 - 122					06/11/18 14:34	1
4-Bromofluorobenzene (Surr)	103		78 - 119					06/11/18 14:34	1
Dibromofluoromethane (Surr)	98		70 - 120					06/11/18 14:34	1
1,2-Dichloroethane-d4 (Surr)	99		70 - 120					06/11/18 14:34	1

Method: 8270C SIM - Sen	nivolatile Organic Compo	ounds (GC/MS	S SIM)					
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND ND	0.023	0.0023	ug/L		06/08/18 09:38	06/12/18 18:14	1
Benzo[a]pyrene	ND	0.023	0.0034	ug/L		06/08/18 09:38	06/12/18 18:14	1
Benzo[b]fluoranthene	ND	0.023	0.0090	ug/L		06/08/18 09:38	06/12/18 18:14	1
Benzo[k]fluoranthene	ND	0.034	0.010	ug/L		06/08/18 09:38	06/12/18 18:14	1
Chrysene	ND	0.023	0.0068	ug/L		06/08/18 09:38	06/12/18 18:14	1
Dibenz(a,h)anthracene	ND	0.023	0.0023	ug/L		06/08/18 09:38	06/12/18 18:14	1
Indeno[1,2,3-cd]pyrene	ND	0.023	0.0079	ug/L		06/08/18 09:38	06/12/18 18:14	1
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	72	53 - 120				06/08/18 09:38	06/12/18 18:14	1

Method: NWTPH-Gx - Northw	est - Volatile Petro	oleum Products (GC	)				
Analyte	Result Qualifi	ier RL	MDL Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND	0.25	0.10 mg/L			06/12/18 18:45	1
2					_		5=
Surrogate	%Recovery Qualifi	ier Limits			Prepared	Analyzed	Dii Fac
Surrogate 4-Bromofluorobenzene (Surr)	%Recovery Qualifi	ier <u>Limits</u> 50 - 150			Prepared	Analyzed 06/12/18 18:45	Dil Fac

Method: NWTPH-Dx - Se	mi-Volatile Petroleum Prod	ucts by NW7	PH with	Silica G	Sel Cle	eanup		
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND ND	0.12	0.073	mg/L		06/11/18 13:05	06/12/18 14:24	1
Motor Oil (>C24-C36)	ND	0.40	0.11	mg/L		06/11/18 13:05	06/12/18 14:24	1
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	106	50 - 150				06/11/18 13:05	06/12/18 14:24	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-77886-1

Lab Sample ID: 580-77886-2

Matrix: Water

Client Sample ID: Trip Blank Date Collected: 06/07/18 00:00

Date Received: 06/07/18 11:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			06/11/18 12:56	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123					06/11/18 12:56	1
Toluene-d8 (Surr)	106		79 - 122					06/11/18 12:56	1
4-Bromofluorobenzene (Surr)	100		78 - 119					06/11/18 12:56	1
Dibromofluoromethane (Surr)	99		70 - 120					06/11/18 12:56	1
1,2-Dichloroethane-d4 (Surr)	102		70 - 120					06/11/18 12:56	1

Method: NWTPH-Gx - Nort	hwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			06/08/18 17:16	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		50 - 150			-		06/08/18 17:16	1

6/14/2018

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# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-78119-1

FROM: Dilip Kumar Former Unocal

DATE: July 03, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-78119-1 for 1 water sample and 1 trip blank collected on June 15, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

### **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### Holding Times and Preservation

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

A method blank was analyzed for each method. No method blank contamination was detected.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance besides for three cPAHs, benzo[a]anthracene, benzo[a]pyrene and benzo[b]fluoranthene. The LCS and LCSD recoveries for cPAHs were observed the range of 1% to 7% high bias compared to the acceptance criteria. The associated sample results were non-detect, therefore not qualified.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

#### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-78119-1.

### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-78119-1.

### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-78119-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.

- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blank and trip blank samples
  were free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-78119-1	06/15/2018	09:55	Regular
Trip Blank	580-78119-2	06/15/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

SDG: sample delivery group

# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-78160-1

FROM: Dilip Kumar Former Unocal

DATE: July 03, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-78160-1 for 1 water sample and 1 trip blank collected on June 18, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

### **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### Holding Times and Preservation

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

A method blank was analyzed for each method. No method blank contamination was detected.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier	
NE	NE	NE	NE	NE	NE	

### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-78160-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-78160-1.

#### Laboratory Duplicates

Laboratory duplicate was not performed for SDG 580-78160-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not

note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time. The method blank and trip blank samples were free of contamination with no qualification required.

- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose	
Outfall #002	Outfall #002 580-78160-1		9:00	Regular	
Trip Blank	580-78160-2	06/18/2018	NA	Trip Blank	

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

SDG: sample delivery group

# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-78490-1

FROM: Dilip Kumar Former Unocal

DATE: July 27, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-78490-1 for 1 water sample and 1 trip blank collected on June 29, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

### **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### Holding Times and Preservation

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

A method blank was analyzed for each method. No method blank contamination was detected.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance besides for one cPAH, Indeno[1,2,3-cd] pyrene. The relative percent difference of LCS and LCSD recoveries for Indeno[1,2,3-cd] pyrene was observed 5% high bias compared to the acceptance criteria. The associated sample results were non-detect, therefore not qualified.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

#### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-78490-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-78490-1.

#### Laboratory Duplicates

Laboratory duplicate was not performed for SDG 580-78490-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.

- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blank and trip blank samples
  were free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### REFERENCES

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose	
Outfall #002	580-78490-1	06/29/2018	10:45	Regular	
Trip Blank	580-78490-2	06/29/2018	NA	Trip Blank	

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

SDG: sample delivery group

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# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78490-1

Client Sample ID: Outfall #002 Lab Sample ID: 580-78490-1 Date Collected: 06/29/18 10:45

Matrix: Water

Date Received: 06/30/18 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			07/04/18 02:29	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	99		74 - 123			_		07/04/18 02:29	1
Toluene-d8 (Surr)	106		79 - 122					07/04/18 02:29	1
4-Bromofluorobenzene (Surr)	100		78 - 119					07/04/18 02:29	1
Dibromofluoromethane (Surr)	100		70 - 120					07/04/18 02:29	1
1,2-Dichloroethane-d4 (Surr)	105		70 - 120					07/04/18 02:29	1
Method: 8270C SIM - Semivola	atile Organic Com	npounds (G	C/MS SIM)						
Analyte	Result	Qualifier	ŔL	MDL	Unit	D	Prepared	Analyzed	Dil Fac

Method: 8270C SIM - Semivola	tile Organic Compounds	s (GC/MS SIM)						
Analyte	Result Qualifier	r RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND	0.055	0.015	ug/L		07/02/18 14:04	07/05/18 18:42	1
Benzo[a]pyrene	ND	0.11	0.012	ug/L		07/02/18 14:04	07/05/18 18:42	1
Benzo[b]fluoranthene	ND	0.055	0.012	ug/L		07/02/18 14:04	07/05/18 18:42	1
Benzo[k]fluoranthene	ND	0.055	0.013	ug/L		07/02/18 14:04	07/05/18 18:42	1
Chrysene	ND	0.11	0.017	ug/L		07/02/18 14:04	07/05/18 18:42	1
Dibenz(a,h)anthracene	ND	0.11	0.011	ug/L		07/02/18 14:04	07/05/18 18:42	1
Indeno[1,2,3-cd]pyrene	ND *	0.055	0.015	ug/L		07/02/18 14:04	07/05/18 18:42	1
Surrogate	%Recovery Qualifie	r Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	77	53 - 120				07/02/18 14:04	07/05/18 18:42	1

Method: NWTPH-Gx - Northwe	est - Volatile Petro	oleum Prod	ucts (GC)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	0.10	J	0.25	0.10	mg/L			06/30/18 23:43	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	89		50 - 150			_		06/30/18 23:43	1
Trifluorotoluene (Surr)	84		50 - 150					06/30/18 23:43	1

Method: NWTPH-Dx - Semi-Vola	itile Petroleum	Products by	y NWTPH with	Silica Gel	l Cleanup	)			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.14	0.083	mg/L		07/05/18 10:41	07/06/18 12:43	1
Motor Oil (>C24-C36)	ND		0.45	0.12	mg/L		07/05/18 10:41	07/06/18 12:43	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	78		50 - 150				07/05/18 10:41	07/06/18 12:43	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78490-1

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Client Sample ID: Trip Blank

Date Collected: 06/29/18 00:00 Date Received: 06/30/18 10:00 Lab Sample ID: 580-78490-2

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			07/03/18 23:14	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123			-		07/03/18 23:14	1
Toluene-d8 (Surr)	105		79 - 122					07/03/18 23:14	1
4-Bromofluorobenzene (Surr)	102		78 - 119					07/03/18 23:14	1
Dibromofluoromethane (Surr)	100		70 - 120					07/03/18 23:14	1
1.2-Dichloroethane-d4 (Surr)	107		70 - 120					07/03/18 23:14	1

Analyte	Result	Qualifier	ucts (GC) RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			06/30/18 18:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	91	-	50 - 150			=		06/30/18 18:03	1
Trifluorotoluene (Surr)	85		50 - 150					06/30/18 18:03	1

7/10/2018

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# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-78657-1

FROM: Dilip Kumar Former Unocal

DATE: July 27, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-78657-1 for 1 water sample and 1 trip blank collected on July 05, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

#### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water Samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	<b>Holding Time</b>	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

A method blank was analyzed for each method. No method blank contamination was detected.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance besides for two cPAHs, Dibenz(a, h)anthracene and Indeno[1,2,3-cd] pyrene. The LCS and/or LCSD recoveries for Dibenz(a, h)anthracene and Indeno[1,2,3-cd] pyrene were observed at 5% and 1% high bias compared to the acceptance criteria, respectively. The associated sample results were non-detect, therefore not qualified.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

#### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-78657-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-78657-1.

#### Laboratory Duplicates

Laboratory duplicate was not performed for SDG 580-78657-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.

- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blank and trip blank samples
  were free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### REFERENCES

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-78657-1	07/05/2018	14:45	Regular
Trip Blank	580-78657-2	07/05/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

SDG: sample delivery group

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Rush
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Short Hold

Chain of Custody Record

Client Arcadis			Client	Contact	Pet	ev C	aw	glgr	al							Date	-	1/5	5/1	8	Cha	iin of Cusi	tody Nur	nber 3	7650
Address 1100 Olive way, Suite 8	00,		Telepho	ne Nur	nber (Area	Code)/F	ax Nun	nber								Lab	Numb	er			Paţ	ge		of	1
City Seattle Project Name and Location (State) Edwards Tex	WA 21p	9810	Sample En Billing	: Kv	uege	ex '	Lab Coi Elò	ntact Liv	ic L	υa	iver	EPA 624	ž	3	<u>≥</u> 3001 	alysis ( re spac	Attaci ce is n	list in	l) Loc	: 580		Spe	ecial In	struci	ions/
Contract/Purchase Order/Quote No.				1 9	Matrix		w   <del>-</del>	Pre	ntaine serva	tives	; ;	Benzeme E	NWTPH-	NWTOH-DX	1882				78	365	7	Con	ditions	s of Re	eceipt
Sample I.D. and Location/Descr. (Containers for each sample may be combin	ption ed on one line)	Date	Time	Air	Soil Sed.		Umpres. HZS04	HNO3	HCI	NaOH	ZnAc/ NaOH	Rev	2	× ×	CCPATKS			] ,	t	,	-	1	<i>a</i> .	_	
Outfall #002		7/5/18	1445	- $($	+		2		8			$\Diamond$		<i>X</i> /								PH=	١, لا	+	
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																) Disp		l l							
Cooler  Yes No Cooler Temp:	Possible H	lazard Identification azard 🔲 Flar		] Skin	Irritant	☐ Poi				*****	wn 🗆		•			Arch				Mon		A fee maj are retaine			
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## **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78657-1

Client Sample ID: Outfall #002 Lab Sample ID: 580-78657-1 Date Collected: 07/05/18 14:45

Matrix: Water

Date Received: 07/06/18 11:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			07/09/18 18:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123			•		07/09/18 18:46	1
Toluene-d8 (Surr)	104		79 - 122					07/09/18 18:46	1
4-Bromofluorobenzene (Surr)	101		78 - 119					07/09/18 18:46	1
Dibromofluoromethane (Surr)	100		70 - 120					07/09/18 18:46	1
1,2-Dichloroethane-d4 (Surr)	110		70 - 120					07/09/18 18:46	1

Method: 8270C SIM - Semivo	latile Organi	c Compou	inds (GC/MS	SIM)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.050	0.014	ug/L		07/10/18 09:51	07/19/18 15:17	1
Benzo[a]pyrene	ND		0.10	0.011	ug/L		07/10/18 09:51	07/19/18 15:17	1
Benzo[b]fluoranthene	ND		0.050	0.011	ug/L		07/10/18 09:51	07/19/18 15:17	1
Benzo[k]fluoranthene	ND		0.050	0.012	ug/L		07/10/18 09:51	07/19/18 15:17	1
Chrysene	ND		0.10	0.016	ug/L		07/10/18 09:51	07/19/18 15:17	1
Dibenz(a,h)anthracene	ND	<b>≠</b>	0.10	0.010	ug/L		07/10/18 09:51	07/19/18 15:17	1
Indeno[1,2,3-cd]pyrene	ND	•€	0.050	0.014	ug/L		07/10/18 09:51	07/19/18 15:17	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	81		53 - 120				07/10/18 09:51	07/19/18 15:17	1

Method: NWTPH-Gx - Nort	hwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			07/12/18 07:41	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	99		50 - 150					07/12/18 07:41	1
Trifluorotoluene (Surr)	99		50 - 150					07/12/18 07:41	1

Method: NWTPH-Dx - Se	emi-Volatile Petrol	eum Prod	ucts by NW1	PH with	Silica (	Gel Cle	eanup		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11	0.067	mg/L		07/10/18 09:44	07/12/18 13:19	1
Motor Oil (>C24-C36)	ND		0.36	0.099	mg/L		07/10/18 09:44	07/12/18 13:19	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	87		50 - 150				07/10/18 09:44	07/12/18 13:19	1

## **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78657-1

7-2

Client Sample ID: Trip Blank Date Collected: 07/05/18 00:00 Lab Sample ID: 580-78657-2

Matrix: Water

Duto	Conceted.	01/00/10	00.00
Date	Received:	07/06/18	3 11:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			07/09/18 17:33	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123			•		07/09/18 17:33	1
Toluene-d8 (Surr)	102		79 - 122					07/09/18 17:33	1
4-Bromofluorobenzene (Surr)	100		78 - 119					07/09/18 17:33	1
Dibromofluoromethane (Surr)	101		70 - 120					07/09/18 17:33	1
1,2-Dichloroethane-d4 (Surr)	109		70 - 120					07/09/18 17:33	1

Method: NWTPH-Gx - Nort	hwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			07/11/18 20:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94		50 - 150			=		07/11/18 20:48	1
Trifluorotoluene (Surr)	100		50 - 150					07/11/18 20:48	1

## **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-78765-1

FROM: Dilip Kumar Former Unocal

DATE: July 27, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

## INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-78765-1 for 1 water sample and 1 trip blank collected on July 11, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

## **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### Holding Times and Preservation

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	<b>Holding Time</b>	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

A method blank was analyzed for each method. No method blank contamination was detected.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance besides for one cPAH, Indeno[1,2,3-cd] pyrene. The LCS and/or LCSD recoveries for Indeno[1,2,3-cd] pyrene were observed in the range of 3% to 4% high bias compared to the acceptance criteria. The associated sample results were non-detect, therefore not qualified.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	d Sample ID Parameter LCS Recovery	LCSD Recovery	RPD	Validation Qualifier	
NE	NE	NE	NE	NE	NE

### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-78765-1.

### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-78765-1.

### Laboratory Duplicates

Laboratory duplicate was not performed for SDG 580-78765-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.

- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blank and trip blank samples
  were free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### REFERENCES

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	aboratory Sample ID Sample Date		Sample Purpose		
Outfall #002	580-78765-1	07/11/2018	08:15	Regular		
Trip Blank	580-78765-2	07/11/2018	NA	Trip Blank		

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

SDG: sample delivery group

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DISTRIBUTION: WHITE - Stays with the Samples; CANARY - Returned to Client with Report; PINK - Field Copy

TAL-8274-580 (0210) 7/26/2018

## **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Collected: 07/11/18 08:15

Date Received: 07/11/18 11:55

Client Sample ID: Outfall #002

TestAmerica Job ID: 580-78765-1

Lab Sample ID: 580-78765-1

Matrix: Water

ter

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Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			07/16/18 19:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	101		74 - 123			-		07/16/18 19:48	1
Toluene-d8 (Surr)	103		79 - 122					07/16/18 19:48	1
4-Bromofluorobenzene (Surr)	101		78 - 119					07/16/18 19:48	1
Dibromofluoromethane (Surr)	102		70 - 120					07/16/18 19:48	1
1,2-Dichloroethane-d4 (Surr)	107		70 - 120					07/16/18 19:48	1

Analyte	Result Qual	lifier RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND	0.28	0.078	ug/L		07/15/18 11:18	07/18/18 02:18	5
Benzo[a]pyrene	ND	0.56	0.062	ug/L		07/15/18 11:18	07/18/18 02:18	5
Benzo[b]fluoranthene	ND	0.28	0.062	ug/L		07/15/18 11:18	07/18/18 02:18	5
Benzo[k]fluoranthene	ND	0.28	0.067	ug/L		07/15/18 11:18	07/18/18 02:18	5
Chrysene	ND	0.56	0.090	ug/L		07/15/18 11:18	07/18/18 02:18	5
Dibenz(a,h)anthracene	ND	0.56	0.056	ug/L		07/15/18 11:18	07/18/18 02:18	5
Indeno[1,2,3-cd]pyrene	ND <del>*</del>	0.28	0.078	ug/L		07/15/18 11:18	07/18/18 02:18	5
Surrogate	%Recovery Qual	lifier Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14		53 - 120				07/15/18 11:18	07/18/18 02:18	5

Method: NWTPH-Gx - Northwes	st - Volatile Petro	oleum Prod	ucts (GC)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			07/25/18 20:56	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)			50 - 150			-		07/25/18 20:56	1
Trifluorotoluene (Surr)	101		50 - 150					07/25/18 20:56	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.12	0.070	mg/L		07/15/18 11:10	07/16/18 23:10	1
Motor Oil (>C24-C36)	ND		0.38	0.10	mg/L		07/15/18 11:10	07/16/18 23:10	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	79		50 - 150				07/15/18 11:10	07/16/18 23:10	1

## **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-78765-1

Lab Sample ID: 580-78765-2

Matrix: Water

D Sample ID. 560-76765-

Client Sample ID: Trip Blank
Date Collected: 07/11/18 00:00
Date Received: 07/11/18 11:55

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			07/16/18 16:58	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123			-		07/16/18 16:58	1
Toluene-d8 (Surr)	105		79 - 122					07/16/18 16:58	1
4-Bromofluorobenzene (Surr)	100		78 - 119					07/16/18 16:58	1
Dibromofluoromethane (Surr)	101		70 - 120					07/16/18 16:58	1
1,2-Dichloroethane-d4 (Surr)	106		70 <sub>-</sub> 120					07/16/18 16:58	1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND ND		0.25	0.10	mg/L			07/25/18 20:25	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	94	-	50 - 150			=		07/25/18 20:25	1
Trifluorotoluene (Surr)	105		50 - 150					07/25/18 20:25	1

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## **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-79184-1

FROM: Dilip Kumar Former Unocal

DATE: September 05, 2018

SITE: Edmonds Bulk Fuel Terminal Edmonds,

Washington

## INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-79184-1 for 1 water sample, 1 field duplicate and 1 trip blank collected on July 26, 2018. Matrix spike/matrix spike duplicates (MS/MSD) were prepared for 1 water sample. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

## **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results, MS/MSD results and surrogate recoveries.

Each category is further described in the following sections.

### Data Completeness

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### Blanks

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### **Deuterated Monitoring Compounds (Surrogates)**

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria besides for three cPAHs, benzo[b]fluoranthene, dibenz(a,h)anthracene and indeno[1,2,3-cd]pyrene. The relative percent difference of LCS and/or LCSD recoveries for these three cPAHs were observed range of 1% to 14% high bias compared to the acceptance criteria. The associated sample results were non-detect, therefore not qualified.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

## Matrix spike/Matrix spike duplicates

Matrix spikes were prepared in duplicate and analyzed. MS and MSD analysis must exhibit a percent recoveries and relative percent differences within the laboratory's acceptance criteria.

The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where compound concentration detected in the parent sample exceeds the MS/MSD concentration by factor four.

A MS/MSD was performed using sample Outfall #002 and the results were observed within the acceptance criteria besides for two cPAHs, dibenz(a,h)anthracene and indeno[1,2,3-cd]pyrene. The relative percent difference of MS and MSD recoveries for these two cPAHs were observed range of 2% to 13% high bias compared to the acceptance criteria. The associated sample results were non-detect, therefore not qualified.

In addition, benzene RPD was exceeding the acceptance criteria. The associated sample result was non-detect therefore associated sample result was not qualified.

Samples associated with MS/MSD exhibited recoveries outside the control limit presented in the following table:

	Field Sample ID	Parameter	MS Recovery	MSD Recovery	RPD	Validation Qualifier	Laboratory Limit
Ī	NE	NE	NE	NE	NE	NE	NE

### Field Duplicates

Field duplicate was collected for SDG 580-79184-1 and all precision criteria were met.

Duplicate sample ID and Parent field sample ID were updated in the following table:

Duplicate Sample ID	Field Sample ID
Dup-1	Outfall 002

## **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-79184-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD, MS/MSD and FD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate, LCS and MS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blank and trip blank samples
  were free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

# **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-79184-1	07/26/2018	12:05	Regular
Dup-1	580-79184-3	07/26/2018	NA	Field Duplicate
Trip Blank	580-79184-2	07/26/2018	NA	Trip Blank

Note: NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

SDG: sample delivery group NE: not encountered

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Standard 72 hour		4 day 24 hour	Relinqui	shed by		meric	al Ca		// L	<i>8]¹</i>	0	13 I	<u>'5</u>		Receiv						Date	8/18	Time
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TestAmerica Job ID: 580-79184-1

Client Sample ID: Outfall #002

Date Collected: 07/26/18 12:05 Date Received: 07/27/18 13:15 Lab Sample ID: 580-79184-1

. Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND	F <del>2</del>	1.0	0.53	ug/L			07/31/18 19:42	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	107		74 - 123			-		07/31/18 19:42	1
Toluene-d8 (Surr)	101		79 - 122					07/31/18 19:42	1
4-Bromofluorobenzene (Surr)	102		78 - 119					07/31/18 19:42	1
Dibromofluoromethane (Surr)	97		70 - 120					07/31/18 19:42	1
1,2-Dichloroethane-d4 (Surr)	79		70 - 120					07/31/18 19:42	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.26	0.074	ug/L		08/01/18 09:57	08/02/18 17:36	5
Benzo[a]pyrene	ND		0.53	0.058	ug/L		08/01/18 09:57	08/02/18 17:36	5
Benzo[b]fluoranthene	ND	-	0.26	0.058	ug/L		08/01/18 09:57	08/02/18 17:36	5
Benzo[k]fluoranthene	ND		0.26	0.063	ug/L		08/01/18 09:57	08/02/18 17:36	5
Chrysene	ND		0.53	0.084	ug/L		08/01/18 09:57	08/02/18 17:36	5
Dibenz(a,h)anthracene	ND	F1 *	0.53	0.053	ug/L		08/01/18 09:57	08/02/18 17:36	5
Indeno[1,2,3-cd]pyrene	ND	F1.*	0.26	0.074	ug/L		08/01/18 09:57	08/02/18 17:36	5
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14			53 - 120				08/01/18 09:57	08/02/18 17:36	5

Method: NWTPH-Gx - North			•	•					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			08/04/18 21:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	84		50 - 150					08/04/18 21:54	1
Trifluorotoluene (Surr)	116		50 - 150					08/04/18 21:54	1

Method: NWTPH-Dx - Se	mi-Volatile Petroleum Prod	ucts by NW1	PH with	Silica G	Sel Cle	eanup		
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND ND	0.12	0.071	mg/L		07/31/18 10:17	08/01/18 13:04	1
Motor Oil (>C24-C36)	ND	0.38	0.10	mg/L		07/31/18 10:17	08/01/18 13:04	1
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	76	50 - 150				07/31/18 10:17	08/01/18 13:04	1

## **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79184-1

Lab Sample ID: 580-79184-2

**Matrix: Water** 

Client Sample ID: Trip Blank Date Collected: 07/26/18 00:00

Date Received: 07/27/18 13:15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			07/31/18 15:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	107		74 - 123					07/31/18 15:46	1
Toluene-d8 (Surr)	99		79 - 122					07/31/18 15:46	1
4-Bromofluorobenzene (Surr)	100		78 - 119					07/31/18 15:46	1
Dibromofluoromethane (Surr)	99		70 - 120					07/31/18 15:46	1
1,2-Dichloroethane-d4 (Surr)	82		70 - 120					07/31/18 15:46	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			08/04/18 23:27	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	84		50 - 150			-		08/04/18 23:27	1
Trifluorotoluene (Surr)	117		50 - 150					08/04/18 23:27	1

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Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

**Client Sample ID: Dup-1** 

Lab Sample ID: 580-79184-3

Matrix: Water

Date Collected: 07/26/18 00:00 Date Received: 07/27/18 13:15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			07/31/18 21:00	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	108		74 - 123					07/31/18 21:00	1
Toluene-d8 (Surr)	100		79 - 122					07/31/18 21:00	1
4-Bromofluorobenzene (Surr)	101		78 - 119					07/31/18 21:00	1
Dibromofluoromethane (Surr)	98		70 - 120					07/31/18 21:00	1
1,2-Dichloroethane-d4 (Surr)	78		70 - 120					07/31/18 21:00	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.27	0.075	ug/L		08/01/18 09:57	08/02/18 18:42	5
Benzo[a]pyrene	ND		0.54	0.059	ug/L		08/01/18 09:57	08/02/18 18:42	5
Benzo[b]fluoranthene	ND	*	0.27	0.059	ug/L		08/01/18 09:57	08/02/18 18:42	5
Benzo[k]fluoranthene	ND		0.27	0.064	ug/L		08/01/18 09:57	08/02/18 18:42	5
Chrysene	ND		0.54	0.086	ug/L		08/01/18 09:57	08/02/18 18:42	5
Dibenz(a,h)anthracene	ND	*	0.54	0.054	ug/L		08/01/18 09:57	08/02/18 18:42	5
Indeno[1,2,3-cd]pyrene	ND	*	0.27	0.075	ug/L		08/01/18 09:57	08/02/18 18:42	5
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenvl-d14	83		53 - 120				08/01/18 09:57	08/02/18 18:42	5

Method: NWTPH-Gx - Northw	vest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			08/04/18 23:58	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4 D			50 - 150					08/04/18 23:58	
4-Bromofluorobenzene (Surr)	86		50 - 150					06/04/16 23.36	ı

Method: NWTPH-Dx - Se	emi-Volatile Petro	leum Prod	ucts by NW1	PH with	Silica C	Gel Cle	eanup		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.12	0.071	mg/L		07/31/18 10:17	08/01/18 14:09	1
Motor Oil (>C24-C36)	ND		0.38	0.10	mg/L		07/31/18 10:17	08/01/18 14:09	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	79		50 - 150				07/31/18 10:17	08/01/18 14:09	1

## **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-79422-1

FROM: Dilip Kumar Former Unocal

DATE: September 05, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-79422-1 for 1 water sample and 1 trip blank collected on August 07, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

### **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

## **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	<b>Holding Time</b>	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

A method blank was analyzed for each method. No method blank contamination was detected.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID Surrogates		Recovery	Laboratory Limit
NE	NE	NE	NE

## Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance besides for one cPAH, indeno[1,2,3-cd]pyrene. The LCSD recovery for this cPAH was observed 1% high bias compared to the acceptance criteria. The associated sample result was non-detect, therefore not qualified.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

## Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-79422-1.

### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-79422-1.

### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-79422-1.

## CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.

- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blank and trip blank samples
  were free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### REFERENCES

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose		
Outfall #002	580-79422-1	08/07/2018	10:30	Regular		
Trip Blank - 2	580-79422-2	08/07/2018	NA	Trip Blank		

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

SDG: sample delivery group

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TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

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Chain of Custody Record

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Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

Client Sample ID: Outfall #002 Lab Sample ID: 580-79422-1 Matrix: Water

Date Collected: 08/07/18 10:30 Date Received: 08/07/18 12:05

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			08/15/18 04:49	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123					08/15/18 04:49	1
Toluene-d8 (Surr)	107		79 - 122					08/15/18 04:49	1
4-Bromofluorobenzene (Surr)	97		78 - 119					08/15/18 04:49	1
Dibromofluoromethane (Surr)	95		70 - 120					08/15/18 04:49	1
1,2-Dichloroethane-d4 (Surr)	96		70 - 120					08/15/18 04:49	

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.26	0.072	ug/L		08/10/18 11:14	08/14/18 21:37	5
Benzo[a]pyrene	ND		0.51	0.056	ug/L		08/10/18 11:14	08/14/18 21:37	5
Benzo[b]fluoranthene	ND		0.26	0.056	ug/L		08/10/18 11:14	08/14/18 21:37	5
Benzo[k]fluoranthene	ND		0.26	0.062	ug/L		08/10/18 11:14	08/14/18 21:37	5
Chrysene	ND		0.51	0.082	ug/L		08/10/18 11:14	08/14/18 21:37	5
Dibenz(a,h)anthracene	ND		0.51	0.051	ug/L		08/10/18 11:14	08/14/18 21:37	5
Indeno[1,2,3-cd]pyrene	ND	<u>~</u>	0.26	0.072	ug/L		08/10/18 11:14	08/14/18 21:37	5
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	95		53 - 120				08/10/18 11:14	08/14/18 21:37	5

Method: NWTPH-Gx - Nort Analyte		e Petroleui Qualifier	m Products ( RL	GC) MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L		-	08/10/18 01:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		50 - 150			-		08/10/18 01:13	1
Trifluorotoluene (Surr)	113		50 <sub>-</sub> 150					08/10/18 01:13	1

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup											
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac		
#2 Diesel (C10-C24)	ND		0.11	0.065	mg/L		08/08/18 09:57	08/08/18 23:01	1		
Motor Oil (>C24-C36)	0.19	J	0.35	0.096	mg/L		08/08/18 09:57	08/08/18 23:01	1		
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac		
o-Terphenyl	88		50 - 150				08/08/18 09:57	08/08/18 23:01	1		

## **Client Sample Results**

Client: ARCADIS U.S. Inc

Project/Site: Chevron Edmonds Terminal

TestAmerica Job ID: 580-79422-1

Lab Sample ID: 580-79422-2

Matrix: Water

Client Sample ID: Trip Blank - 2 Date Collected: 08/07/18 00:00

Date Received: 08/07/18 12:05

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			08/15/18 00:01	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	99		74 - 123					08/15/18 00:01	1
Toluene-d8 (Surr)	107		79 - 122					08/15/18 00:01	1
4-Bromofluorobenzene (Surr)	98		78 - 119					08/15/18 00:01	1
Dibromofluoromethane (Surr)	96		70 - 120					08/15/18 00:01	1
1,2-Dichloroethane-d4 (Surr)	95		70 - 120					08/15/18 00:01	1

Method: NWTPH-Gx - Norti	nwest - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			08/10/18 01:43	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	104		50 - 150			-		08/10/18 01:43	1
Trifluorotoluene (Surr)	119		50 - 150					08/10/18 01:43	1

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8/17/2018

## **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-79614-1

FROM: Dilip Kumar Former Unocal

DATE: September 11, 2018

SITE: Edmonds Bulk Fuel Terminal Edmonds,

Washington

## INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-79614-1 for 1 water sample and 1 trip blank collected on August 15, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

### **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

## **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	<b>Holding Time</b>	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

A method blank was analyzed for each method. No method blank contamination was detected.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit	
NE	NE	NE	NE	

## Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-79614-1.

### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-79614-1.

### Laboratory Duplicates

Laboratory duplicate was not performed for SDG 580-79614-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA quidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not

note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time. The method blank and trip blank samples were free of contamination with no qualification required.

- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-79614-1	08/15/2018	10:00	Regular
Trip Blank	580-79614-2	08/15/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

SDG: sample delivery group

Test/	<del>\</del> m	erio	Ca
THE LEADER II	N ENVIRON	IMENTAL	TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com

Rush
Short Hold

Chain of Custody Record

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# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Collected: 08/15/18 10:00

Date Received: 08/15/18 11:54

Client Sample ID: Outfall #002

TestAmerica Job ID: 580-79614-1

Lab Sample ID: 580-79614-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			08/16/18 23:28	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	94		74 - 123			-		08/16/18 23:28	1
Toluene-d8 (Surr)	106		79 - 122					08/16/18 23:28	1
4-Bromofluorobenzene (Surr)	101		78 - 119					08/16/18 23:28	1
Dibromofluoromethane (Surr)	101		70 - 120					08/16/18 23:28	1
1,2-Dichloroethane-d4 (Surr)	114		70 - 120					08/16/18 23:28	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.053	0.015	ug/L	<del></del>	08/17/18 13:42	08/21/18 00:37	1
Benzo[a]pyrene	ND		0.11	0.012	ug/L		08/17/18 13:42	08/21/18 00:37	1
Benzo[b]fluoranthene	ND		0.053	0.012	ug/L		08/17/18 13:42	08/21/18 00:37	1
Benzo[k]fluoranthene	ND		0.053	0.013	ug/L		08/17/18 13:42	08/21/18 00:37	1
Chrysene	ND		0.11	0.017	ug/L		08/17/18 13:42	08/21/18 00:37	1
Dibenz(a,h)anthracene	ND		0.11	0.011	ug/L		08/17/18 13:42	08/21/18 00:37	1
Indeno[1,2,3-cd]pyrene	ND		0.053	0.015	ug/L		08/17/18 13:42	08/21/18 00:37	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenvl-d14	65		53 - 120				08/17/18 13:42	08/21/18 00:37	

Method: NWTPH-Gx - Northwe	st - Volatile Petro	oleum Prod	ucts (GC)						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			08/27/18 19:18	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)			50 - 150			-		08/27/18 19:18	1

Method: NWTPH-Dx - Semi-\	/olatile Petroleum	Products by	y NWTPH with:	Silica Ge	l Cleanup	)			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.12	0.073	mg/L		08/26/18 14:00	08/27/18 14:28	1
Motor Oil (>C24-C36)	ND		0.39	0.11	mg/L		08/26/18 14:00	08/27/18 14:28	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	77		50 - 150				08/26/18 14:00	08/27/18 14:28	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Collected: 08/15/18 10:00

Date Received: 08/15/18 11:54

Surrogate

4-Bromofluorobenzene (Surr)

Trifluorotoluene (Surr)

**Client Sample ID: Trip Blank** 

TestAmerica Job ID: 580-79614-1

Lab Sample ID: 580-79614-2

Analyzed

08/27/18 20:19

08/27/18 20:19

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Dil Fac

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			08/16/18 17:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	96		74 - 123			_		08/16/18 17:46	1
Toluene-d8 (Surr)	104		79 - 122					08/16/18 17:46	1
4-Bromofluorobenzene (Surr)	101		78 - 119					08/16/18 17:46	1
Dibromofluoromethane (Surr)	101		70 - 120					08/16/18 17:46	1
1,2-Dichloroethane-d4 (Surr)	122	X	70 - 120					08/16/18 17:46	1
Method: NWTPH-Gx - Northwe	est - Volatile Petro	oleum Prod	ucts (GC)						
Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND	-	0.25	0.10	mg/L			08/27/18 20:19	1

Limits

50 - 150

50 - 150

%Recovery Qualifier

107

123

# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-79751-1

FROM: Dilip Kumar Former Unocal

DATE: September 11, 2018

SITE: Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-79751-1 for 1 water sample and 1 trip blank collected on August 21, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

#### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	<b>Holding Time</b>	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

A method blank was analyzed for each method. No method blank contamination was detected.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-79751-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-79751-1.

#### Laboratory Duplicates

Laboratory duplicate was not performed for SDG 580-79751-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not

note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time. The method blank and trip blank samples were free of contamination with no qualification required.

- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-79751-1	08/21/2018	10:30	Regular
Trip Blank	580-79751-2	08/21/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

SDG: sample delivery group

www.testamericainc.com

Chain of Custody Record

Client		Client Contact	tu (o	neboll	Date ( )   S /   S	Chain of Custody Nu	37489
Address 100 dly Way Svite	89)	Telephone Num.	ber (Area Code)/Fa		Lab Number	Page	of
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				580-79751 Chain	of Custody	Tuse sta	ded Sqc
				***************************************			
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				Cooler	Dsc: Med Blad FedEx: g: Babble 1286		
				Cust. S	Seal: YesNo_XLab Cour:X		
				Wel/Pa	acks/Dry lce/None Other:		
							~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Cooler Possible Ha.	zard Identification		I I	Sam	ple Disposal Disposal By Lab	(A fee may be ass	sessed if samples
☐ Yes ☐ No Cooler Temp: ☐ Non-Haz	ard 🗆 Flammat	ole 🗆 Skin Ir	ritant 🗀 Poise	on B 🔲 Unknown 🗀 A	Return To Client 🔲 Archive For Mont		
Turn Around Time Required (business days)		St.	اک م	QC Requirements (Specify)			
🗌 24 Hours 🔲 5 Days 🗀 10 Day.	s 🗌 15 Days	1 Other Sta	···				
1. Relinquished By Sign/Print		\$ 21/18	1035	1. Received By Sign/Print	Francisco Luna, Sr	Date 8/21/18	Time ) <b>U 3</b> 5
2. Relinquished By Sign/Print	чени	Date	Time	2. Received By Sign/Print	,	Date	Time
3. Relinquished By Sign/Print		Date	Time	3. Received By Sign/Print		Date	Time
Comments			1	1			

THE LEADER IN ENVIRONMENTAL TESTING

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Collected: 08/21/18 10:30

Date Received: 08/21/18 10:35

Client Sample ID: Outfall #002

TestAmerica Job ID: 580-79751-1

1

Lab Sample ID: 580-79751-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			08/22/18 23:21	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	97		74 - 123					08/22/18 23:21	1
Toluene-d8 (Surr)	107		79 - 122					08/22/18 23:21	1
4-Bromofluorobenzene (Surr)	97		78 - 119					08/22/18 23:21	1
Dibromofluoromethane (Surr)	95		70 - 120					08/22/18 23:21	1
1.2-Dichloroethane-d4 (Surr)	90		70 - 120					08/22/18 23:21	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND		0.057	0.016	ug/L		08/23/18 09:46	08/25/18 20:41	1
Benzo[a]pyrene	ND		0.11	0.013	ug/L		08/23/18 09:46	08/25/18 20:41	1
Benzo[b]fluoranthene	ND		0.057	0.013	ug/L		08/23/18 09:46	08/25/18 20:41	1
Benzo[k]fluoranthene	ND		0.057	0.014	ug/L		08/23/18 09:46	08/25/18 20:41	1
Chrysene	ND		0.11	0.018	ug/L		08/23/18 09:46	08/25/18 20:41	1
Dibenz(a,h)anthracene	ND		0.11	0.011	ug/L		08/23/18 09:46	08/25/18 20:41	1
Indeno[1,2,3-cd]pyrene	ND		0.057	0.016	ug/L		08/23/18 09:46	08/25/18 20:41	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	89		53 - 120				08/23/18 09:46	08/25/18 20:41	1

ı	Method: NWTPH-GX - Northwest -	volatile Petro	oleum Prodi	icts (GC)						
	Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Gasoline	ND		0.25	0.10	mg/L			08/28/18 00:22	1
	Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
	4-Bromofluorobenzene (Surr)	111		50 - 150			-		08/28/18 00:22	1
l	Trifluorotoluene (Surr)	122		50 - 150					08/28/18 00:22	1

Method: NWTPH-DX - Semi-vo		Qualifier	Y NW I PH WITH 3 RL	SIIICA GE MDL		ח	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.13	0.074			08/26/18 14:00	08/27/18 15:23	
#2 Diesei (C10-C24)	ND				Ü				'
Motor Oil (>C24-C36)	0.12	J	0.40	0.11	mg/L		08/26/18 14:00	08/27/18 15:23	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	81		50 - 150				08/26/18 14:00	08/27/18 15:23	1

# **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Collected: 08/21/18 00:00

Date Received: 08/21/18 10:35

**Client Sample ID: Trip Blank** 

TestAmerica Job ID: 580-79751-1

Lab Sample ID: 580-79751-2

Ма

atrix:	Water

Method: 624 - Volatile Organic Compounds (GC/MS)										
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
Benzene	MD		1.0	0.53	ug/L			08/22/18 18:09	1	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac	
Trifluorotoluene (Surr)	98		74 - 123			-		08/22/18 18:09	1	
Toluene-d8 (Surr)	104		79 - 122					08/22/18 18:09	1	
4-Bromofluorobenzene (Surr)	101		78 - 119					08/22/18 18:09	1	
Dibromofluoromethane (Surr)	99		70 - 120					08/22/18 18:09	1	
1,2-Dichloroethane-d4 (Surr)	108		70 - 120					08/22/18 18:09	1	

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)										
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
Gasoline	ND ND		0.25	0.10	mg/L			08/28/18 00:52	1	
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac	
4-Bromofluorobenzene (Surr)	108	-	50 - 150			=		08/28/18 00:52	1	
Trifluorotoluene (Surr)	122		50 - 150					08/28/18 00:52	1	

# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-81046-1

FROM: Dilip Kumar Former Unocal

DATE: November 22, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-81046-1 for 1 water sample and 1 trip blank collected on October 10, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

### **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	<b>Holding Time</b>	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit	
NE	NE	NE	NE	

### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-81046-1.

#### Field Duplicates

According to the SAP, field duplicate was not performed for SDG 580-81046-1 Laboratory Duplicates

Laboratory duplicate was not performed for SDG 580-81046-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not

note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time. The method blank and trip blank samples were free of contamination with no qualification required.

- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose	
Outfall #002	580-81046-1	10/10/2018	09:00	Regular	
Trip Blank	580-81046-1	10/10/2018	NA	Trip Blank	

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

SDG: sample delivery group NE: not encountered

# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-81239-1

FROM: Dilip Kumar Former Unocal

DATE: January 31, 2019

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-81239-1 for 1 water sample and 1 trip blank collected on October 18, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

### **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	<b>Holding Time</b>	Date Sampled	Date of Analysis	Exceedance	
NE	NE	NE	NE	NE	

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier	
NE	NE	NE	NE	NE	NE	

### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-81239-1.

#### Field Duplicates

According to the SAP, field duplicate was not performed for SDG 580-81239-1 Laboratory Duplicates

Laboratory duplicate was not performed for SDG 580-81239-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not

note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time. The method blank and trip blank samples were free of contamination with no qualification required.

- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-81239-1	10/18/2018	13:30	Regular
Trip Blank	580-81239-2	10/18/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

SDG: sample delivery group NE: not encountered

# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-81378-1

FROM: Dilip Kumar Former Unocal

DATE: November 22, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-81378-1 for 1 water sample and 1 trip blank collected on October 26, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

#### DATA VALIDATION

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water Samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### Holding Times and Preservation

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	<b>Holding Time</b>	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier	
NE	NE	NE	NE	NE	NE	

### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-81378-1.

#### Field Duplicates

According to the SAP, field duplicate was not performed for SDG 580-81378-1 Laboratory Duplicates

Laboratory duplicate was not performed for SDG 580-81378-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not

note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time. The method blank and trip blank samples were free of contamination with no qualification required.

- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

	Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Ī	Outfall #002	580-81378-1	10/26/2018	09:00	Regular
	Trip Blank	580-81378-1	10/26/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

SDG: sample delivery group NE: not encountered

# **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-81704-1

FROM: Dilip Kumar Former Unocal

DATE: December 28, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-81704-1 for one water sample, one field duplicate and one trip blank collected on November 07, 2018. Matrix spike/matrix spike duplicates (MS/MSD) were prepared for one water sample. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

### **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks

- Deuterated Monitoring Compounds (Surrogates)
- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results, MS/MSD results and surrogate recoveries.

Each category is further described in the following sections.

### Data Completeness

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### Blanks

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

# Matrix spike/Matrix Spike Duplicates

Matrix spikes were prepared in duplicate and analyzed. MS and MSD analysis must exhibit a percent recoveries and relative percent differences within the laboratory's acceptance criteria.

The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where compound concentration detected in the parent sample exceeds the MS/MSD concentration by factor four.

Samples associated with MS/MSD exhibited recoveries outside the control limit presented in the following table: Case narrative noted that spike compounds were inadvertently omitted during the extraction process for the matrix spike/matrix spike duplicate (MS/MSD), therefore validation qualifiers were not applicable for associated samples.

Field Sample ID	Parameter	MS Recovery (%)	MSD Recovery (%)	RPD	Validation Qualifier	Laboratory Limit
Outfall #002	DRO	0.3	0	NC	NA	50-120
	НО	0	0	NC	NA	64-120

Notes:

NC: not calculated NA: not applicable

DRO: reported as #2 Diesel (C10-C24) HO: reported as Motor Oil (>C24-C36)

#### Field Duplicates

Field duplicate was collected for SDG 580-81704-1 and all precision criteria were met.

Duplicate sample ID and Parent field sample ID were updated in the following table:

Duplicate Sample ID	Field Sample ID
Dup-1	Outfall #002

### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-81704-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD, MS/MSD and FD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate, LCS and MS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blank and trip blank samples
  were free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

## **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

# **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample ID Sample Date Sa		Sample Purpose	
Outfall #002	580-81704-1	11/07/2018	09:30	Regular	
Dup-1	580-81704-2	11/07/2018	NA	Field Duplicate	
Trip Blank	580-81704-3	11/07/2018	NA	Trip Blank	

Note: NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

SDG: sample delivery group NE: not encountered

## **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-81805-1

FROM: Dilip Kumar Former Unocal

DATE: December 28, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

#### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-81805-1 for one water sample and one trip blank collected on November 13, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

#### **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

### Holding Times and Preservation

All analyses were performed within the method-specified holding time except for method NWTPH-DX. DRO reported as #2 Diesel (C10-C24) and HO reported as Motor Oil (>C24-C36) exceeded acceptance criteria due to a high LCS in the original analysis. Laboratory was reported out of holding time results for sample Outfall#002; Hence the results were qualified as estimated "J".

Holding time exceedance presented in the following table:

Field Sample ID	Analyte	Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
Outfall #002	DRO	Ecology	14 days	11/13/2018	11/30/2018	17 days
Odiiali #002	НО	NWTPH-Dx	1 + days	11/13/2010	11/30/2010	17 days

#### Notes:

DRO: reported as #2 Diesel (C10-C24) HO: reported as Motor Oil (>C24-C36)

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

DRO, reported as #2 diesel (C10-C24), was detected at concentration greater than the MDL in method blank MB 580-289897/1-B. The associated sample result was less than five times the blank value, therefore

associated sample result was qualified as non-detect (U). But sample Outfall#002 was already qualified as estimated "J" for holding time exceedances, validation qualifier updated as "UJ" instead of "U".

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
Outfall #002	МВ	Ecology NWTPH-Dx	DRO	ug/L	0.0687	0.25	UJ

Notes:

MB: method blank

UJ: the analyte was analyzed for, but was not detected and the reported quantitation limit is approximate

DRO: reported as #2 Diesel (C10-C24)

ug/L: micrograms per liter

Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

#### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

#### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-81805-1.

#### **Field Duplicates**

According to the SAP, field duplicate was not collected for SDG 580-81805-1.

#### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-81805-1.

## **CONCLUSION**

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time except for one sample for DRO reported as #2 Diesel (C10-C24) and exceeding the holding time and therefore qualified as estimated. DRO was detected in the associated laboratory method blank; this laboratory method blank detects resulted in associated sample detected data qualified as non-detect. The trip blank was free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number of measurements planned. Completeness is expressed as the percentage of valid or usable measurements compared to planned measurements. Valid data are defined as all data that are not rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### REFERENCES

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

## **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-81805-1	11/13/2018	10:00	Regular
Trip Blank	580-81805-2	11/13/2018	NA	Trip Blank

Note:

NA: not applicable

## **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
580-81805-1	Outfall #002	REG	580-81805-1	Ecology NWTPH-Dx	DRO	0.25	ug/L	НВ	UJ	HTA, BL1	N
580-81805-1	Outfall #002	REG	580-81805-1	Ecology NWTPH-Dx	НО	0.42	ug/L	Н	J	НТА	Y

Notes:

REG: regular

SDG: sample delivery group

DRO: reported as #2 Diesel (C10-C24) HO: reported as Motor Oil (>C24-C36)

J: the concentration is an approximate value

B: compound was found in the laboratory method blank and sample H: sample was prepped or analyzed beyond the specified holding time

UJ: the analyte was analyzed for, but was not detected and the reported quantitation limit is approximate

BL1: result less than some multiple of that found in laboratory method blank

HTA: analytical holding time exceeded

ug/L: micrograms per liter N: analyte not detected Y: analyte detected

## **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-82036-1

FROM: Dilip Kumar Former Unocal

DATE: December 28, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-82036-1 for 1 water sample and 1 trip blank collected on November 21, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

#### **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

#### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	<b>Holding Time</b>	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Notes:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

DRO, reported as #2 diesel (C10-C24), was detected at concentration greater than the MDL in method blank MB 580-289897/1-B. The associated sample result was less than five times the blank value, therefore associated sample result was qualified as non-detect (U).

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
Outfall #002	МВ	Ecology NWTPH- Dx	#2 Diesel (C10-C24)	ug/L	0.0687	0.17	U

Notes:

MB: method blank U: non-detect

ug/L: micrograms per liter

Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

#### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria except for sample Outfall #002, the surrogate recovery for 8270 C SIM analysis was below the lower control limit and all associated non-detected sample results were qualified as estimated "UJ".

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit	
Outfall #002	Terphenyl-d14	8 %	53-150	

#### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

## Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-82036-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-82036-1.

#### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-82036-1.

### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. One sample
  results were qualified as estimated for low surrogate recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. DRO, reported as #2 Diesel (C10-C24)
  was detected in the associated laboratory method blank; this laboratory method blank detects resulted in
  associated sample detected data qualified as non-detect. The trip blank was free of contamination with
  no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

## **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-82036-1	11/21/2018	08:00	Regular
Trip Blank	580-82036-2	11/21/2018	NA	Trip Blank

Note:

NA: not applicable

## **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
580-82036-1	Outfall #002	REG	580-82036-1	Ecology NWTPH-Dx	#2 Diesel (C10- C24)	0.17	ug/L	В	U	BL1	N
580-82036-1	Outfall #002	REG	580-82036-1	8270-SIM	Benzo[a]anthrac ene	ND	ug/L		UJ	SURL	N
580-82036-1	Outfall #002	REG	580-82036-1	8270-SIM	Benzo[a]pyrene	ND	ug/L		UJ	SURL	N
580-82036-1	Outfall #002	REG	580-82036-1	8270-SIM	Benzo[b]fluorant hene	ND	ug/L		UJ	SURL	N
580-82036-1	Outfall #002	REG	580-82036-1	8270-SIM	Benzo[k]fluorant hene	ND	ug/L		UJ	SURL	N
580-82036-1	Outfall #002	REG	580-82036-1	8270-SIM	Chrysene	ND	ug/L		UJ	SURL	N
580-82036-1	Outfall #002	REG	580-82036-1	8270-SIM	Dibenz(a,h)anthr acene	ND	ug/L		UJ	SURL	N
580-82036-1	Outfall #002	REG	580-82036-1	8270-SIM	Indeno[1,2,3- cd]pyrene	ND	ug/L		UJ	SURL	N

Notes:

REG: regular

SDG: sample delivery group

UJ: the analyte was analyzed for, but was not detected and the reported quantitation limit is approximate

B: compound was found in the laboratory method blank and sample

U: non-detect

BL1: result less than some multiple of that found in laboratory method blank

SURL: : surrogate recovery below lower acceptance limit

ug/L: micrograms per liter N: analyte not detected Y: analyte detected 82036

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310

Short Hold

Rush

Chain of Custody Record

THE LEADER IN ENVIRONMENTAL TESTING	www.testamericainc.com			•
Client Avadis	Client Contact Peter	Campbell	Date 1\[2\]   18	Chain of Custody Number 34917
Address 1100 olive way, svite	T-1611115150.1.1.0		Lab Number	Page of
City Secrettle WA 981	Ol Evictoriese	Lab Contact  Elevene Walker 3 5 5 5	nalysis (Attach list if ore space is needed)	
Project Name and Location (State)  Educords Terminal	Billing Contact			Special Instructions/
Contract/Purchase Order/Quote No.	Matrix			Conditions of Receipt
Sample I.D. and Location/Description (Containers for each sample may be combined on one line)  Date of the combined on one line)				
	V18 0800 X	2 8 XXXX 6 XX		pH = 7.86
Trip Blank -				* use standor
				544
				* Banzone & CPAH
		Therm. ID: AZ_C	or: 4.5 ° Unc: 1.7 °	w/ quantitative level them less
		Cooler Dsc: 13 why	Blos -	than 1 mg/L
580	D-82036 Chain of Custody	Cust. Seal: Yes_No Blue Ice, Oet, Dry, N	Lab Cour: X	Wall Day/L
	J I I I I I I			
Cooler Possible Hazard Iden  ☐ Yes ☐ No Cooler Temp: ☐ Non-Hazard	ntification Flammable   Skin Irritant   Poi		Disposal By Lab Archive For Months	(A fee may be assessed if samples are retained longer than 1 month)
Turn Around Time Required (business days)  ☐ 24 Hours ☐ 48 Hours ☐ 5 Days ☐ 10 Days ☐	15 Days X Other STAT	QC Requirements (Specify)		
1. Relinquished By Sign/Print  2. Evic Kunger  2. Relinquished By Sign/Print	N2118 1200	1. Received By Sign/Print  Frant is (b)	Luna Jr	Date 1/8 1200
2. Relinquished By Sign/Print	Date Time	2. Received By Sign/Print	(	Date Time

DISTRIBUTION: WHITE - Stays with the Samples; CANARY - Returned to Client with Report; PINK - Field Copy
Page 15 of 16

3. Relinquished By Sign/Print

Comments

TAL-8274-589/99/2018

Date

Time

Date

3. Received By Sign/Print

## **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal

Date Collected: 11/21/18 08:00

Date Received: 11/21/18 12:00

TestAmerica Job ID: 580-82036-1

Client Sample ID: Outfall #002

Lab Sample ID: 580-82036-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			11/29/18 22:21	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	100		74 - 123			-		11/29/18 22:21	1
Toluene-d8 (Surr)	107		79 - 122					11/29/18 22:21	1
4-Bromofluorobenzene (Surr)	101		78 - 119					11/29/18 22:21	1
Dibromofluoromethane (Surr)	97		70 - 120					11/29/18 22:21	1
1,2-Dichloroethane-d4 (Surr)	95		70 - 120					11/29/18 22:21	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND ND	UJ	0.051	0.014	ug/L	<del></del>	11/28/18 08:33	11/29/18 01:07	1
Benzo[a]pyrene	ND	UJ	0.10	0.011	ug/L		11/28/18 08:33	11/29/18 01:07	1
Benzo[b]fluoranthene	ND	UJ	0.051	0.011	ug/L		11/28/18 08:33	11/29/18 01:07	1
Benzo[k]fluoranthene	ND	UJ	0.051	0.012	ug/L		11/28/18 08:33	11/29/18 01:07	1
Chrysene	ND	UJ	0.10	0.016	ug/L		11/28/18 08:33	11/29/18 01:07	1
Dibenz(a,h)anthracene	ND	UJ	0.10	0.010	ug/L		11/28/18 08:33	11/29/18 01:07	1
Indeno[1,2,3-cd]pyrene	ND	UJ	0.051	0.014	ug/L		11/28/18 08:33	11/29/18 01:07	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	8	X	53 120				11/28/18 08:33	11/29/18 01:07	

Method: NWTPH-Gx - Northwest	<ul> <li>Volatile Petrol</li> </ul>	leum Produ	cts (GC)						
Analyte	Result (	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			11/28/18 23:39	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Surrogate  4-Bromofluorobenzene (Surr)	88 - 88	Qualifier	Limits 50 - 150			-	Prepared	Analyzed 11/28/18 23:39	Dil Fac

Welliou. NWTFH-DX - Sellii-Volali	e Petroleum	FIOUUCIS D	y NVVIER WILLI	Silica Ge	i Cieanup				
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.17	B U	0.11	0.066	mg/L		11/29/18 09:06	11/30/18 21:12	1
Motor Oil (>C24-C36)	0.23	J	0.36	0.098	mg/L		11/29/18 09:06	11/30/18 21:12	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	93		50 - 150				11/29/18 09:06	11/30/18 21:12	1

## **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82036-1

Lab Sample ID: 580-82036-2

Prepared

Matrix: Water

Analyzed

11/28/18 15:55

11/28/18 15:55

%Recovery Qualifier

85

120

Date Collected: 11/21/18 00:01 Date Received: 11/21/18 12:00

Surrogate

4-Bromofluorobenzene (Surr)

Trifluorotoluene (Surr)

**Client Sample ID: Trip Blank** 

Method: 624 - Volatile Organic	Compounds (GC	C/MS)							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			11/29/18 21:56	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	98		74 - 123			_		11/29/18 21:56	1
Toluene-d8 (Surr)	106		79 - 122					11/29/18 21:56	1
4-Bromofluorobenzene (Surr)	99		78 - 119					11/29/18 21:56	1
Dibromofluoromethane (Surr)	96		70 - 120					11/29/18 21:56	1
1,2-Dichloroethane-d4 (Surr)	95		70 - 120					11/29/18 21:56	1
Mathada NWTDII Car Northwee	et Valetile Detw	alaum Duad							
Method: NWTPH-Gx - Northwe			, ,			_			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			11/28/18 15:55	1

Limits

50 - 150

50 - 150

Dil Fac

## **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-82599-1

FROM: Dilip Kumar Former Unocal

DATE: December 28, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-82599-1 for 1 water sample and 1 trip blank collected on December 10, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

#### **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results and surrogate recoveries.

Each category is further described in the following sections.

### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

#### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	<b>Holding Time</b>	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Notes:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

#### Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

#### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	Parameter	LCS Recovery	LCSD Recovery	RPD	Validation Qualifier
NE	NE	NE	NE	NE	NE

### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-82599-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-82599-1.

#### Laboratory Duplicates

Laboratory duplicate was not performed for SDG 580-82599-1.

#### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.
- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not

note any discrepancies with sample collection, storage or preservation procedures. All data were reported from analyses within the recommended holding time. The method blank and trip blank samples were free of contamination with no qualification required.

- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-82599-1	11/10/2018	13:00	Regular
Trip Blank	580-82599-2	11/10/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laborate Sample	, ,	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

SDG: sample delivery group NE: not encountered

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.testamericainc.com Loc: 580 **82599** 

Short Hold

Rush

Chain of Custody Record

Client Arcadis		Client (		D.I	Phe	lit	, E	in c	ei	ie							12/	101	18		Chain of Custody		1918
Address 1100 Olive way, sui	te 800	Telepho	ne Num	ber (Are	a Code	e)/Fax .	Numbe	er								Lab N					Page	of	<u> </u>
Scattle State WA	Zip Code 98101	Samplei 3aS	DV	Litt	10		Conta	ict NE (	NU	رال	C/-	479	7	5 Q	more	ysis (A space	ttach li is nee	st if ded)		T			
Project Name and Location (State) Edmonds Terminal		Billing C	ontact									EPA	6×	3							Specia	i Instruct	ions/
Contract/Purchase Order/Quote No.				Matrix				Contain Preserv			The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	tent	NETOR-	TO TO THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF THE STATE OF	0 3			**************************************			Conditi	ons of Re	ceipt
Sample 1.D. and Location/Description (Containers for each sample may be combined on one lin	e) Date	Time	Air Aqueous	Sed.	201/	Unpres.	H2S04	HCI	NaOH	ZnAc/ NaOH		Benzene	3 -	330	1								
Outfall #002 Trip Blank	12/10/18	1300	X			2		8				$\stackrel{\checkmark}{}$	$\bigcirc$	$\bigcirc$	1						PH = =	1.38	
Trip Blank				-				ما	-		_/	$\langle \rangle$	4		-						<b>3</b>		1, 1
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									Cı	ıst. S	eal: \ ea Ke	es	_No_	×	]	UPS:_ Lab C Other:	our:_	7			1 mg	<del>/</del>	
580-82599 Chain of Custody														1									
Cooler Possible  Yes No Cooler Temp: Non	Hazard Identification Hazard ☐ Flamm	nable 🗆	Skin II	ritant		roison	В		inknoi		Sampl ] Rei			nt		Disposi Archive	al By La For	3b	M	onths	(A fee may be a are retained lo		
Turn Around Time Required (business days)  ☐ 24 Hours ☐ 48 Hours ☐ 5 Days ☐ 10	Days ☐ 15 Days	othe		STA	<b>π</b>		QC Re	equiren	nents						***************************************								
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Comments							~·····································				•						***************************************						

Client Sample ID: Outfall #002

Date Collected: 12/10/18 13:00 Date Received: 12/11/18 13:00 Lab Sample ID: 580-82599-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			12/18/18 22:28	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	102		74 - 123					12/18/18 22:28	1
Toluene-d8 (Surr)	104		79 - 122					12/18/18 22:28	1
4-Bromofluorobenzene (Surr)	101		78 - 119					12/18/18 22:28	1
Dibromofluoromethane (Surr)	106		70 - 120					12/18/18 22:28	1
1,2-Dichloroethane-d4 (Surr)	114		70 - 120					12/18/18 22:28	1

Method: 8270C SIM - Sen Analyte	Result Qualifier	RL	•	Unit	D	Prepared	Analyzed	Dil Fac
Benzo[a]anthracene	ND ND	0.25	0.071	ug/L		12/16/18 06:57	12/17/18 20:24	5
Benzo[a]pyrene	ND	0.51	0.056	ug/L		12/16/18 06:57	12/17/18 20:24	5
Benzo[b]fluoranthene	ND	0.25	0.056	ug/L		12/16/18 06:57	12/17/18 20:24	5
Benzo[k]fluoranthene	ND	0.25	0.061	ug/L		12/16/18 06:57	12/17/18 20:24	5
Chrysene	ND	0.51	0.081	ug/L		12/16/18 06:57	12/17/18 20:24	5
Dibenz(a,h)anthracene	ND	0.51	0.051	ug/L		12/16/18 06:57	12/17/18 20:24	5
Indeno[1,2,3-cd]pyrene	ND	0.25	0.071	ug/L		12/16/18 06:57	12/17/18 20:24	5
Surrogate	%Recovery Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	76	53 - 120				12/16/18 06:57	12/17/18 20:24	5

Method: NWTPH-Gx - Northw	est - Volatile	e Petroleui	m Products (	GC)					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L			12/14/18 14:44	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	86		50 - 150					12/14/18 14:44	1

Method: NWTPH-Dx - Semi-Volatile Petroleum Products by NWTPH with Silica Gel Cleanup											
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac		
#2 Diesel (C10-C24)	ND		0.11	0.067	mg/L		12/13/18 15:47	12/16/18 19:51	1		
Motor Oil (>C24-C36)	ND		0.36	0.099	mg/L		12/13/18 15:47	12/16/18 19:51	1		
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac		
o-Terphenyl	75		50 - 150				12/13/18 15:47	12/16/18 19:51	1		

## **Client Sample Results**

Client: ARCADIS U.S. Inc Project/Site: Edmonds Terminal TestAmerica Job ID: 580-82599-1

Client Sample ID: Trip Blank Date Collected: 12/10/18 00:01

Lab Sample ID: 580-82599-2

**Matrix: Water** 

|--|

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.53	ug/L			12/18/18 22:53	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	99		74 - 123					12/18/18 22:53	1
Toluene-d8 (Surr)	106		79 - 122					12/18/18 22:53	1
4-Bromofluorobenzene (Surr)	102		78 - 119					12/18/18 22:53	1
Dibromofluoromethane (Surr)	97		70 - 120					12/18/18 22:53	1
1,2-Dichloroethane-d4 (Surr)	109		70 - 120					12/18/18 22:53	1

Method: NWTPH-Gx - Nort Analyte		Petroleur Qualifier	m Products ( RL	GC) MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25	0.10	mg/L		<u> </u>	12/14/18 13:23	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	70		50 - 150			-		12/14/18 13:23	1
Trifluorotoluene (Surr)	107		50 - 150					12/14/18 13:23	1

## **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-82864-1

FROM: Dilip Kumar Former Unocal

DATE: January 23, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-82864-1 for 1 water sample and 1 trip blank collected on December 20, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

#### **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water Samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results, MS/MSD results and surrogate recoveries.

Each category is further described in the following sections.

#### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

#### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### Trip blank

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

#### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

### Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	mple ID Parameter LCS Recovery	LCSD Recovery	RPD	Validation Qualifier	
NE	NE	NE	NE	NE	NE

#### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-82864-1.

#### Field Duplicates

According to the SAP, field duplicate was not collected for SDG 580-82864-1.

### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-82864-1.

#### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.

- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blank and trip blank samples
  were free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### **REFERENCES**

Arcadis. 2016a. Engineering Design Report. Former Unocal Edmonds Bulk Fuel Terminal. March 8.

Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Sample ID Laboratory Sample ID		Sample Time	Sample Purpose
Outfall #002	580-82864-1	12/20/2018	14:00	Regular
Trip Blank	580-82864-2	12/20/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

SDG: sample delivery group NE: not encountered

## **Data Validation Memorandum**

TO: Ophélie Encelle SDG: 580-82965-1

FROM: Dilip Kumar Former Unocal

DATE: January 23, 2018

Edmonds Bulk Fuel Terminal Edmonds,

Washington

### INTRODUCTION

This report was prepared by Arcadis Consulting India Pvt Ltd for Arcadis U.S., Inc. (Arcadis) to provide a data validation of the analytical results for the confirmation samples associated with the dual-phase extraction (DPE) System present at the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site). The DPE System is running since December 1st, 2017 and is implemented according to the Final Interim Action Work Plan (Final IAWP, Arcadis 2016b) and the Engineering Design Report (Arcadis 2016a). Quality assurance requirements for the confirmation samples associated with the DPE System are listed in the Sampling and Analysis Plan (SAP) provided as Appendix F of the Final IAWP. Treated water from the DPE System is discharged to Willow Creek at Outfall #002 under National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit No. WA0991007. This permit requires the collection of discharge water samples weekly during water treatment operation at Outfall #002 and submittal of the discharge water samples to a Washington State Department of Ecology (Ecology) approved laboratory, Test America Laboratories, Inc. (TA) in Tacoma, Washington.

Particularly, this report summarizes the level II data validation findings of the analytical results reported in the sample delivery group (SDG) 580-82965-1 for 1 water sample and 1 trip blank collected on December 27, 2018. The samples for analysis and qualified results are listed in Table 1 and Table 2. The data were reviewed in accordance with United States Environmental Protection Agency (USEPA. 2017), National Functional Guidelines for Superfund Organic Methods Data Review.

According to the NPDES permit, treated water samples must be submitted to an Ecology approved laboratory, for the following analyses:

- Benzene
- Gasoline range organics (GRO)
- Diesel range organics (DRO) and heavy oil range organics (HO)
- Carcinogenic polyaromatic hydrocarbons (cPAHs)

#### **DATA VALIDATION**

The analytical data were reviewed to evaluate the usability of the data. The data validation process includes the following category:

- Data Completeness
- Holding Times and Preservation
- Blanks
- Deuterated Monitoring Compounds (Surrogates)

- Laboratory Control Samples/Laboratory Control Samples Duplicate (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Field Duplicates (FD)
- Laboratory Duplicates/Replicates (LR)

Water Samples were analyzed for benzene (USEPA method 624), GRO (Ecology method NWTPH-Gx), DRO/HO (Ecology method NWTPH-Dx) and cPAHs (USEPA method 8270C SIM).

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer.

The data review process performed involved evaluating the following parameters: sample receipt, case narrative, holding times, method blank results, trip blank results, LCS/LCSD results, MS/MSD results and surrogate recoveries.

Each category is further described in the following sections.

#### **Data Completeness**

Water sample analyses were performed as requested on chain-of-custody documentation. The laboratory reported all requested water sample analyses and the deliverable data reports were complete.

#### **Holding Times and Preservation**

All analyses were performed within the method-specified holding time. In addition, all samples were collected and preserved appropriately.

Holding time exceedance presented in the following table:

Method	Holding Time	Date Sampled	Date of Analysis	Exceedance
NE	NE	NE	NE	NE

Note:

NE: not encountered

#### **Blanks**

Quality assurance (QA) blanks (i.e., method and field blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Laboratory method blanks measure laboratory contamination. Rinsate blanks measure contamination of samples during field operations by non-dedicated sampling equipment. Trip blanks measure contamination of samples during samples transportation.

#### Laboratory Method Blanks

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Field sample ID qualified for blank contamination summarized in the following table:

Field Sample ID	Blank type	Method	Parameter	Unit	Blank Result	Sample Result	Validation Qualifier
NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NE: not encountered

Rinsate Blank

No rinsate blank is required since the equipment is dedicated to the sampling.

#### *Trip blank*

No detections were observed in the trip blank therefore no sample contamination is suspected during sample transportation and results are meeting QA requirements.

#### Deuterated Monitoring Compounds (Surrogates)

Appropriate numbers of surrogate compounds were spiked into each sample for the USEPA method 624, USEPA method 8270C SIM, Ecology NWTPH-Gx and Ecology NWTPH-Dx. All surrogate compound recoveries were within the laboratory's acceptance criteria.

Field Sample IDs associated with surrogates exhibiting outside of control limits presented in the following table:

Field Sample ID	Surrogates	Recovery	Laboratory Limit
NE	NE	NE	NE

## Laboratory Control Sample / Laboratory Control Sample Duplicates

LCSs were prepared in duplicate and analyzed. LCS and LCSD recoveries reported and the relative percent differences (RPDs) between the LCS and LCSD recoveries were within the laboratory's acceptance criteria.

Samples associated with LCS/LCSD exhibited recoveries outside the control limit presented in the following table:

Field Sample ID	mple ID Parameter LCS Recovery	LCSD Recovery	RPD	Validation Qualifier	
NE	NE	NE	NE	NE	NE

#### Matrix spike/Matrix spike duplicates

According to the SAP, MS/MSD were not collected for SDG 580-82965-1.

#### **Field Duplicates**

According to the SAP, field duplicate was not collected for SDG 580-82965-1.

### **Laboratory Duplicates**

Laboratory duplicate was not performed for SDG 580-82965-1.

#### CONCLUSION

The objective of this validation memorandum is to demonstrate that sufficient number of representative samples were collected, and the resulting analytical data were acceptable according to the USEPA guidelines and the NPDES and SAP requirements.

- Precision of the data was verified through the review of field and laboratory data quality indicators that include LCS/LCSD. Precision was acceptable.
- Accuracy of the data was verified through the review of surrogate and LCS recoveries. Accuracy was acceptable.

- Representativeness of the data was verified through the sample collection, storage and preservation
  procedures, verification of holding time compliance and evaluation of blank data. The laboratory did not
  note any discrepancies with sample collection, storage or preservation procedures. All data were
  reported from analyses within the recommended holding time. The method blank and trip blank samples
  were free of contamination with no qualification required.
- Comparability of the data was ensured through the use of standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number
  of measurements planned. Completeness is expressed as the percentage of valid or usable
  measurements compared to planned measurements. Valid data are defined as all data that are not
  rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

### **REFERENCES**

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Arcadis. 2016b. Final Interim Action Work Plan. Former Unocal Edmonds Bulk Fuel Terminal. July 19.

USEPA 2017. National Functional Guidelines for Superfund Organic Methods Data Review (USEPA-540-R-2017-002). January.

### **ATTACHMENTS**

Table 1: Sample Summary

Table 2: Qualified Results Summary

**Table 1: Sample Summary** 

Field Sample ID	Laboratory Sample ID	Sample Date	Sample Time	Sample Purpose
Outfall #002	580-82965-1	12/27/2018	10:55	Regular
Trip Blank	580-82965-2	12/27/2018	NA	Trip Blank

Note:

NA: not applicable

# **Table 2: Qualified Results Summary**

Laboratory Sample ID	Field Sample ID	Sample Purpose	SDG	Analytical Method	Parameter	Laboratory Result	Unit	Laboratory Qualifier	Validation Qualifier	Reason Code	Detect Flag
NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

SDG: sample delivery group NE: not encountered



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