Remediation Management Services Company

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August 3, 2021

Washington Department of Ecology
Northwest Regional Office
Attn: Ms. Donna Musa
3190 160th Avenue SE
Bellevue, WA 98008-5452

Dear Ms. Musa:

Please find the enclosed Semi-Annual Status Report - First Half of 2021, that documents the results at Olympic Pipe Line Company LLC, Anacorted K-Booster located at 10200 West March Point Road, Anacortes, Washington.

Sincerely yours,

Wade Melton
Operations Project Manager
Remediation Management Services Company
An affiliate of Atlantic Richfield Company

cc: File, Antea Group

Semi-Annual Status Report First Half of 2021

OPLC Anacortes K-Booster
10200 West March Point Road, Anacortes, Washington

Antea®Group

Understanding today.
Improving tomorrow.

PREPARED FOR
Remediation Management Services Company
An affiliate of Atlantic Richfield Company
4 Centerpointe Drive, Suite 200
La Palma, CA 90623
and
BP Pipelines and Logistics
Olympic District
600 SW 39th Street, Suite 275
Renton, WA 98057

PREPARED BY
Antea Group - Seattle, WA
August 3, 2021
Project # WAKBOOS211

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First Half of 2021
OPLC Anacortes K-Booster
10200 West March Point Road, Anacortes, Washington

Reporting Period	January 2021 – June 2021
Agency Contact	Donna Musa, Toxics Cleanup Program; +1 425 649 7136
Ecology Site ID No.	19701
RM Contact	Wade Melton, + 360 594 7978
Olympic Contact	Alexandria Crooks, +1 425 981 2590
Antea Group Contact	Megan Richard, +1 425 498 7711

1.0 SITE HISTORY

- The Olympic Pipeline Company (OPLC) K-Booster Station (K-Booster) is located within the Marathon Petroleum Anacortes Refinery (Marathon Refinery). The refinery has previously been operated by both Tesoro Corporation and Shell Oil Company (Shell). K-Booster is approximately 0.2 acres in size and is in the northeast corner of the Tesoro Refinery. K-Booster consists of a control building, transfer pumps, a process sump, and various pipeline monitoring equipment. The facility surface is primarily gravel and the perimeter is fenced. The Marathon Refinery cooling towers are located west of and adjacent to K Booster. A refinery flare field and aboveground storage tanks are located north and south of K-Booster, respectively.
- The OPLC 16-inch diameter high-pressure underground pipeline (main line) passes through the facility. Products transported by the pipeline include gasoline, diesel fuel, and jet fuel.
- In September 1994, petroleum sheen, on surface water in a drainage ditch near the refinery cooling towers, was discovered by Shell personnel. Shell personnel identified K-Booster as a potential source of the petroleum sheen.
- OPLC personnel were notified of the sheen, and subsequently discovered a leaking pipe union that was potentially contributing to the petroleum sheen. OPLC personnel repaired the leaking union, and excavated petroleum contaminated soil identified in the area of the repair. Additionally, OPLC personnel installed a 36-inch diameter recovery well to recover light non-aqueous phase liquids (LNAPL) via vacuum truck. The Washington State Department of Ecology (Ecology) was notified of the release by letter on December 5, 1994.
- Following the September 1994 release, six test pits and 22 hollow stem auger soil borings were installed to delineate soil, and groundwater conditions around K-Booster. Three soil borings were completed as groundwater monitoring wells 94-2, 94-3, and 94-4.
- In 1995, two additional groundwater monitoring wells (95-1 and 95-4) were installed.
- In December 2007, OPLC detected LNAPL in monitoring well 94-4 during routine monitoring at the facility.

- On January 15, 2008, Delta Consultants (Delta) conducted groundwater monitoring, and detected LNAPL in monitoring well 94-4 at a thickness of 0.83 feet.
- On January 29, 2008, Delta collected groundwater samples from 94-3, 94-4, 95-1, and 95-4. Monitoring well 94-2 could not be located. A multi-phase extraction (MPE) event was conducted on monitoring well 94-4. MPE events were conducted weekly to bi-weekly on 94-4 through April 2008.
- On April 21, 2008, Delta installed two soil borings using a hollow stem auger drill rig, and subsequently completed the soil borings as groundwater water monitoring wells MW-6 and MW 7.
- On May 27, 2008, Delta collected groundwater samples from monitoring wells 94-3, 95-1, 95-4, MW-6, and MW-7. An MPE event was performed on 94-4 and MW-7.
- Delta conducted monthly groundwater sampling and monitoring events through November 2008. MPE events were conducted monthly when LNAPL was detected.
- Monthly monitoring, groundwater sampling, and MPE events were discontinued in December 2008. Semi-annual groundwater sampling has been conducted since 2009.
- In a letter dated February 8, 2011, Ecology notified OPLC that K-Booster was being added to the Confirmed and Suspected Contaminated Sites List.
- On October 7, 2011, monitoring well 94-4 was abandoned. The monitoring well was abandoned to facilitate the installation of secondary containment at K-Booster.
- In January 2013, the Skagit County Health Department issued the results of the Site Hazard Assessment (SHA) conducted at K-Booster. The hazard ranking of K-Booster, an estimation of the potential threat to human health and/or the environment relative to all other Washington state sites assessed at the time, was determined to be a 3, where 1 represents the highest relative risk and 5 the lowest.
- Site characterization and remedial activities are being conducted by OPLC in accordance with Ecology Model Toxics Control Act (MTCA) as an Independent Cleanup Action outside the Voluntary Cleanup Program (VCP).
- Arcadis Consulting conducted groundwater monitoring at this site January 2017 through August 2018.
- On June 13, 2019, Antea Group conducted semi-annual groundwater monitoring at this site and recovered 0.25 gallons of water with LNAPL from MW-7.

2.0 WORK PERFORMED DURING THE REPORTING PERIOD

- On May 26, 2021, semi-annual groundwater monitoring and sampling was conducted. Groundwater samples were collected from 94-3, 95-1, 95-4, MW-6, and MW-7.

3.0 SYSTEM CONFIGURATION

- Not applicable.

4.0 PROJECT STATUS

- Semi-annual groundwater sampling and reporting.

5.0 DATA REVIEW AND RECOMMENDATIONS

- Benzene and total petroleum hydrocarbons as gasoline (TPH-G) were detected in excess of MTCA Method A Cleanup Levels in well 94-3 at concentrations of 610 micrograms per liter (ug/L) and 1,800 ug/L, respectively. Monitoring well 94-3 is located up-gradient of the 1994 release, and the continued presence of hydrocarbon concentrations (Chart 1) suggests an up-gradient source. Down-gradient monitoring well MW-7 contained concentrations of benzene, TPH-G, and TPH-D in excess of MTCA

Method A Cleanup Levels at 17 ug/L, 1,900 ug/L, and 1,700 ug/L, respectively. Hydrocarbon concentrations remain stable in monitoring well MW-7 (Chart 2), which is down-gradient of well 94-3 and the source. Samples collected from monitoring wells 95-1, 95-4, and MW-6 did not contain any petroleum hydrocarbon concentrations in excess of the MTCA Method A Cleanup Levels.

- No measurable LNAPL was detected during the reporting period.
- The Groundwater Gauging Data and Analytical Data is presented in Tables 1 and 2, respectively.
- Hydrocarbon concentration and groundwater elevations over time in monitoring wells 94-3 and MW-7 are presented in Charts 1 and 2, respectively.
- A Site Location Map, Site Map, and Groundwater Elevation Contour and Groundwater Analytical Data Map are presented on Figures 1, 2, and 3, respectively.
- The Laboratory Analytical Report is included as Appendix A.
- Antea Group will conduct semi-annual groundwater monitoring and sampling in the second half of 2021 and conduct passive LNAPL recovery with absorbent socks as needed.

6.0 REMARKS

The recommendations contained in this report represent Antea USA, Inc.'s professional opinions based upon the currently available information and are arrived at in accordance with currently accepted professional standards. This report is based upon a specific scope of work requested by the client. The contract between Antea USA, Inc. and its client outlines the scope of work, and only those tasks specifically authorized by that contract or outlined in this report were performed. This report is intended only for the use of Antea USA, Inc.'s client and anyone else specifically identified in writing by Antea USA, Inc. as a user of this report. Antea USA, Inc. will not and cannot be liable for unauthorized reliance by any other third party. Other than as contained in this paragraph, Antea USA, Inc. makes no express or implied warranty as to the contents of this report.

Katelyn Younger

Date: August 3, 2021

Katelyn Younger
Staff Professional

Reviewed by:

State of Washington 3157 Licensed Geologist MEGAN RICHARD

Date: August 3, 2021

Megan Richard, LG
Senior Project Manager

cc: Ms. Donna Musa, Department of Ecology, Northwest Regional Office (Hardcopy, Electronic Copy)
Mr. Neil Norcross, Marathon Petroleum Corporation (Hardcopy)
Ms. Alexandria Crooks, OPLC, Renton, WA (Electronic Copy)
Mr. Wade Melton, Remediation Management Services Company (Electronic Copy - RMO Upload)
File, Antea Group

7.0 CONTACT INFORMATION

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Tables

Table 1
Groundwater Gauging Data
K-Booster Station
10200 West March Point Road, Anacortes, WA 98221

Well I.D.	Date	GROUNDWATER ELEVATION DATA					
		TOC Elevation (ft)	Water Level Depth (ft)	LNAPL Depth (ft)	LNAPL Thickness (ft)	Water Level Elevation* (ft)	Qualifiers
94-3	1/15/2008	72.74	3.56	NP	--	69.18	--
94-3	1/29/2008	72.74	2.84	NP	--	69.90	--
94-3	2/1/2008	72.74	2.81	NP	--	69.93	--
94-3	2/7/2008	72.74	2.83	NP	--	69.91	--
94-3	2/14/2008	72.74	2.50	NP	--	70.24	--
94-3	2/21/2008	72.74	2.91	NP	--	69.83	--
94-3	2/29/2008	72.74	3.07	NP	--	69.67	--
94-3	4/3/2008	72.74	2.94	NP	--	69.80	--
94-3	4/15/2008	72.74	3.00	NP	--	69.74	--
94-3	5/27/2008	72.74	3.08	NP	--	69.66	--
94-3	6/24/2008	72.74	3.29	NP	--	69.45	--
94-3	7/28/2008	72.74	4.23	NP	--	68.51	--
94-3	8/26/2008	72.74	3.35	NP	--	69.39	--
94-3	9/29/2008	72.74	3.45	NP	--	69.29	--
94-3	10/21/2008	72.74	3.53	NP	--	69.21	--
94-3	11/25/2008	72.74	3.08	NP	--	69.66	--
94-3	1/27/2009	72.74	3.03	NP	--	69.71	--
94-3	7/6/2009	72.74	3.33	NP	--	69.41	--
94-3	3/17/2010	72.74	2.96	NP	--	69.78	--
94-3	9/15/2010	72.74	3.17	NP	--	69.57	--
94-3	3/4/2011	72.74	2.55	NP	--	70.19	--
94-3	8/24/2011	72.74	3.10	NP	--	69.64	--
94-3	5/10/2012	72.74	2.66	NP	--	70.08	--
94-3	11/15/2012	72.74	2.65	NP	--	70.09	--
94-3	3/28/2013	72.74	2.63	NP	--	70.11	--
94-3	12/18/2013	72.74	2.64	NP	--	70.10	--
94-3	6/25/2014	72.74	2.76	NP	--	69.98	--
94-3	12/9/2014	72.74	2.60	NP	--	70.14	--
94-3	6/16/2015	72.74	2.97	NP	--	69.77	--
94-3	10/21/2015	72.74	2.88	NP	--	69.86	--

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		TOC Elevation (ft)	Water Level Depth (ft)	LNAPL Depth (ft)	LNAPL Thickness (ft)	Water Level Elevation* (ft)	Qualifiers
94-3	4/21/2016	72.74	2.49	NP	--	70.25	--
94-3	11/10/2016	72.74	2.65	NP	--	70.09	--
94-3	6/26/2017	72.74	2.75	NP	--	69.99	--
94-3	11/14/2017	72.74	2.55	NP	--	70.19	--
94-3	6/29/2018	72.74	2.88	NP	--	69.86	--
94-3	11/8/2018	72.74	2.92	NP	--	69.82	--
94-3	6/13/2019	72.74	3.23	NP	--	69.51	--
94-3	10/9/2019	72.74	3.00	NP	--	69.74	--
94-3	6/11/2020	72.74	2.94	NP	--	69.80	--
94-3	11/6/2020	72.74	2.92	NP	--	69.82	--
94-3	5/26/2021	72.74	3.02	NP	--	69.72	--
94-4	1/15/2008	--	4.66	3.83	0.83	--	--
94-4	1/29/2008	--	6.14	5.05	1.09	--	--
94-4	2/1/2008	--	5.81	5.41	0.40	--	--
94-4	2/7/2008	--	--	--	--	--	NG
94-4	2/14/2008	--	4.04	NP	--	--	--
94-4	2/21/2008	--	9.10	7.50	1.60	--	--
94-4	2/29/2008	--	9.57	8.78	0.79	--	--
94-4	4/3/2008	--	7.62	5.31	2.31	--	--
94-4	4/15/2008	--	8.96	8.02	0.94	--	--
94-4	5/27/2008	--	9.90	9.42	0.48	--	--
94-4	6/24/2008	--	10.36	9.71	0.65	--	--
94-4	7/28/2008	--	10.96	10.36	0.60	--	--
94-4	8/26/2008	--	8.77	8.75	0.02	--	--
94-4	9/29/2008	--	11.01	10.86	0.15	--	--
94-4	10/21/2008	--	11.06	10.88	0.18	--	--
94-4	11/25/2008	--	9.52	9.41	0.11	--	--
94-4	1/27/2009	--	5.75	5.30	0.45	--	--
94-4	7/6/2009	--	10.13	10.11	0.02	--	--

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		TOC Elevation (ft)	Water Level Depth (ft)	LNAPL Depth (ft)	LNAPL Thickness (ft)	Water Level Elevation* (ft)	Qualifiers
94-4	3/17/2010	64.81	4.21	NP	--	60.60	--
94-4	7/26/2010	64.81	6.85	NP	--	57.96	--
94-4	9/15/2010	64.81	5.45	5.43	0.02	59.38	--
94-4	3/4/2011	64.81	3.31	NP	--	61.50	--
94-4	8/24/2011	64.81	10.43	NP	--	54.38	--
94-4	10/7/2011	64.81	10.89	NP	--	53.92	ABD
95-1	1/29/2008	65.95	13.69	NP	--	52.26	--
95-1	2/1/2008	65.95	13.61	NP	--	52.34	--
95-1	2/7/2008	65.95	13.49	NP	--	52.46	--
95-1	2/14/2008	65.95	13.37	NP	--	52.58	--
95-1	2/21/2008	65.95	13.36	NP	--	52.59	--
95-1	2/29/2008	65.95	13.74	NP	--	52.21	--
95-1	4/3/2008	65.95	15.34	NP	--	50.61	--
95-1	4/15/2008	65.95	13.73	NP	--	52.22	--
95-1	5/27/2008	65.95	13.87	NP	--	52.08	--
95-1	6/24/2008	65.95	13.98	NP	--	51.97	--
95-1	7/28/2008	65.95	14.13	NP	--	51.82	--
95-1	8/26/2008	65.95	14.07	NP	--	51.88	--
95-1	9/29/2008	65.95	14.08	NP	--	51.87	--
95-1	10/21/2008	65.95	14.07	NP	--	51.88	--
95-1	11/25/2008	65.95	13.89	NP	--	52.06	--
95-1	1/27/2009	65.95	13.72	NP	--	52.23	--
95-1	7/6/2009	65.95	14.21	NP	--	51.74	--
95-1	3/17/2010	65.95	13.88	NP	--	52.07	--
95-1	9/15/2010	65.95	--	--	--	--	Dry
95-1	3/4/2011	65.95	13.96	NP	--	51.99	--
95-1	8/24/2011	65.95	--	--	--	--	Dry
95-1	5/10/2012	65.95	13.87	NP	--	52.08	--
95-1	11/15/2012	65.95	--	--	--	--	Dry

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		TOC Elevation (ft)	Water Level Depth (ft)	LNAPL Depth (ft)	LNAPL Thickness (ft)	Water Level Elevation* (ft)	Qualifiers
95-1	3/28/2013	65.95	--	--	--	--	Dry
95-1	12/18/2013	65.95	13.93	NP	--	52.02	--
95-1	6/25/2014	65.95	14.02	NP	--	51.93	--
95-1	12/9/2014	65.95	13.72	NP	--	52.23	--
95-1	6/16/2015	65.95	14.10	NP	--	51.85	--
95-1	10/21/2015	65.95	13.89	NP	--	52.06	--
95-1	4/21/2016	65.95	13.80	NP	--	52.15	--
95-1	11/10/2016	65.95	13.56	NP	--	52.39	--
95-1	6/26/2017	65.95	14.00	NP	--	51.95	--
95-1	11/14/2017	65.95	13.77	NP	--	52.18	--
95-1	6/29/2018	65.95	14.05	NP	--	51.90	--
95-1	11/8/2018	65.95	13.75	NP	--	52.20	--
95-1	6/13/2019	65.95	--	--	--	--	Dry
95-1	10/9/2019	65.95	--	--	--	--	Dry
95-1	6/11/2020	65.95	15.57	NP	--	50.38	--
95-1	11/6/2020	65.95	13.64	NP	--	52.31	--
95-1	5/26/2021	65.95	13.88	NP	--	52.07	--
95-4	1/15/2008	63.62	11.27	NP	--	52.35	--
95-4	1/29/2008	63.62	11.31	NP	--	52.31	--
95-4	2/1/2008	63.62	11.24	NP	--	52.38	--
95-4	2/7/2008	63.62	11.17	NP	--	52.45	--
95-4	2/14/2008	63.62	10.82	NP	--	52.80	--
95-4	2/21/2008	63.62	10.95	NP	--	52.67	--
95-4	2/29/2008	63.62	11.26	NP	--	52.36	--
95-4	4/3/2008	63.62	11.05	NP	--	52.57	--
95-4	4/15/2008	63.62	11.24	NP	--	52.38	--
95-4	5/27/2008	63.62	11.49	NP	--	52.13	--
95-4	6/24/2008	63.62	11.61	NP	--	52.01	--
95-4	7/28/2008	63.62	11.99	NP	--	51.63	--

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		TOC Elevation (ft)	Water Level Depth (ft)	LNAPL Depth (ft)	LNAPL Thickness (ft)	Water Level Elevation* (ft)	Qualifiers
95-4	8/26/2008	63.62	12.01	NP	--	51.61	--
95-4	9/29/2008	63.62	12.11	NP	--	51.51	--
95-4	10/21/2008	63.62	12.16	NP	--	51.46	--
95-4	11/25/2008	63.62	11.73	NP	--	51.89	--
95-4	1/27/2009	63.62	11.23	NP	--	52.39	--
95-4	7/6/2009	63.62	12.02	NP	--	51.60	--
95-4	3/17/2010	63.62	11.51	NP	--	52.11	--
95-4	9/15/2010	63.62	11.82	NP	--	51.80	--
95-4	3/4/2011	63.62	11.21	NP	--	52.41	--
95-4	8/24/2011	63.62	10.12	NP	--	53.50	--
95-4	5/10/2012	63.62	11.47	NP	--	52.15	--
95-4	11/15/2012	63.62	11.67	NP	--	51.95	--
95-4	3/28/2013	63.62	11.41	NP	--	52.21	--
95-4	12/18/2013	63.62	11.67	NP	--	51.95	--
95-4	6/25/2014	63.62	11.76	NP	--	51.86	--
95-4	12/9/2014	63.62	11.36	NP	--	52.26	--
95-4	6/16/2015	63.62	11.92	NP	--	51.70	--
95-4	10/21/2015	63.62	12.03	NP	--	51.59	--
95-4	4/21/2016	63.62	11.30	NP	--	52.32	--
95-4	11/10/2016	63.62	11.42	NP	--	52.20	--
95-4	6/26/2017	63.62	11.68	NP	--	51.94	--
95-4	11/14/2017	63.62	11.56	NP	--	52.06	--
95-4	6/29/2018	63.62	11.84	NP	--	51.78	--
95-4	11/8/2018	63.62	11.71	NP	--	51.91	--
95-4	6/13/2019	63.62	11.72	NP	--	51.90	--
95-4	10/9/2019	63.62	11.53	NP	--	52.09	--
95-4	6/11/2020	63.62	11.47	NP	--	52.15	--
95-4	11/6/2020	63.62	11.44	NP	--	52.18	--
95-4	5/26/2021	63.62	11.47	NP	--	52.15	--

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		TOC Elevation (ft)	Water Level Depth (ft)	LNAPL Depth (ft)	LNAPL Thickness (ft)	Water Level Elevation* (ft)	Qualifiers
MW-6	5/27/2008	63.30	8.34	NP	--	54.96	--
MW-6	6/24/2008	63.30	8.55	NP	--	54.75	--
MW-6	7/28/2008	63.30	9.19	NP	--	54.11	--
MW-6	8/26/2008	63.30	9.42	NP	--	53.88	--
MW-6	9/29/2008	63.30	9.65	NP	--	53.65	--
MW-6	10/21/2008	63.30	9.78	NP	--	53.52	--
MW-6	11/25/2008	63.30	9.02	NP	--	54.28	--
MW-6	1/27/2009	63.30	7.54	NP	--	55.76	--
MW-6	7/6/2009	63.30	9.20	NP	--	54.10	--
MW-6	3/17/2010	63.30	8.05	NP	--	55.25	--
MW-6	9/15/2010	63.30	9.27	NP	--	54.03	--
MW-6	3/4/2011	63.30	7.31	NP	--	55.99	--
MW-6	8/24/2011	63.30	9.39	NP	--	53.91	--
MW-6	5/10/2012	63.30	7.89	NP	--	55.41	--
MW-6	11/15/2012	63.30	8.74	NP	--	54.56	--
MW-6	3/28/2013	63.30	7.59	NP	--	55.71	--
MW-6	12/18/2013	63.30	8.43	NP	--	54.87	--
MW-6	6/25/2014	63.30	8.61	NP	--	54.69	--
MW-6	12/9/2014	63.30	7.85	NP	--	55.45	--
MW-6	6/16/2015	63.30	9.01	NP	--	54.29	--
MW-6	10/21/2015	63.30	9.51	NP	--	53.79	--
MW-6	4/21/2016	63.30	7.93	NP	--	55.37	--
MW-6	11/10/2016	63.30	8.41	NP	--	54.89	--
MW-6	6/26/2017	63.30	8.73	NP	--	54.57	--
MW-6	11/14/2017	63.30	8.87	NP	--	54.43	--
MW-6	6/29/2018	63.30	8.96	NP	--	54.34	--
MW-6	11/8/2018	63.30	9.10	NP	--	54.20	--
MW-6	6/13/2019	63.30	9.90	NP	--	53.40	--
MW-6	10/9/2019	63.30	9.60	NP	--	53.70	--
MW-6	6/11/2020	63.30	8.56	NP	--	54.74	--

Table 1
Groundwater Gauging Data
K-Booster Station
10200 West March Point Road, Anacortes, WA 98221

Well I.D.	Date	GROUNDWATER ELEVATION DATA					
		TOC Elevation (ft)	Water Level Depth (ft)	LNAPL Depth (ft)	LNAPL Thickness (ft)	Water Level Elevation* (ft)	Qualifiers
MW-6	11/6/2020	63.30	8.89	NP	--	54.41	--
MW-6	5/26/2021	63.30	8.61	NP	--	54.69	--
MW-7	5/27/2008	64.01	11.60	11.49	0.11	52.49	--
MW-7	6/24/2008	64.01	11.83	11.71	0.12	52.27	--
MW-7	7/28/2008	64.01	12.43	12.40	0.03	51.60	--
MW-7	8/26/2008	64.01	12.49	NP	--	51.52	--
MW-7	9/29/2008	64.01	12.54	NP	--	51.47	--
MW-7	10/21/2008	64.01	12.59	NP	--	51.42	--
MW-7	11/25/2008	64.01	11.71	11.57	0.14	52.41	--
MW-7	1/27/2009	64.01	10.85	10.65	0.20	53.31	--
MW-7	7/6/2009	64.01	12.50	12.45	0.05	51.55	--
MW-7	3/17/2010	64.01	11.05	NP	--	52.96	--
MW-7	7/26/2010	64.01	11.84	11.80	0.04	52.20	--
MW-7	9/15/2010	64.01	11.98	NP	--	52.03	--
MW-7	3/4/2011	64.01	10.99	NP	--	53.02	--
MW-7	8/24/2011	64.01	12.53	NP	--	51.48	--
MW-7	10/7/2011	64.01	--	--	--	--	Dry
MW-7	5/10/2012	64.01	11.69	NP	--	52.32	--
MW-7	11/15/2012	64.01	11.72	NP	--	52.29	--
MW-7	3/28/2013	64.01	11.36	NP	--	52.65	--
MW-7	12/18/2013	64.01	11.67	NP	--	52.34	--
MW-7	6/25/2014	64.01	11.85	NP	--	52.16	--
MW-7	12/9/2014	64.01	11.37	NP	--	52.64	--
MW-7	6/16/2015	64.01	12.26	NP	--	51.75	--
MW-7	10/21/2015	64.01	12.25	NP	--	51.76	--
MW-7	4/21/2016	64.01	11.49	NP	--	52.52	--
MW-7	11/10/2016	64.01	11.59	NP	--	52.42	--
MW-7	6/26/2017	64.01	11.81	NP	--	52.20	--
MW-7	11/14/2017	64.01	11.69	NP	--	52.32	--

Table 1
Groundwater Gauging Data
K-Booster Station
10200 West March Point Road, Anacortes, WA 98221

Well I.D.	Date	GROUNDWATER ELEVATION DATA					
		TOC Elevation (ft)	Water Level Depth (ft)	LNAPL Depth (ft)	LNAPL Thickness (ft)	Water Level Elevation* (ft)	Qualifiers
MW-7	6/29/2018	64.01	12.18	NP	--	51.83	--
MW-7	11/8/2018	64.01	11.74	NP	--	52.27	--
MW-7	6/13/2019	64.01	12.04	12.03	0.01	51.98	--
MW-7	10/9/2019	64.01	11.68	NP	--	52.33	--
MW-7	6/11/2020	64.01	11.50	NP	--	52.51	--
MW-7	11/6/2020	64.01	11.88	NP	--	52.13	--
MW-7	5/26/2021	64.01	11.43	NP	--	52.58	--

Notes:
TOC - Top of Casing
ft - feet
NP - No Product
LNAPL - Light Non-Aqueous Phase Liquid
* - Corrected for LNAPL if present (assumes LNAPL specific gravity = 0.75)
-- No Information Available
Dry - Well Dry
NG - Not gauged
ABD - Abandoned

Table 2
Groundwater Analytical Data
K-Booster Station
10200 West March Point Road, Anacortes, WA 98221

CONSTITUENT		B	T	E	X	TPH-G	TPH-D	TPH-O
UNIT		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MTCA METHOD A CLEANUP LEVELS		**5**	**1000**	**700**	**1000**	**800**	**500**	**500**
Well ID	Date							
94-3	1/29/2008	**20**	4.48	1.51	16.4	515	< 0.248	< 495
94-3	4/3/2008	**17.8**	43.8	17.1	132	**2,420**	2.14	< 485
94-3	5/27/2008	**35.9**	10.6	2.5	43.1	**895**	< 0.243	< 485
94-3	6/24/2008	**28.7**	11.8	2.92	47	**831**	< 0.243	< 485
94-3	7/28/2008	**31.2**	13.6	2.49	55.8	**821**	< 0.243	< 485
94-3	8/26/2008	**27.4**	11.4	2.53	46.9	785	< 0.236	< 472
94-3	1/27/2009	**23.3**	5.36	1.22	22.7	666	< 236	< 472
94-3	7/6/2009	**11**	3.87	0.756	16.8	371	< 238	< 476
94-3	3/17/2010	**14**	1.3	< 1.0	4.6	130	< 120	< 240
94-3	9/15/2010	**6.0**	< 1.0	< 1.0	< 3.0	107	< 76	< 380
94-3	3/4/2011	< 1.0	< 1.0	< 1.0	< 3.0	< 50.0	< 75	< 380
94-3	8/24/2011	< 1.0	< 1.0	< 1.0	< 3.0	< 50.0	< 76	< 380
94-3	5/10/2012	**65.0**	73.6	82.1	142	**1,490**	< 75	< 380
94-3	11/15/2012	**88.5**	115	163	495	**4,470**	243	< 185
94-3	3/28/2013	**76**	47	37	176.8	**1,600**	< 250	< 500
94-3	12/18/2013	**20**	8.4	2.1	18	550	< 120	< 240
94-3	6/25/2014	**150**	55	16	140	**1,700**	230	< 240
94-3	12/9/2014	**46**	26	7.8	52	**1,100**	190	< 240
94-3	6/16/2015	**55**	37	12	110	**1,200**	240 Y	< 250
94-3	10/21/2015	**52**	29	7.4	69	**1,300**	190	< 250
94-3	4/21/2016	**82**	47	8.6	95	**1,700**	390	< 250
94-3	11/10/2016	**68**	32	7.2	63	**1,300**	450	260
94-3	6/26/2017	**70.2**	40.4	6.48	76.1	**1,390**	182 J	< 250
94-3	11/14/2017	**130**	68	16	70.8	**1,300**	290	< 260
94-3	6/29/2018	**380**	140	47	169.7	**2,600**	480	< 370
94-3	11/8/2018	**300**	160	33	220	**2,400 H**	**580**	< 350
94-3	6/13/2019	**300**	140	28	170	**3,000**	**610**	< 350
94-3	10/9/2019	**320**	64	5.0	110	**1,500**	330	< 350
94-3	6/11/2020	**520**	< 100	< 150	< 150	**2,300**	**600**	< 350

Table 2
Groundwater Analytical Data
K-Booster Station
10200 West March Point Road, Anacortes, WA 98221

CONSTITUENT		B	T	E	X	TPH-G	TPH-D	TPH-O
UNIT		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MTCA METHOD A CLEANUP LEVELS		**5**	**1000**	**700**	**1000**	**800**	**500**	**500**
94-3	11/6/2020	**180**	49	8.7	68	**1,500**	460	< 350
94-3	5/26/2021	**610**	120	24	70	**1,800**	430	< 350
94-4	1/29/2008	**5,700**	**11,900**	**1,320**	**8,280**	465	0.67	< 97100
94-4	7/6/2009	**53**	6.5	11.8	97.7	**4,140**	**315,000**	< 9520
94-4	3/17/2010	1.5	2.9	10	170	**8,100**	**19,000**	330
94-4	3/4/2011	< 1.0	< 1.0	2.5	19.2	**2,380**	**1,200**	< 380
95-1	1/29/2008	**5.83**	< 0.5	< 0.5	< 1	148	< 0.248	< 500
95-1	4/3/2008	1.18	< 0.5	< 0.5	< 1	68.7	0.297	< 476
95-1	5/27/2008	3.29	< 0.5	< 0.5	< 1	102	< 0.236	< 472
95-1	6/24/2008	**5.11**	< 0.5	< 0.5	< 1	125	< 0.243	< 485
95-1	7/28/2008	< 0.5	< 0.5	< 0.5	< 1	56	< 0.238	< 476
95-1	8/26/2008	1.26	< 0.5	< 0.5	< 1	51.1	< 0.238	< 476
95-1	1/27/2009	3.12	< 0.5	< 0.5	< 1	96.5	< 236	< 472
95-1	7/6/2009	< 0.5	< 0.5	< 0.5	< 1	< 80	< 238	< 476
95-1	3/17/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 50	< 120	< 240
95-1	3/4/2011	< 1.0	< 1.0	2.0	< 3.0	128	170	< 380
95-1	5/10/2012	< 1.0	< 1.0	< 1.0	< 3.0	< 50.0	--	--
95-1	12/18/2013	< 1.0	< 1.0	< 1.0	< 3.0	210	**630**	< 240
95-1	6/25/2014	< 1.0	< 1.0	< 1.0	< 3.0	< 50	140	< 240
95-1	12/9/2014	< 1.0	< 1.0	< 1.0	< 3.0	300	140	< 240
95-1	6/16/2015	< 2.0 *	< 2.0	< 3.0	< 3.0	95	< 110	< 250
95-1	10/21/2015	< 2.0	< 2.0	< 3.0	< 3.0	< 50	< 110	< 250
95-1	4/21/2016	< 2.0	< 2.0	< 3.0	< 3.0	< 50	120	< 250
95-1	11/10/2016	< 2.0	< 2.0	< 3.0	< 3.0	< 50	150	< 250
95-1	6/26/2017	< 1.0	< 1.0	< 1.0	< 3.0	< 100	< 200	< 250
95-1	11/14/2017	< 2.0	< 2.0	< 3.0	< 2.5	< 250	< 100	< 260
95-1	6/29/2018	< 3.0	< 2.0	< 3.0	< 2.5	< 250	< 110	< 360
95-1	11/8/2018	< 3.0	< 2.0	< 3.0	< 3.0	< 250 H	< 110	< 350

Table 2
Groundwater Analytical Data
K-Booster Station
10200 West March Point Road, Anacortes, WA 98221

CONSTITUENT		B	T	E	X	TPH-G	TPH-D	TPH-O
UNIT		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MTCA METHOD A CLEANUP LEVELS		**5**	**1000**	**700**	**1000**	**800**	**500**	**500**
95-1	6/11/2020	< 3.0 *	< 2.0 *	< 3.0 *	< 3.0 *	< 250	< 110	< 350
95-1	11/6/2020	< 3.0	< 2.0	< 3.0	< 3.0	< 250	< 110	< 340
95-1	5/26/2021	< 1.0	< 1.0	< 1.0	< 2.0	< 250	480	420
95-4	1/29/2008	0.965	< 0.5	0.667	< 1	< 50	< 0.25	< 495
95-4	4/3/2008	1.12	8.25	2.52	23.8	472	0.366	< 476
95-4	5/27/2008	< 0.5	< 0.5	< 0.5	< 1	< 50	< 0.248	< 495
95-4	6/24/2008	< 0.5	< 0.5	< 0.5	< 1	< 50	< 0.243	< 485
95-4	7/28/2008	< 0.5	< 0.5	< 0.5	< 1	< 50	< 0.243	< 485
95-4	8/26/2008	< 0.5	< 0.5	< 0.5	< 1	< 50	< 0.246	< 472
95-4	1/27/2009	< 0.5	< 0.5	< 0.5	< 1	< 50	< 236	< 472
95-4	7/6/2009	< 0.5	< 0.5	< 0.5	< 1	< 80	< 236	< 472
95-4	3/17/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 50	< 120	< 240
95-4	9/15/2010	< 1.0	< 1.0	< 1.0	< 3.0	< 50.0	< 76	< 380
95-4	3/4/2011	< 1.0	< 1.0	< 1.0	< 3.0	< 50.0	< 75	< 380
95-4	8/24/2011	< 1.0	< 1.0	< 1.0	< 3.0	< 50.0	< 75	< 380
95-4	5/10/2012	< 1.0	< 1.0	< 1.0	< 3.0	< 50.0	< 76	< 380
95-4	11/15/2012	< 1	< 1	< 1	< 3	< 100	< 185	< 185
95-4	3/28/2013	< 0.50	< 0.50	< 0.50	< 1.0	< 50	< 250	< 500
95-4	12/18/2013	< 1.0	< 1.0	< 1.0	< 3.0	< 50	< 120	< 240
95-4	6/25/2014	< 1.0	< 1.0	< 1.0	< 3.0	< 50	< 120	< 240
95-4	12/9/2014	< 1.0	< 1.0	< 1.0	< 3.0	< 50	120	< 240
95-4	6/16/2015	< 2.0	< 2.0	< 3.0	< 3.0	73	160 Y	< 250
95-4	10/21/2015	< 2.0	< 2.0	< 3.0	< 3.0	< 50	< 110	< 250
95-4	4/21/2016	< 2.0	< 2.0	< 3.0	< 3.0	< 50	< 110	< 250
95-4	11/10/2016	< 2.0	< 2.0	< 3.0	< 3.0	< 50	130	< 250
95-4	6/26/2017	< 1.0	< 1.0	< 1.0	< 3.0	< 100	< 200	< 250
95-4	11/14/2017	< 2.0	< 2.0	< 3.0	< 2.5	< 250	< 100	< 250
95-4	6/29/2018	< 3.0	< 2.0	< 3.0	< 2.5	< 250	< 110	< 360
95-4	11/8/2018	< 3.0	< 2.0	< 3.0	< 3.0	< 250 H	< 110	< 350

Table 2
Groundwater Analytical Data
K-Booster Station
10200 West March Point Road, Anacortes, WA 98221

CONSTITUENT		B	T	E	X	TPH-G	TPH-D	TPH-O
UNIT		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MTCA METHOD A CLEANUP LEVELS		**5**	**1000**	**700**	**1000**	**800**	**500**	**500**
95-4	6/13/2019	< 3.0	< 2.0	< 3.0	< 3.0	< 250	< 110	< 350
95-4	10/9/2019	< 3.0	< 2.0	< 3.0	< 3.0	< 250	< 110	< 350
95-4	6/11/2020	< 3.0 *	< 2.0 *	< 3.0 *	< 3.0 *	< 250	480	< 360
95-4	11/6/2020	< 3.0	< 2.0	< 3.0	< 3.0	< 250	< 110	< 340
95-4	5/26/2021	< 1.0	< 1.0	< 1.0	< 2.0	< 250	< 110	< 350
MW-6	5/27/2008	< 0.5	< 0.5	< 0.5	< 1	< 50	< 0.243	< 485
MW-6	6/24/2008	< 0.5	< 0.5	< 0.5	< 1	< 50	< 0.243	< 485
MW-6	7/28/2008	< 0.5	< 0.5	< 0.5	< 1	< 50	< 0.238	< 476
MW-6	8/26/2008	< 0.5	< 0.5	< 0.5	< 1	< 50	< 0.245	< 490
MW-6	1/27/2009	< 0.5	< 0.5	< 0.5	< 1	< 50	< 236	< 472
MW-6	7/6/2009	< 0.5	< 0.5	< 0.5	< 1	< 80	< 250	< 500
MW-6	3/17/2010	< 1.0	< 1.0	< 1.0	< 2.0	< 50	< 120	< 240
MW-6	9/15/2010	< 1.0	< 1.0	< 1.0	< 3.0	< 50.0	< 76	< 380
MW-6	3/4/2011	< 1.0	< 1.0	< 1.0	< 3.0	< 50.0	< 75	< 380
MW-6	8/24/2011	< 1.0	< 1.0	< 1.0	< 3.0	< 50.0	< 75	< 380
MW-6	5/10/2012	< 1.0	< 1.0	< 1.0	< 3.0	< 50.0	< 76	< 380
MW-6	11/15/2012	< 1	< 1	< 1	< 3	< 100	< 189	< 189
MW-6	3/28/2013	< 0.50	< 0.50	< 0.50	< 1.0	< 50	< 250	< 500
MW-6	6/25/2014	< 1.0	< 1.0	< 1.0	< 3.0	< 50	< 120	< 240
MW-6	12/9/2014	< 1.0	< 1.0	< 1.0	< 3.0	< 50	130	< 240
MW-6	12/18/2014	< 1.0	< 1.0	< 1.0	< 3.0	< 50	< 120	< 240
MW-6	6/16/2015	< 2.0	< 2.0	< 3.0	< 3.0	< 50	< 110	< 250
MW-6	10/21/2015	< 2.0	< 2.0	< 3.0	< 3.0	< 50	< 110	< 250
MW-6	4/21/2016	< 2.0	< 2.0	< 3.0	< 3.0	< 50	< 110	< 250
MW-6	11/10/2016	< 2.0	< 2.0	< 3.0	< 3.0	< 50	120	< 250
MW-6	6/26/2017	< 1.0	< 1.0	< 1.0	< 3.0	< 100	< 200	< 250
MW-6	11/14/2017	< 2.0	< 2.0	< 3.0	< 2.5	< 250	< 100	< 260
MW-6	6/29/2018	< 3.0	< 2.0	< 3.0	< 2.5	< 250	< 120	< 370
MW-6	11/8/2018	< 3.0	< 2.0	< 3.0	< 3.0	< 250 H	< 110	< 350

Table 2
Groundwater Analytical Data
K-Booster Station
10200 West March Point Road, Anacortes, WA 98221

CONSTITUENT		B	T	E	X	TPH-G	TPH-D	TPH-O
UNIT		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
MTCA METHOD A CLEANUP LEVELS		**5**	**1000**	**700**	**1000**	**800**	**500**	**500**
MW-6	6/13/2019	< 3.0	< 2.0	< 3.0	< 3.0	< 250	< 110	< 350
MW-6	10/9/2019	< 3.0	< 2.0	< 3.0	< 3.0	< 250	< 110	< 350
MW-6	6/11/2020	< 3.0 *	< 2.0 *	< 3.0 *	< 3.0 *	< 250	< 110	< 350
MW-6	11/6/2020	< 3.0	< 2.0	< 3.0	< 3.0	< 250	< 110	< 340
MW-6	5/26/2021	< 1.0	< 1.0	< 1.0	< 2.0	< 250	< 110	< 360
MW-7	10/21/2008	**1,940**	680	318	**1,280**	**229,000**	7.4	< 476
MW-7	3/17/2010	**150**	11	68	590	**12,000**	**270,000**	**4,500**
MW-7	9/15/2010	**793**	18.2	55.3	165	**3,820**	**1,900**	< 380
MW-7	8/24/2011	**22.5**	< 1.0	2.6	< 3.0	**3,870**	**1,500**	< 380
MW-7	5/10/2012	**199**	11.3	93.5	55.3	**3,300**	**2,000**	< 380
MW-7	3/28/2013	**150**	8.9	85	36	**4,300**	**1,300**	< 500
MW-7	12/18/2013	**76**	2.7	23	13	**3,700**	**2,000**	< 240
MW-7	6/25/2014	**65**	2.6	32	14	**1,700**	**1,700**	< 240
MW-7	12/9/2014	**270**	12	210	25	**4,100**	**3,800**	320
MW-7	6/16/2015	**22**	< 2.0	15	< 3.0	**1,200**	**3,500 Y**	< 250
MW-7	10/21/2015	**41**	< 2.0	< 3.0	< 3.0	**2,200**	**3,300**	< 250
MW-7	4/21/2016	**71**	< 2.0	23	< 3.0	**1,300**	**3,200**	270
MW-7	11/10/2016	**140**	2.4	34	< 3.0	**930**	**6,300**	**900**
MW-7	6/26/2017	**25.9**	< 1.0	14.2	1.18 J	**830**	**4,610**	**731**
MW-7	11/14/2017	**97**	< 2.0	51	< 2.5	**2,000**	**3,500**	490
MW-7	6/29/2018	**120**	< 2.0	36	< 2.5	**2,600**	**4,500**	< 360
MW-7	11/8/2018	**190**	2.4	67	3.1	**4,200 H**	**5,800**	**630**
MW-7	6/13/2019	**180**	2.5	54	3.3	**3,800**	**7,200**	**520**
MW-7	10/9/2019	**130**	< 2.0	66	3.6	**3,800**	**3,500**	< 350
MW-7	6/11/2020	**63**	< 2.0	21	< 3.0 *	**3,600**	**5,800**	**500**
MW-7	11/6/2020	**38**	< 2.0	14	< 3.0	**3,100**	**6,400**	460
MW-7	5/26/2021	**17**	1.3	11	< 2.0	**1,900**	**1,700**	< 350

Table 2
Groundwater Analytical Data
K-Booster Station
10200 West March Point Road, Anacortes, WA 98221

CONSTITUENT UNIT	B ug/L	T ug/L	E ug/L	X ug/L	TPH-G ug/L	TPH-D ug/L	TPH-O ug/L
MTCA METHOD A CLEANUP LEVELS	**5**	**1000**	**700**	**1000**	**800**	**500**	**500**

Notes:

B = Benzene

T = Toluene

E = Ethylbenzene

X = Xylenes, Total

TPH-G = Total petroleum hydrocarbons as gasoline by Northwest Method NWTPH-Gx

TPH-D = Total petroleum hydrocarbons as diesel by Northwest Method NWTPH-Dx

TPH-O = Total petroleum hydrocarbons as oil by Northwest Method NWTPH-Dx

1,000/800[1] ug/L if no detectable levels of Benzene in the sample - otherwise 800 ug/L

<1.0 = Concentrations were not detected above the laboratory method reporting limit.

ug/L = Micrograms per liter (ppb)

J = Result is greater than the method detection limit and less than the reporting limit given as an approximate concentration value

ND = Not detected

NE = Not evaluated

-- = No value given/Not analyzed/Not applicable

MTCA = Model Toxics Control Act

Results in **bold** indicate concentrations in excess of MTCA Method A Cleanup Levels

Y = The chromatographic response resembles a typical fuel pattern.

H = Sample was prepped or analyzed beyond the specified holding time.

Charts

Chart 1
94-3 Hydrocarbon Concentrations and Water Elevation vs Time
OPLC K-Booster

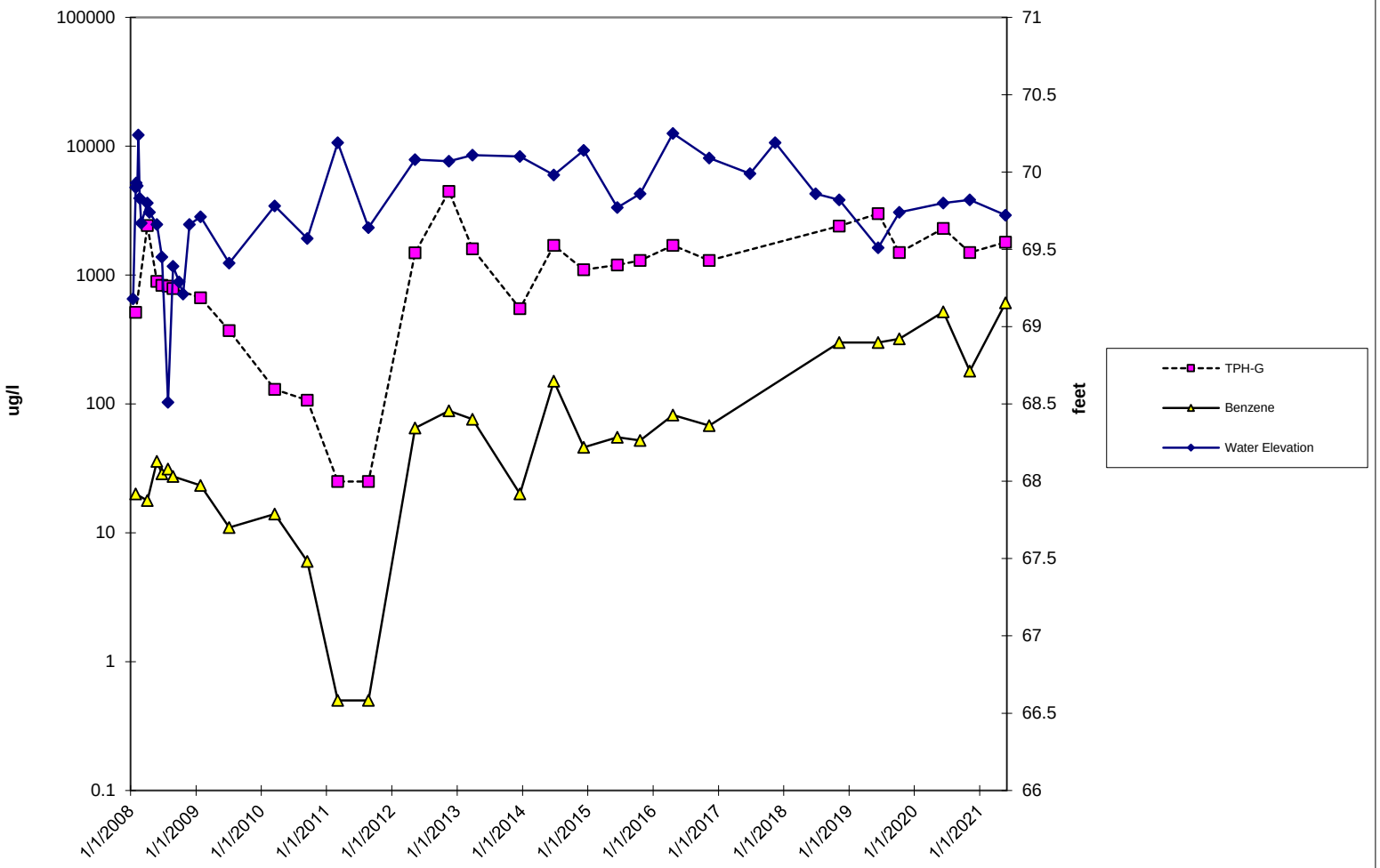
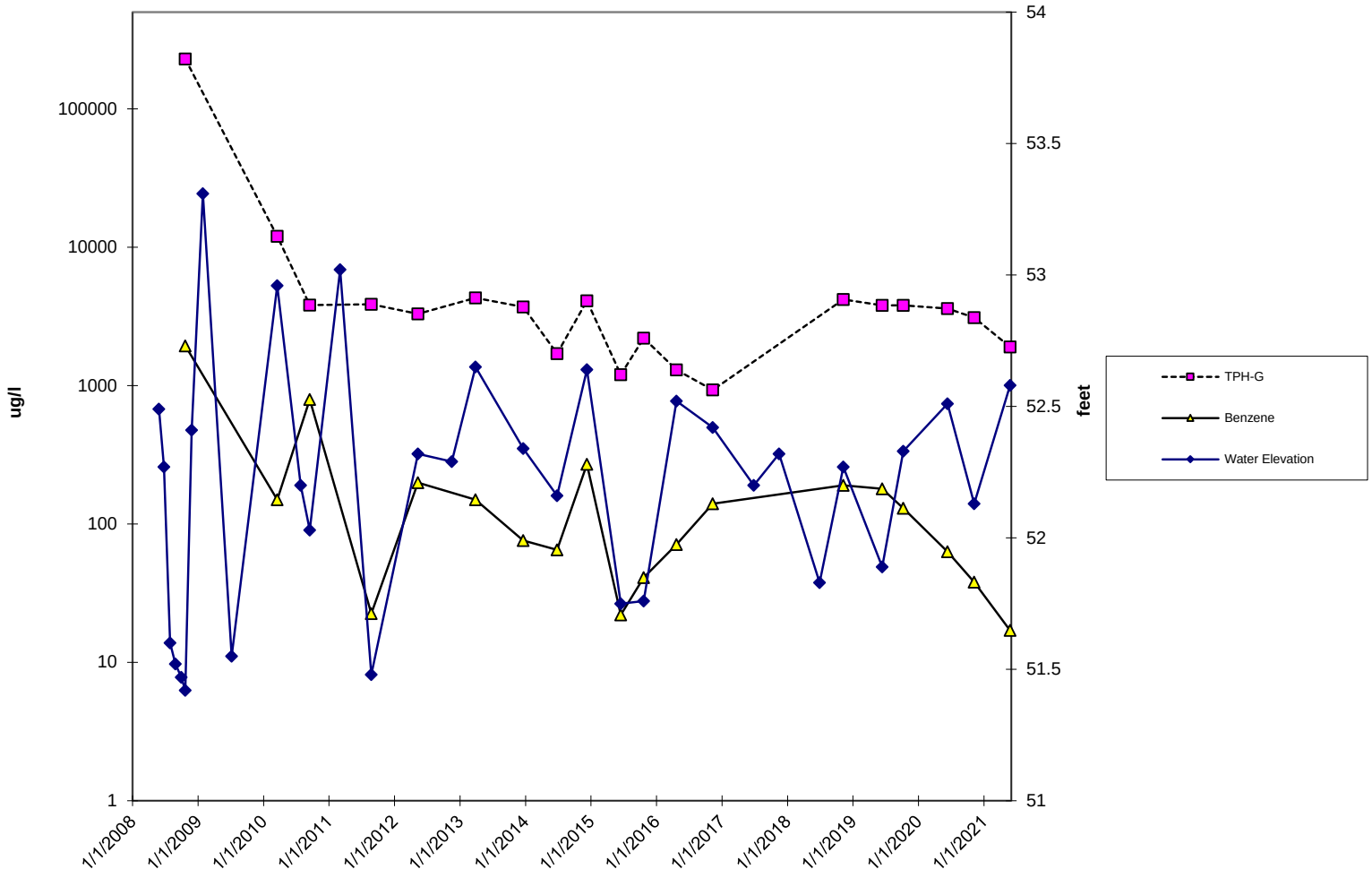
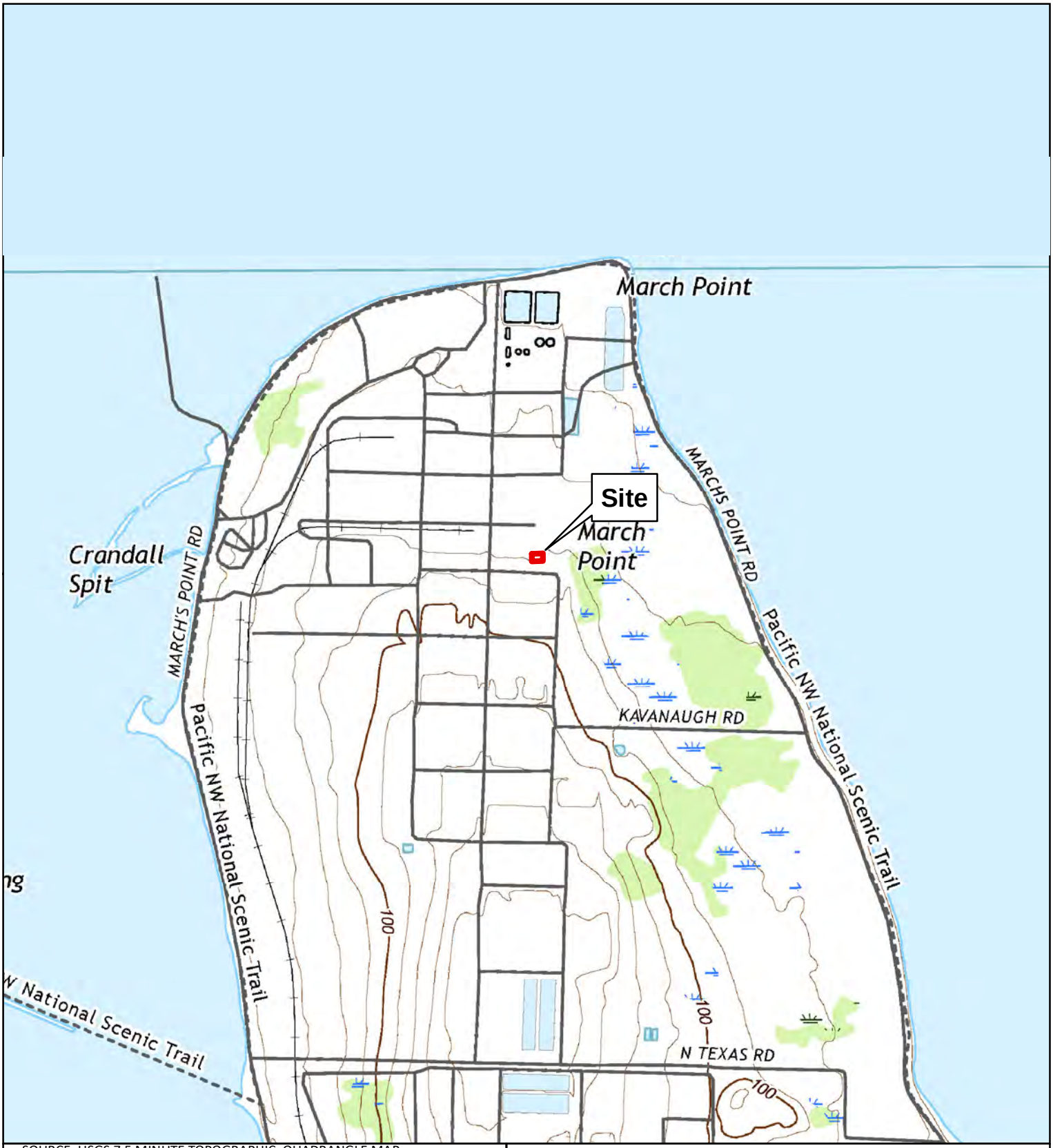


Chart 2
MW-7 Hydrocarbon Concentrations and Water Elevation vs Time
OPLC K-Booster



Figures



SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAP; ANACORTES SOUTH AND ANACORTES NORTH, WASHINGTON

0 500 1,000 2,000 3,000 4,000 Feet

FIGURE 1
Site Location Map

K-Booster Station
Anacortes, Washington

PROJECT NO.	PREPARED BY	REF SCALE
WAKBOOS191	*JH*	*1:24,000*
DATE	REVIEWED BY	MAP SCALE
1/18/2019	*BE*	*1 inch = 2,000 feet*

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\\gis-s3\GIS_Data\Sandbox\!Projects\A-E\BP_Seattle\BP_Pipeline\KBooster\WAKBOOS181\Layout\KBooster_011019_SiteLocation.mxd

Legend

- Well Location (approximate)
- Well Destroyed

1. The locations shown are approximate.
2. This figure is for information purposes only. It is intended to assist in the identification of features discussed in a related document. Data were compiled from sources as listed in this figure. The data sources do not guarantee these data are accurate or complete. There may have been updates to the data since the publication of this figure.

0 12.5 25 50 75 100 Feet

N

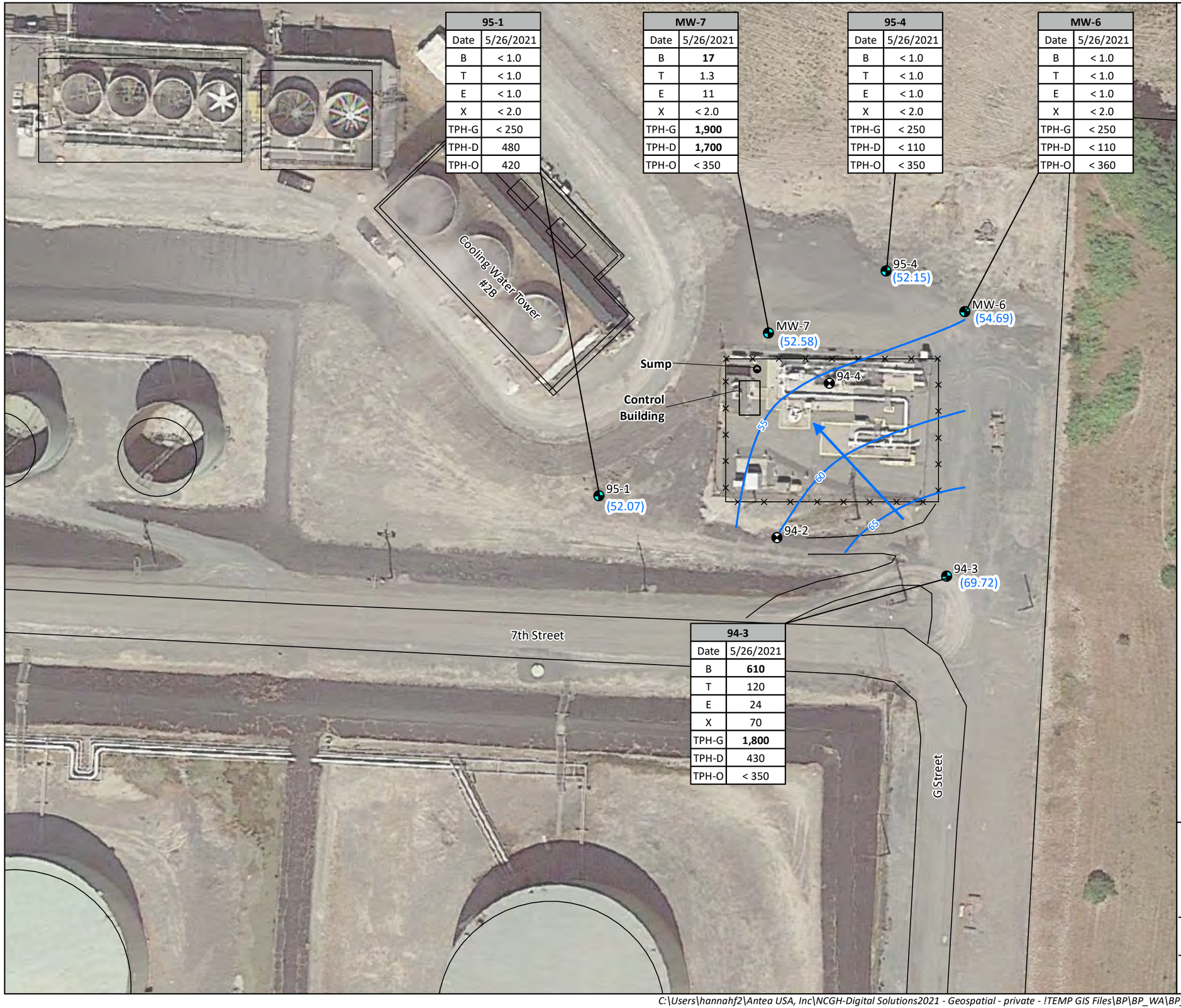
FIGURE 2
SITE MAP

K-BOOSTER STATION
ANACORTES, WASHINGTON

PROJECT NO.	PREPARED BY	REF SCALE
WAKBOOS191	*JH*	*1:600*
DATE	REVIEWED BY	MAP SCALE
1/10/2019	*BE/MR*	*1 INCH = 50 FEET*

anteagroup

\\gis-s3\GIS_Data\Sandbox\!Projects\A-E\BP_Seattle\BP_Pipeline\KBooster\WAKBOOS181\Layout\KBooster_010719_SiteMap.mxd



95-1	
Date	5/26/2021
B	< 1.0
T	< 1.0
E	< 1.0
X	< 2.0
TPH-G	< 250
TPH-D	480
TPH-O	420

MW-7	
Date	5/26/2021
B	**17**
T	1.3
E	11
X	< 2.0
TPH-G	**1,900**
TPH-D	**1,700**
TPH-O	< 350

95-4	
Date	5/26/2021
B	< 1.0
T	< 1.0
E	< 1.0
X	< 2.0
TPH-G	< 250
TPH-D	< 110
TPH-O	< 350

MW-6	
Date	5/26/2021
B	< 1.0
T	< 1.0
E	< 1.0
X	< 2.0
TPH-G	< 250
TPH-D	< 110
TPH-O	< 360

94-3	
Date	5/26/2021
B	**610**
T	120
E	24
X	70
TPH-G	**1,800**
TPH-D	430
TPH-O	< 350

Legend

- Well Location (approximate)
- Well Destroyed
- Groundwater Elevation Contour (ft)
- Inferred Groundwater Flow Direction

(Approximate Groundwater Gradient: 0.12 ft/linear ft)

(69.72) Groundwater Elevation (in feet)

Chemical	Cleanup Level
B	5
T	1000
E	700
X	1000
TPH-G	800 [1]
TPH-D	500
TPH-O	500

1. The locations shown are approximate.
2. This figure is for information purposes only. It is intended to assist in the identification of features discussed in a related document. Data were compiled from sources as listed in this figure. The data sources do not guarantee these data are accurate or complete. There may have been updates to the data since the publication of this figure.

NOTES:
All concentrations reported in micrograms per liter (µg/L)
NS = Not Sampled
B = Benzene by EPA Method 8260
T = Toluene by EPA Method 8260
E = Ethylbenzene by EPA Method 8260
X = Xylenes by EPA Method 8260
TPH-G = Total petroleum hydrocarbons as gasoline by Northwest Method NWTPH-Gx
TPH-D = Total petroleum hydrocarbons as diesel by Northwest Method NWTPH-Dx
TPH-O = Total petroleum hydrocarbons as oil by Northwest Method NWTPH-Dx
[1] = MTCA Method A Cleanup Level for TPH-Gasoline is 1000 (µg/L) if benzene is not detectable in groundwater
< = Less than the stated laboratory reporting limit or method detection limit
BOLD = Concentration is at or above MTCA Method A Cleanup Level
MTCA = Model Toxics Control Act

0 12.5 25 50 75 100 Feet

N

FIGURE 3
GROUNDWATER ELEVATION CONTOUR AND ANALYTICAL DATA MAP
MAY 26, 2021

K-BOOSTER STATION
ANACORTES, WASHINGTON

PROJECT NO.	PREPARED BY	REF SCALE
WAKBOOS201	*HMF*	*1:600*
DATE	REVIEWED BY	MAP SCALE
7/23/2021	*KY*	*1 INCH = 50 FEET*

antea group

C:\Users\hannahf2\Antea USA, Inc\NCGH-Digital Solutions2021 - Geospatial - private - !TEMP GIS Files\BP\BP_WA\BP_Seattle\BP_Pipeline\KBooster\WAKBOOS181\Layout\KBooster_GWE_GWA_2Q21.mxd

Appendix A - Analytical Lab Reports and Chain-of-Custody Documentation

eurofins | Environment Testing America

ANALYTICAL REPORT

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

Laboratory Job ID: 580-103402-1
Client Project/Site: BP - OPLC - K Booster
Sampling Event: MW

For:
Antea USA Inc.
4006 148th Ave NE
Redmond, Washington 98052

Attn: Megan Richard

M. Elaine Walker

Authorized for release by:
6/10/2021 5:07:07 PM

Elaine Walker, Project Manager II
(253)248-4972
m.elaine.walker@eurofinset.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.eurofinsus.com/Env

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.

Table of Contents

Definitions/Glossary

Client: Antea USA Inc.
Project/Site: BP - OPLC - K Booster

Job ID: 580-103402-1

Qualifiers

GC VOA

Qualifier	Qualifier Description
S1+	Surrogate recovery exceeds control limits, high biased.

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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Job ID: 580-103402-1

Laboratory: Eurofins FGS, Seattle

Narrative

Job Narrative
580-103402-1

Receipt
Six samples were received on 5/27/2021 12:06 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.0º C.

GC/MS VOA
Method 8260D: The following sample was diluted to bring the concentration of target analytes within the calibration range: 94-3_20210526 (580-103402-1). 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 NWTPH-Gx: Surrogate recovery for the following sample was outside control limits: 94-3_20210526 (580-103402-1). 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
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: Antea USA Inc.
Project/Site: BP - OPLC - K Booster

Job ID: 580-103402-1

Client Sample ID: 94-3_20210526 — Lab Sample ID: 580-103402-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	610		10		ug/L	10		8260D	Total/NA
Toluene	120		10		ug/L	10		8260D	Total/NA
Ethylbenzene	24		10		ug/L	10		8260D	Total/NA
Xylenes, Total	70		20		ug/L	10		8260D	Total/NA
Gasoline	1800		250		ug/L	1		NWTPH-Gx	Total/NA
#2 Diesel (C10-C24)	0.43		0.11		mg/L	1		NWTPH-Dx	Total/NA

Client Sample ID: 95-1_20210526 — Lab Sample ID: 580-103402-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
#2 Diesel (C10-C24)	0.48		0.11		mg/L	1		NWTPH-Dx	Total/NA
Motor Oil (>C24-C36)	0.42		0.36		mg/L	1		NWTPH-Dx	Total/NA

Client Sample ID: 95-4_20210526 — Lab Sample ID: 580-103402-3

No Detections.

Client Sample ID: MW-6_20210526 — Lab Sample ID: 580-103402-4

No Detections.

Client Sample ID: MW-7_20210526 — Lab Sample ID: 580-103402-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	17		1.0		ug/L	1		8260D	Total/NA
Toluene	1.3		1.0		ug/L	1		8260D	Total/NA
Ethylbenzene	11		1.0		ug/L	1		8260D	Total/NA
Gasoline	1900		250		ug/L	1		NWTPH-Gx	Total/NA
#2 Diesel (C10-C24)	1.7		0.11		mg/L	1		NWTPH-Dx	Total/NA

Client Sample ID: Trip Blank-1_20210526 — Lab Sample ID: 580-103402-6

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: 94-3_20210526

Lab Sample ID: 580-103402-1

Date Collected: 05/26/21 10:45

Matrix: Water

Date Received: 05/27/21 12:06

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**610**		10		ug/L			06/07/21 01:54	10
Toluene	**120**		10		ug/L			06/07/21 01:54	10
Ethylbenzene	**24**		10		ug/L			06/07/21 01:54	10
Xylenes, Total	**70**		20		ug/L			06/07/21 01:54	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 120*		*06/07/21 01:54*	*10*
1,2-Dichloroethane-d4 (Surr)	*98*		*80 - 126*		*06/07/21 01:54*	*10*
4-Bromofluorobenzene (Surr)	*110*		*80 - 120*		*06/07/21 01:54*	*10*
Dibromofluoromethane (Surr)	*95*		*80 - 120*		*06/07/21 01:54*	*10*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	**1800**		250		ug/L			06/07/21 12:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*154*	*S1+*	*50 - 150*		*06/07/21 12:22*	*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)	**0.43**		0.11		mg/L		06/02/21 08:36	06/09/21 23:49	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		06/02/21 08:36	06/09/21 23:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*72*		*50 - 150*	*06/02/21 08:36*	*06/09/21 23:49*	*1*

Client Sample ID: 95-1_20210526

Lab Sample ID: 580-103402-2

Date Collected: 05/26/21 09:45

Matrix: Water

Date Received: 05/27/21 12:06

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			06/07/21 02:19	1
Toluene	ND		1.0		ug/L			06/07/21 02:19	1
Ethylbenzene	ND		1.0		ug/L			06/07/21 02:19	1
Xylenes, Total	ND		2.0		ug/L			06/07/21 02:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*80 - 120*		*06/07/21 02:19*	*1*
1,2-Dichloroethane-d4 (Surr)	*102*		*80 - 126*		*06/07/21 02:19*	*1*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*		*06/07/21 02:19*	*1*
Dibromofluoromethane (Surr)	*106*		*80 - 120*		*06/07/21 02:19*	*1*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		250		ug/L			06/07/21 12:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*84*		*50 - 150*		*06/07/21 12:47*	*1*

Client Sample ID: 95-1_20210526

Lab Sample ID: 580-103402-2

Date Collected: 05/26/21 09:45
Matrix: Water
Date Received: 05/27/21 12:06

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.48		0.11		mg/L		06/02/21 08:36	06/08/21 03:08	1
Motor Oil (>C24-C36)	0.42		0.36		mg/L		06/02/21 08:36	06/08/21 03:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*78*		*50 - 150*	*06/02/21 08:36*	*06/08/21 03:08*	*1*

Client Sample ID: 95-4_20210526

Lab Sample ID: 580-103402-3

Date Collected: 05/26/21 13:00
Matrix: Water
Date Received: 05/27/21 12:06

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			06/07/21 17:00	1
Toluene	ND		1.0		ug/L			06/07/21 17:00	1
Ethylbenzene	ND		1.0		ug/L			06/07/21 17:00	1
Xylenes, Total	ND		2.0		ug/L			06/07/21 17:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*80 - 120*		*06/07/21 17:00*	*1*
1,2-Dichloroethane-d4 (Surr)	*106*		*80 - 126*		*06/07/21 17:00*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*06/07/21 17:00*	*1*
Dibromofluoromethane (Surr)	*105*		*80 - 120*		*06/07/21 17:00*	*1*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		250		ug/L			06/07/21 13:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*88*		*50 - 150*		*06/07/21 13:11*	*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		0.11		mg/L		06/02/21 08:36	06/08/21 03:27	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		06/02/21 08:36	06/08/21 03:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*68*		*50 - 150*	*06/02/21 08:36*	*06/08/21 03:27*	*1*

Client Sample ID: MW-6_20210526

Lab Sample ID: 580-103402-4

Date Collected: 05/26/21 11:45
Matrix: Water
Date Received: 05/27/21 12:06

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			06/08/21 01:20	1
Toluene	ND		1.0		ug/L			06/08/21 01:20	1
Ethylbenzene	ND		1.0		ug/L			06/08/21 01:20	1
Xylenes, Total	ND		2.0		ug/L			06/08/21 01:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*80 - 120*		*06/08/21 01:20*	*1*
1,2-Dichloroethane-d4 (Surr)	*106*		*80 - 126*		*06/08/21 01:20*	*1*

Client Sample ID: MW-6_20210526

Lab Sample ID: 580-103402-4

Date Collected: 05/26/21 11:45
Matrix: Water
Date Received: 05/27/21 12:06

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*06/08/21 01:20*	*1*
Dibromofluoromethane (Surr)	*106*		*80 - 120*		*06/08/21 01:20*	*1*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		250		ug/L			06/07/21 14:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*88*		*50 - 150*		*06/07/21 14:00*	*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		0.11		mg/L		06/02/21 08:36	06/08/21 04:07	1
Motor Oil (>C24-C36)	ND		0.36		mg/L		06/02/21 08:36	06/08/21 04:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*65*		*50 - 150*	*06/02/21 08:36*	*06/08/21 04:07*	*1*

Client Sample ID: MW-7_20210526

Lab Sample ID: 580-103402-5

Date Collected: 05/26/21 14:15
Matrix: Water
Date Received: 05/27/21 12:06

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**17**		1.0		ug/L			06/08/21 01:44	1
Toluene	**1.3**		1.0		ug/L			06/08/21 01:44	1
Ethylbenzene	**11**		1.0		ug/L			06/08/21 01:44	1
Xylenes, Total	ND		2.0		ug/L			06/08/21 01:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*80 - 120*		*06/08/21 01:44*	*1*
1,2-Dichloroethane-d4 (Surr)	*94*		*80 - 126*		*06/08/21 01:44*	*1*
4-Bromofluorobenzene (Surr)	*112*		*80 - 120*		*06/08/21 01:44*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 120*		*06/08/21 01:44*	*1*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	**1900**		250		ug/L			06/07/21 14:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*133*		*50 - 150*		*06/07/21 14:24*	*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)	**1.7**		0.11		mg/L		06/02/21 08:36	06/08/21 04:27	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		06/02/21 08:36	06/08/21 04:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*61*		*50 - 150*	*06/02/21 08:36*	*06/08/21 04:27*	*1*

Client: Antea USA Inc.
Project/Site: BP - OPLC - K Booster

Job ID: 580-103402-1

Client Sample ID: Trip Blank-1_20210526

Lab Sample ID: 580-103402-6

Date Collected: 05/26/21 00:01

Matrix: Water

Date Received: 05/27/21 12:06

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			06/08/21 02:09	1
Toluene	ND		1.0		ug/L			06/08/21 02:09	1
Ethylbenzene	ND		1.0		ug/L			06/08/21 02:09	1
Xylenes, Total	ND		2.0		ug/L			06/08/21 02:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*80 - 120*		*06/08/21 02:09*	*1*
1,2-Dichloroethane-d4 (Surr)	*102*		*80 - 126*		*06/08/21 02:09*	*1*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*		*06/08/21 02:09*	*1*
Dibromofluoromethane (Surr)	*106*		*80 - 120*		*06/08/21 02:09*	*1*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		250		ug/L			06/07/21 11:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*88*		*50 - 150*		*06/07/21 11:58*	*1*

Surrogate Summary

Client: Antea USA Inc.
Project/Site: BP - OPLC - K Booster

Job ID: 580-103402-1

Method: 8260D - Volatile Organic Compounds by GC/MS

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

		Percent Surrogate Recovery (Acceptance Limits)			
		TOL	DCA	BFB	DBFM
Lab Sample ID	Client Sample ID	(80-120)	(80-126)	(80-120)	(80-120)
580-103402-1	94-3_20210526	106	98	110	95
580-103402-2	95-1_20210526	100	102	103	106
580-103402-3	95-4_20210526	100	106	101	105
580-103402-4	MW-6_20210526	99	106	100	106
580-103402-5	MW-7_20210526	105	94	112	99
580-103402-6	Trip Blank-1_20210526	101	102	104	106
LCS 580-358439/4	Lab Control Sample	103	94	106	103
LCS 580-358479/4	Lab Control Sample	103	94	108	105
LCS 580-358527/4	Lab Control Sample	102	95	109	104
LCSD 580-358439/5	Lab Control Sample Dup	103	94	108	104
LCSD 580-358479/5	Lab Control Sample Dup	103	95	112	104
LCSD 580-358527/5	Lab Control Sample Dup	103	96	107	105
MB 580-358439/7	Method Blank	100	105	101	104
MB 580-358479/7	Method Blank	100	104	100	105
MB 580-358527/7	Method Blank	100	104	99	104

Surrogate Legend

TOL = Toluene-d8 (Surr)
DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)

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

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

		Percent Surrogate Recovery (Acceptance Limits)
		BFB2
Lab Sample ID	Client Sample ID	(50-150)
580-103402-1	94-3_20210526	154 S1+
580-103402-2	95-1_20210526	84
580-103402-3	95-4_20210526	88
580-103402-4	MW-6_20210526	88
580-103402-5	MW-7_20210526	133
580-103402-6	Trip Blank-1_20210526	88
LCS 580-358426/4	Lab Control Sample	94
LCSD 580-358426/5	Lab Control Sample Dup	95
MB 580-358426/3	Method Blank	87

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

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

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

		Percent Surrogate Recovery (Acceptance Limits)
		OTPH
Lab Sample ID	Client Sample ID	(50-150)
580-103402-1	94-3_20210526	72
580-103402-2	95-1_20210526	78
580-103402-3	95-4_20210526	68
580-103402-4	MW-6_20210526	65

Surrogate Summary

Client: Antea USA Inc. Job ID: 580-103402-1
Project/Site: BP - OPLC - K Booster

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

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

		Percent Surrogate Recovery (Acceptance Limits)						
Lab Sample ID	Client Sample ID	OTPH (50-150)						
580-103402-5	MW-7_20210526	61						
LCS 580-358034/2-A	Lab Control Sample	82						
LCSD 580-358034/3-A	Lab Control Sample Dup	87						
MB 580-358034/1-A	Method Blank	71						

Surrogate Legend

OTPH = o-Terphenyl

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 580-358439/7
Matrix: Water
Analysis Batch: 358439

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			06/07/21 01:29	1
Toluene	ND		1.0		ug/L			06/07/21 01:29	1
Ethylbenzene	ND		1.0		ug/L			06/07/21 01:29	1
Xylenes, Total	ND		2.0		ug/L			06/07/21 01:29	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*80 - 120*		*06/07/21 01:29*	*1*
1,2-Dichloroethane-d4 (Surr)	*105*		*80 - 126*		*06/07/21 01:29*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*06/07/21 01:29*	*1*
Dibromofluoromethane (Surr)	*104*		*80 - 120*		*06/07/21 01:29*	*1*

Lab Sample ID: LCS 580-358439/4
Matrix: Water
Analysis Batch: 358439

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	11.0		ug/L		110	82 - 122
Toluene	10.0	11.0		ug/L		110	80 - 120
Ethylbenzene	10.0	11.0		ug/L		110	80 - 120
m-Xylene & p-Xylene	10.0	11.2		ug/L		112	80 - 120
o-Xylene	10.0	10.7		ug/L		107	80 - 125
Xylenes, Total	20.0	21.9		ug/L		110	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*94*		*80 - 126*
4-Bromofluorobenzene (Surr)	*106*		*80 - 120*
Dibromofluoromethane (Surr)	*103*		*80 - 120*

Lab Sample ID: LCSD 580-358439/5
Matrix: Water
Analysis Batch: 358439

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	10.0	10.4		ug/L		104	82 - 122	5	14
Toluene	10.0	10.4		ug/L		104	80 - 120	5	13
Ethylbenzene	10.0	10.6		ug/L		106	80 - 120	4	14
m-Xylene & p-Xylene	10.0	10.6		ug/L		106	80 - 120	6	14
o-Xylene	10.0	10.2		ug/L		102	80 - 125	5	16
Xylenes, Total	20.0	20.8		ug/L		104	80 - 120	5	16

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*94*		*80 - 126*
4-Bromofluorobenzene (Surr)	*108*		*80 - 120*
Dibromofluoromethane (Surr)	*104*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-358479/7
Matrix: Water
Analysis Batch: 358479

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			06/07/21 13:13	1
Toluene	ND		1.0		ug/L			06/07/21 13:13	1
Ethylbenzene	ND		1.0		ug/L			06/07/21 13:13	1
Xylenes, Total	ND		2.0		ug/L			06/07/21 13:13	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*80 - 120*		*06/07/21 13:13*	*1*
1,2-Dichloroethane-d4 (Surr)	*104*		*80 - 126*		*06/07/21 13:13*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*06/07/21 13:13*	*1*
Dibromofluoromethane (Surr)	*105*		*80 - 120*		*06/07/21 13:13*	*1*

Lab Sample ID: LCS 580-358479/4
Matrix: Water
Analysis Batch: 358479

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	10.2		ug/L		102	82 - 122
Toluene	10.0	9.94		ug/L		99	80 - 120
Ethylbenzene	10.0	10.1		ug/L		101	80 - 120
m-Xylene & p-Xylene	10.0	10.1		ug/L		101	80 - 120
o-Xylene	10.0	9.86		ug/L		99	80 - 125
Xylenes, Total	20.0	20.0		ug/L		100	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*94*		*80 - 126*
4-Bromofluorobenzene (Surr)	*108*		*80 - 120*
Dibromofluoromethane (Surr)	*105*		*80 - 120*

Lab Sample ID: LCSD 580-358479/5
Matrix: Water
Analysis Batch: 358479

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	10.0	9.77		ug/L		98	82 - 122	4	14
Toluene	10.0	9.66		ug/L		97	80 - 120	3	13
Ethylbenzene	10.0	9.78		ug/L		98	80 - 120	4	14
m-Xylene & p-Xylene	10.0	9.83		ug/L		98	80 - 120	3	14
o-Xylene	10.0	9.59		ug/L		96	80 - 125	3	16
Xylenes, Total	20.0	19.4		ug/L		97	80 - 120	3	16

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 126*
4-Bromofluorobenzene (Surr)	*112*		*80 - 120*
Dibromofluoromethane (Surr)	*104*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-358527/7
Matrix: Water
Analysis Batch: 358527

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			06/08/21 00:30	1
Toluene	ND		1.0		ug/L			06/08/21 00:30	1
Ethylbenzene	ND		1.0		ug/L			06/08/21 00:30	1
Xylenes, Total	ND		2.0		ug/L			06/08/21 00:30	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*80 - 120*		*06/08/21 00:30*	*1*
1,2-Dichloroethane-d4 (Surr)	*104*		*80 - 126*		*06/08/21 00:30*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*06/08/21 00:30*	*1*
Dibromofluoromethane (Surr)	*104*		*80 - 120*		*06/08/21 00:30*	*1*

Lab Sample ID: LCS 580-358527/4
Matrix: Water
Analysis Batch: 358527

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	9.77		ug/L		98	82 - 122
Toluene	10.0	9.79		ug/L		98	80 - 120
Ethylbenzene	10.0	9.95		ug/L		99	80 - 120
m-Xylene & p-Xylene	10.0	9.92		ug/L		99	80 - 120
o-Xylene	10.0	9.55		ug/L		95	80 - 125
Xylenes, Total	20.0	19.5		ug/L		97	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*102*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 126*
4-Bromofluorobenzene (Surr)	*109*		*80 - 120*
Dibromofluoromethane (Surr)	*104*		*80 - 120*

Lab Sample ID: LCSD 580-358527/5
Matrix: Water
Analysis Batch: 358527

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	10.0	9.46		ug/L		95	82 - 122	3	14
Toluene	10.0	9.54		ug/L		95	80 - 120	3	13
Ethylbenzene	10.0	9.73		ug/L		97	80 - 120	2	14
m-Xylene & p-Xylene	10.0	9.69		ug/L		97	80 - 120	2	14
o-Xylene	10.0	9.31		ug/L		93	80 - 125	2	16
Xylenes, Total	20.0	19.0		ug/L		95	80 - 120	2	16

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*96*		*80 - 126*
4-Bromofluorobenzene (Surr)	*107*		*80 - 120*
Dibromofluoromethane (Surr)	*105*		*80 - 120*

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

Lab Sample ID: MB 580-358426/3
Matrix: Water
Analysis Batch: 358426

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		250		ug/L			06/07/21 10:45	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*87*		*50 - 150*		*06/07/21 10:45*	*1*

Lab Sample ID: LCS 580-358426/4
Matrix: Water
Analysis Batch: 358426

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Gasoline			1000	915		ug/L		91	79 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*94*		*50 - 150*

Lab Sample ID: LCSD 580-358426/5
Matrix: Water
Analysis Batch: 358426

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

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Gasoline			1000	879		ug/L		88	79 - 120	4	10

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*95*		*50 - 150*

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

Lab Sample ID: MB 580-358034/1-A
Matrix: Water
Analysis Batch: 358545

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 358034

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		06/02/21 08:36	06/08/21 01:48	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		06/02/21 08:36	06/08/21 01:48	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*71*		*50 - 150*	*06/02/21 08:36*	*06/08/21 01:48*	*1*

Lab Sample ID: LCS 580-358034/2-A
Matrix: Water
Analysis Batch: 358545

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 358034

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
#2 Diesel (C10-C24)			2.00	1.75		mg/L		88	50 - 120		
Motor Oil (>C24-C36)			2.00	1.88		mg/L		94	64 - 120		

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

Lab Sample ID: LCS 580-358034/2-A
Matrix: Water
Analysis Batch: 358545

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 358034

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

Lab Sample ID: LCSD 580-358034/3-A
Matrix: Water
Analysis Batch: 358545

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 358034

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
#2 Diesel (C10-C24)			2.00	1.89		mg/L		94	50 - 120	7	26
Motor Oil (>C24-C36)			2.00	2.07		mg/L		103	64 - 120	10	24

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

GC/MS VOA

Analysis Batch: 358439

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
580-103402-1	94-3_20210526	Total/NA	Water	8260D	
580-103402-2	95-1_20210526	Total/NA	Water	8260D	
MB 580-358439/7	Method Blank	Total/NA	Water	8260D	
LCS 580-358439/4	Lab Control Sample	Total/NA	Water	8260D	
LCSD 580-358439/5	Lab Control Sample Dup	Total/NA	Water	8260D	

Analysis Batch: 358479

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
580-103402-3	95-4_20210526	Total/NA	Water	8260D	
MB 580-358479/7	Method Blank	Total/NA	Water	8260D	
LCS 580-358479/4	Lab Control Sample	Total/NA	Water	8260D	
LCSD 580-358479/5	Lab Control Sample Dup	Total/NA	Water	8260D	

Analysis Batch: 358527

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
580-103402-4	MW-6_20210526	Total/NA	Water	8260D	
580-103402-5	MW-7_20210526	Total/NA	Water	8260D	
580-103402-6	Trip Blank-1_20210526	Total/NA	Water	8260D	
MB 580-358527/7	Method Blank	Total/NA	Water	8260D	
LCS 580-358527/4	Lab Control Sample	Total/NA	Water	8260D	
LCSD 580-358527/5	Lab Control Sample Dup	Total/NA	Water	8260D	

GC VOA

Analysis Batch: 358426

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
580-103402-1	94-3_20210526	Total/NA	Water	NWTPH-Gx	
580-103402-2	95-1_20210526	Total/NA	Water	NWTPH-Gx	
580-103402-3	95-4_20210526	Total/NA	Water	NWTPH-Gx	
580-103402-4	MW-6_20210526	Total/NA	Water	NWTPH-Gx	
580-103402-5	MW-7_20210526	Total/NA	Water	NWTPH-Gx	
580-103402-6	Trip Blank-1_20210526	Total/NA	Water	NWTPH-Gx	
MB 580-358426/3	Method Blank	Total/NA	Water	NWTPH-Gx	
LCS 580-358426/4	Lab Control Sample	Total/NA	Water	NWTPH-Gx	
LCSD 580-358426/5	Lab Control Sample Dup	Total/NA	Water	NWTPH-Gx	

GC Semi VOA

Prep Batch: 358034

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
580-103402-1	94-3_20210526	Total/NA	Water	3510C	
580-103402-2	95-1_20210526	Total/NA	Water	3510C	
580-103402-3	95-4_20210526	Total/NA	Water	3510C	
580-103402-4	MW-6_20210526	Total/NA	Water	3510C	
580-103402-5	MW-7_20210526	Total/NA	Water	3510C	
MB 580-358034/1-A	Method Blank	Total/NA	Water	3510C	
LCS 580-358034/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 580-358034/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	

Analysis Batch: 358545

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
580-103402-2	95-1_20210526	Total/NA	Water	NWTPH-Dx	358034

GC Semi VOA (Continued)

Analysis Batch: 358545 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
580-103402-3	95-4_20210526	Total/NA	Water	NWTPH-Dx	358034
580-103402-4	MW-6_20210526	Total/NA	Water	NWTPH-Dx	358034
580-103402-5	MW-7_20210526	Total/NA	Water	NWTPH-Dx	358034
MB 580-358034/1-A	Method Blank	Total/NA	Water	NWTPH-Dx	358034
LCS 580-358034/2-A	Lab Control Sample	Total/NA	Water	NWTPH-Dx	358034
LCSD 580-358034/3-A	Lab Control Sample Dup	Total/NA	Water	NWTPH-Dx	358034

Analysis Batch: 358729

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
580-103402-1	94-3_20210526	Total/NA	Water	NWTPH-Dx	358034

Lab Chronicle

Client: Antea USA Inc.
Project/Site: BP - OPLC - K Booster

Job ID: 580-103402-1

Client Sample ID: 94-3_20210526
Lab Sample ID: 580-103402-1
Date Collected: 05/26/21 10:45
Matrix: Water
Date Received: 05/27/21 12:06

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		10	358439	06/07/21 01:54	T1W	FGS SEA
Total/NA	Analysis	NWTPH-Gx		1	358426	06/07/21 12:22	W1T	FGS SEA
Total/NA	Prep	3510C			358034	06/02/21 08:36	N1B	FGS SEA
Total/NA	Analysis	NWTPH-Dx		1	358729	06/09/21 23:49	ADB	FGS SEA

Client Sample ID: 95-1_20210526
Lab Sample ID: 580-103402-2
Date Collected: 05/26/21 09:45
Matrix: Water
Date Received: 05/27/21 12:06

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	358439	06/07/21 02:19	T1W	FGS SEA
Total/NA	Analysis	NWTPH-Gx		1	358426	06/07/21 12:47	W1T	FGS SEA
Total/NA	Prep	3510C			358034	06/02/21 08:36	N1B	FGS SEA
Total/NA	Analysis	NWTPH-Dx		1	358545	06/08/21 03:08	ADB	FGS SEA

Client Sample ID: 95-4_20210526
Lab Sample ID: 580-103402-3
Date Collected: 05/26/21 13:00
Matrix: Water
Date Received: 05/27/21 12:06

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	358479	06/07/21 17:00	T1W	FGS SEA
Total/NA	Analysis	NWTPH-Gx		1	358426	06/07/21 13:11	W1T	FGS SEA
Total/NA	Prep	3510C			358034	06/02/21 08:36	N1B	FGS SEA
Total/NA	Analysis	NWTPH-Dx		1	358545	06/08/21 03:27	ADB	FGS SEA

Client Sample ID: MW-6_20210526
Lab Sample ID: 580-103402-4
Date Collected: 05/26/21 11:45
Matrix: Water
Date Received: 05/27/21 12:06

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	358527	06/08/21 01:20	T1W	FGS SEA
Total/NA	Analysis	NWTPH-Gx		1	358426	06/07/21 14:00	W1T	FGS SEA
Total/NA	Prep	3510C			358034	06/02/21 08:36	N1B	FGS SEA
Total/NA	Analysis	NWTPH-Dx		1	358545	06/08/21 04:07	ADB	FGS SEA

Client Sample ID: MW-7_20210526
Lab Sample ID: 580-103402-5
Date Collected: 05/26/21 14:15
Matrix: Water
Date Received: 05/27/21 12:06

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	358527	06/08/21 01:44	T1W	FGS SEA
Total/NA	Analysis	NWTPH-Gx		1	358426	06/07/21 14:24	W1T	FGS SEA
Total/NA	Prep	3510C			358034	06/02/21 08:36	N1B	FGS SEA
Total/NA	Analysis	NWTPH-Dx		1	358545	06/08/21 04:27	ADB	FGS SEA

Lab Chronicle

Client: Antea USA Inc.
Project/Site: BP - OPLC - K Booster

Job ID: 580-103402-1

Client Sample ID: Trip Blank-1_20210526

Date Collected: 05/26/21 00:01
Date Received: 05/27/21 12:06

Lab Sample ID: 580-103402-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	358527	06/08/21 02:09	T1W	FGS SEA
Total/NA	Analysis	NWTPH-Gx		1	358426	06/07/21 11:58	W1T	FGS SEA

Laboratory References:

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

Accreditation/Certification Summary

Client: Antea USA Inc.
Job ID: 580-103402-1
Project/Site: BP - OPLC - K Booster

Laboratory: Eurofins FGS, Seattle

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Washington	State	C788	07-13-21

Method Summary

Client: Antea USA Inc.
Project/Site: BP - OPLC - K Booster

Job ID: 580-103402-1

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	FGS SEA
NWTPH-Gx	Northwest - Volatile Petroleum Products (GC)	NWTPH	FGS SEA
NWTPH-Dx	Northwest - Semi-Volatile Petroleum Products (GC)	NWTPH	FGS SEA
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	FGS SEA
5030B	Purge and Trap	SW846	FGS SEA

Protocol References:

NWTPH = Northwest Total Petroleum Hydrocarbon

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

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

Sample Summary

Client: Antea USA Inc.
Project/Site: BP - OPLC - K Booster

Job ID: 580-103402-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
580-103402-1	94-3_20210526	Water	05/26/21 10:45	05/27/21 12:06	
580-103402-2	95-1_20210526	Water	05/26/21 09:45	05/27/21 12:06	
580-103402-3	95-4_20210526	Water	05/26/21 13:00	05/27/21 12:06	
580-103402-4	MW-6_20210526	Water	05/26/21 11:45	05/27/21 12:06	
580-103402-5	MW-7_20210526	Water	05/26/21 14:15	05/27/21 12:06	
580-103402-6	Trip Blank-1_20210526	Water	05/26/21 00:01	05/27/21 12:06	

Laboratory Management Program (LaMP) Chain of Custody Record
Soil, Sediment and Groundwater Samples

Page 1 of 1

BP Site Node Path: Olympic Pipeline Company
BP/RM Facility No: K-Booster
Req Due Date (mm/dd/yy): Standard TAT
Rush TAT Yes ____ No X
Lab Work Order Number: 103402

Lab Name: Test America	BP/ARC Facility Address: 10200 West March Point Road	Consultant/Contractor: Antea Group
Lab Address: Tacoma, WA	City, State, ZIP Code: Anacortes, Washington 98221	Consultant/Contractor Project No: WAKBOOS211.10123
Lab PM: Elaine Walker	Lead Regulatory Agency: Washington Department of Ecology	Address: 4006 148th Ave NE, Redmond, WA 98052
Lab Phone: 253 248.4972	California Global ID No.: NA	Consultant/Contractor PM: Megan Richard
Lab Shipping Accnt:	Enfos Proposal No: WR849991/00BHX-0011	Phone: 425-498-7711 Email: Megan.Richard@anteagroup.us
Lab Bottle Order No:	Accounting Mode: Provision ___X___ OOC-BU ____ OOC-RM ____	Send/Submit EDD to: Megan.Richard@anteagroup.us
Other Info: m.elaine.walker@eurofinset.com	Stage: 1_Appraise (10) Activity: Interim Measures (123)	Invoice To: BP-RM _____ BP/ARC ___X___
BP/RM PM: Wade Melton		
PM Phone: 360-594-7978		
PM Email: wade.melton@bp.com		

Lab No.	Sample Description	Date	Time	Field Matrix	Start Depth	End Depth	Depth Unit	Grab (G) or Composite (C)	Total Number of Containers	Filt.	Pres.	Analysis: 8260BTEX	NWTPH-Dx	NWTPH-Gx	Comments
	94-3_20210526	5/26/21	1045	W				G	8			X	X	X	
	95-1_		0945	W				G				X	X	X	
	95-4_		1300	W				G				X	X	X	
	MW-6_		1145	W				G				X	X	X	
	MW-7_		1415	W				G				X	X	X	
	Trip Blank-1			W				G	4			X		X	

Report Type & QC Level: Limited (Standard) Package ___Y___ ; Limited Plus Package ____ ; Full Package ____

Sampler's Name: Nathan Han	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: Antea Group	Nathan Han / Antea	5/27/21	1206	[signature] EFG	5/27/21	12:06
Ship Method: Courier Ship Date:						
Shipment Tracking No.						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals in Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: _____ °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

BP LaMP Soil/H2O COC July 2018

Therm. ID: A1 Cor: 1.0 ° Unc: 1.2 °
Cooler Dsc: MD B1
Packing: Bulk FedEx: _____
Cust. Seal: Yes ___ No X UPS: _____
Blue Ice, Wet, Dry, None Lab Cour: X
Other: _____

580-103402 Chain of Custody

Login Container Summary Report

580-103402

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Container Temp	Preservative Added (mls)	Lot #
94-3_20210526	580-103402-A-1	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
94-3_20210526	580-103402-B-1	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
94-3_20210526	580-103402-C-1	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
94-3_20210526	580-103402-D-1	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
94-3_20210526	580-103402-E-1	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
94-3_20210526	580-103402-F-1	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
94-3_20210526	580-103402-G-1	Amber Glass 250mL - hydrochloric acid	<2			0308501F/590'
94-3_20210526	580-103402-H-1	Amber Glass 250mL - hydrochloric acid	<2			0308501F/590'
95-1_20210526	580-103402-A-2	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
95-1_20210526	580-103402-B-2	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
95-1_20210526	580-103402-C-2	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
95-1_20210526	580-103402-D-2	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
95-1_20210526	580-103402-E-2	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
95-1_20210526	580-103402-F-2	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
95-1_20210526	580-103402-G-2	Amber Glass 250mL - hydrochloric acid	<2			0308501F/590'
95-1_20210526	580-103402-H-2	Amber Glass 250mL - hydrochloric acid	<2			0308501F/590'
95-4_20210526	580-103402-A-3	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
95-4_20210526	580-103402-B-3	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
95-4_20210526	580-103402-C-3	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
95-4_20210526	580-103402-D-3	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
95-4_20210526	580-103402-E-3	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
95-4_20210526	580-103402-F-3	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
95-4_20210526	580-103402-G-3	Amber Glass 250mL - hydrochloric acid	<2			0308501F/590'
95-4_20210526	580-103402-H-3	Amber Glass 250mL - hydrochloric acid	<2			0308501F/590'
MW-6_20210526	580-103402-A-4	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
MW-6_20210526	580-103402-B-4	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
MW-6_20210526	580-103402-C-4	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
MW-6_20210526	580-103402-D-4	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
MW-6_20210526	580-103402-E-4	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
MW-6_20210526	580-103402-F-4	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
MW-6_20210526	580-103402-G-4	Amber Glass 250mL - hydrochloric acid	<2			0308501F/590'
MW-6_20210526	580-103402-H-4	Amber Glass 250mL - hydrochloric acid	<2			0308501F/590'
MW-7_20210526	580-103402-A-5	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
MW-7_20210526	580-103402-B-5	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
MW-7_20210526	580-103402-C-5	Voa Vial 40ml - HCL/rubber septa				0226201F/590'

Client Sample ID	Lab ID	Container Type	Container pH	Container Temp	Preservative Added (mls)	Lot #
MW-7_20210526	580-103402-D-5	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
MW-7_20210526	580-103402-E-5	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
MW-7_20210526	580-103402-F-5	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
MW-7_20210526	580-103402-G-5	Amber Glass 250mL - hydrochloric acid	<2			0308501F/590'
MW-7_20210526	580-103402-H-5	Amber Glass 250mL - hydrochloric acid	<2			0308501F/590'
Trip Blank-1	580-103402-A-6	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
Trip Blank-1	580-103402-B-6	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
Trip Blank-1	580-103402-C-6	Voa Vial 40ml - HCL/rubber septa				0226201F/590'
Trip Blank-1	580-103402-D-6	Voa Vial 40ml - HCL/rubber septa				0226201F/590'

Login Sample Receipt Checklist

Client: Antea USA Inc.

Job Number: 580-103402-1

Login Number: 103402
List Number: 1
Creator: Blankinship, Tom X

List Source: Eurofins FGS, Seattle

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

GC/MS VOA BATCH WORKSHEET

Lab Name: Eurofins FGS, Seattle Job No.: 580-103402-1

SDG No.:

Batch Number: 358439 Batch Start Date: 06/06/21 23:24 Batch Analyst: Wongsakul, Thanaporn 1

Batch Method: 8260D Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	Initial pH	5X SUR/IS 00003	VOAMasterMix 00067	
LCS 580-358439/4		8260D		5 mL	5 mL		1 uL	10 uL	
LCSD 580-358439/5		8260D		5 mL	5 mL		1 uL	10 uL	
MB 580-358439/7		8260D		5 mL	5 mL		1 uL		
580-103402-A-1	94-3_20210526	8260D	T	5 mL	5 mL	<2 SU	1 uL		
580-103402-A-2	95-1_20210526	8260D	T	5 mL	5 mL	<2 SU	1 uL		

Batch Notes	

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GC/MS VOA BATCH WORKSHEET

Lab Name: Eurofins FGS, Seattle Job No.: 580-103402-1

SDG No.:

Batch Number: 358479 Batch Start Date: 06/07/21 11:07 Batch Analyst: Wongsakul, Thanaporn 1

Batch Method: 8260D Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	Initial pH	5X SUR/IS 00003	VOAMasterMix 00068	
LCS 580-358479/4		8260D		5 mL	5 mL		1 uL	10 uL	
LCSD 580-358479/5		8260D		5 mL	5 mL		1 uL	10 uL	
MB 580-358479/7		8260D		5 mL	5 mL		1 uL		
580-103402-A-3	95-4_20210526	8260D	T	5 mL	5 mL	<2 SU	1 uL		

Batch Notes	

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GC/MS VOA BATCH WORKSHEET

Lab Name: Eurofins FGS, Seattle Job No.: 580-103402-1

SDG No.:

Batch Number: 358527 Batch Start Date: 06/07/21 22:00 Batch Analyst: Wongsakul, Thanaporn 1

Batch Method: 8260D Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	Initial pH	5X SUR/IS 00003	VOAMasterMix 00068	
LCS 580-358527/4		8260D		5 mL	5 mL		1 uL	10 uL	
LCSD 580-358527/5		8260D		5 mL	5 mL		1 uL	10 uL	
MB 580-358527/7		8260D		5 mL	5 mL		1 uL		
580-103402-A-4	MW-6_20210526	8260D	T	5 mL	5 mL	<2 SU	1 uL		
580-103402-A-5	MW-7_20210526	8260D	T	5 mL	5 mL	<2 SU	1 uL		
580-103402-A-6	Trip Blank-1_20210526	8260D	T	5 mL	5 mL	<2 SU	1 uL		

Batch Notes	

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GC VOA BATCH WORKSHEET

Lab Name: Eurofins FGS, Seattle Job No.: 580-103402-1

SDG No.:

Batch Number: 358426 Batch Start Date: 06/07/21 09:56 Batch Analyst: Thaneerat, Wijittra 1

Batch Method: NWTPH-Gx Batch End Date:

Lab Sample ID	Client Sample ID	Method Chain	Basis	InitialAmount	FinalAmount	Initial pH	BFBGRO ARCHON 00046	GRO_LCS 00066	
MB 580-358426/3		NWTPH-Gx		5 mL	5 mL		1 uL		
LCS 580-358426/4		NWTPH-Gx		5 mL	5 mL		1 uL	50 uL	
LCSD 580-358426/5		NWTPH-Gx		5 mL	5 mL		1 uL	50 uL	
580-103402-B-6	Trip Blank-1 20210526	NWTPH-Gx	T	5 mL	5 mL	<2 SU	1 uL		
580-103402-B-1	94-3_20210526	NWTPH-Gx	T	5 mL	5 mL	<2 SU	1 uL		
580-103402-A-2	95-1_20210526	NWTPH-Gx	T	5 mL	5 mL	<2 SU	1 uL		
580-103402-B-3	95-4_20210526	NWTPH-Gx	T	5 mL	5 mL	<2 SU	1 uL		
580-103402-D-4	MW-6_20210526	NWTPH-Gx	T	5 mL	5 mL	<2 SU	1 uL		
580-103402-D-5	MW-7_20210526	NWTPH-Gx	T	5 mL	5 mL	<2 SU	1 uL		

Batch Notes	

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GC SEMI VOA BATCH WORKSHEET

Lab Name: Eurofins FGS, Seattle Job No.: 580-103402-1

SDG No.:

Batch Number: 358034 Batch Start Date: 06/02/21 08:36 Batch Analyst: Barfield, Nate 1

Batch Method: 3510C Batch End Date: 06/02/21 16:00

Lab Sample ID	Client Sample ID	Method Chain	Basis	GrossWeight	TareWeight	InitialAmount	FinalAmount	ReceivedpH	FirstAdjustpH
MB 580-358034/1		3510C, NWTPH-Dx				250 mL	1 mL	7 SU	2 SU
LCS 580-358034/2		3510C, NWTPH-Dx				250 mL	1 mL	7 SU	2 SU
LCSD 580-358034/3		3510C, NWTPH-Dx				250 mL	1 mL	7 SU	2 SU
580-103402-G-1	94-3_20210526	3510C, NWTPH-Dx	T	00415.53 g	00168.39 g	247.1 mL	1 mL	2 SU	2 SU
580-103402-G-2	95-1_20210526	3510C, NWTPH-Dx	T	00412.98 g	00168.12 g	244.9 mL	1 mL	2 SU	2 SU
580-103402-G-3	95-4_20210526	3510C, NWTPH-Dx	T	00414.89 g	00166.16 g	248.7 mL	1 mL	2 SU	2 SU
580-103402-G-4	MW-6_20210526	3510C, NWTPH-Dx	T	00410.44 g	00168.46 g	242 mL	1 mL	2 SU	2 SU
580-103402-G-5	MW-7_20210526	3510C, NWTPH-Dx	T	00414.70 g	00168.25 g	246.5 mL	1 mL	2 SU	2 SU

Lab Sample ID	Client Sample ID	Method Chain	Basis	SecondAdjustpH	TPH_Water_Spk 00027	TPH_WaterSurr 00065			
MB 580-358034/1		3510C, NWTPH-Dx		n/a SU		100 uL			
LCS 580-358034/2		3510C, NWTPH-Dx		n/a SU	100 uL	100 uL			
LCSD 580-358034/3		3510C, NWTPH-Dx		n/a SU	100 uL	100 uL			
580-103402-G-1	94-3_20210526	3510C, NWTPH-Dx	T	n/a SU		100 uL			
580-103402-G-2	95-1_20210526	3510C, NWTPH-Dx	T	n/a SU		100 uL			
580-103402-G-3	95-4_20210526	3510C, NWTPH-Dx	T	n/a SU		100 uL			
580-103402-G-4	MW-6_20210526	3510C, NWTPH-Dx	T	n/a SU		100 uL			
580-103402-G-5	MW-7_20210526	3510C, NWTPH-Dx	T	n/a SU		100 uL			

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.

GC SEMI VOA BATCH WORKSHEET

Lab Name: Eurofins FGS, Seattle Job No.: 580-103402-1

SDG No.:

Batch Number: 358034 Batch Start Date: 06/02/21 08:36 Batch Analyst: Barfield, Nate 1

Batch Method: 3510C Batch End Date: 06/02/21 16:00

Batch Notes	
Acid Used for pH Adjustment ID	2723693
Balance ID	SEA225
Batch Comment	Vialed by NB
Analyst ID - Concentration	NB
Concentration 1 Corrected Temperature	70.3-75.3 Degrees C
Concentration 2 Corrected Temperature	17.9 Degrees C
Equipment ID - Concentration 1	SteamBath 1
Equipment ID - Concentration 2	Turbovap 5
Analyst ID - Extraction	NB
Filter ID	2815023
Method/Fraction	3510C_LVI/TPH
Na2SO4 ID	2854614
pH Indicator ID	538534
Pipette/Syringe/Dispenser ID	MP4
Prep Solvent ID	2859502
Prep Solvent Volume Used	100 mL
Analyst ID - Spike Analyst	NB
Analyst ID - Spike Witness Analyst	PS
Sufficient Volume for Batch QC	yes
Thermometer ID - Concentration 1	61013-040-1
Thermometer ID - Concentration 2	DIGITALREADOUT
Concentration 1 Uncorrected Temperature	70-75 Degrees C
Concentration 2 Uncorrected Temperature	20 Degrees C
Vial Lot Number	24162054
Reagent Water ID	DI

Basis	Basis Description
T	Total/NA

The pound sign (#) in the amount added field denotes that the reagent was used undiluted. All calculations are performed using the stated concentration for this reagent.