SECOND SEMI-ANNUAL 2018
GROUNDWATER MONITORING REPORT

SHELL BRANDED WHOLESALE FACILITY
919 EAST DIMOND BOULEVARD
ANCHORAGE, ALASKA

SAP #: 121665

PLANET ID #: 10006287
AGENCY #: 2100.26.106-24054

GES PROJECT #: 3016006

Prepared for:

SHELL OIL PRODUCTS, US
308 WILCOX NO. 101
CASTLE ROCK, CO 80104

Prepared by:

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November 28, 2018

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ACRONYMS AND ABBREVIATIONS

µg/L	Micrograms per Liter
Bgs	Below Ground Surface
COPCs	Constituents of Potential Concern
DEC	Alaska Department of Environmental Conservation
DRO	Diesel Range Organics
EPA	United States Environmental Protection Agency
ESA	Environmental Site Assessment
ESC	ESC Lab Sciences
GAC	Granular Activated Carbon
GES	Groundwater & Environmental Services, Inc.
GRO	Gasoline Range Organics
LCS	Laboratory Control Spike
LCSD	Laboratory Control Spike Duplicate
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PAH	Polycyclic Aromatic Hydrocarbon(s)
PQL	Practical Quantitation Limit
RL	Laboratory Reporting Limit
RPD	Relative Percent Difference
RRO	Residual Range Organics
SOPs	Standard Operating Procedures
SOPUS	Shell Oil Products US
TOC	Top of Casing
TPH	Total Petroleum Hydrocarbons
UST	Underground Storage Tank
VES	Vapor Extraction System
VOCs	Volatile Organics

1.0 INTRODUCTION

Groundwater & Environmental Services, Inc. (GES) is pleased to present this Second Semi-Annual 2018 Groundwater Monitoring Report to the Alaska Department of Environmental Conservation (DEC) on behalf of Shell Oil Products US (SOPUS) summarizing the October 2018 groundwater monitoring and sampling event at 919 East Dimond Boulevard, Anchorage, Alaska (Figure 1). The site description and background, groundwater monitoring and sampling details, results and findings, data quality, and conclusions are presented below.

1.1 Site Description and Background

The site is an active retail gasoline station located in south-central Alaska, in the Municipality of Anchorage, at 919 East Dimond Boulevard. Aboveground structures include a station building and two dispenser islands located south of the station building (Figure 2). The underground fuel storage tanks (USTs) are located within a common excavation in the northeastern portion of the site. The site was entered into DEC's Contaminated Site Database in 1990, due to petroleum hydrocarbon contaminated soils encountered during station upgrades near the first generation fuel USTs and waste oil UST.

A soil vapor extraction system (VES) was installed at the site in 1992, and an air sparging system was added in 1994 through 1995. The VES and air sparging systems were deactivated on October 30, 1997. The current monitoring wells were part of the previous VES/air sparging system. In 2008, Delta Environmental Consultants, Inc. conducted a Phase II Environmental Site Assessment (ESA) at the site and reported two soil samples with gasoline-range organics (GRO) and/or benzene concentrations exceeding the respective DEC migration to groundwater cleanup levels.

Currently there are twelve groundwater monitoring wells located onsite, including a nested well (DMW-4) comprised of three monitoring wells screened at three separate intervals, identified as DMW4-A, DMW4-B, and DMW4-C. Monitoring well DMW-3 is presumed to be buried, and is neither gauged nor sampled. On the October 2018 sampling event, the remaining wells were gauged and six of them were sampled. MW-9, which couldn't be sampled during the April 2018 sampling event, was redeveloped on September 28, 2018 and it was included in this last sampling event. The locations of all monitoring wells are depicted on Figure 2.

1.2 Site Hydrogeology

Historical static groundwater depths range from approximately 4 to 13 feet below ground surface (bgs), according to available historical groundwater data. Static groundwater depths ranged from 4.89 feet below top of casing (TOC) in MW-9 to 7.45 feet below TOC in MW-8 on October 4 and 5, 2018. Groundwater flow direction is to the west at a gradient of 0.02 feet/feet (Figure 3).

2.0 GROUNDWATER MONITORING AND SAMPLING

GES gauged fluid levels in monitoring wells DMW-1, DMW-2, DMW-4A, DMW-4B, DMW-4C, DMW-5, MW-6, MW-7, MW-8, MW-9, MW-10, MW-12 and MW-13 on October 4 and 5, 2018. GES also sampled monitoring wells DMW-1, DMW-2, and MW-9 on October 4, 2018, and MW-10, MW-12 and MW-13 on October 5, 2018.

Wells DMW-2, and MW-9, were sampled using a bladder pump and low flow methodologies consistent with DEC guidance and GES standard operating procedures (SOPs) included as Appendix B. Wells DMW-1, MW-10, MW-12, and MW-13 were sampled via a PVC bailer.

Samples were collected for analysis of volatile organic compounds (VOCs) (full list). Wells DMW-1, MW-9, MW-10, MW-12, MW-13 and the field duplicate (DUP-1) were additionally analyzed for polycyclic aromatic hydrocarbons (PAHs) and total petroleum hydrocarbons (TPH) as diesel range organics (DRO) and residual range organics (RRO). Samples from wells MW-9, MW-10, MW-12, MW-13 and the field duplicate (DUP-1) were analyzed for TPH as gasoline range organics (GRO) too. This revised sampling suite is based on email correspondence and approval by the DEC on September 20, 2017.

Groundwater samples were submitted under chain of custody to ESC Lab Sciences/Pace Analytical (ESC). GES's daily field forms and well sampling forms are presented as Appendix A.

All purge water was filtered through a portable granular activated carbon (GAC) filter and discharged in a designated location onsite. The volume of water treated by the GAC filter during the event was recorded on both the groundwater monitoring and sampling field notes and the Portable GAC Volume Tracking Log, which is kept with the portable GAC bucket at all times. This method of purge water treatment was approved by Robert Weimer on September 29, 2016 via email.

2.1 Groundwater Analytical Methods

Collected groundwater samples were analyzed for VOCs via United States Environmental Protection Agency (EPA) Method 8260B, GRO by Alaska Series Method AK 101, DRO and RRO by Alaska Series Method AK 102/103, and PAHs via EPA Method 8270D-SIM.

2.2 Groundwater Analytical Results

The following is a summary of the analytical results from October 2018:

- TPH-RRO was detected above the DEC's Table C cleanup level of 1,100 micrograms per Liter (µg/L) in wells DMW-1 and MW-13 at a concentrations of 4,340 µg/L and 1,510 µg/L, respectively. It was also detected above the DEC's Table C cleanup level at the field duplicate DMW-1 DUP at a concentration of 6,040 µg/L.

- Benzene was detected above the DEC's Table C cleanup level of 4.6 µg/L in wells DMW-1 at a concentration of 42.9 µg/L, DMW-2 at a concentration of 37.2, and MW-9 at concentration of 36.7 µg/L. Benzene was also detected above the DEC's Table C cleanup level at the field duplicate DMW-1 DUP at a concentration of 42.2 µg/L.

All other concentrations of the analytes of interest in the remaining wells were less than their respective DEC Table C cleanup level and/or laboratory reporting limits, including PAHs. Current and historical groundwater analytical results are summarized in Table 1, PAHs are tabulated in Table 2, and current analytical data is shown on Figure 4. A copy of the laboratory analytical report is presented as Appendix C.

3.0 DATA QUALITY

Groundwater & Environmental Services, Inc. (GES) reviewed the analytical data from the Shell – 919 Dimond Blvd., Anchorage, Alaska Site (Site) October 2018 sampling event in order to determine accuracy and precision for each analysis as well as to determine overall data usability. Organic and inorganic data were reviewed for holding times, method and field blank results, surrogate or system monitoring compound recoveries, Matrix Spike/Matrix Spike Duplicate (MS/MSD) and Laboratory Control Spike/Laboratory Control Spike Duplicate (LCS/LCSD) LCS recoveries. All data necessary to complete the data review were provided by the laboratory.

Monitoring well samples from six locations were collected from the site on October 4 and 5, 2018.

The samples were sent to Pace Analytical laboratory and analyzed by the following methodologies as requested on the Chain of Custody:

All samples were analyzed for Volatile Organic Compounds (GC/MS) by Method 8260B. In addition, monitoring well samples were analyzed as follows:

MW-9, MW-10, MW-12, MW-13

- Semi-Volatile Organic Compounds (GC) by Method AK102/103,
- Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM,
- Volatile Organic Compounds (GC) by Method 8021/AK101

For DMW-1 sample

- Semi-Volatile Organic Compounds (GC) by Method AK102/103,
- Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM

The analytical results were reviewed using laboratory acceptance criteria, procedures, and guidelines contained in the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, revised January 2017.

Analytical data are usable and considered definitive data and suitable for comparison to regulatory standards.

Holding Times

Analytical holding times were met.

Blank Results

Benzo(g,h,i)perylene was positive in the blank below the PQL but above the MDL: EPA guidelines requires the field sample concentrations to exceed by five times those of the blank to be considered representative of the sample. Under these guidelines, the positive analytical detections in associated samples for benzo(g,h,i)perylene are qualified as non-detect at the PQL.

LCS/LCSD

All LCS/LCSD recoveries were within laboratory-specified criteria.

MS/MSD

All associated MS/MSD recoveries and RPDs were within laboratory-specified criteria.

Preservation

Samples were collected and subsequently stored in amber sample bottles. Coolers arrived at the laboratory at above recommended temperature (4° ± 2° C) at 1.25°C. Samples were stored in appropriate bottleware with correct preservation until prepared and analyzed.

Surrogates Recoveries and Accuracy

The surrogate recoveries were all within laboratory-specified ranges with the exception of the following:

- N-Triacontane-d62 recovered below laboratory criteria for samples MW-9 and MW-10.
- Nitrobenzene-d5 recovered below the minimum EPA 10% requirement for valid data in MW-10.
- p-Terphenyl recovered high in the SVOC analysis for MW-9.

The low n-triacontane recoveries indicate a possible low bias for the RRO concentrations reported for the samples. The high recoveries for p-terphenyl indicate a possible high bias in the naphthalene result for MW-9. The below EPA compliance level recovery of nitrobenzene-d5 does not impact the data, as the other two surrogates recovered are at or near 100%, and indicate there is not overall issue with the methodology.

RRO detections in MW-9 and MW-10 are qualified as estimated with a possible low bias. Naphthalene in MW-9 is qualified as estimated with a possible high bias. MW-10 SVOCs are usable as reported.

Duplicate Analyses and Precision

Precision is the distribution of a set of reported values about the mean, or the closeness of agreement between individual test results obtained under prescribed and similar conditions. Precision is best expressed in terms of relative percent difference (RPD).

The blind field duplicate was sampled from location DMW-1 and labeled DUP-1. All RPDs of analytes above the reporting limit were below the EPA recommended 30%, with the following exception:

- Field duplicates for the AK102/103 analyses had RPDs ≥ 30%. (DRO 30%, RRO 32%).

The positive analytical results for DRO and RRO in DMW-1 and DUP-1 are qualified as estimated due to precision issues.

Analysis of the laboratory precision employed evaluation of laboratory LCS/LCSD and MS/MSD relative percent difference RPD against provided ranges. All RPD values fell within range for the quality control samples with the exceptions listed above in Section 3.4.

Accuracy

Accuracy is a measure of the closeness of an observed value to the "true" value, e.g., theoretical or reference value, or population mean. Accuracy includes a combination of random error and systematic error (bias) that result from sampling and analytical operations. Analytical batch accuracy is measured through the analyses of recoveries in LCSs and MS/MSDs. Sample specific accuracy is measured with surrogate recovery. All surrogate recoveries and all recoveries reported in the LCS with the above noted exceptions, and any MS/MSD results were within laboratory-specified criteria, with the exception of the VOC recoveries noted in section 3.4. Accuracy for this sampling event and report is 97%.

Sensitivity

Sensitivity is the measure of how low a concentration can be detected/reported. Sensitivity is measured using PQLs or RLs with additional sensitivity achieved by reporting to the method detection limit (MDL). Analytes reported with a positive detection between the RL and the MDL are considered present, but the quantity is estimated. The PQL levels are sufficient to compare to the DEC standards, and analytes reported below the PQL are also below the corresponding direct contact standard. No analyte was detected at or near regulatory levels.

4.0 CONCLUSIONS

During the October 2018 groundwater monitoring event, TPH-RRO concentrations in wells DMW-1 and MW-13 exceeded the DEC's Table C cleanup levels. Benzene concentrations in wells DMW-1, DMW-2, and MW-9 exceeded DEC's Table C cleanup levels too.

GES completed the additional collection of groundwater data for PAHs in selected wells at the site. The PAH data is available in this groundwater monitoring report in Table 2 and Figure 4. No concentration of any PAH compound was reported over the DEC's Table C cleanup levels.

GES plans to sample the newly installed wells (MW-9, MW-10, MW-12 and MW-13) on a quarterly basis for four quarters. The data from the 1st and 3rd quarter events will be reported in the semi-annual reports. GES recommends continued semi-annual groundwater monitoring at the site until the constituents of potential concern (COPCs) are at concentrations less than DEC's Table C cleanup levels or attenuating to a point that may be acceptable for closure with institutional controls.

FIGURES

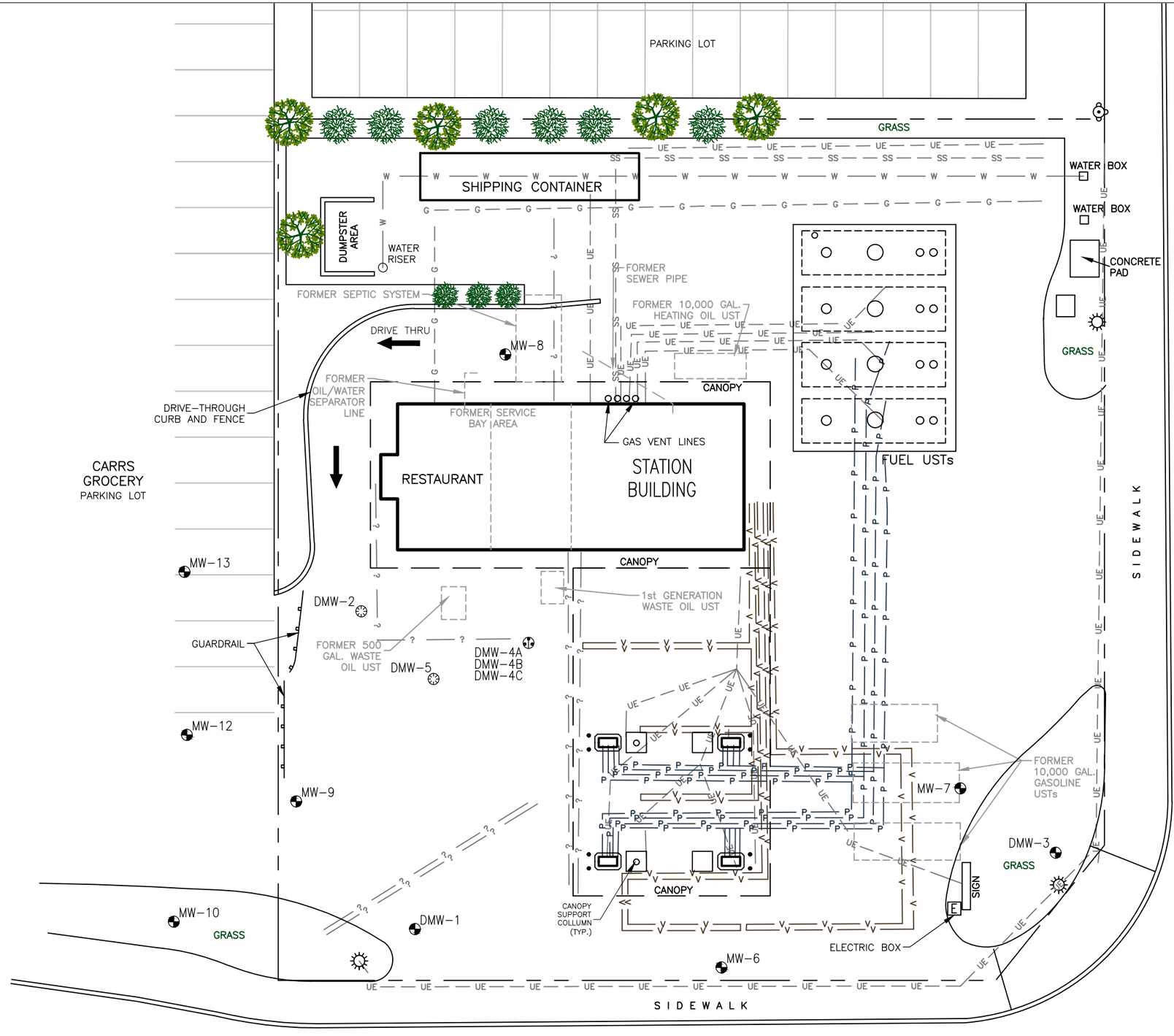
SOURCE: USGS 7.5 MINUTE SERIES
TOPOGRAPHIC QUADRANGLE 1963
ANCHORAGE A–8, ALASKA
CONTOUR INTERVAL = 50'

QUADRANGLE LOCATION

DRAFTED BY: W.G.S. (N.J.)	SITE LOCATION MAP
CHECKED BY:	SHELL OIL PRODUCTS STATION #121665 919 EAST DIMOND BOULEVARD ANCHORAGE, ALASKA
REVIEWED BY:	
NORTH	Groundwater & Environmental Services, Inc. 5046 COMMERCIAL CIRCLE, SUITE F, CONCORD, CALIFORNIA 94520

SCALE IN FEET	DATE	FIGURE
0 2000	4–30–15	1

M:\Graphics\3000-CA-North\Shell\Alaska\121665 Anchorage\121665 Anchorage SLM.dwg, Layout1, 4/30/2015 11:05:04 AM, WShea



LEGEND

- PROPERTY BOUNDARY
- DISPENSER ISLAND w/BOLLARDS
- UTILITY POLE
- LIGHT POLE
- FIRE HYDRANT
- MONITORING WELL
- SOIL VAPOR EXTRACTION WELL
- NESTED AIR SPARGE WELL
- UNDERGROUND PRODUCT LINE
- UNDERGROUND VENT LINE
- UNDERGROUND SANITARY SEWER LINE
- UNDERGROUND ELECTRIC LINE
- UNDERGROUND WATER LINE
- UNDERGROUND GAS LINE
- UNKNOWN LINE

Site Map

Shell Oil Products
Station #121665
919 East Dimond Boulevard
Anchorage, Alaska

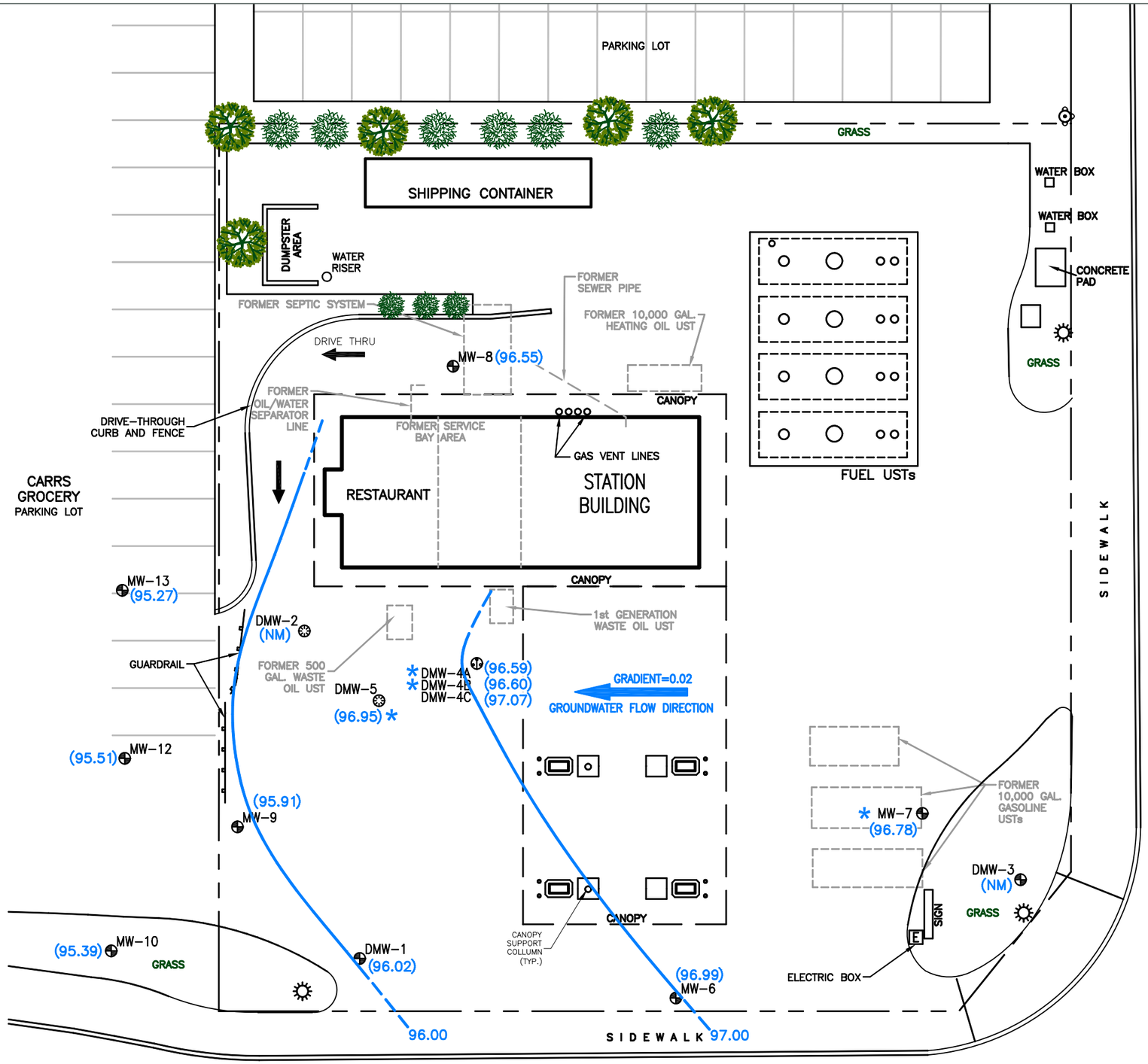
Drawn
E.V.
Designed
M.W.
Approved
M.C.P.

Date
05/24/18
Figure
2

Scale In Feet (Approximate)
0 20

Groundwater & Environmental Services, Inc.

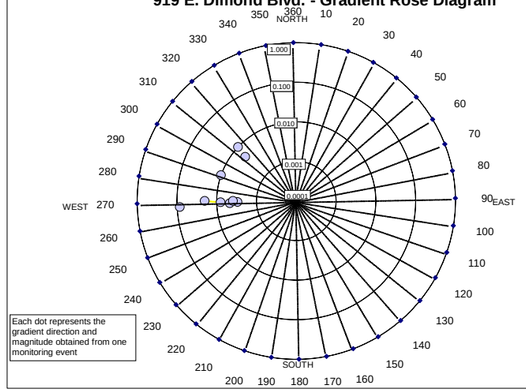
M:\Graphics\3000-CA-North\Shell\Alaska\121665 Anchorage (E Dimond Blvd)\121665 Anchorage SM.dwg, B-20, EVega



LEGEND

- PROPERTY BOUNDARY
- DISPENSER ISLAND w/BOLLARDS
- UTILITY POLE
- LIGHT POLE
- FIRE HYDRANT
- MONITORING WELL
- SOIL VAPOR EXTRACTION WELL
- NESTED AIR SPARGE WELL
- (97.07) GROUNDWATER ELEVATION (feet)
- GROUNDWATER CONTOUR (feet)
- DASHED WHERE INFERRED
- (NM) NOT MEASURED
- * ELEVATION NOT USED IN CONTOURING

919 E. Dimond Blvd. - Gradient Rose Diagram



Groundwater Elevation Contour Map
October 4, 2018

Shell Oil Products
Station #121665
919 East Dimond Boulevard
Anchorage, Alaska

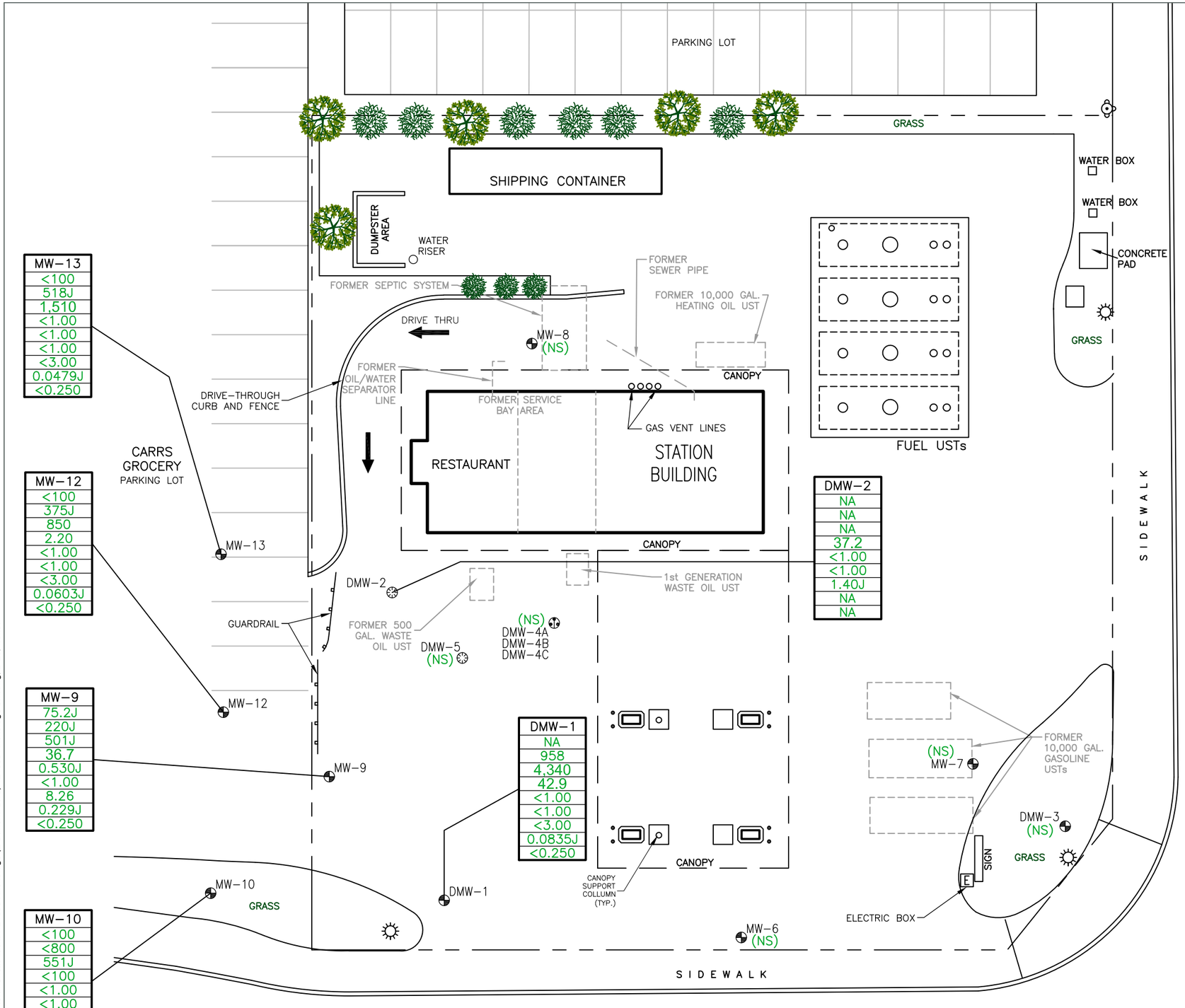
Drawn W.G.S.
Designed M.W.
Approved M.C.P.

Date 11/9/18
Figure 3

Scale In Feet (Approximate)
0 20

Groundwater & Environmental Services, Inc.

M:\Graphics\3000-CA-North\Shell\Alaska\121665 Anchorage (E Dimond Blvd)\121665 Anchorage SM.dwg, B-20, 11/16/2018 7:52:04 AM, wwesterlund



MW-13
<100
518J
1,510
<1.00
<1.00
<1.00
<3.00
0.0479J
<0.250

MW-12
<100
375J
850
2.20
<1.00
<1.00
<3.00
0.0603J
<0.250

MW-9
75.2J
220J
501J
36.7
0.530J
<1.00
8.26
0.229J
<0.250

MW-10
<100
<800
551J
<100
<1.00
<1.00
<3.00
0.0458J
<0.250

DMW-2
NA
NA
NA
37.2
<1.00
<1.00
1.40J
NA
NA

DMW-1
NA
958
4,340
42.9
<1.00
<1.00
<3.00
0.0835J
<0.250

LEGEND

— — — —	PROPERTY BOUNDARY
	DISPENSER ISLAND w/BOLLARDS
	UTILITY POLE
	LIGHT POLE
	FIRE HYDRANT
	MONITORING WELL
	SOIL VAPOR EXTRACTION WELL
	NESTED AIR SPARGE WELL
DMW-1	WELL IDENTIFICATION
NA	TPH-GRO CONCENTRATION (ug/L)
958	TPH-DRO CONCENTRATION (ug/L)
4,340	TPH-RRO CONCENTRATION (ug/L)
42.9	BENZENE CONCENTRATION (ug/L)
<1.00	TOLUENE CONCENTRATION (ug/L)
<1.00	ETHYLBENZENE CONCENTRATION (ug/L)
<3.00	XYLENE CONCENTRATION (ug/L)
0.0835J	NAPHTHALENE CONCENTRATION (ug/L)
<0.250	1-MeNaph CONCENTRATION (ug/L)
ug/L	MICROGRAMS PER LITER
TPH	TOTAL PETROLEUM HYDROCARBONS
GRO	GASOLINE RANGE ORGANICS
DRO	DIESEL RANGE ORGANICS
RRO	RESIDUAL RANGE ORGANICS
1-MeNaph	1-METHYLNAPHTHALENE
<#	WHERE AN ANALYTE IS NOT DETECTED, A REPORTING LIMIT IS GIVEN
NA	NOT ANALYZED FOR THIS PARAMETER
NS	NOT SAMPLED
J	ESTIMATED VALUE DETECTED BELOW REPORTING LIMIT

NOTE:

BOLD VALUE INDICATES RESULT ABOVE DEC TABLE C CLEANUP LEVELS.

Groundwater Analytical Data Map
October 4, 2018

Shell Oil Products
Station #121665
919 East Dimond Boulevard
Anchorage, Alaska

Drawn W.G.S.
Designed M.W.
Approved M.C.P.

Date 11/28/18
Figure 4

Scale In Feet (Approximate)
0 20

Groundwater & Environmental Services, Inc.

M:\Graphics\3000-CA-North\Shell\Alaska\121665 Anchorage (E Dimond Blvd)\121665 Anchorage SM.dwg, B-20, wshea

TABLES

TABLE 1

SUMMARY OF HISTORICAL GROUNDWATER ANALYTICAL DATA
SHELL-BRANDED WHOLSALE FACILITY
919 EAST DIMOND ROAD
ANCHORAGE, ALASKA

						HYDROCARBONS			*PRIMARY VOCs*				*OXYGENATES*					
Sample ID	***Date***		***TOC***	***DTW***	***GWE***	***TPH-GRO***	***TPH-DRO***	***TPH-RRO***	***B***	***T***	***E***	***X***	***MTBE***	***DIPE***	***Ethanol***	***ETBE***	***TBA***	***TAME***
				DEC Cleanup Levels		***2,200***	***1,500***	***1,100***	***4.6***	***1,100***	***15***	***190***	***140***	***NE***	***NE***	***NE***	***NE***	***NE***
DMW-1[9]	06/08/05	[4]	111.11	5.34	105.77	1,000	--	--	**170**	6	54	66.1	--	--	--	--	--	--
DMW-1[9]	09/24/05	[4]	111.11	5.26	105.85	--	--	--	**170**	<10	30	44.3	--	--	--	--	--	--
DMW-1[9]	12/03/05	[4]	111.11	5.89	105.22	454	--	--	**73.3**	0.6	17.2	29.4	--	--	--	--	--	--
DMW-1[9]	12/03/05	[4,*]	111.11	--	--	518	--	--	**81.8**	0.6	19.1	31.8	--	--	--	--	--	--
DMW-1[9]	03/21/06		111.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-1[9]	06/20/06	[4]	111.11	7.00	104.11	70.0	--	--	**17.0**	<0.5	1.5	<1.0	--	--	--	--	--	--
DMW-1[9]	03/27/07	[1]	111.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-1[9]	06/21/07	[2]	111.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-1[9]	09/26/07	[4]	111.11	5.78	105.33	<80.0	--	--	**19.0**	<0.500	<0.500	<1.00	--	--	--	--	--	--
DMW-1[9]	09/26/07	[*]	111.11	--	--	<80.0	--	--	**18.6**	<0.500	<0.500	<1.00	--	--	--	--	--	--
DMW-1[9]	12/13/07	[1]	111.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-1[9]	03/25/08	[6]	111.11	6.01	105.10	--	--	--	**6.61**	<0.500	0.700	<3.00	ND	ND	ND	ND	ND	ND
DMW-1[9]	03/25/08	[6,*]	111.11	--	--	--	--	--	**6.62**	<0.500	0.700	<3.00	ND	ND	ND	ND	112	ND
DMW-1[9]	06/13/08	[5]	111.11	4.74	106.37	<100	--	--	4.6	<5.0	<0.50	<1.5	--	--	--	--	--	--
DMW-1[9]	09/16/08		111.11	5.15	105.96	<100	--	--	--	--	--	--	--	--	--	--	--	--
DMW-1[9]	12/01/08	[1]	111.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-1[9]	03/23/09	[1]	111.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-1[9]	06/12/09	[5]	111.11	6.05	105.06	350.0	--	--	**100**	<5.0	9.0	16	--	--	--	--	--	--
DMW-1[9]	09/14/09	[6]	111.11	5.79	105.32	--	--	--	**55**	<5.0	<1.0	<3.0	3.2	ND	ND	ND	39	ND
DMW-1[9]	12/09/09	[5]	111.11	5.51	105.60	<100	--	--	**46**	<5.0	<0.50	<1.5	--	--	--	--	--	--
DMW-1[9]	03/19/10	[1]	111.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-1[9]	05/16/10	[5]	111.11	4.95	106.16	<100	--	--	4.8	<5.0	0.51	<1.5	--	--	--	--	--	--
DMW-1[9]	09/21/10	[6]	111.11	4.64	106.47	--	--	--	**2,000**	**38,000**	**5,100**	**42,000**	--	--	--	--	--	--
DMW-1[9]	11/02/10	[10]	111.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-1[9]	03/08/11		111.11	--	Blockage at 5.25 feet. Unable to take water level or sample.					--	--	--	--	--	--	--	--	--
DMW-1	05/24/11		111.11	5.02	106.09	**5,310 J**	--	--	**136 J**	42.0 J	21.00	1,050 J	--	--	--	--	--	--
DMW-1	07/29/11		111.11	5.37	105.74	**--**	--	--	**92.1**	10.8	107	538	4.01	<1.00	<100	<1.00	364	<1.00
DMW-1 DUP	10/12/11		111.11	5.61	105.50	**2,350**	--	--	**166**	8.74	87.5	562	--	--	--	--	--	--
DMW-1	10/12/11		111.11	5.61	105.50	**2,530**	--	--	**159**	9.54	90.0	511	--	--	--	--	--	--
DMW-1 DUP	04/25/12		111.11	4.32	106.79	84.8 J	--	--	**12.6**	0.596 J	1.08	<3.00	--	--	--	--	--	--
DMW-1	04/25/12		111.11	4.32	106.79	123 J	--	--	**12.7**	0.885 J	1.17	2.56 J	--	--	--	--	--	--
DMW-1 DUP	10/03/12		111.11	4.29	106.82	<69	--	--	**13**	<0.30 J	0.67	<0.63 J	--	--	--	--	--	--
DMW-1	10/03/12		111.11	4.29	106.82	<56	--	--	**8.8**	<0.20 J	<0.57	<0.59 J	--	--	--	--	--	--
DMW-1	06/07/13		111.11	4.72	106.39	<100	--	--	**7.38**	<1.00	<1.00	<3.00	--	--	--	--	--	--
DMW-1 DUP	06/07/13		111.11	4.72	106.39	<100	--	--	**7.47**	<1.00	<1.00	<3.00	--	--	--	--	--	--
DMW-1	10/18/13		111.11	3.92	107.19	<100	1,070 J	**1,710**	**6.53**	<1.00	<1.00	<2.00	--	--	--	--	--	--

TABLE 1

SUMMARY OF HISTORICAL GROUNDWATER ANALYTICAL DATA
SHELL-BRANDED WHOLSALE FACILITY
919 EAST DIMOND ROAD
ANCHORAGE, ALASKA

						HYDROCARBONS			PRIMARY VOCs				OXYGENATES					
Sample ID	**Date**		**TOC**	**DTW**	**GWE**	**TPH-GRO**	**TPH-DRO**	**TPH-RRO**	**B**	**T**	**E**	**X**	**MTBE**	**DIPE**	**Ethanol**	**ETBE**	**TBA**	**TAME**
				DEC Cleanup Levels		**2,200**	**1,500**	**1,100**	**4.6**	**1,100**	**15**	**190**	**140**	**NE**	**NE**	**NE**	**NE**	**NE**
DMW-1DUP	10/18/13		111.11	3.92	107.19	<100	1,260 J	**1,390**	**7.59**	<1.00	<1.00	<2.00	--	--	--	--	--	--
DMW-1	10/21/13		111.11	4.00	107.11	<100	<842 J	<1,030	**14.7**	<1.00	<1.00	<2.00	--	--	--	--	--	--
DMW-1DUP	10/21/13		--	--	--	<100	1,340 J	<962	**15.3**	<1.00	<1.00	<2.00	--	--	--	--	--	--
DMW-1	04/09/14		111.11	Iced in		--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-1	06/17/14		111.11	4.81	106.30	<100	152 J	207 J	**13.00**	<1.00	0.432 J	<2.00	--	--	--	--	--	--
DMW-1DUP	06/17/14		111.11	4.81	106.30	<100	152 J	145 J	**13.20**	<1.00	0.440 J	<2.00						
DMW-1	10/07/14		118.03	4.52	113.51	<100	474 J	644 J	1.63	0.664 J	0.207 J	0.850 J						
DMW-1DUP	10/07/14		118.03	4.52	113.51	<100	204 J	474 J	1.63	0.632 J	<1.00	0.849 J						
DMW-1	04/17/15		118.03	5.95	112.08	21.3 J	**2,490**	**2,210**	3.5	0.27 J	0.41 J	0.67 J	--	--	--	--	--	--
DMW-1 DUP	04/17/15		--	--	--	<50	**2,350**	**2,200**	4.0	0.35 J	0.49 J	0.78 J	--	--	--	--	--	--
DMW-1	10/20/15		118.03	5.00	113.03	75.7	1,060	**1,280**	**31.1**	7.4	2.8	7.5	--	--	--	--	--	--
DMW-1 DUP	10/20/15		--	--	--	74.2	1,110	**1,370**	**29.3**	7.3	2.6	6.8	--	--	--	--	--	--
DMW-1	04/02/16		118.03	6.08	111.95	23.6 J	**1,710**	**1,690**	0.76 J	0.34 J	0.20 J	0.68 J	--	--	--	--	--	--
DMW-1 DUP	04/02/16		118.03	6.08	111.95	22.0 J	**2,080**	**2,320**	0.73 J	0.31 J	<1.0	0.62 J	--	--	--	--	--	--
DMW-1	10/04/16		118.03	5.50	112.53	<100	342	634	**26.3**	<1.0	<1.0	1.3	6.2	--	--	--	--	--
DMW-1 DUP	10/04/16		118.03	5.50	112.53	<100	<190	<380	**29.3**	1.0	<1.0	1.2	6.5	--	--	--	--	--
DMW-1	04/18/17		118.03	Ice in Casing		--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-1	10/03/17		118.03	5.07	112.96	--	726	**2,000**	**49.7**	<1.00	0.439 J	<3.00	4.79	<1.00	--	--	--	--
DMW-1 DUP	10/03/17		118.03	5.07	112.96	--	--	--	**50.4**	<1.00	<1.00	<3.00	4.94	<1.00	--	--	--	--
DMW-1	04/26/18		101.30	5.20	96.10	--	487 J	**1,320**	**6.24**	<1.00	<1.00	<3.00	3.27	<1.00	--	--	--	--
DMW-1	**10/04/18**		101.30	5.28	96.02	--	958	**4,340**	**42.9**	<1.00	<1.00	<3.00	2.93	<1.00	--	--	--	--
DMW-1 DUP	**10/04/18**		101.30	5.28	96.02	58.5 J	1,310	**6,040**	**42.2**	<1.00	<1.00	<3.00	3.02	<1.00	--	--	--	--
DMW-2[9]	06/08/05	[4]	113.03	7.51	105.52	160	--	--	**45**	1.4	<1.0	2.1	--	--	--	--	--	--
DMW-2[9]	09/24/05	[4, 7]	113.03	6.25	106.78	--	--	--	<1.0	<1.0	<1.0	<1.0	--	--	--	--	--	--
DMW-2[9]	12/03/05	[4]	113.03	7.81	105.22	153	--	--	**47**	<0.5	<0.5	1.98	--	--	--	--	--	--
DMW-2[9]	03/21/06	[4]	113.03	9.75	103.28	--	--	--	**31.8**	<0.5	<0.5	<1.0	--	--	--	--	--	--
DMW-2[9]	06/20/06	[4]	113.03	7.95	105.08	<50.0	--	--	**7.16**	<0.5	<0.5	<1.0	--	--	--	--	--	--
DMW-2[9]	12/12/06	[6]	113.03	7.65	105.38	<50.0	--	--	3.18	<0.500	<0.500	<3.00	--	--	--	--	--	--
DMW-2[9]	12/12/06	[6,*]	113.03	--	--	<50.0	--	--	3.05	<0.500	<0.500	<3.00	--	--	--	--	--	--
DMW-2[9]	03/29/07	[4]	113.03	8.65	104.38	--	--	--	**26.0**	<0.500	0.570	<1.50	--	--	--	--	--	--
DMW-2[9]	06/21/07	[4]	113.03	8.59	104.44	229	--	--	**40.1**	<0.500	<0.500	<1.00	--	--	--	--	--	--
DMW-2[9]	09/26/07	[4]	113.03	7.99	105.04	194	--	--	**86.9**	<0.500	<0.500	5.24	--	--	--	--	--	--
DMW-2[9]	12/13/07	[4]	113.03	7.45	105.58	94.4	--	--	**45.2**	<0.500	<0.500	1.37	--	--	--	--	--	--
DMW-2[9]	03/25/08	[6]	113.03	8.06	104.97	--	--	--	3.17	<0.500	<0.500	<3.00	21.4	3.18	ND	ND	101	ND
DMW-2[9]	06/13/08	[5]	113.03	6.75	106.28	<100	--	--	<0.50	<5.0	<0.50	<1.50						

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SUMMARY OF HISTORICAL GROUNDWATER ANALYTICAL DATA
SHELL-BRANDED WHOLSALE FACILITY
919 EAST DIMOND ROAD
ANCHORAGE, ALASKA

						HYDROCARBONS			*PRIMARY VOCs*				*OXYGENATES*					
Sample ID	***Date***		***TOC***	***DTW***	***GWE***	***TPH-GRO***	***TPH-DRO***	***TPH-RRO***	***B***	***T***	***E***	***X***	***MTBE***	***DIPE***	***Ethanol***	***ETBE***	***TBA***	***TAME***
				DEC Cleanup Levels		***2,200***	***1,500***	***1,100***	***4.6***	***1,100***	***15***	***190***	***140***	***NE***	***NE***	***NE***	***NE***	***NE***
DMW-2[9]	09/16/08		113.03	7.40	105.63	<100	--	--	--	--	--	--	--	--	--	--	--	--
DMW-2[9]	12/01/08	[5]	113.03	7.58	105.45	110	--	--	**26**	<5.0	3.9	3.4	--	--	--	--	--	--
DMW-2[9]	03/23/09	[6]	113.03	7.23	105.80	--	--	--	**53**	<5.0	<1.0	<3.0	--	--	--	--	--	--
DMW-2[9]	06/12/09	[5]	113.03	8.07	104.96	<100	--	--	**7.6**	<5.0	<0.50	<1.5	--	--	--	--	--	--
DMW-2[9]	09/14/09	[6]	113.03	8.06	104.97	--	--	--	**78**	<5.0	<1.0	3.0	37	5.0	ND	ND	130	ND
DMW-2[9]	09/14/09	[6,*]	113.03	--	--	--	--	--	**74**	<5.0	<1.0	<3	40	5.2	ND	ND	120	ND
DMW-2[9]	12/09/09	[5]	113.03	7.78	105.25	140	--	--	**58**	<5.0	<0.50	1.8	--	--	--	--	--	--
DMW-2[9]	12/09/09	[5,*]	113.03	--	--	150	--	--	**61**	<5.0	<0.50	1.6	--	--	--	--	--	--
DMW-2[9]	03/19/10	[6]	113.03	8.18	104.85	--	--	--	**40**	<5.0	<1.0	<3.0	--	--	--	--	--	--
DMW-2[9]	03/19/10	[6,*]	113.03	--	--	--	--	--	**51**	<5.0	<1.0	<1.5	--	--	--	--	--	--
DMW-2[9]	05/16/10	[5]	113.03	7.05	105.98	<100	--	--	1.3	<5.0	<0.50	<1.5	--	--	--	--	--	--
DMW-2[9]	05/16/10	[5,*]	113.03	--	--	<100	--	--	2.5	<5.0	<0.50	<1.5	--	--	--	--	--	--
DMW-2[9]	9/21//10	[6]	113.03	6.82	106.21	--	--	--	1.9 J	<5.0	<1.0	<3.0	--	--	--	--	--	--
DMW-2[9]	9/21//10	[6,*]	113.03	--	--	<100	--	--	4.2 J	<5.0	<0.50	<1.5	--	--	--	--	--	--
DMW-2[9]	11/02/10	[6]	113.03	7.09	105.94	46 J	--	--	**15.0**	0.22 J	<0.50	0.38 J	--	--	--	--	--	--
DMW-2	03/08/11		113.03	8.30	104.73	--	--	--	4.71	<1.00	<1.00	<3.00	--	--	--	--	--	--
DMW-2	05/24/11		113.03	6.07	106.96	<100	--	--	2.68 J	<1.00 J	<1.00 J	<3.00 J	--	--	--	--	--	--
DMW-2	07/29/11		113.03	7.61	105.42	--	--	--	**61.1 J**	<1.00	<1.00	3.13	43.9 J	4.30	<100	<1.00	212 J	<1.00
DMW-2	10/12/11		113.03	8.75	104.28	238	--	--	**92.9**	<1.00	<1.00	3.34	--	--	--	--	--	--
DMW-2	04/25/12		113.03	6.71	106.32	--	--	--	2.55	<1.00	<1.00	<3.00	--	--	--	--	--	--
DMW-2	10/03/12		113.03	6.61	106.42	--	--	--	2.6	<0.50	<0.50	<0.39 J	--	--	--	--	--	--
DMW-2	06/07/13		113.03	6.70	106.33	--	<762	<962	**7.86**	<1.00	<1.00	<3.00	7.97	--	--	--	--	--
DMW-2	10/18/13		113.03	6.18	106.85	<100	<769	<952	1.78	<1.00	<1.00	<2.00	--	--	--	--	--	--
DMW-2	10/21/13		113.03	6.22	106.81	<100	<800	<1,110	<1.00	<1.00	<1.00	<2.00	--	--	--	--	--	--
DMW-2	04/09/14		113.03	7.23	105.80	<100	<800	<990	<1.00	<1.00	<1.00	<2.00	--	--	--	--	--	--
DMW-2	10/07/14		119.90	6.48	113.42	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-2	10/09/14		--	--	--	<100	356 J	93.3 J	1.32	<1.00	<1.00	<2.00	--	--	--	--	--	--
DMW-2	04/17/15		119.90	8.23	111.67	71.3	252	320	**34.9**	<1.0	<1.0	<2.0	--	--	--	--	--	--
DMW-2	10/20/15		119.90	6.30	113.60	<50	64.6 J	129 J	<1.0	<1.0	<1.0	<2.0	--	--	--	--	--	--
DMW-2	04/02/16		119.90	8.32	111.58	97.9	311	346	**30.5**	<5.0	<5.0	<10	--	--	--	--	--	--
DMW-2	10/04/16		119.90	7.78	112.12	<100	343	615	**41.3**	<1.0	<1.0	<3.0	37.6	--	--	--	--	--
DMW-2	04/19/17		119.90	8.10	111.80	<100	597 J	554 J	**5.81**	<1.00	<0.500	<1.50	28.1	3.75	--	--	--	--
DMW-2	10/03/17		119.90	7.15	112.75	--	--	--	**14.6**	<1.00	<1.00	<3.00	14.8	1.66	--	--	--	--
DMW-2	04/26/18		103.60	7.84	95.76	--	--	--	**27.6**	<1.00	<1.00	<3.00	31.5	4.16	--	--	--	--
DM-2 DUP	04/26/18		103.60	7.84	95.76	67.2 J	540 J	582 J	**24.0**	<1.00	<0.500	<5.00	28.3	4.15	--	--	--	--
DMW-2	**10/04/18**		103.60	7.34	96.26	--	--	--	**37.2**	<1.00	<1.00	1.40 J	30.3	3.53	--	--	--	--

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SHELL-BRANDED WHOLSALE FACILITY
919 EAST DIMOND ROAD
ANCHORAGE, ALASKA

					HYDROCARBONS			*PRIMARY VOCs*				*OXYGENATES*					
Sample ID	***Date***	***TOC***	***DTW***	***GWE***	***TPH-GRO***	***TPH-DRO***	***TPH-RRO***	***B***	***T***	***E***	***X***	***MTBE***	***DIPE***	***Ethanol***	***ETBE***	***TBA***	***TAME***
			DEC Cleanup Levels		***2,200***	***1,500***	***1,100***	***4.6***	***1,100***	***15***	***190***	***140***	***NE***	***NE***	***NE***	***NE***	***NE***
DMW-3	06/08/05	113.60	7.08	106.52	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-3	09/24/05	113.60	6.75	106.85	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-3	12/03/05 [1]	113.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-3	03/21/06	113.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-3	06/20/06	113.60	7.15	106.45	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-3	03/23/09 [1]	113.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-3	06/12/09 [3]	113.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-3	09/14/09 [3]	113.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-3	03/19/10 [1]	113.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-3	05/16/10 [3]	113.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-3	03/08/11	113.60	--	Unable to locate due to snow bank			--	--	--	--	--	--	--	--	--	--	--
DMW-3	05/24/11	113.60	--	Unable to locate		--	--	--	--	--	--	--	--	--	--	--	--
DMW-3	07/29/11	113.60	--	Zurn key needed to open well			--	--	--	--	--	--	--	--	--	--	--
DMW-3	10/12/11	113.60	--	Unable to access		--	--	--	--	--	--	--	--	--	--	--	--
DMW-3	04/25/12	113.60	--	Unable to open		--	--	--	--	--	--	--	--	--	--	--	--
DMW-3	10/03/12	113.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-3	06/07/13	113.60	--	Unable to locate		--	--	--	--	--	--	--	--	--	--	--	--
DMW-4A	06/08/05	112.87	8.21	104.66	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4A	09/24/05	112.87	7.63	105.24	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4A	12/03/05	112.87	7.29	105.58	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4A	03/21/06	112.87	9.36	103.51	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4A	06/20/06	112.87	8.97	103.90	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4A	12/11/06	112.87	6.85	106.02	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4A	03/27/07	112.87	7.91	104.96	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4A	10/20/15	112.87	6.50	106.37	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4A	04/02/16	112.87	7.64	105.23	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4A	10/04/16	112.87	7.15	105.72	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4A	04/18/17	112.87	7.32	105.55	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4A	10/03/17	112.87	6.59	106.28	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4A	04/26/18	103.40	7.12	96.28	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4A	**10/04/18**	103.40	6.81	96.59	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4B	06/08/05	112.85	8.15	104.70	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4B	09/24/05	112.85	7.47	105.38	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4B	12/03/05	112.85	7.22	105.63	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4B	03/21/06	112.85	9.00	103.85	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4B	06/20/06	112.85	8.85	104.00	--	--	--	--	--	--	--	--	--	--	--	--	--

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SHELL-BRANDED WHOLSALE FACILITY
919 EAST DIMOND ROAD
ANCHORAGE, ALASKA

						HYDROCARBONS			PRIMARY VOCs				OXYGENATES					
Sample ID	*Date*		*TOC*	*DTW*	*GWE*	*TPH-GRO*	*TPH-DRO*	*TPH-RRO*	*B*	*T*	*E*	*X*	*MTBE*	*DIPE*	*Ethanol*	*ETBE*	*TBA*	*TAME*
				DEC Cleanup Levels		*2,200*	*1,500*	*1,100*	*4.6*	*1,100*	*15*	*190*	*140*	*NE*	*NE*	*NE*	*NE*	*NE*
DMW-4B	12/11/06		112.85	6.80	106.05	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4B	03/27/07		112.85	7.85	105.00	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4B	10/20/15		112.85	6.45	106.40	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4B	04/02/16		112.85	7.56	105.29	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4B	10/04/16		112.85	7.10	105.75	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4B	04/18/17		112.85	7.32	105.53	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4B	10/03/17		112.85	6.59	106.26	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4B	04/26/18		103.40	7.10	96.30	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4B	**10/04/18**		103.40	6.80	96.60	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4C	06/08/05	[4]	112.83	6.42	106.41	<100	--	--	2.6	2	<1.0	1.7	--	--	--	--	--	--
DMW-4C	06/08/05	[4]	112.83	--	--	<100	--	--	<1.0	<1.0	<1.0	<1.0	--	--	--	--	--	--
DMW-4C	09/24/05	[5]	112.83	6.02	106.81	<100	--	--	2.1	<1.0	<1.0	<1.0	--	--	--	--	--	--
DMW-4C	12/03/05	[4]	112.83	6.72	106.11	<50	--	--	<0.2	<0.5	<0.5	<1.0	--	--	--	--	--	--
DMW-4C	03/21/06	[4]	112.83	6.74	106.09	830	--	--	**7.39**	3.56	9.96	181	--	--	--	--	--	--
DMW-4C	03/21/06	[4]	112.83	--	--	643	--	--	**10.2**	3.72	11.1	180	--	--	--	--	--	--
DMW-4C	06/20/06	[4]	112.83	6.32	106.51	<50.0	--	--	<0.2	<0.5	<0.5	<1.0	--	--	--	--	--	--
DMW-4C	12/12/06	[5]	112.83	6.50	106.33	**4,510**	--	--	**16.1**	10.5	116	951	--	--	--	--	--	--
DMW-4C	03/27/07	[8]	112.83	6.72	106.11	--	--	--	3.90	46.9	7.93	977	--	--	--	--	--	--
DMW-4C	06/21/07	[4]	112.83	6.34	106.49	--	--	--	<0.200	<0.500	<0.500	<1.00	--	--	--	--	--	--
DMW-4C	09/26/07	[4]	112.83	6.67	106.16	<80.0	--	--	<0.500	<0.500	<0.500	<1.00	--	--	--	--	--	--
DMW-4C	12/13/07	[4]	112.83	6.75	106.08	290	--	--	**11.7**	<0.500	3.66	39.0	--	--	--	--	--	--
DMW-4C	03/25/08		112.83	7.11	105.72	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4C	06/13/08	[5]	112.83	6.30	106.53	420	--	--	**14**	<5.0	7.5	12	--	--	--	--	--	--
DMW-4C	06/13/08	[5,*]	112.83	--	--	450	--	--	**15**	<5.0	9.1	14	--	--	--	--	--	--
DMW-4C	09/16/08	[4]	112.83	6.57	106.26	<100	--	--	<0.50	<5.0	<0.50	<1.5	--	--	--	--	--	--
DMW-4C	09/16/08	[*]	112.83	--	--	<100	--	--	<0.50	<5.0	<0.50	<1.5	--	--	--	--	--	--
DMW-4C	12/01/08	[5]	112.83	6.68	106.15	580	--	--	**17**	<5.0	18	45	--	--	--	--	--	--
DMW-4C	12/01/08	[5,*]	112.83	--	--	460	--	--	**14**	<5.0	14	42	--	--	--	--	--	--
DMW-4C	03/23/09		112.83	6.45	106.38	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4C	06/12/09	[5]	112.83	6.09	106.74	<100	--	--	<0.50	<5.0	<0.50	15	--	--	--	--	--	--
DMW-4C	09/14/09	[5,6]	112.83	6.33	106.50	<100	--	--	0.53	<5.0	<0.50	2.2	ND	ND	ND	ND	ND	ND
DMW-4C	12/09/09	[5]	112.83	6.65	106.18	<100	--	--	<0.50	<5.0	<0.50	<1.5	--	--	--	--	--	--
DMW-4C	03/19/10	[5]	112.83	6.91	105.92	**2,300**	--	--	**15**	<5.0	23	280	--	--	--	--	--	--
DMW-4C	05/16/10	[5]	112.83	5.98	106.85	<100	--	--	<0.50	<5.0	<0.50	<1.5	--	--	--	--	--	--
DMW-4C	09/21/10	[5]	112.83	6.29	106.54	750	--	--	**16**	<5.0	11	87	--	--	--	--	--	--
DMW-4C	11/02/10	[4]	112.83	6.37	106.46	<50	--	--	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--
DMW-4C	03/08/11		112.83	7.20	105.63	363	--	--	**8.00**	<1.00	1.95	20.6	--	--	--	--	--	--

TABLE 1

SUMMARY OF HISTORICAL GROUNDWATER ANALYTICAL DATA
SHELL-BRANDED WHOLSALE FACILITY
919 EAST DIMOND ROAD
ANCHORAGE, ALASKA

						HYDROCARBONS			PRIMARY VOCs				OXYGENATES					
Sample ID	**Date**		**TOC**	**DTW**	**GWE**	**TPH-GRO**	**TPH-DRO**	**TPH-RRO**	**B**	**T**	**E**	**X**	**MTBE**	**DIPE**	**Ethanol**	**ETBE**	**TBA**	**TAME**
				DEC Cleanup Levels		**2,200**	**1,500**	**1,100**	**4.6**	**1,100**	**15**	**190**	**140**	**NE**	**NE**	**NE**	**NE**	**NE**
DMW-4C	05/24/11		112.83	6.14	106.69	310 J	--	--	3.81 J	<1.00 J	1.87 J	28.1 J	--	--	--	--	--	--
DMW-4C	07/29/11		112.83	6.48	106.35	<100	--	--	3.10	<1.00	<1.00	4.31	3.41	<1.00	<100	<1.00	238	<1.00
DMW-4C	10/12/11		112.83	6.54	106.29	<100	--	--	<1.00	<1.00	<1.00	<3.00	--	--	--	--	--	--
DMW-4C	04/25/12		112.83	6.21	106.62	718	--	--	**10.2**	0.561 J	5.32	35.1	--	--	--	--	--	--
DMW-4C	10/03/12		112.83	6.26	106.57	240	--	--	**7.4**	<0.28 J	11	<0.77 J	--	--	--	--	--	--
DMW-4C	06/07/13		112.83	6.19	106.64	505	<762	<1,000 J	**7.44**	1.49	14.1	35.3	15.2	--	--	--	--	--
DMW-4C	10/18/13		112.83	6.21	106.62	145	<762 J	<1,000	**7.02**	<1.00	6.61	<2.00	--	--	--	--	--	--
DMW-4C	10/21/13		112.83	6.24	106.59	358	<889	<1,030	**8.29**	<1.00	11.0	8.79	--	--	--	--	--	--
DMW-4C	04/08/14		--	--	--	708	<792	<980	4.67	<1.00	8.74	12.2	--	--	--	--	--	--
DMW-4C	04/09/14		112.83	6.72	106.11	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-4C	10/07/14		119.64	5.98	113.66	995	<800	197 J	**6.23**	1.50	15.5	34.9	--	--	--	--	--	--
DMW-4C	04/18/15		119.64	6.51	113.13	1,080	729	353	3.4	0.90 J	12.4	50.1	--	--	--	--	--	--
DMW-4C	10/20/15		119.64	5.80	113.84	90.4	389	235	0.31 J	0.56 J	0.29 J	1.9 J	--	--	--	--	--	--
DMW-4C	04/02/16		119.64	6.60	113.04	642	719	188	1.5	0.74 J	5.8	21.5	--	--	--	--	--	--
DMW-4C	10/04/16		119.64	6.18	113.46	374	869	470	1.8	1.6	2.1	14.6	6.2	--	--	--	--	--
DMW-4C	04/18/17		119.64	6.62	113.02	134	850	570 J	1.48	1.20	3.32	14.5	4.38	<1.00	--	--	--	--
DMW-4C	10/03/17		119.64	6.17	113.47	--	--	--	2.02	0.607 J	1.73	5.30	4.48	<1.00	--	--	--	--
DMW-4C	04/26/18		103.40	6.27	97.13	--	--	--	2.96	0.532 J	3.15	8.15	4.90	<1.00	--	--	--	--
DMW-4C	**10/04/18**		103.40	6.33	97.07	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-5	06/08/05	[4]	112.63	6.19	106.44	--	--	--	**76**	2.3	23	19.2	--	--	--	--	--	--
DMW-5	09/24/05	[4]	112.63	5.80	106.83	--	--	--	**14**	<1.0	1.1	<1.0	--	--	--	--	--	--
DMW-5	09/24/05	[*]	112.63	--	--	240	--	--	**19**	<1.0	<1.0	<1.0	--	--	--	--	--	--
DMW-5	12/03/05	[4]	112.63	6.43	106.20	--	--	--	**25.8**	<0.5	<0.5	<1.0	--	--	--	--	--	--
DMW-5	03/21/06	[4]	112.63	7.27	105.36	--	--	--	**45.5**	<0.5	<0.5	1.6	--	--	--	--	--	--
DMW-5	06/20/06	[4]	112.63	6.10	106.53	168	--	--	**43.1**	<0.5	1.82	<1.0	--	--	--	--	--	--
DMW-5	12/11/06	[6]	112.63	6.15	106.48	53.2	--	--	**9.53**	<0.500	<0.500	<3.00	--	--	--	--	--	--
DMW-5	03/27/07	[4]	112.63	6.41	106.22	--	--	--	**21.0**	<0.500	<0.500	<1.50	--	--	--		--	--
DMW-5	06/21/07	[4]	112.63	6.10	106.53	138	--	--	**22.9**	<0.500	<0.500	<1.00	--	--	--	--	--	--
DMW-5	09/26/07	[4]	112.63	6.42	106.21	95.6	--	--	**35.2**	<0.500	<0.500	<1.00	--	--	--	--	--	--
DMW-5	12/13/07	[4]	112.63	6.51	106.12	--	--	--	**14.9**	<0.500	<0.500	<1.00	--	--	--	--	--	--
DMW-5	12/13/07	[*]	112.63	--	--	--	--	--	**7.50**	<0.500	<0.500	<1.00	--	--	--	--	--	--
DMW-5	03/25/08	[6]	112.63	7.11	105.52	--	--	--	**10.2**	<0.500	<0.500	<3.00	16.6	ND	ND	ND	446	ND
DMW-5	06/13/08	[4]	112.63	5.98	106.65	--	--	--	2.2	<5.0	<0.50	<1.5	--	--	--	--	--	--
DMW-5	09/16/08	[4]	112.63	6.25	106.38	--	--	--	**25**	<5.0	<0.5	<1.5	--	--	--	--	--	--
DMW-5	12/01/08	[1]	112.63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 1

SUMMARY OF HISTORICAL GROUNDWATER ANALYTICAL DATA
SHELL-BRANDED WHOLSALE FACILITY
919 EAST DIMOND ROAD
ANCHORAGE, ALASKA

						HYDROCARBONS			*PRIMARY VOCs*				*OXYGENATES*					
Sample ID	***Date***		***TOC***	***DTW***	***GWE***	***TPH-GRO***	***TPH-DRO***	***TPH-RRO***	***B***	***T***	***E***	***X***	***MTBE***	***DIPE***	***Ethanol***	***ETBE***	***TBA***	***TAME***
				DEC Cleanup Levels		***2,200***	***1,500***	***1,100***	***4.6***	***1,100***	***15***	***190***	***140***	***NE***	***NE***	***NE***	***NE***	***NE***
DMW-5	03/23/09	[6]	112.63	6.32	106.31	--	--	--	**47**	<5.0	<1.0	<3.0	--	--	--	--	--	--
DMW-5	03/23/09	[6, *]	112.63	--	--	--	--	--	**46**	<5.0	<1.0	<3.0	--	--	--	--	--	--
DMW-5	06/12/09	[6]	112.63	6.04	106.59	--	--	--	**51**	<5.0	<1.0	<3.0	10	ND	ND	ND	140	ND
DMW-5	06/12/09	[5,6,*]	112.63	--	--	170	--	--	**44**	<5.0	<0.50	<1.5	10	ND	ND	ND	150	ND
DMW-5	09/14/09	[6]	112.63	6.28	106.35	--	--	--	**66**	<5.0	<1.0	<3.0	16	ND	ND	ND	540	ND
DMW-5	12/09/09	[6]	112.63	6.59	106.04	--	--	--	**55**	<5.0	<1.0	<3.0	--	--	--	--	--	--
DMW-5	03/19/10	[6]	112.63	7.11	105.52	--	--	--	**42**	<5.0	<1.0	<3.0	--	--	--	--	--	--
DMW-5	05/16/10	[6]	112.63	5.91	106.72	--	--	--	**31**	<5.0	<1.0	<3.0	--	--	--	--	--	--
DMW-5	09/21/10	[6]	112.63	6.02	106.61	--	--	--	**24**	<5.0	<1.0	<3.0	--	--	--	--	--	--
DMW-5	11/02/10	[6]	112.63	6.23	106.40	--	--	--	**24**	0.23 J	<1.0	<3.0	--	--	--	--	--	--
DMW-5	11/02/10	[6, *]	112.63	6.23	106.40	--	--	--	**25**	0.21 J	<1.0	<3.0	--	--	--	--	--	--
DMW-5	03/08/11		112.63	7.25	105.38	--	--	--	**8.33**	<1.00	<1.00	<3.00	--	--	--	--	--	--
DMW-5	03/08/11		112.63	7.25	105.38	--	--	--	**8.67**	<1.00	<1.00	<3.00	--	--	--	--	--	--
DMW-5	05/24/11		112.63	6.07	106.56	--	--	--	**12.6**	<1.00	<1.00	<3.00	--	--	--	--	--	--
DMW-5	07/29/11		112.63	6.22	106.41	--	--	--	**16.6**	<1.00	<1.00	<3.00	8.95	<1.00	<100	<1.00	677	<1.00
DMW-5	10/12/11		112.63	6.29	106.34	--	--	--	**16.8**	<1.00	<1.00	<3.00	--	--	--	--	--	--
DMW-5	04/25/12		112.63	5.93	106.70	--	--	--	**23.0**	<1.00	<1.00	<3.00	--	--	--	--	--	--
DMW-5	10/03/12		112.63	6.02	106.61	--	--	--	**46**	<0.18 J	<0.10 J	<1.0	--	--	--	--	--	--
DMW-5	06/07/13		112.63	5.89	106.74	--	<762	<962	**11.1**	<1.00	<1.00	<3.00	2.69	--	--	--	--	--
DMW-5	10/18/13		112.63	5.93	106.70	<100	<777	<962	**13.8**	<1.00	<1.00	<2.00	--	--	--	--	--	--
DMW-5	10/21/13		112.63	5.99	106.64	<100	<842	<952 J	**11.4**	<1.00	<1.00	<2.00	--	--	--	--	--	--
DMW-5	04/08/14		--	--	--	<100	<808	<1000	2.16	<1.00	<1.00	<3.00	--	--	--	--	--	--
DMW-5	04/09/14		112.63	6.44	106.19	--	--	--	--	--	--	--	--	--	--	--	--	--
DMW-5	10/07/14		119.55	5.91	113.64	<100	522 J	108 J	**8.43**	<1.00	<1.00	<2.00	--	--	--	--	--	--
DMW-5	04/17/15		119.55	6.43	113.12	55.7	180	314	**21.1**	<1.0	<1.0	<2.0	--	--	--	--	--	--
DMW-5	10/20/15		119.55	5.70	113.85	<50	194	315	4.0	<1.0	<1.0	<2.0	--	--	--	--	--	--
DMW-5	04/02/16		119.55	6.55	113.00	25.9 J	169	201	2.8	<1.0	<1.0	<2.0	--	--	--	--	--	--
DMW-5	10/04/16		119.55	6.08	113.47	<100	<190	<380	4.1	<1.0	<1.0	<3.0	3.3	--	--	--	--	--
DMW-5	04/18/17		119.55	6.58	112.97	<100	247 J	443 J	**5.70**	<1.00	<0.500	<1.50	2.35 J	<1.00	--	--	--	--
DMW-5	10/03/17		119.55	6.05	113.50	--	--	--	0.757 J	<1.00	<1.00	<3.00	1.76	<1.00	--	--	--	--
DMW-5	04/26/18		103.20	6.16	97.04	--	--	--	2.90	<1.00	<1.00	<3.00	0.552 J	<1.00	--	--	--	--
DMW-5	**10/04/18**		103.20	6.25	96.95	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	10/18/13		--	5.25	--	<100	<762	<952	<1.00	<1.00	<1.00	<2.00	--	--	--	--	--	--
MW-6	10/21/13		--	5.32	--	<100	<842	<1,030	<1.00	<1.00	<1.00	<2.00	--	--	--	--	--	--
MW-6	04/08/14		--	--	--	<100	<800	<1010	<1.00	<1.00	<1.00	<3.00	--	--	--	--	--	--

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SHELL-BRANDED WHOLSALE FACILITY
919 EAST DIMOND ROAD
ANCHORAGE, ALASKA

					HYDROCARBONS			*PRIMARY VOCs*				*OXYGENATES*					
Sample ID	***Date***	***TOC***	***DTW***	***GWE***	***TPH-GRO***	***TPH-DRO***	***TPH-RRO***	***B***	***T***	***E***	***X***	***MTBE***	***DIPE***	***Ethanol***	***ETBE***	***TBA***	***TAME***
			DEC Cleanup Levels		***2,200***	***1,500***	***1,100***	***4.6***	***1,100***	***15***	***190***	***140***	***NE***	***NE***	***NE***	***NE***	***NE***
MW-6	04/09/14	--	7.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	10/07/14	118.73	5.24	113.49	<100	80.6 J	49.7 J	1.82	<1.00	<1.00	<2.00	--	--	--	--	--	--
MW-6	04/18/15	118.73	5.52	113.21	<50	185	250	0.26 J	<1.0	<1.0	<2.0	--	--	--	--	--	--
MW-6	10/20/15	118.73	5.10	113.63	41.7 J	380	561	<1.0	<1.0	<1.0	<2.0	--	--	--	--	--	--
MW-6	04/02/16	118.73	5.41	113.32	<50	50.1 J	55.6 J	<1.0	<1.0	<1.0	<2.0	--	--	--	--	--	--
MW-6	10/04/16	118.73	5.40	113.33	<100	413	389	<1.0	<1.0	<1.0	<3.0	<1.0	--	--	--	--	--
MW-6	04/18/17	118.73	3.86	114.87	<100	332 J	430 J	<0.500	<1.00	<0.500	<1.50	<5.00	<1.00	--	--	--	--
MW-6	10/03/17	118.73	5.30	113.43	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	04/26/18	102.50	4.94	97.56	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	**10/04/18**	102.50	5.51	96.99	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	10/18/13	--	6.21	--	<100	<821	<962	<1.00	<1.00	<1.00	<2.00	--	--	--	--	--	--
MW-7	10/21/13	--	6.27	--	<100	<784	<1,050	<1.00	<1.00	<1.00	<2.00	--	--	--	--	--	--
MW-7	04/08/14	--	--	--	<100	<777	<980	<1.00	<1.00	<1.00	<3.00	--	--	--	--	--	--
MW-7	04/09/14	--	8.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	10/07/14	119.90	6.17	113.73	<100	73.4 J	46.8 J	<1.00	<1.00	<1.00	<2.00	--	--	--	--	--	--
MW-7	04/18/15	119.90	6.59	113.31	<50	41.1 JB	126 J	<1.0	<1.0	<1.0	<2.0	--	--	--	--	--	--
MW-7	10/20/15	119.90	5.97	113.93	<50	71.7 J	153 J	<1.0	<1.0	<1.0	<2.0	--	--	--	--	--	--
MW-7	04/02/16	119.60	6.55	113.05	<50	37.1 J	58.5 J	<1.0	<1.0	<1.0	<2.0	--	--	--	--	--	--
MW-7	10/04/16	119.60	6.34	113.26	<100	<190	<380	<1.0	<1.0	<1.0	<3.0	<1.0	--	--	--	--	--
MW-7	04/18/17	119.60	6.5	113.10	<100	197 J	<800	<0.500	<1.00	<0.500	<1.50	<5.00	<1.00	--	--	--	--
MW-7	10/03/17	119.60	6.32	113.28	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	04/26/18	103.30	6.25	97.05	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	**10/04/18**	103.30	6.52	96.78	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-8	10/18/13	--	6.95	--	<100	<769	<952 J	<1.00	<1.00	<1.00	<2.00	--	--	--	--	--	--
MW-8	10/21/13	--	7.07	--	<100	<865	<971	<1.00	<1.00	<1.00	<2.00	--	--	--	--	--	--
MW-8	04/09/14	--	7.73	--	<100	<842	<962	<1.00	<1.00	<1.00	<3.00	--	--	--	--	--	--
MW-8	10/07/14	120.25	7.04	113.21	<100	--	--	--	--	--	--	--	--	--	--	--	--
MW-8	10/09/14	--	--	--	<100	173 J	217 J	<1.00	<1.00	<1.00	<2.00	--	--	--	--	--	--
MW-8	04/17/15	120.25	7.73	112.52	<50	226	377	<1.0	<1.0	<1.0	<2.0	--	--	--	--	--	--
MW-8	10/20/15	120.25	6.60	113.65	<50	150	319	<1.0	<1.0	<1.0	<2.0	--	--	--	--	--	--
MW-8	04/02/16	120.25	7.70	112.55	<50	152	155	<1.0	<1.0	<1.0	<2.0	--	--	--	--	--	--
MW-8	10/04/16	120.25	7.30	112.95	<100	<190	487	<1.0	<1.0	<1.0	<3.0	19.7	--	--	--	--	--
MW-8	04/19/17	120.25	7.79	112.46	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-8	10/03/17	120.25	7.10	113.15	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 1

SUMMARY OF HISTORICAL GROUNDWATER ANALYTICAL DATA
SHELL-BRANDED WHOLSALE FACILITY
919 EAST DIMOND ROAD
ANCHORAGE, ALASKA

					HYDROCARBONS			*PRIMARY VOCs*				*OXYGENATES*					
Sample ID	***Date***	***TOC***	***DTW***	***GWE***	***TPH-GRO***	***TPH-DRO***	***TPH-RRO***	***B***	***T***	***E***	***X***	***MTBE***	***DIPE***	***Ethanol***	***ETBE***	***TBA***	***TAME***
			DEC Cleanup Levels		***2,200***	***1,500***	***1,100***	***4.6***	***1,100***	***15***	***190***	***140***	***NE***	***NE***	***NE***	***NE***	***NE***
MW-8	04/26/18	104.00	7.34	96.66	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-8	**10/04/18**	104.00	7.45	96.55	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-9	04/26/18	100.80	13.64	87.16	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-9	**10/04/18**	100.80	4.89	95.91	75.2 J	220 J	501 J	**36.7**	0.530 J	<1.00	8.26	7.57	0.332 J	--	--	--	--
MW-10	04/27/18	100.80	5.18	95.62	32.8 J	627 J	**1,260**	0.300 J	<1.00	<0.500	<1.50	0.645 J	<1.00	--	--	--	--
MW-10	**10/05/18**	100.80	5.41	95.39	<100	<800	551 J	<1.00	<1.00	<1.00	<3.00	2.04	<1.00	--	--	--	--
MW-12	04/26/18	100.50	4.52	95.98	29.2 J	328 J	552 J	<0.500	<1.00	<0.500	<1.50	0.540 J	<1.00	--	--	--	--
MW-12	**10/05/18**	100.50	4.99	95.51	<100	375 J	850	2.2	<1.00	<1.00	<3.00	3.21	0.611 J	--	--	--	--
MW-13	04/26/18	100.30	7.78	92.52	32.7 J	472 J	469 J	0.203 J	<1.00	<0.500	<1.50	0.657 J	1.06	--	--	--	--
MW-13	**10/05/18**	100.30	5.03	95.27	<100	518 J	**1,510**	<1.00	<1.00	<1.00	<3.00	1.44	1.36	--	--	--	--
Trip Blank	06/08/05	--	--	--	<100	--	--	<1.0	<1.0	<1.0	<1.0	--	--	--	--	--	--
Trip Blank	12/03/05	--	--	--	<50	--	--	<0.2	<0.5	<0.5	<1.0	--	--	--	--	--	--
Trip Blank	03/21/06	--	--	--	<50	--	--	<0.2	<0.5	<0.5	<1.0	--	--	--	--	--	--
Trip Blank	06/20/06	--	--	--	<50.0	--	--	<0.2	<0.5	<0.5	<1.0	--	--	--	--	--	--
Trip Blank	12/12/06 [6]	--	--	--	--	--	--	<0.500	<0.500	<0.500	<3.00	--	--	--	--	--	--
Trip Blank	09/26/07	--	--		<80.0	--	--	<0.500	<0.500	<0.500	<1.00	--	--	--	--	--	--
Trip Blank	12/13/07	--	--	--	--	--	--	<0.500	<0.500	<0.500	<1.00	--	--	--	--	--	--
Trip Blank	03/25/08 [6]	--	--	--	--	--	--	<0.500	<0.500	<0.500	<3.00	ND	ND	ND	ND	ND	ND
Trip Blank	09/16/08	--	--	--	<100	--	--	<0.50	<5.0	<0.50	<1.5	--	--	--	--	--	--
Trip Blank	12/01/08 [5]	--	--	--	<100	--	--	<0.50	<5.0	<0.50	<1.5	--	--	--	--	--	--
Trip Blank	03/23/09 [6]	--	--	--	--	--	--	<1.0	<5.0	<1.0	<3.0	--	--	--	--	--	--
Trip Blank	06/12/09 [5, 6]	--	--	--	<100	--	--	<0.50	<5.0	<0.50	<1.5	ND	ND	ND	ND	ND	ND
Trip Blank	12/09/09 [5]	--	--	--	<100	--	--	<0.50	<0.50	<0.50	<1.5	--	--	--	--	--	--
Trip Blank	03/20/10 [5]	--	--	--	<100	--	--	<0.50	<5.0	<0.50	<1.5	--	--	--	--	--	--
Trip Blank	05/16/10 [5]	--	--	--	<100	--	--	<0.50	<5.0	<0.50	<1.5	--	--	--	--	--	--
Trip Blank	03/08/11	--	--	--	--	--	--	<1.00	<1.00	<1.00	<3.00	--	--	--	--	--	--
Trip Blank	05/24/11	--	--	--	--	--	--	<1.00	<1.00	<1.00	<3.00	--	--	--	--	--	--
Trip Blank	07/29/11	--	--	--	--	--	--	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00	<100	<1.00	<20.0	<1.00
Trip Blank	10/12/11	--	--	--	--	--	--	<1.00	<1.00	<1.00	<3.00	--	--	--	--	--	--
Trip Blank	04/17/15	--	--	--	<50	--	--	<1.0	<1.0	<1.0	<2.0	--	--	--	--	--	--
Trip Blank	04/18/15	--	--	--	<50	--	--	<1.0	<1.0	<1.0	<2.0	--	--	--	--	--	--

TABLE 1

SUMMARY OF HISTORICAL GROUNDWATER ANALYTICAL DATA
SHELL-BRANDED WHOLSALE FACILITY
919 EAST DIMOND ROAD
ANCHORAGE, ALASKA

					HYDROCARBONS			*PRIMARY VOCs*				*OXYGENATES*					
Sample ID	***Date***	***TOC***	***DTW***	***GWE***	***TPH-GRO***	***TPH-DRO***	***TPH-RRO***	***B***	***T***	***E***	***X***	***MTBE***	***DIPE***	***Ethanol***	***ETBE***	***TBA***	***TAME***
			DEC Cleanup Levels		***2,200***	***1,500***	***1,100***	***4.6***	***1,100***	***15***	***190***	***140***	***NE***	***NE***	***NE***	***NE***	***NE***
Trip Blank	10/20/15	--	--	--	<50	--	--	<1.0	<1.0	<1.0	<2.0	--	--	--	--	--	--
Trip Blank	04/02/16	--	--	--	<50	--	--	<1.0	<1.0	<1.0	<2.0	--	--	--	--	--	--
Trip Blank	04/19/17	--	--	--	<100	--	--	<0.500	<1.00	<0.500	<1.50	<5.00	--	--	--	--	--
Trip Blank	10/03/17	--	--	--	<100	--	--	<0.500	<1.00	<0.500	<1.50	<5.00	--	--	--	--	--
Trip Blank	04/26/18	--	--	--	31.7 J	--	--	<0.500	<1.00	0.207 J	<1.50	<5.00	--	--	--	--	--
Trip Blank	10/04/18	--	--	--	--	--	--	<1.00	<1.00	<1.00	<3.00	<1.00	<1.00	--	--	--	--

Notes:
Groundwater results given in µg/L = micrograms per liter
-- = Not analyzed.
NA = Not Applicable
NE = Not Established
ND = Analytes not detected at or above the laboratory reporting limit (MDL or MRL, as appropriate)
DEC = Alaska Department of Environmental Conservation
BTEX = Benzene, Toluene, Ethylbenzene, and Total Xylenes
TPH-GRO = Total Petroleum Hydrocrabons (TPH) as Gasoline range orgaincs; analyzed per AK101 Method.
DRO = TPH as Diesel Range Organic, per AK102 Method.
RRO = TPH as Residual Range Organics, per AK102 Method.
MTBE = Methyl tert-butyl ether, per EPA Method 8260B.
DIPE = Di-isopropyl ether, per EPA Method 8260B.
ETBE = Ethyl tert-butyl ether, per EPA Method 8260B.
TBA = tert-Butyl alcohol, per EPA Method 8260B.
TAME = tert-Amyl Methyl Ether, per EPA Method 8260B.
VOCs = Volatile Organic Compounds
µg/l = micrograms per liter
"*" = duplicate sample
"<" = not detected at or above method reporting limits
Concentrations in bold type following third quarter 2016 indicate the analyte was detected above DEC 18AAC75 Table C Cleanup levels (effective November 6, 2016
J - Estimated value detected below Reporting Limit.
B - Indicates analyte found in associated method blank.
[1]Monitoring well inaccessible due to ice in monument/well casing, or snow and ice piled over well
[2] Unable to locate well.
[3] Unable to open well monument.
[4]BETX analyzed by EPA Method 8021B.
[5]BETX analyzed by ADEC Method AK101.
[6]BETX (and/or oxygenates where applicable) analyzed by EPA Method 8260B.
[7]Sample was also tested for oxygenates by EPA Method 8015B/8260B (lab data available upon request)
[8]Sample required dilution due to high concentrations of target analyte.
[9]Well to be sampled on a quarterly basis for BETX and on a semi-annual basis for GRO, as authorized by ADEC in a letter dated December 20, 1999
[10] Vault filling too quickly with melt water from snow to be monitorec

TABLE 2
GROUNDWATER ANALYTICAL DATA - PAH
SHELL-BRANDED WHOLSALE FACILITY
919 EAST DIMOND ROAD
ANCHORAGE, ALASKA

Well Idenification	Sample Date	EPA Method 8270 (ug/l)																		
		1-Methylnaphthalene	2-Methylnaphthalene	2-Chloronaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
Alaska Screening Criteria																				
Cleanup Levels		**11**	**36**	**746**	**530**	**260**	**43**	**0.120**	**0.034**	**0.34**	**0.26**	**0.80**	**2.0**	**0.034**	**260**	**290**	**0.19**	**1.7**	**170**	**120**
DMW-1	10/4/2016	<0.32	<0.32	--	<0.32	<0.32	<0.20	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.032	<0.20	<0.20	<0.032	<0.32	<0.20	<0.20
DMW-1	10/3/2017	0.0246 J	<0.250	<0.250	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.00266 J	0.00313 J	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.0250 J	<0.0500	<0.0500
DMW-1 DUP	10/3/2017	0.0292 J	<0.250	<0.250	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.00349 J	0.00439 J	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.0420 J	<0.0500	<0.0500
DMW-1	4/26/2018	<0.250	<0.250	<0.250	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.0203 J	0.0311 J	<0.0500	<0.0500	<0.0500	0.0210 J	<0.0500	0.0118 J	0.0448 J	<0.0500	0.0349 J
DMW-1	**10/4/2018**	<0.250	<0.250	<0.250	<0.0500	<0.0500	<0.0500	0.0120 J	<0.0500	0.00409 J	0.00657 J	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.0635 J	<0.0500	<0.0500
DMW-1 DUP	**10/4/2018**	<0.250	<0.250	<0.250	<0.0500	<0.0500	<0.0500	0.0190 J	<0.0500	0.00914 J	0.0161 J	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.0655 J	<0.0500	0.0241 J
DMW-2	10/4/2016	<0.31	<0.31	--	<0.31	<0.31	<0.19	<0.031	<0.031	<0.031	<0.031	<0.031	<0.031	<0.031	<0.19	<0.19	<0.031	<0.31	<0.19	<0.19
DMW-2 DUP	4/26/2018	<0.250	<0.250	<0.250	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.00223J	0.00369J	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.04585	<0.0500	<0.0500
DMW-4C	10/4/2016	3.1	<0.31	--	<0.31	<0.31	<0.19	<0.031	<0.031	<0.031	<0.031	<0.031	<0.031	<0.031	<0.19	<0.19	<0.031	1.4	<0.19	<0.19
DMW-4C	4/19/2017	0.458	0.0269 J	<0.250	0.0326 J	0.0286 J	0.0187 J	0.0314 J	0.0244 J	0.0263 J	0.0290 J	0.0265 J	0.0323 J	<0.0500	0.0354 J	0.0252 J	<0.0500	0.126 J	0.0264 J	0.0298 J
DMW-4C	10/3/2017	0.880	<0.250	<0.250	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.650	<0.0500	<0.0500
DMW-4C	4/26/2018	0.619	<0.250	<0.250	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.00352 J	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.143 J	<0.0500	<0.0500
MW-8	10/4/2016	<0.31	<0.31	--	<0.31	<0.31	<0.19	<0.031	<0.031	<0.031	<0.031	<0.031	<0.031	<0.031	<0.19	<0.19	<0.031	<0.31	<0.19	<0.19
MW-9	**10/4/2018**	<0.250	<0.250	<0.250	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.229 J	<0.0500	<0.0500
MW-10	4/27/2018	<0.250	<0.250	<0.250	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.00223J	0.00425 J	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.0647 J	<0.0500	<0.0500
MW-10	**10/5/2018**	<0.250	<0.250	<0.250	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.0458 J	<0.0500	<0.0500
MW-12	4/26/2018	<0.250	<0.250	<0.250	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.00289J	0.00439 J	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.0292 J	<0.0500	<0.0500
MW-12	**10/5/2018**	<0.250	<0.250	<0.250	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.0603 J	<0.0500	<0.0500
MW-13	4/26/2018	<0.250	<0.250	<0.250	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.00247 J	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.0513 J	<0.0500	<0.0500
MW-13	**10/5/2018**	<0.250	<0.250	<0.250	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.00314 J	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	0.0479 J	<0.0500	<0.0500

Notes:
ug/l = micrograms per liter

TABLE 2
GROUNDWATER ANALYTICAL DATA - PAH
SHELL-BRANDED WHOLSALE FACILITY
919 EAST DIMOND ROAD
ANCHORAGE, ALASKA

EPA = Environmental Protection Agency
Concentrations in bold type indicate the analyte was detected above DEC 18AAC75 Table C Cleanup levels (effective November 6, 2016)
<# = Analyte not detected above the indicated laboratory Method Detection Limit.
J = Indicates an estimated value.
DUP = Duplicate
PAH = Polycyclic aromatic hydrocarbons

APPENDIX A

Field Sheets

Groundwater
& Environmental Services, Inc.

GROUNDWATER MONITORING WELL DATA

Client: SOPUS	Date: 10/4 - 10/5/18
Project No.: 3016006	Site No.: 121665
Site Location/Address: 919 E. Dimond Blvd., Anchorage, AK	Field Staff: A. Zablocki

Well Number	Depth to Water (BTOC in feet)	Depth to Product (BTOC in feet)	Product Thickness (feet)	Product Removed (Gallons)	Measured Depth to Bottom of Well (BTOC)	Well Completion Depth (BGS)	Casing Diameter (inches)	Screen Interval
DMW-1 * Sat bottom	5.28	ND	0.0	NA	18.32	30.34	4	15-30
DMW-2	7.34	ND	0	NA	19.10	20.34	4	5-20
DMW-4A	6.81	sheen	0	NA	NM	30	2	25-30
DMW-4B	6.80	ND	0	NA	NM	20	2	15-20
DMW-4C	6.33	ND	0	NA	NM	10	2	5-10
DMW-5	6.25	ND	0	NA	NM	20	4	5-20
MW-6	5.51	ND	0	NA	NM	17.5	2	4-17.5
MW-7	6.52	ND	0	NA	NM	19	2	4-19
MW-8	7.45	ND	0	NA	18.74	19	2	4-19
MW-9	4.89	ND	0.0	NA	13.25	14	2	4-14
MW-10	5.41	ND	0	NA	9.55	14	2	4-14
MW-11	Not installed							
MW-12	4.99	ND	0.0	NA	12.10	14	2	4-14
MW-13	5.03	ND	0	NA	13.80	14	2	4-14

ND = not detected NM = not measured
NA = not applicable

SAMPLING EVENT DATASHEET

Project Name: 9/9 Dimond, Anchorage Well No: DMW-1 Date: 10/4/18

Project No: 3016006 Personnel: Amy Zablocki

GAUGING DATA

Water Level Measuring Method: WLM / IP Measuring Point Description: TOC

WELL PURGE VOLUME CALCULATION	Total Depth (feet)		Depth to Water (feet)		Water Column (feet)	Multiplier for Casing Diameter				Casing Volume (gal)		Total Purge Volume (gal)
	~~18.30~~ 18.32	-	5.28	=	13.04	X	1	2	4	6	8.35	=	8.35
							0.04	0.16	0.64	1.44			

PURGING DATA

Purge Method: WATERRA / BAILER / ~~SUB~~ bladder Purge Depth: ~~Screen~~ 6.25 Purge Rate: 6 cpm (gpm)

Time	1318	1337	1358	~~82~~ 1422		
Volume Purge (gal)	2.0	4.0	6.0			
Temperature (C)	12.21	11.26	10.70			
pH	6.61	6.61	6.65			
Spec.Cond (umhos)	4371	4368	4364			
Turbidity/Color	Clear/grayish brn	→	→			
Odor (Y/N)	N	N	N			
Dewatered (Y/N)	N	N	N			

Comments/Observations:

lost pump down well at approx 1435, collect sample via bailer

SAMPLING DATA

Time Sampled: 1545 Approximate Depth to Water During Sampling: 6 (feet)

Comments:

Sample Number	Number of Containers	Container Type	Preservative	Volume Filled (mL or L)	Turbidity/ Color	Analysis Method
DMW-1	7	VOA/Amber	HCL	40ML/~~500~~ 250 mL		SEE COC
DUP-1	7	"	HCL/none	40ML "		"

Total Purge Volume: 6.5 (gallons) Disposal: on site through GAC

Weather Conditions:

Condition of Well Box and Casing at Time of Sampling:

Well Head Conditions Requiring Correction:

Problems Encountered During Purging and Sampling:

Comments:

BOLTS (Y) / N

CAP & ~~LOCK~~ (Y) / N

GROUT (Y) / N

WELL BOX Y / N

SECURED Y / N

SAMPLING EVENT DATASHEET

Project Name: 919 Dimond, Anchorage Well No: DMW-2 Date: 10/4/18

Project No: 3016006 Personnel: Amy Zablocki

GAUGING DATA

Water Level Measuring Method: WLM / (IP) Measuring Point Description: TOC

WELL PURGE VOLUME CALCULATION	Total Depth (feet)		Depth to Water (feet)		Water Column (feet)	Multiplier for Casing Diameter				Casing Volume (gal)		Total Purge Volume (gal)
	19.10	(-)	7.34	(=)	11.76	(X) 1	2	4	6	1.88	(=)	1.88
						0.04	0.16	0.64	1.44			

PURGING DATA

Purge Method: WATERRA / BAILER / (SUB) bladder Purge Depth: ~~Screen~~ 8.25 Purge Rate: 6 gpm (gpm)

Time 954	0959	1002	1005	~~1028~~ 1007		
Volume Purge (gal)	0.5	1.0	1.5	1.75		
Temperature (C)	11.74	11.91	11.95	11.94		
pH	6.16	6.17	6.17	6.17		
~~Spec.Cond.(umhos)~~ uS/cm	3619	3648	3654	3642		
Turbidity/Color	yellowish/brn	→	→	→		
Odor (Y/N)	N	→	→	→ N		
Dewatered (Y/N)	N	→	→	N		

Comments/Observations:

SAMPLING DATA

Time Sampled: 1010 Approximate Depth to Water During Sampling: 8.5 (feet)

Comments: lowered pump with water column

Sample Number	Number of Containers	Container Type	Preservative	Volume Filled (mL or L)	Turbidity/ Color	Analysis Method
		VOA	HCL	40ML		SEE COC

Total Purge Volume: 2 (gallons) Disposal: on site through GAC

Weather Conditions:

Condition of Well Box and Casing at Time of Sampling:

Well Head Conditions Requiring Correction:

Problems Encountered During Purging and Sampling:

Comments:

BOLTS Y / N 1 of 3

CAP & LOCK (Y) / N

GROUT (Y) / N

WELL BOX (Y) / N

SECURED Y / (N)

SAMPLING EVENT DATASHEET

Project Name: 919 E Dimond, Anchorage Well No: MW-9 Date: 10/4/18

Project No: 30160006 Personnel: Amy Zablocki

GAUGING DATA

Water Level Measuring Method: WLM / (IP) Measuring Point Description: TOC

WELL PURGE VOLUME CALCULATION	Total Depth (feet)		Depth to Water (feet)		Water Column (feet)		Multiplier for Casing Diameter				Casing Volume (gal)		Total Purge Volume (gal)
	13.25	-	4.89	=	8.36	X	1	(2)	4	6	1.34	=	1.34
							0.04	0.16	0.64	1.44			

PURGING DATA

Purge Method: WATERRA / BAILER / (SUB) Bladder Purge Depth: ~~Screen~~ 5.75 Purge Rate: (gpm)

Time	1118 ~~1127~~	1137	1144			
Volume Purge (gal)	0.5	1.0	1.25			
Temperature (C)	11.69	11.50	11.49			
pH	6.40	6.38	6.38			
Spec.Cond.(umhos)	3516	3601	3596			
Turbidity/Color	gray/brn	→	→			
Odor (Y/N)	N	→	→			
Dewatered (Y/N)	N	N	N			

Comments/Observations:

SAMPLING DATA

Time Sampled: 1150 Approximate Depth to Water During Sampling: (feet)

Comments:

Sample Number	Number of Containers	Container Type	Preservative	Volume Filled (mL or L)	Turbidity/ Color	Analysis Method
MW-9	10	VOA	HCL	40ML		SEE COC

Total Purge Volume: 1.5 (gallons) Disposal:

Weather Conditions:

Condition of Well Box and Casing at Time of Sampling:

Well Head Conditions Requiring Correction:

Problems Encountered During Purging and Sampling:

Comments:

BOLTS	Y	/	N
CAP & LOCK	Y	/	N
GROUT	Y	/	N
WELL BOX	Y	/	N
SECURED	Y	/	N

SAMPLING EVENT DATASHEET

Project Name: 919 E Dimond, Anchorage, AK Well No: MW-10 Date: 10/5/18

Project No: 30160006 Personnel: Amy Zablocki

GAUGING DATA

Water Level Measuring Method: WLM / IP Measuring Point Description: TOC

WELL PURGE VOLUME CALCULATION	Total Depth (feet)		Depth to Water (feet)		Water Column (feet)		Multiplier for Casing Diameter				Casing Volume (gal)		Total Purge Volume (gal)
	9.55	-	5.41	=	4.14	X	1	(2)	4	6	0.66	=	0.66
							0.04	0.16	0.64	1.44			

PURGING DATA

Purge Method: WATERRA / (BAILER) / SUB Purge Depth: 6 ft ~~Screen~~ Purge Rate: (gpm)

Time	1130	1132	1136	1140		
Volume Purge (gal)	0.25	0.50	0.75			
Temperature (C)	10.55	10.55	10.60			
pH	6.24	6.42	6.46			
~~Spec.Cond.(umhos)~~ uS/cm	3323	3342	3300			
Turbidity/Color	Cloudy/gray	→	→			
Odor (Y/N)	N	N	N			
Dewatered (Y/N)	N	N	N			

Comments/Observations:

0.0 PID

SAMPLING DATA

Time Sampled: 1145 Approximate Depth to Water During Sampling: (feet)

Comments:

Sample Number	Number of Containers	Container Type	Preservative	Volume Filled (mL or L)	Turbidity/ Color	Analysis Method
MW-10	10	VOA	HCL	40ML		SEE COC

Total Purge Volume: 0.75 (gallons) Disposal: On Site through GAC

Weather Conditions: 50° / Partly Cloudy

Condition of Well Box and Casing at Time of Sampling: OK

Well Head Conditions Requiring Correction:

Problems Encountered During Purging and Sampling:

Comments:

BOLTS	Y / N
CAP & LOCK	Y / N
GROUT	Y / N
WELL BOX	Y / N
SECURED	Y / N

SAMPLING EVENT DATASHEET

Project Name: 619 E Dimond, Anchorage Well No: MW-12 Date: 10/5/18

Project No: 3016006 Personnel: Amy Zablocki

GAUGING DATA

Water Level Measuring Method: ~~WLM~~ / IP Measuring Point Description: TOC

WELL PURGE VOLUME CALCULATION	Total Depth (feet)		Depth to Water (feet)		Water Column (feet)		Multiplier for Casing Diameter				Casing Volume (gal)		Total Purge Volume (gal)
	12.10	-	4.99	=	7.11	X	1	2	4	6	1.14	=	1.14
							0.04	0.16	0.64	1.44			

PURGING DATA

Purge Method: WATERRA / BAILER / SUB Purge Depth: ~~Screen~~ 5.75 Purge Rate: (gpm)

Time	1244	1246	1249	1252	1256	
Volume Purge (gal)	0.25	0.50	0.75	1.0		
Temperature (C)	12.35	12.28	12.03	11.36°		
pH	6.37	6.29	~~6.22~~ 6.26	6.24		
Spec.Cond.(~~umhos~~) uS/cm	3898	3905	3866	3771		
Turbidity/Color	cloudy/gray brown	→	→	→		
Odor (Y/N)	N	→	→	→		
Dewatered (Y/N)	N	N	N	N		

Comments/Observations:

O.O PID

SAMPLING DATA

Time Sampled: 1305 Approximate Depth to Water During Sampling: 6. (feet)

Comments: PID O.O.

Collected sample from top 1 foot of water column

Sample Number	Number of Containers	Container Type	Preservative	Volume Filled (mL or L)	Turbidity/ Color	Analysis Method
MW-12	10	VOA	HCL	40ML		SEE COC

Total Purge Volume: 1.25 (gallons) Disposal:

Weather Conditions: 50° Partly Cloudy

Condition of Well Box and Casing at Time of Sampling: OK

Well Head Conditions Requiring Correction:

Problems Encountered During Purging and Sampling:

Comments:

BOLTS	(Y)	/ N
CAP & ~~LOCK~~	(Y)	/ N
GROUT	(Y)	/ N
WELL BOX	(Y)	/ N
SECURED	(Y)	/ N

SAMPLING EVENT DATASHEET

Project Name: 919 E Dimond, Anchorage, AK Well No: MW-13 Date: 10/5/18

Project No: 3016006 Personnel: Amy Zablocki

GAUGING DATA

Water Level Measuring Method: WLM / (IP) Measuring Point Description: TOC

WELL PURGE VOLUME CALCULATION	Total Depth (feet)		Depth to Water (feet)		Water Column (feet)		Multiplier for Casing Diameter				Casing Volume (gal)		Total Purge Volume (gal)
	13.80	-	5.03	=	8.77	X	1	(2)	4	6	1.40	=	1.40
							0.04	(0.16)	0.64	1.44			

PURGING DATA

Purge Method: WATERRA / (BAILER) / SUB Purge Depth: ~~Screen~~ 6 ft Purge Rate: (gpm)

Time	1402	1406	1409	1413		
Volume Purge (gal)	0.5	1.0	1.5			
Temperature (C)	11.21	11.21	10.98			
pH	6.48	6.30	6.24			
Spec. Cond. (~~umhos~~) mS/cm	2709	2707	2686			
Turbidity/Color	yellow/brn	→	→			
Odor (Y/N)	N	→	→			
Dewatered (Y/N)	N	N	N			

Comments/Observations:

0.0 PID

SAMPLING DATA

Time Sampled: 1415 Approximate Depth to Water During Sampling: ~~6.60~~ 6.5 (feet)

Comments:

Sample Number	Number of Containers	Container Type	Preservative	Volume Filled (mL or L)	Turbidity/ Color	Analysis Method
MW-13	10	VOA	HCL	40ML		SEE COC

Total Purge Volume: 1.5 (gallons) Disposal: on site treat + discharge

Weather Conditions:

Condition of Well Box and Casing at Time of Sampling: note: casing cut unevenly

Well Head Conditions Requiring Correction: J-Plug won't seal

Problems Encountered During Purging and Sampling:

Comments:

BOLTS	(Y)	/	N
CAP & LOCK	(Y)	/	N
GROUT	Y	/	N
WELL BOX	Y	/	N
SECURED	Y	/	N

APPENDIX B

Standard Field Procedures for Groundwater Monitoring

TITLE: LOW FLOW GROUNDWATER SAMPLING

PURPOSE / SCOPE

This SOP describes procedures for sampling groundwater using low-flow purging and sampling techniques. The purpose is to obtain samples that are representative of existing groundwater conditions, or samples that retain the physical and chemical properties of the groundwater within an aquifer. Improper sampling and transport procedures may cause compounds of interest to be removed from or added to the sample prior to analysis.

Note: *The importance of proper and consistent field sampling methods, as well as proper documentation,* ***CANNOT BE OVER-EMPHASIZED****.*

This SOP shall be used in conjunction with an approved Health and Safety Plan (HASP). Also, consult the HASP for information on the selection and use of PPE.

REFERENCE

ASTM D5903: Guide for Planning and Preparing for a Groundwater Sampling Event

ASTM D4448: Standard Guide for Sampling Groundwater Wells

ASTM D5979: Guide for Conceptualization and Characterization of Groundwater Systems

EPA, *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures*, (ORD/ OSWER, Washington D.C., 1996) (EPA-540/S-95/504).

EPA Region III, *Recommended Procedure For Low-Flow Purging and Sampling of Groundwater Monitoring Wells.* (Waste and Chemicals Management Division, 1997.)

RESPONSIBILITIES

4.1 Project Manager

The responsibility of the Project Manager (PM) is to ensure that all activities performed by site personnel are performed: safely; in compliance with all pertinent regulations and procedures; and with the necessary equipment and resources to accomplish the tasks described in the Work Plan.

4.2 Local Health and Safety Officer (LHSO)

The Local Health and Safety Officer (LHSO), in consultation with the Corporate HSO and State project representatives, will designate the appropriate level of personnel protective equipment (PPE) for field personnel to safely accomplish their work.

4.3 Case Manager

The Case Manager (CM) is responsible for providing Field Personnel with a sampling or work plan/schedule. In addition, the PM or CM will provide field personnel with enough information to perform the work safely and correctly. This information should include the operational and safety procedures that are applicable to the work being performed.

4.4 Field Personnel

Field personnel are responsible for the safe completion of assigned tasks as described in the SOPs, Health and Safety Plan (HASP) and appropriate site-specific work plans and procedures. They are required to document the work performed and to alert their immediate supervisors of any variances from procedures established in the above documents.

EQUIPMENT / MATERIALS

A basic checklist of suggested equipment and supplies needed to implement this SOP include, but is not limited to:

- Personnel protective equipment as outlined in the site-specific HASP
- Adjustable rate, positive displacement pump (low flow-rate stainless steel submersible pump recommended) or pre-cleaned stainless steel bladder pump
- Electronic, audible (or visual identification) water level meter (0.01 feet accuracy), or interface probe if needed
- Teflon or Teflon-lined polyethylene tubing (3/8 to 1/2 inch, inside diameter)
- Flow measurement supplies (graduated cylinder and stop watch).
- Properly sized generator to operate pump

- In-line flow-through cell capable of measuring pH, specific conductance, and temperature
- Nylon cable-ties
- Decontamination supplies
- Distilled water
- Polyethylene sheeting/cloth/paper towels/garbage bags
- Transportable, purged water storage container
- Well construction log details and historical groundwater gauging data
- Photoionization detector (PID)
- Secondary containment for the flow-through cell
- Field book
- Well Purging Record Form

***Note**: Gas powered equipment at sampling sites require special care to ensure that GES staff handling these units do not contaminate down-hole equipment. Frequent disposable glove changes are required, as well as strict separation of sampling crew tasks (e.g., those handling pumps and hoses do not conduct fueling activities).*

PREPARATION

***Note:** Pre-plan the schedule of sampling activities so that sample collection progresses from "clean" to "dirty" areas to minimize the potential for cross contamination.*

PROCEDURE

Prior to low-flow purging and sampling activities, all measuring devices must be calibrated daily in accordance with equipment vendor recommendations and recorded on a calibration log sheet. Purging and sampling activities should occur in a progression from the "cleanest" to the "dirtiest" well.

7.1 Well Set-Up Activities

The following steps are required to properly set up for sampling:

1. Properly identify and inspect each well.
2. Wear appropriate PPE during set-up activities.

3. Place a sheet of polyethylene adjacent to the well to keep sampling and monitoring equipment from touching the ground.
4. Remove the well cap slowly (positive pressure inside may blow cap off).
5. Measure the VOC concentration at the top of the casing and in the breathing zone using a PID—record reading in field book.
6. Measure and record the depth to water (to within 0.01 feet) using a water level meter or interface probe, if applicable (the water level measurement should be taken from a permanent reference point scribed on top of the well casing).
7. To minimize turbidity in the well, use total well depth information obtained from the well construction logs to calculate one casing volume.[1]
8. Attach and secure Teflon or Teflon-lined polyethylene tubing to low-flow (0.10 to 0.50 L/min) stainless steel submersible pump.
9. Lower the submersible pump slowly and gently into the monitoring well to minimize aquifer agitation and mixing of the stagnant well casing water, and then secure the safety drop cable or nylon rope and tubing together with nylon cable-ties.
10. Place the intake of the submersible pump within the upper 12 inches of the water column. The intake of the pump should be placed at an elevation above dense non-aqueous phase liquid (DNAPL), if applicable.
11. Plumb the in-line flow-through cell to the discharge tubing from the well.
12. Plumb a discharge line from the effluent of the flow-through cell to a transportable, purged water storage container.
13. Position a power source (e.g., a generator) for operation of the submersible pump down gradient of the well to be purged.

1 Multiply the total water column thickness (ft) by the cross-sectional area of the well (ft^2) and record in field book and on Well Purging Record form. One cubic foot (ft^3) is equivalent to 7.48 gallons.

7.2 Low Flow Purging and Sampling

Once you have completed the well set up activities above, follow these steps to purge and sample using low-flow techniques:

1. Put on new nitrile gloves. Change nitrile gloves any time the integrity of the glove is compromised during the purging and sampling activities.
2. Activate the low-flow submersible pump and begin extracting groundwater at a rate between 0.10 and 0.50 L/min.

3. Measure the water level approximately every 10 seconds and adjust extraction rate to obtain minimal drawdown in the well of 0.2 feet, but no more than 0.3 feet maximum.
4. Once drawdown is stabilized, begin monitoring water quality indicators (pH, specific conductance, and temperature) using the in-line flow-through cell. Record observations in field book and on the attached Well Purging Record form. *Note: while purging, the pumping rate and groundwater level are measured and recorded every 10 minutes (or as appropriate).*
5. Monitor the water level and extraction rate, in addition to monitoring water quality indicators, and make periodic adjustments to flow rates to ensure steady flow and minimal drawdown.
6. Water quality readings will be monitored every five minutes (or as appropriate) until stabilization criteria are achieved.
7. Stabilization is achieved when a minimum of three (minimum of four if using temperature as an indicator) successive readings for each parameter, collected 3-5 minutes apart, are within the following criteria:

Water Quality Indicator Parameter	Stabilization Criteria
pH	±0.1 s.u.
Specific Conductance	±3%
Temperature	±3% (minimum of ± 0.2°C)
Oxidation-reaction potential (ORP)	± 10 mV
Turbidity	±10%
Dissolved Oxygen	±10%

***Note**: Stabilization criteria is achieved when the average value of three readings are within each parameter criteria limits.*

8. Collect the necessary samples once purging activities are complete and the groundwater stabilization/clarity is acceptable according to applicable protocol described above.
9. If a well is low yield and purged dry, do not collect a sample until it has recharged to approximately 80% of its pre-purge volume, when practical.
10. Collect samples directly from the pump or bailer into the appropriate sample container under typical circumstances. Take care to avoid handling the interior of the bottle or cap. **Do not** place the bottle cap on the ground or in a pocket to avoid contamination.
11. Fill all sampling containers for each well in a manner that minimizes aeration and turbulence. Put on a new pair of nitrile gloves before filling each container.

12. Disconnect or bypass the flow-through cell prior to obtaining each sample. The first volume of groundwater in the tubing is to be discarded and treated according to the waste management section described below. Place the discharge line in position at the base of the sample bottle. Fill the sample bottle from the bottom to the top, allowing it to overflow before sealing. *Note: do not overflow if the sample bottles contain preservatives.*
13. Place samples immediately on ice and store at 4° C.
14. Obtain final water level and flow rate measurements and enter in field book and on the Well Purging Record form.

7.3 Decontamination Procedures

Clean all equipment that will enter the well or come into contact with groundwater prior to each low-flow purging and sampling activity with a stiff brush and a solution of water and laboratory-grade detergent. All decontamination fluids will be disposed of in accordance with the site's waste management plan.

7.4 Documentation

Document all the events, equipment used, and measurements collected during the sampling activities in the field notes. Make all entries in black indelible ink and strike out any corrections with a single line. Initial and date corrections.

Record all manually-measured data and procedural descriptions in a field notebook and on well purging forms (**Attachment 1**). Maintain detailed notes regarding field calibration events, purging or PID anomalies, and volumes of extracted groundwater.

7.5 Waste Management

Transfer all purged water to the hazardous waste accumulation area were it will be pumped through a 20 and 50 micron filter prior to transfer into 6,000-gallon wastewater storage tank. A record of the total gallons will be maintained in the field book.

Porous materials (PPE, rags, etc.) contaminated with groundwater and non-porous materials that cannot be decontaminated will be managed as hazardous waste. Porous and non-porous materials not contaminated with groundwater will be disposed of as residual waste.

RECORDS

1.0 TITLE: FLUID LEVEL GAUGING

2.0 PURPOSE / SCOPE

The purpose of this SOP is to provide general instructions to all GES personnel concerning fluid level gauging activities. The measurement of fluid levels (groundwater or phase-separated compounds) in monitor wells, piezometers, extraction wells, and/or boreholes is required in geotechnical, hydrogeologic, and waste management investigations to determine the presence and condition of the groundwater, or the presence and thickness of phase-separated compounds. Water level measurements (hydraulic head) are used to determine: hydraulic gradients and the direction of groundwater flow; the effectiveness of groundwater extraction systems; and the volume of water required for well purging prior to groundwater sampling. The measurement of the thickness of phase-separated compounds provides a qualitative (not quantitative) monitoring of this form of contamination.

In order to provide reliable data, water levels must be determined over the shortest period of time possible. Barometric pressure can affect groundwater levels and, therefore, observation of significant weather changes during the period of water level measurements must be noted. Tidal fluctuations, navigation controls on rivers, rainfall events and groundwater pumping can also affect groundwater level measurements. Personnel collecting water level data must note if any of these controls are in effect during the groundwater level collection period. Due to possible changes during the groundwater level determination period, it is imperative that the time of data collection at each station be accurately recorded.

In conjunction with groundwater level measurements, surface water (e.g., ponds, lakes, rivers, and lagoons) must be monitored as well. This information is critical in understanding the hydrogeologic setting of the site and, most importantly, how contaminants may move beneath the site.

Note: *The importance of proper and consistent field methods, as well as proper documentation,* ***CANNOT BE OVER-EMPHASIZED****.*

This SOP shall be used in conjunction with an approved Health and Safety Plan (HASP). Also, consult the HASP for information on the selection and use of PPE.

3.0 REFERENCE

ASTM 4750 —Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well)

ASTM D6000 —Guide for Presentation of Water-Level Information from Ground-Water Sites

U.S. EPA (1986), RCRA Ground water Monitoring Technical Enforcement Guidance Document, Washington, D.C.

U.S. EPA (1992), RCRA Ground water Monitoring: Draft Technical Guidance, Washington, D.C. (EPA/530-R-93-001).

4.0 RESPONSIBILITIES

4.1 Project Manager

The Project Manger (PM) is responsible to ensure that all activities performed by site personnel are performed safely, in compliance with all pertinent regulations and procedures, and provide the necessary equipment and resources to accomplish the tasks described in this procedure.

4.2 Local Health and Safety Officer (LHSO)

The Local Health and Safety Officer (LHSO), in consultation with the Corporate HSO and State project representatives, will designate the appropriate level of personnel protective equipment (PPE) for field personnel to safely accomplish their work.

4.3 Case Manager

The Case Manager (CM) is responsible for providing field personnel with a comprehensive fluid level gauging work plan/schedule. In addition, the PM or CM will provide field personnel with enough information to perform the work safely and correctly. This information should include the operational and safety procedures that are applicable to the work being performed.

4.4 Field Personnel

Field personnel are responsible for the safe completion of assigned tasks as described in the SOPs, Health and Safety Plan (HASP) and appropriate site-specific work plans and procedures. They are required to document the work

performed and to alert their immediate supervisors of any variances from procedures established in the above documents.

5.0 EQUIPMENT / MATERIALS

A number of devices are used by GES to collect water level measurements. Typical devices used are:

- Calibrated electronic water level indicators (e.g., solinst or slope indicator)
- Tape/ploppers
- Pressure transducers and dataloggers (generally for pumping tests and long-term monitoring)
- Stevens recorders for long-term monitoring

Devices typically used by GES to measure phase-separated compounds are:

- Electronic audible interface probe
- Clear bottom-loading bailers
- Weighted cotton string or cord

The pressure transducers, Stevens recorders, and oil/water interface probes have manuals which describe their use. This procedure will focus on an overview of this equipment and other methods which have more widespread use in fluid level measurement.

***Note**: Since many decisions concerning the distribution, transport, and remediation of groundwater contamination will be made on the basis of fluid level monitoring, the accuracy of the measurements made at an appropriate level of precision is very important.*

Typically, the precision required is +/-0.01 foot (+/-1 mm); the majority of GES' measuring devices are graduated to this precision level. To ensure accuracy, double check all fluid level readings; it is very easy to misread a tape or transpose figures when recording the data.

6.0 PREPARATION

Review and perform preparation activities per SOP FM 1.5, *General Instructions for Field Personnel.*

If the water-level data are being collected for the entire site, the Water-Level Measurement Field Sheet, obtained from the PM/CM, should be used (Attachment A). If the data are being collected during low flow ground water sampling, SOP FM 8.5, *Low Flow Groundwater Sampling Procedures* should be followed. If gauging activities are associated with other Site investigation activities the appropriate SOP will be reference accordingly.

Obtain a copy of previous water levels from the PM or CM.

The device used to measure water levels should attain an accuracy of 0.01 ft. A steel tape or an electric sounder can be used to measure water levels, but this SOP only concerns the use of an electric sounder.

When practical, the same portable water-level measurement device should be used for all measurements. However, in order to prevent cross contamination between monitor wells, the water-level indicators must be decontaminated according to SOP FM 14.1, *Decontamination of Dedicated Sampling Equipment*. If an indicator is dedicated to a particular section of the site, or a particular well, it should be marked accordingly.

Obtain and complete the Equipment Checklist (SOP FM 1.5, Attachment A) to confirm that all the necessary materials are available before proceeding.

Make sure water-level measuring equipment is in good operating condition.

Whenever possible, start at those wells that are the least contaminated and work towards more contaminated areas as indicated by the PM or CM.

Clean all equipment per SOP FM 14.1 before the initial and between each use.

7.0 PROCEDURE

Water-Level Measurement Procedure

Once the prior planning and preparation activities are completed, fluid level measurements can proceed. The typical series of events which will take place are:

- Well identification/inspection
- Air monitoring
- Reference point determination
- Level measurements
- Equipment decontamination

- Field note completion, review, and checking
- Equipment return
- Documentation submitted to appropriate staff and files

***Note**: Similar to sampling sequence, fluid level measurements should follow a logical order from the least known or suspected level of contamination to the greatest. This will minimize the potential for cross-contamination between wells/monitoring locations.*

Well Identification/Inspection

Once at the site and prior to fluid level measurements, confirm that the well to be measured has been correctly identified and located. Frequently sites under evaluation have numerous wells, or wells located in clusters such that identification errors can easily occur. The monitoring personnel should be alert to potential cap switching, mislabeled locations or unlabeled wells.

Proper well locations can be determined by comparison of the well log details to measured well details (i.e., total well depth, casing diameter, casing stick-up or stick-down distances), field ties and site plans.

Once the correct monitor well is identified, a thorough inspection shall be completed, and recorded in the field book. Determine if the cap and lock are secure or if they have been tampered with. If the well is unlocked, replace the lock. Any cracks in the protective casing and/or surface seal should be noted, as well as any subsidence or surface water ponding in the vicinity of the well.

Note the results of the well inspection (even if the well is in perfect condition) and inform the Project Coordinator of any well repairs required. Arrange to have any unmarked wells permanently stamped for proper identification. (A temporary marking at the time of monitoring should also be performed.)

Air Monitoring

Unlock and open the protective casing. Remove the well casing cap and monitor the breathing zone directly above the open cap with an organic vapor meter (SOP FM 16.4). Record vapor readings on the Water Level Measurement Field Sheet (Attachment A). Refer to the site-specific HASP if vapor readings are detected above 1.0 parts per million for more than a five minute period. Recording of extended air monitoring activities shall be conducted with the Air Monitoring Record, Real-Time Monitoring sheet (SOP FM 16.4).

Reference Point Determination

Use the top of the reference point as imprinted on the top of the well casing as the measuring reference point. If a reference point is not present, the north side of the well casing will be used as the reference point and marked on the well casing in a manner that can be referred to during future monitoring events (e.g., notch piping or write with permanent marker). This will be the point of measure (POM) to be used when obtaining water-level measurements. Any deviation from this measuring point must be documented on the Water-Level Measurement Field Sheet (Attachment A) and reported to PM or CM.

Level measurements

Measure the distance from the water surface to the POM by placing a steel indicator reference bar (or something comparatively straight and rigid) over the top of the well casing, then lower an electronic water-level indicator or equivalent (i.e., steel tape) into the sounding port as marked. When water is encountered, a light (usually red) will shine on the reel of the water-level indicator, and an intermittent beeping sound will be heard. Slowly move the line up and down along the side of the reference bar until the exact point at which the buzz is heard is located. A continuous beeping sound indicates a phase layer is confirmed. Using the bottom of the reference bar as the measuring point, obtain the depth-to-water measurement and phase layer measurement, if encountered, by referencing the markings on the water-level indicator line to the buzzing tone, red indicator light, or audible beeping sound. Note the reading. Compare the new measurement to previously measured water levels.

***Note**: Beware of watertight caps which provide an airtight seal on the casing end and the water level is positioned within the casing area (i.e., not within the screened interval). Often if this condition exists, a vacuum or pressurized zone is created within the casing section which supports or depresses the water column within the well casing, creating an artificially high or low water column. This effect can cause a few inches or feet of error in the static water level. Two or three water level measurements will confirm water level stability or changing conditions. Once the water level has stabilized (i.e., static) the proper measurement may be taken.*

Equipment decontamination

The water level indicator may then be removed and decontaminated in accordance to the Work Plan requirements.

Field note completion, review, and checking

Record measurement, date, and any notes next to the previous month's water level on the Water-Level Measurement Field Sheet (Attachment A). If the water-

level measurement seems suspect or if there is a 0.5 ft difference from the last reading, then re-check water-level measurement. Place a check mark next to the well ID on the Water-Level Measurement Field Sheet to indicate that the measurement was verified.

Report any measurement anomalies to the PM or CM. Secure well cap and lock the protective casing or cap.

Equipment return

After all equipment has been thoroughly cleaned and decontaminated, return to proper location and complete any necessary equipment forms.

Store water-level indicator in a clean, protected area during transport to the next well and after work is completed.

Documentation submitted to appropriate staff and files

Forward original Water-Level Measurement Field Sheet to PM or CM.

8.0 RECORDS

Field Notes

The field notes must document all the events, equipment used, and measurements collected during the sampling activities. The field notes must be legible and concise so that the entire sample event can be reconstructed later for future reference.

Record field notes in a standard bound survey-type field book issued for general note taking/field records and available from all GES equipment administrators. Make all field book entries black ink and make any changes/corrections with a single strikethrough line. Initial and date to indicate who made the change/ correction and when it was made.

Complete and submit a Water-Level Measurement Field Sheet.

9.0 FOLLOW-UP ACTIVITIES

Perform the following once field activities are complete.

APPENDIX C

Laboratory Report

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

October 16, 2018

GES, Inc. - Concord, CA

Sample Delivery Group:	L1032690
Samples Received:	10/08/2018
Project Number:	3016006-800006-214
Description:	
Site:	919 E. DIMOND BLVD.
Report To:	Mark Peterson 5046 Commercial Circle, Ste. F Concord, CA 94520

Entire Report Reviewed By:

Jason Romer
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace National is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

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MW-9 L1032690-01 GW

Collected by: Amy Zablocki | Collected date/time: 10/04/18 11:50 | Received date/time: 10/08/18 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method AK101	WG1180312	1	10/15/18 00:34	10/15/18 00:34	JAH
Volatile Organic Compounds (GC/MS) by Method 8260C	WG1178724	1	10/10/18 15:52	10/10/18 15:52	ACG
Volatile Organic Compounds (GC/MS) by Method 8260C	WG1179332	1	10/11/18 12:49	10/11/18 12:49	ACG
Semi-Volatile Organic Compounds (GC) by Method AK102/103	WG1178967	1	10/13/18 07:40	10/13/18 22:24	SHG
Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM	WG1178312	1	10/10/18 10:31	10/11/18 17:19	CJR

MW-10 L1032690-02 GW

Collected by: Amy Zablocki | Collected date/time: 10/05/18 11:45 | Received date/time: 10/08/18 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method AK101	WG1180312	1	10/15/18 00:59	10/15/18 00:59	JAH
Volatile Organic Compounds (GC/MS) by Method 8260C	WG1178724	1	10/10/18 16:13	10/10/18 16:13	ACG
Semi-Volatile Organic Compounds (GC) by Method AK102/103	WG1178967	1	10/13/18 07:40	10/13/18 22:46	SHG
Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM	WG1178312	1	10/10/18 10:31	10/11/18 17:42	JF

MW-12 L1032690-03 GW

Collected by: Amy Zablocki | Collected date/time: 10/05/18 13:05 | Received date/time: 10/08/18 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method AK101	WG1180312	1	10/15/18 01:23	10/15/18 01:23	JAH
Volatile Organic Compounds (GC/MS) by Method 8260C	WG1178724	1	10/10/18 16:35	10/10/18 16:35	ACG
Semi-Volatile Organic Compounds (GC) by Method AK102/103	WG1178967	1	10/13/18 07:40	10/13/18 23:08	SHG
Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM	WG1178312	1	10/10/18 10:31	10/11/18 18:04	CJR

MW-13 L1032690-04 GW

Collected by: Amy Zablocki | Collected date/time: 10/05/18 14:15 | Received date/time: 10/08/18 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method AK101	WG1177931	1	10/09/18 14:32	10/09/18 14:32	ACG
Volatile Organic Compounds (GC/MS) by Method 8260C	WG1178724	1	10/10/18 16:56	10/10/18 16:56	ACG
Semi-Volatile Organic Compounds (GC) by Method AK102/103	WG1178967	1	10/13/18 07:40	10/13/18 23:30	SHG
Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM	WG1178312	1	10/10/18 10:31	10/11/18 18:27	CJR

DUP-1 L1032690-05 GW

Collected by: Amy Zablocki | Collected date/time: 10/04/18 15:45 | Received date/time: 10/08/18 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC) by Method AK101	WG1177931	1	10/09/18 14:56	10/09/18 14:56	ACG
Volatile Organic Compounds (GC/MS) by Method 8260C	WG1178724	1	10/10/18 17:17	10/10/18 17:17	ACG
Semi-Volatile Organic Compounds (GC) by Method AK102/103	WG1178967	1	10/13/18 07:40	10/13/18 23:52	SHG
Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM	WG1178312	1	10/10/18 10:31	10/11/18 18:50	CJR

DMW-1 L1032690-06 GW

Collected by: Amy Zablocki | Collected date/time: 10/04/18 15:45 | Received date/time: 10/08/18 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 8260C	WG1178724	1	10/10/18 17:38	10/10/18 17:38	ACG
Semi-Volatile Organic Compounds (GC) by Method AK102/103	WG1178967	1	10/13/18 07:40	10/14/18 00:14	SHG
Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM	WG1178312	1	10/10/18 10:31	10/11/18 19:13	CJR

DMW-2 L1032690-07 GW

Collected by: Amy Zablocki
Collected date/time: 10/04/18 10:10
Received date/time: 10/08/18 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 8260C	WG1178724	1	10/10/18 18:00	10/10/18 18:00	ACG

TRIP BLANK L1032690-08 GW

Collected by: Amy Zablocki
Collected date/time: 10/04/18 10:10
Received date/time: 10/08/18 10:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Volatile Organic Compounds (GC/MS) by Method 8260C	WG1178724	1	10/10/18 12:41	10/10/18 12:41	ACG

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jason Romer
Project Manager

Volatile Organic Compounds (GC) by Method AK101

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
TPHGAK C6 to C10	75.2	J	10.0	100	1	10/15/2018 00:34	WG1180312
(S) a,a,a-Trifluorotoluene(FID)	*84.3*			*50.0-150*		*10/15/2018 00:34*	WG1180312

Volatile Organic Compounds (GC/MS) by Method 8260C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	U		10.0	50.0	1	10/10/2018 15:52	WG1178724
Acrolein	U		8.87	50.0	1	10/10/2018 15:52	WG1178724
Acrylonitrile	U		1.87	10.0	1	10/10/2018 15:52	WG1178724
Benzene	36.7		0.331	1.00	1	10/11/2018 12:49	WG1179332
Bromobenzene	U		0.352	1.00	1	10/10/2018 15:52	WG1178724
Bromodichloromethane	U		0.380	1.00	1	10/10/2018 15:52	WG1178724
Bromoform	U		0.469	1.00	1	10/10/2018 15:52	WG1178724
Bromomethane	U		0.866	5.00	1	10/10/2018 15:52	WG1178724
n-Butylbenzene	U		0.361	1.00	1	10/10/2018 15:52	WG1178724
sec-Butylbenzene	U		0.365	1.00	1	10/10/2018 15:52	WG1178724
tert-Butylbenzene	U		0.399	1.00	1	10/10/2018 15:52	WG1178724
Carbon tetrachloride	U		0.379	1.00	1	10/10/2018 15:52	WG1178724
Chlorobenzene	U		0.348	1.00	1	10/10/2018 15:52	WG1178724
Chlorodibromomethane	U		0.327	1.00	1	10/10/2018 15:52	WG1178724
Chloroethane	U		0.453	5.00	1	10/10/2018 15:52	WG1178724
Chloroform	U		0.324	5.00	1	10/10/2018 15:52	WG1178724
Chloromethane	U		0.276	2.50	1	10/10/2018 15:52	WG1178724
2-Chlorotoluene	U		0.375	1.00	1	10/10/2018 15:52	WG1178724
4-Chlorotoluene	U		0.351	1.00	1	10/10/2018 15:52	WG1178724
1,2-Dibromo-3-Chloropropane	U		1.33	5.00	1	10/10/2018 15:52	WG1178724
1,2-Dibromoethane	U		0.381	1.00	1	10/10/2018 15:52	WG1178724
Dibromomethane	U		0.346	1.00	1	10/10/2018 15:52	WG1178724
1,2-Dichlorobenzene	U		0.349	1.00	1	10/10/2018 15:52	WG1178724
1,3-Dichlorobenzene	U		0.220	1.00	1	10/10/2018 15:52	WG1178724
1,4-Dichlorobenzene	U		0.274	1.00	1	10/10/2018 15:52	WG1178724
Dichlorodifluoromethane	U	J4	0.551	5.00	1	10/10/2018 15:52	WG1178724
1,1-Dichloroethane	U		0.259	1.00	1	10/10/2018 15:52	WG1178724
1,2-Dichloroethane	U		0.361	1.00	1	10/11/2018 12:49	WG1179332
1,1-Dichloroethene	U		0.398	1.00	1	10/10/2018 15:52	WG1178724
cis-1,2-Dichloroethene	U		0.260	1.00	1	10/10/2018 15:52	WG1178724
trans-1,2-Dichloroethene	U		0.396	1.00	1	10/10/2018 15:52	WG1178724
1,2-Dichloropropane	U		0.306	1.00	1	10/10/2018 15:52	WG1178724
1,1-Dichloropropene	U		0.352	1.00	1	10/10/2018 15:52	WG1178724
1,3-Dichloropropane	U		0.366	1.00	1	10/10/2018 15:52	WG1178724
cis-1,3-Dichloropropene	U		0.418	1.00	1	10/10/2018 15:52	WG1178724
trans-1,3-Dichloropropene	U		0.419	1.00	1	10/10/2018 15:52	WG1178724
2,2-Dichloropropane	U		0.321	1.00	1	10/10/2018 15:52	WG1178724
Di-isopropyl ether	0.332	J	0.320	1.00	1	10/10/2018 15:52	WG1178724
Ethylbenzene	U		0.384	1.00	1	10/10/2018 15:52	WG1178724
Hexachloro-1,3-butadiene	U		0.256	1.00	1	10/10/2018 15:52	WG1178724
Isopropylbenzene	U		0.326	1.00	1	10/10/2018 15:52	WG1178724
p-Isopropyltoluene	U		0.350	1.00	1	10/10/2018 15:52	WG1178724
2-Butanone (MEK)	U		3.93	10.0	1	10/10/2018 15:52	WG1178724
Methylene Chloride	U		1.00	5.00	1	10/10/2018 15:52	WG1178724
4-Methyl-2-pentanone (MIBK)	U		2.14	10.0	1	10/10/2018 15:52	WG1178724
Methyl tert-butyl ether	7.57		0.367	1.00	1	10/10/2018 15:52	WG1178724
Naphthalene	U		1.00	5.00	1	10/10/2018 15:52	WG1178724
n-Propylbenzene	U		0.349	1.00	1	10/10/2018 15:52	WG1178724
Styrene	U		0.307	1.00	1	10/10/2018 15:52	WG1178724

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
1,1,1,2-Tetrachloroethane	U		0.385	1.00	1	10/10/2018 15:52	WG1178724
1,1,2,2-Tetrachloroethane	U		0.130	1.00	1	10/10/2018 15:52	WG1178724
1,1,2-Trichlorotrifluoroethane	U		0.303	1.00	1	10/10/2018 15:52	WG1178724
Tetrachloroethene	U		0.372	1.00	1	10/10/2018 15:52	WG1178724
Toluene	0.530	J	0.412	1.00	1	10/10/2018 15:52	WG1178724
1,2,3-Trichlorobenzene	U		0.230	1.00	1	10/10/2018 15:52	WG1178724
1,2,4-Trichlorobenzene	U		0.355	1.00	1	10/10/2018 15:52	WG1178724
1,1,1-Trichloroethane	U		0.319	1.00	1	10/10/2018 15:52	WG1178724
1,1,2-Trichloroethane	U		0.383	1.00	1	10/10/2018 15:52	WG1178724
Trichloroethene	U		0.398	1.00	1	10/10/2018 15:52	WG1178724
Trichlorofluoromethane	U		1.20	5.00	1	10/10/2018 15:52	WG1178724
1,2,3-Trichloropropane	U		0.807	2.50	1	10/10/2018 15:52	WG1178724
1,2,4-Trimethylbenzene	2.22		0.373	1.00	1	10/10/2018 15:52	WG1178724
1,2,3-Trimethylbenzene	0.599	J	0.321	1.00	1	10/10/2018 15:52	WG1178724
1,3,5-Trimethylbenzene	0.435	J	0.387	1.00	1	10/10/2018 15:52	WG1178724
Vinyl chloride	U		0.259	1.00	1	10/10/2018 15:52	WG1178724
Xylenes, Total	8.26		1.06	3.00	1	10/10/2018 15:52	WG1178724
(S) Toluene-d8	*105*			*80.0-120*		*10/10/2018 15:52*	WG1178724
(S) Toluene-d8	*112*			*80.0-120*		*10/11/2018 12:49*	WG1179332
(S) Dibromofluoromethane	*99.6*			*75.0-120*		*10/10/2018 15:52*	WG1178724
(S) Dibromofluoromethane	*95.1*			*75.0-120*		*10/11/2018 12:49*	WG1179332
(S) 4-Bromofluorobenzene	*103*			*77.0-126*		*10/10/2018 15:52*	WG1178724
(S) 4-Bromofluorobenzene	*102*			*77.0-126*		*10/11/2018 12:49*	WG1179332

Semi-Volatile Organic Compounds (GC) by Method AK102/103

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
AK102 DRO C10-C25	220	J	170	800	1	10/13/2018 22:24	WG1178967
AK103 RRO C25-C36	501	J	460	800	1	10/13/2018 22:24	WG1178967
(S) o-Terphenyl	*37.3*	J2		*50.0-150*		*10/13/2018 22:24*	WG1178967
(S) n-Triacontane d62	*11.0*	J2		*50.0-150*		*10/13/2018 22:24*	WG1178967

Sample Narrative:

L1032690-01 WG1178967: Sample produced total emulsion during Extraction process, low surr/spike recoveries due to matrix

Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Anthracene	U		0.00800	0.0500	1	10/11/2018 17:19	WG1178312
Acenaphthene	U		0.0100	0.0500	1	10/11/2018 17:19	WG1178312
Acenaphthylene	U		0.00700	0.0500	1	10/11/2018 17:19	WG1178312
Benzo(a)anthracene	U		0.00830	0.0500	1	10/11/2018 17:19	WG1178312
Benzo(a)pyrene	U		0.0158	0.0500	1	10/11/2018 17:19	WG1178312
Benzo(b)fluoranthene	U		0.00212	0.0500	1	10/11/2018 17:19	WG1178312
Benzo(g,h,i)perylene	U		0.00227	0.0500	1	10/11/2018 17:19	WG1178312
Benzo(k)fluoranthene	U		0.0255	0.0500	1	10/11/2018 17:19	WG1178312
Chrysene	U		0.0144	0.0500	1	10/11/2018 17:19	WG1178312
Dibenz(a,h)anthracene	U		0.00454	0.0500	1	10/11/2018 17:19	WG1178312
Fluoranthene	U		0.0165	0.0500	1	10/11/2018 17:19	WG1178312
Fluorene	U		0.00898	0.0500	1	10/11/2018 17:19	WG1178312
Indeno(1,2,3-cd)pyrene	U		0.00739	0.0500	1	10/11/2018 17:19	WG1178312
Naphthalene	0.229	J	0.0123	0.250	1	10/11/2018 17:19	WG1178312
Phenanthrene	U		0.0184	0.0500	1	10/11/2018 17:19	WG1178312
Pyrene	U		0.0155	0.0500	1	10/11/2018 17:19	WG1178312
1-Methylnaphthalene	U		0.0189	0.250	1	10/11/2018 17:19	WG1178312

Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
2-Methylnaphthalene	U		0.0155	0.250	1	10/11/2018 17:19	WG1178312
2-Chloronaphthalene	U		0.0165	0.250	1	10/11/2018 17:19	WG1178312
(S) Nitrobenzene-d5	*59.9*			*11.0-135*		*10/11/2018 17:19*	WG1178312
(S) 2-Fluorobiphenyl	*110*			*32.0-120*		*10/11/2018 17:19*	WG1178312
(S) p-Terphenyl-d14	*130*	J1		*23.0-122*		*10/11/2018 17:19*	WG1178312

Volatile Organic Compounds (GC) by Method AK101

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
TPHGAK C6 to C10	U		10.0	100	1	10/15/2018 00:59	WG1180312
(S) a,a,a-Trifluorotoluene(FID)	*83.5*			*50.0-150*		*10/15/2018 00:59*	WG1180312

Volatile Organic Compounds (GC/MS) by Method 8260C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	U		10.0	50.0	1	10/10/2018 16:13	WG1178724
Acrolein	U		8.87	50.0	1	10/10/2018 16:13	WG1178724
Acrylonitrile	U		1.87	10.0	1	10/10/2018 16:13	WG1178724
Benzene	U		0.331	1.00	1	10/10/2018 16:13	WG1178724
Bromobenzene	U		0.352	1.00	1	10/10/2018 16:13	WG1178724
Bromodichloromethane	U		0.380	1.00	1	10/10/2018 16:13	WG1178724
Bromoform	U		0.469	1.00	1	10/10/2018 16:13	WG1178724
Bromomethane	U		0.866	5.00	1	10/10/2018 16:13	WG1178724
n-Butylbenzene	U		0.361	1.00	1	10/10/2018 16:13	WG1178724
sec-Butylbenzene	U		0.365	1.00	1	10/10/2018 16:13	WG1178724
tert-Butylbenzene	U		0.399	1.00	1	10/10/2018 16:13	WG1178724
Carbon tetrachloride	U		0.379	1.00	1	10/10/2018 16:13	WG1178724
Chlorobenzene	U		0.348	1.00	1	10/10/2018 16:13	WG1178724
Chlorodibromomethane	U		0.327	1.00	1	10/10/2018 16:13	WG1178724
Chloroethane	U		0.453	5.00	1	10/10/2018 16:13	WG1178724
Chloroform	U		0.324	5.00	1	10/10/2018 16:13	WG1178724
Chloromethane	U		0.276	2.50	1	10/10/2018 16:13	WG1178724
2-Chlorotoluene	U		0.375	1.00	1	10/10/2018 16:13	WG1178724
4-Chlorotoluene	U		0.351	1.00	1	10/10/2018 16:13	WG1178724
1,2-Dibromo-3-Chloropropane	U		1.33	5.00	1	10/10/2018 16:13	WG1178724
1,2-Dibromoethane	U		0.381	1.00	1	10/10/2018 16:13	WG1178724
Dibromomethane	U		0.346	1.00	1	10/10/2018 16:13	WG1178724
1,2-Dichlorobenzene	U		0.349	1.00	1	10/10/2018 16:13	WG1178724
1,3-Dichlorobenzene	U		0.220	1.00	1	10/10/2018 16:13	WG1178724
1,4-Dichlorobenzene	U		0.274	1.00	1	10/10/2018 16:13	WG1178724
Dichlorodifluoromethane	U	J4	0.551	5.00	1	10/10/2018 16:13	WG1178724
1,1-Dichloroethane	U		0.259	1.00	1	10/10/2018 16:13	WG1178724
1,2-Dichloroethane	U		0.361	1.00	1	10/10/2018 16:13	WG1178724
1,1-Dichloroethene	U		0.398	1.00	1	10/10/2018 16:13	WG1178724
cis-1,2-Dichloroethene	U		0.260	1.00	1	10/10/2018 16:13	WG1178724
trans-1,2-Dichloroethene	U		0.396	1.00	1	10/10/2018 16:13	WG1178724
1,2-Dichloropropane	U		0.306	1.00	1	10/10/2018 16:13	WG1178724
1,1-Dichloropropene	U		0.352	1.00	1	10/10/2018 16:13	WG1178724
1,3-Dichloropropane	U		0.366	1.00	1	10/10/2018 16:13	WG1178724
cis-1,3-Dichloropropene	U		0.418	1.00	1	10/10/2018 16:13	WG1178724
trans-1,3-Dichloropropene	U		0.419	1.00	1	10/10/2018 16:13	WG1178724
2,2-Dichloropropane	U		0.321	1.00	1	10/10/2018 16:13	WG1178724
Di-isopropyl ether	U		0.320	1.00	1	10/10/2018 16:13	WG1178724
Ethylbenzene	U		0.384	1.00	1	10/10/2018 16:13	WG1178724
Hexachloro-1,3-butadiene	U		0.256	1.00	1	10/10/2018 16:13	WG1178724
Isopropylbenzene	U		0.326	1.00	1	10/10/2018 16:13	WG1178724
p-Isopropyltoluene	U		0.350	1.00	1	10/10/2018 16:13	WG1178724
2-Butanone (MEK)	U		3.93	10.0	1	10/10/2018 16:13	WG1178724
Methylene Chloride	U		1.00	5.00	1	10/10/2018 16:13	WG1178724
4-Methyl-2-pentanone (MIBK)	U		2.14	10.0	1	10/10/2018 16:13	WG1178724
Methyl tert-butyl ether	2.04		0.367	1.00	1	10/10/2018 16:13	WG1178724
Naphthalene	U		1.00	5.00	1	10/10/2018 16:13	WG1178724
n-Propylbenzene	U		0.349	1.00	1	10/10/2018 16:13	WG1178724
Styrene	U		0.307	1.00	1	10/10/2018 16:13	WG1178724

Volatile Organic Compounds (GC/MS) by Method 8260C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
1,1,1,2-Tetrachloroethane	U		0.385	1.00	1	10/10/2018 16:13	WG1178724
1,1,2,2-Tetrachloroethane	U		0.130	1.00	1	10/10/2018 16:13	WG1178724
1,1,2-Trichlorotrifluoroethane	U		0.303	1.00	1	10/10/2018 16:13	WG1178724
Tetrachloroethene	U		0.372	1.00	1	10/10/2018 16:13	WG1178724
Toluene	U		0.412	1.00	1	10/10/2018 16:13	WG1178724
1,2,3-Trichlorobenzene	U		0.230	1.00	1	10/10/2018 16:13	WG1178724
1,2,4-Trichlorobenzene	U		0.355	1.00	1	10/10/2018 16:13	WG1178724
1,1,1-Trichloroethane	U		0.319	1.00	1	10/10/2018 16:13	WG1178724
1,1,2-Trichloroethane	U		0.383	1.00	1	10/10/2018 16:13	WG1178724
Trichloroethene	U		0.398	1.00	1	10/10/2018 16:13	WG1178724
Trichlorofluoromethane	U		1.20	5.00	1	10/10/2018 16:13	WG1178724
1,2,3-Trichloropropane	U		0.807	2.50	1	10/10/2018 16:13	WG1178724
1,2,4-Trimethylbenzene	U		0.373	1.00	1	10/10/2018 16:13	WG1178724
1,2,3-Trimethylbenzene	U		0.321	1.00	1	10/10/2018 16:13	WG1178724
1,3,5-Trimethylbenzene	U		0.387	1.00	1	10/10/2018 16:13	WG1178724
Vinyl chloride	U		0.259	1.00	1	10/10/2018 16:13	WG1178724
Xylenes, Total	U		1.06	3.00	1	10/10/2018 16:13	WG1178724
(S) Toluene-d8	*104*			*80.0-120*		*10/10/2018 16:13*	WG1178724
(S) Dibromofluoromethane	*99.6*			*75.0-120*		*10/10/2018 16:13*	WG1178724
(S) 4-Bromofluorobenzene	*102*			*77.0-126*		*10/10/2018 16:13*	WG1178724

Semi-Volatile Organic Compounds (GC) by Method AK102/103

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
AK102 DRO C10-C25	U		170	800	1	10/13/2018 22:46	WG1178967
AK103 RRO C25-C36	551	J	460	800	1	10/13/2018 22:46	WG1178967
(S) o-Terphenyl	*33.0*	J2		*50.0-150*		*10/13/2018 22:46*	WG1178967
(S) n-Triacontane d62	*11.5*	J2		*50.0-150*		*10/13/2018 22:46*	WG1178967

Sample Narrative:

L1032690-02 WG1178967: Sample produced total emulsion during Extraction process, low surr/spike recoveries due to matrix

Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Anthracene	U		0.00800	0.0500	1	10/11/2018 17:42	WG1178312
Acenaphthene	U		0.0100	0.0500	1	10/11/2018 17:42	WG1178312
Acenaphthylene	U		0.00700	0.0500	1	10/11/2018 17:42	WG1178312
Benzo(a)anthracene	U		0.00830	0.0500	1	10/11/2018 17:42	WG1178312
Benzo(a)pyrene	U		0.0158	0.0500	1	10/11/2018 17:42	WG1178312
Benzo(b)fluoranthene	U		0.00212	0.0500	1	10/11/2018 17:42	WG1178312
Benzo(g,h,i)perylene	U		0.00227	0.0500	1	10/11/2018 17:42	WG1178312
Benzo(k)fluoranthene	U		0.0255	0.0500	1	10/11/2018 17:42	WG1178312
Chrysene	U		0.0144	0.0500	1	10/11/2018 17:42	WG1178312
Dibenz(a,h)anthracene	U		0.00454	0.0500	1	10/11/2018 17:42	WG1178312
Fluoranthene	U		0.0165	0.0500	1	10/11/2018 17:42	WG1178312
Fluorene	U		0.00898	0.0500	1	10/11/2018 17:42	WG1178312
Indeno(1,2,3-cd)pyrene	U		0.00739	0.0500	1	10/11/2018 17:42	WG1178312
Naphthalene	0.0458	J	0.0123	0.250	1	10/11/2018 17:42	WG1178312
Phenanthrene	U		0.0184	0.0500	1	10/11/2018 17:42	WG1178312
Pyrene	U		0.0155	0.0500	1	10/11/2018 17:42	WG1178312
1-Methylnaphthalene	U		0.0189	0.250	1	10/11/2018 17:42	WG1178312
2-Methylnaphthalene	U		0.0155	0.250	1	10/11/2018 17:42	WG1178312
2-Chloronaphthalene	U		0.0165	0.250	1	10/11/2018 17:42	WG1178312
(S) Nitrobenzene-d5	*1.85*	J2		*11.0-135*		*10/11/2018 17:42*	WG1178312

Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
(S) 2-Fluorobiphenyl	*86.1*			*32.0-120*		*10/11/2018 17:42*	WG1178312
(S) p-Terphenyl-d14	*107*			*23.0-122*		*10/11/2018 17:42*	WG1178312

Sample Narrative:

L1032690-02 WG1178312: Low surrogate recovery due to matrix interference

Volatile Organic Compounds (GC) by Method AK101

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
TPHGAK C6 to C10	U		10.0	100	1	10/15/2018 01:23	WG1180312
(S) a,a,a-Trifluorotoluene(FID)	*83.5*			*50.0-150*		*10/15/2018 01:23*	WG1180312

Volatile Organic Compounds (GC/MS) by Method 8260C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	U		10.0	50.0	1	10/10/2018 16:35	WG1178724
Acrolein	U		8.87	50.0	1	10/10/2018 16:35	WG1178724
Acrylonitrile	U		1.87	10.0	1	10/10/2018 16:35	WG1178724
Benzene	2.20		0.331	1.00	1	10/10/2018 16:35	WG1178724
Bromobenzene	U		0.352	1.00	1	10/10/2018 16:35	WG1178724
Bromodichloromethane	U		0.380	1.00	1	10/10/2018 16:35	WG1178724
Bromoform	U		0.469	1.00	1	10/10/2018 16:35	WG1178724
Bromomethane	U		0.866	5.00	1	10/10/2018 16:35	WG1178724
n-Butylbenzene	U		0.361	1.00	1	10/10/2018 16:35	WG1178724
sec-Butylbenzene	U		0.365	1.00	1	10/10/2018 16:35	WG1178724
tert-Butylbenzene	U		0.399	1.00	1	10/10/2018 16:35	WG1178724
Carbon tetrachloride	U		0.379	1.00	1	10/10/2018 16:35	WG1178724
Chlorobenzene	U		0.348	1.00	1	10/10/2018 16:35	WG1178724
Chlorodibromomethane	U		0.327	1.00	1	10/10/2018 16:35	WG1178724
Chloroethane	U		0.453	5.00	1	10/10/2018 16:35	WG1178724
Chloroform	U		0.324	5.00	1	10/10/2018 16:35	WG1178724
Chloromethane	U		0.276	2.50	1	10/10/2018 16:35	WG1178724
2-Chlorotoluene	U		0.375	1.00	1	10/10/2018 16:35	WG1178724
4-Chlorotoluene	U		0.351	1.00	1	10/10/2018 16:35	WG1178724
1,2-Dibromo-3-Chloropropane	U		1.33	5.00	1	10/10/2018 16:35	WG1178724
1,2-Dibromoethane	U		0.381	1.00	1	10/10/2018 16:35	WG1178724
Dibromomethane	U		0.346	1.00	1	10/10/2018 16:35	WG1178724
1,2-Dichlorobenzene	U		0.349	1.00	1	10/10/2018 16:35	WG1178724
1,3-Dichlorobenzene	U		0.220	1.00	1	10/10/2018 16:35	WG1178724
1,4-Dichlorobenzene	U		0.274	1.00	1	10/10/2018 16:35	WG1178724
Dichlorodifluoromethane	U	J4	0.551	5.00	1	10/10/2018 16:35	WG1178724
1,1-Dichloroethane	U		0.259	1.00	1	10/10/2018 16:35	WG1178724
1,2-Dichloroethane	U		0.361	1.00	1	10/10/2018 16:35	WG1178724
1,1-Dichloroethene	U		0.398	1.00	1	10/10/2018 16:35	WG1178724
cis-1,2-Dichloroethene	U		0.260	1.00	1	10/10/2018 16:35	WG1178724
trans-1,2-Dichloroethene	U		0.396	1.00	1	10/10/2018 16:35	WG1178724
1,2-Dichloropropane	U		0.306	1.00	1	10/10/2018 16:35	WG1178724
1,1-Dichloropropene	U		0.352	1.00	1	10/10/2018 16:35	WG1178724
1,3-Dichloropropane	U		0.366	1.00	1	10/10/2018 16:35	WG1178724
cis-1,3-Dichloropropene	U		0.418	1.00	1	10/10/2018 16:35	WG1178724
trans-1,3-Dichloropropene	U		0.419	1.00	1	10/10/2018 16:35	WG1178724
2,2-Dichloropropane	U		0.321	1.00	1	10/10/2018 16:35	WG1178724
Di-isopropyl ether	0.611	J	0.320	1.00	1	10/10/2018 16:35	WG1178724
Ethylbenzene	U		0.384	1.00	1	10/10/2018 16:35	WG1178724
Hexachloro-1,3-butadiene	U		0.256	1.00	1	10/10/2018 16:35	WG1178724
Isopropylbenzene	U		0.326	1.00	1	10/10/2018 16:35	WG1178724
p-Isopropyltoluene	U		0.350	1.00	1	10/10/2018 16:35	WG1178724
2-Butanone (MEK)	U		3.93	10.0	1	10/10/2018 16:35	WG1178724
Methylene Chloride	U		1.00	5.00	1	10/10/2018 16:35	WG1178724
4-Methyl-2-pentanone (MIBK)	U		2.14	10.0	1	10/10/2018 16:35	WG1178724
Methyl tert-butyl ether	3.21		0.367	1.00	1	10/10/2018 16:35	WG1178724
Naphthalene	U		1.00	5.00	1	10/10/2018 16:35	WG1178724
n-Propylbenzene	U		0.349	1.00	1	10/10/2018 16:35	WG1178724
Styrene	U		0.307	1.00	1	10/10/2018 16:35	WG1178724

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
1,1,1,2-Tetrachloroethane	U		0.385	1.00	1	10/10/2018 16:35	WG1178724
1,1,2,2-Tetrachloroethane	U		0.130	1.00	1	10/10/2018 16:35	WG1178724
1,1,2-Trichlorotrifluoroethane	U		0.303	1.00	1	10/10/2018 16:35	WG1178724
Tetrachloroethene	U		0.372	1.00	1	10/10/2018 16:35	WG1178724
Toluene	U		0.412	1.00	1	10/10/2018 16:35	WG1178724
1,2,3-Trichlorobenzene	U		0.230	1.00	1	10/10/2018 16:35	WG1178724
1,2,4-Trichlorobenzene	U		0.355	1.00	1	10/10/2018 16:35	WG1178724
1,1,1-Trichloroethane	U		0.319	1.00	1	10/10/2018 16:35	WG1178724
1,1,2-Trichloroethane	U		0.383	1.00	1	10/10/2018 16:35	WG1178724
Trichloroethene	U		0.398	1.00	1	10/10/2018 16:35	WG1178724
Trichlorofluoromethane	U		1.20	5.00	1	10/10/2018 16:35	WG1178724
1,2,3-Trichloropropane	U		0.807	2.50	1	10/10/2018 16:35	WG1178724
1,2,4-Trimethylbenzene	U		0.373	1.00	1	10/10/2018 16:35	WG1178724
1,2,3-Trimethylbenzene	U		0.321	1.00	1	10/10/2018 16:35	WG1178724
1,3,5-Trimethylbenzene	U		0.387	1.00	1	10/10/2018 16:35	WG1178724
Vinyl chloride	U		0.259	1.00	1	10/10/2018 16:35	WG1178724
Xylenes, Total	U		1.06	3.00	1	10/10/2018 16:35	WG1178724
(S) Toluene-d8	*104*			*80.0-120*		*10/10/2018 16:35*	WG1178724
(S) Dibromofluoromethane	*100*			*75.0-120*		*10/10/2018 16:35*	WG1178724
(S) 4-Bromofluorobenzene	*103*			*77.0-126*		*10/10/2018 16:35*	WG1178724

Semi-Volatile Organic Compounds (GC) by Method AK102/103

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
AK102 DRO C10-C25	375	J	170	800	1	10/13/2018 23:08	WG1178967
AK103 RRO C25-C36	850		460	800	1	10/13/2018 23:08	WG1178967
(S) o-Terphenyl	*72.8*			*50.0-150*		*10/13/2018 23:08*	WG1178967
(S) n-Triacontane d62	*36.5*	J2		*50.0-150*		*10/13/2018 23:08*	WG1178967

Sample Narrative:

L1032690-03 WG1178967: Sample produced heavy emulsion during Extraction process, low surr/spike recoveries due to matrix

Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Anthracene	U		0.00800	0.0500	1	10/11/2018 18:04	WG1178312
Acenaphthene	U		0.0100	0.0500	1	10/11/2018 18:04	WG1178312
Acenaphthylene	U		0.00700	0.0500	1	10/11/2018 18:04	WG1178312
Benzo(a)anthracene	U		0.00830	0.0500	1	10/11/2018 18:04	WG1178312
Benzo(a)pyrene	U		0.0158	0.0500	1	10/11/2018 18:04	WG1178312
Benzo(b)fluoranthene	U		0.00212	0.0500	1	10/11/2018 18:04	WG1178312
Benzo(g,h,i)perylene	U		0.00227	0.0500	1	10/11/2018 18:04	WG1178312
Benzo(k)fluoranthene	U		0.0255	0.0500	1	10/11/2018 18:04	WG1178312
Chrysene	U		0.0144	0.0500	1	10/11/2018 18:04	WG1178312
Dibenz(a,h)anthracene	U		0.00454	0.0500	1	10/11/2018 18:04	WG1178312
Fluoranthene	U		0.0165	0.0500	1	10/11/2018 18:04	WG1178312
Fluorene	U		0.00898	0.0500	1	10/11/2018 18:04	WG1178312
Indeno(1,2,3-cd)pyrene	U		0.00739	0.0500	1	10/11/2018 18:04	WG1178312
Naphthalene	0.0603	J	0.0123	0.250	1	10/11/2018 18:04	WG1178312
Phenanthrene	U		0.0184	0.0500	1	10/11/2018 18:04	WG1178312
Pyrene	U		0.0155	0.0500	1	10/11/2018 18:04	WG1178312
1-Methylnaphthalene	U		0.0189	0.250	1	10/11/2018 18:04	WG1178312
2-Methylnaphthalene	U		0.0155	0.250	1	10/11/2018 18:04	WG1178312
2-Chloronaphthalene	U		0.0165	0.250	1	10/11/2018 18:04	WG1178312
(S) Nitrobenzene-d5	*51.4*			*11.0-135*		*10/11/2018 18:04*	WG1178312

Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
(S) 2-Fluorobiphenyl	*80.3*			*32.0-120*		*10/11/2018 18:04*	WG1178312
(S) p-Terphenyl-d14	*103*			*23.0-122*		*10/11/2018 18:04*	WG1178312

Volatile Organic Compounds (GC) by Method AK101

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
TPHGAK C6 to C10	U		10.0	100	1	10/09/2018 14:32	WG1177931
(S) a,a,a-Trifluorotoluene(FID)	*82.9*			*50.0-150*		*10/09/2018 14:32*	WG1177931

Volatile Organic Compounds (GC/MS) by Method 8260C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	U		10.0	50.0	1	10/10/2018 16:56	WG1178724
Acrolein	U		8.87	50.0	1	10/10/2018 16:56	WG1178724
Acrylonitrile	U		1.87	10.0	1	10/10/2018 16:56	WG1178724
Benzene	U		0.331	1.00	1	10/10/2018 16:56	WG1178724
Bromobenzene	U		0.352	1.00	1	10/10/2018 16:56	WG1178724
Bromodichloromethane	U		0.380	1.00	1	10/10/2018 16:56	WG1178724
Bromoform	U		0.469	1.00	1	10/10/2018 16:56	WG1178724
Bromomethane	U		0.866	5.00	1	10/10/2018 16:56	WG1178724
n-Butylbenzene	U		0.361	1.00	1	10/10/2018 16:56	WG1178724
sec-Butylbenzene	U		0.365	1.00	1	10/10/2018 16:56	WG1178724
tert-Butylbenzene	U		0.399	1.00	1	10/10/2018 16:56	WG1178724
Carbon tetrachloride	U		0.379	1.00	1	10/10/2018 16:56	WG1178724
Chlorobenzene	U		0.348	1.00	1	10/10/2018 16:56	WG1178724
Chlorodibromomethane	U		0.327	1.00	1	10/10/2018 16:56	WG1178724
Chloroethane	U		0.453	5.00	1	10/10/2018 16:56	WG1178724
Chloroform	U		0.324	5.00	1	10/10/2018 16:56	WG1178724
Chloromethane	U		0.276	2.50	1	10/10/2018 16:56	WG1178724
2-Chlorotoluene	U		0.375	1.00	1	10/10/2018 16:56	WG1178724
4-Chlorotoluene	U		0.351	1.00	1	10/10/2018 16:56	WG1178724
1,2-Dibromo-3-Chloropropane	U		1.33	5.00	1	10/10/2018 16:56	WG1178724
1,2-Dibromoethane	U		0.381	1.00	1	10/10/2018 16:56	WG1178724
Dibromomethane	U		0.346	1.00	1	10/10/2018 16:56	WG1178724
1,2-Dichlorobenzene	U		0.349	1.00	1	10/10/2018 16:56	WG1178724
1,3-Dichlorobenzene	U		0.220	1.00	1	10/10/2018 16:56	WG1178724
1,4-Dichlorobenzene	U		0.274	1.00	1	10/10/2018 16:56	WG1178724
Dichlorodifluoromethane	U	J4	0.551	5.00	1	10/10/2018 16:56	WG1178724
1,1-Dichloroethane	U		0.259	1.00	1	10/10/2018 16:56	WG1178724
1,2-Dichloroethane	U		0.361	1.00	1	10/10/2018 16:56	WG1178724
1,1-Dichloroethene	U		0.398	1.00	1	10/10/2018 16:56	WG1178724
cis-1,2-Dichloroethene	U		0.260	1.00	1	10/10/2018 16:56	WG1178724
trans-1,2-Dichloroethene	U		0.396	1.00	1	10/10/2018 16:56	WG1178724
1,2-Dichloropropane	U		0.306	1.00	1	10/10/2018 16:56	WG1178724
1,1-Dichloropropene	U		0.352	1.00	1	10/10/2018 16:56	WG1178724
1,3-Dichloropropane	U		0.366	1.00	1	10/10/2018 16:56	WG1178724
cis-1,3-Dichloropropene	U		0.418	1.00	1	10/10/2018 16:56	WG1178724
trans-1,3-Dichloropropene	U		0.419	1.00	1	10/10/2018 16:56	WG1178724
2,2-Dichloropropane	U		0.321	1.00	1	10/10/2018 16:56	WG1178724
Di-isopropyl ether	1.36		0.320	1.00	1	10/10/2018 16:56	WG1178724
Ethylbenzene	U		0.384	1.00	1	10/10/2018 16:56	WG1178724
Hexachloro-1,3-butadiene	U		0.256	1.00	1	10/10/2018 16:56	WG1178724
Isopropylbenzene	U		0.326	1.00	1	10/10/2018 16:56	WG1178724
p-Isopropyltoluene	U		0.350	1.00	1	10/10/2018 16:56	WG1178724
2-Butanone (MEK)	U		3.93	10.0	1	10/10/2018 16:56	WG1178724
Methylene Chloride	U		1.00	5.00	1	10/10/2018 16:56	WG1178724
4-Methyl-2-pentanone (MIBK)	U		2.14	10.0	1	10/10/2018 16:56	WG1178724
Methyl tert-butyl ether	1.44		0.367	1.00	1	10/10/2018 16:56	WG1178724
Naphthalene	U		1.00	5.00	1	10/10/2018 16:56	WG1178724
n-Propylbenzene	U		0.349	1.00	1	10/10/2018 16:56	WG1178724
Styrene	U		0.307	1.00	1	10/10/2018 16:56	WG1178724

Volatile Organic Compounds (GC/MS) by Method 8260C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
1,1,1,2-Tetrachloroethane	U		0.385	1.00	1	10/10/2018 16:56	WG1178724
1,1,2,2-Tetrachloroethane	U		0.130	1.00	1	10/10/2018 16:56	WG1178724
1,1,2-Trichlorotrifluoroethane	U		0.303	1.00	1	10/10/2018 16:56	WG1178724
Tetrachloroethene	U		0.372	1.00	1	10/10/2018 16:56	WG1178724
Toluene	U		0.412	1.00	1	10/10/2018 16:56	WG1178724
1,2,3-Trichlorobenzene	U		0.230	1.00	1	10/10/2018 16:56	WG1178724
1,2,4-Trichlorobenzene	U		0.355	1.00	1	10/10/2018 16:56	WG1178724
1,1,1-Trichloroethane	U		0.319	1.00	1	10/10/2018 16:56	WG1178724
1,1,2-Trichloroethane	U		0.383	1.00	1	10/10/2018 16:56	WG1178724
Trichloroethene	U		0.398	1.00	1	10/10/2018 16:56	WG1178724
Trichlorofluoromethane	U		1.20	5.00	1	10/10/2018 16:56	WG1178724
1,2,3-Trichloropropane	U		0.807	2.50	1	10/10/2018 16:56	WG1178724
1,2,4-Trimethylbenzene	U		0.373	1.00	1	10/10/2018 16:56	WG1178724
1,2,3-Trimethylbenzene	U		0.321	1.00	1	10/10/2018 16:56	WG1178724
1,3,5-Trimethylbenzene	U		0.387	1.00	1	10/10/2018 16:56	WG1178724
Vinyl chloride	U		0.259	1.00	1	10/10/2018 16:56	WG1178724
Xylenes, Total	U		1.06	3.00	1	10/10/2018 16:56	WG1178724
(S) Toluene-d8	*104*			*80.0-120*		*10/10/2018 16:56*	WG1178724
(S) Dibromofluoromethane	*100*			*75.0-120*		*10/10/2018 16:56*	WG1178724
(S) 4-Bromofluorobenzene	*104*			*77.0-126*		*10/10/2018 16:56*	WG1178724

Semi-Volatile Organic Compounds (GC) by Method AK102/103

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
AK102 DRO C10-C25	518	J	170	800	1	10/13/2018 23:30	WG1178967
AK103 RRO C25-C36	1510		460	800	1	10/13/2018 23:30	WG1178967
(S) o-Terphenyl	*79.0*			*50.0-150*		*10/13/2018 23:30*	WG1178967
(S) n-Triacontane d62	*44.5*	J2		*50.0-150*		*10/13/2018 23:30*	WG1178967

Sample Narrative:

L1032690-04 WG1178967: Sample produced heavy emulsion during Extraction process, low surr/spike recoveries due to matrix

Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Anthracene	U		0.00800	0.0500	1	10/11/2018 18:27	WG1178312
Acenaphthene	U		0.0100	0.0500	1	10/11/2018 18:27	WG1178312
Acenaphthylene	U		0.00700	0.0500	1	10/11/2018 18:27	WG1178312
Benzo(a)anthracene	U		0.00830	0.0500	1	10/11/2018 18:27	WG1178312
Benzo(a)pyrene	U		0.0158	0.0500	1	10/11/2018 18:27	WG1178312
Benzo(b)fluoranthene	U		0.00212	0.0500	1	10/11/2018 18:27	WG1178312
Benzo(g,h,i)perylene	0.00314	B J	0.00227	0.0500	1	10/11/2018 18:27	WG1178312
Benzo(k)fluoranthene	U		0.0255	0.0500	1	10/11/2018 18:27	WG1178312
Chrysene	U		0.0144	0.0500	1	10/11/2018 18:27	WG1178312
Dibenz(a,h)anthracene	U		0.00454	0.0500	1	10/11/2018 18:27	WG1178312
Fluoranthene	U		0.0165	0.0500	1	10/11/2018 18:27	WG1178312
Fluorene	U		0.00898	0.0500	1	10/11/2018 18:27	WG1178312
Indeno(1,2,3-cd)pyrene	U		0.00739	0.0500	1	10/11/2018 18:27	WG1178312
Naphthalene	0.0479	J	0.0123	0.250	1	10/11/2018 18:27	WG1178312
Phenanthrene	U		0.0184	0.0500	1	10/11/2018 18:27	WG1178312
Pyrene	U		0.0155	0.0500	1	10/11/2018 18:27	WG1178312
1-Methylnaphthalene	U		0.0189	0.250	1	10/11/2018 18:27	WG1178312
2-Methylnaphthalene	U		0.0155	0.250	1	10/11/2018 18:27	WG1178312
2-Chloronaphthalene	U		0.0165	0.250	1	10/11/2018 18:27	WG1178312
(S) Nitrobenzene-d5	*29.2*			*11.0-135*		*10/11/2018 18:27*	WG1178312

Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
(S) 2-Fluorobiphenyl	*93.3*			*32.0-120*		*10/11/2018 18:27*	WG1178312
(S) p-Terphenyl-d14	*98.9*			*23.0-122*		*10/11/2018 18:27*	WG1178312

Volatile Organic Compounds (GC) by Method AK101

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
TPHGAK C6 to C10	58.5	J	10.0	100	1	10/09/2018 14:56	WG1177931
(S) a,a,a-Trifluorotoluene(FID)	*86.6*			*50.0-150*		*10/09/2018 14:56*	WG1177931

Volatile Organic Compounds (GC/MS) by Method 8260C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	U		10.0	50.0	1	10/10/2018 17:17	WG1178724
Acrolein	U		8.87	50.0	1	10/10/2018 17:17	WG1178724
Acrylonitrile	U		1.87	10.0	1	10/10/2018 17:17	WG1178724
Benzene	42.2		0.331	1.00	1	10/10/2018 17:17	WG1178724
Bromobenzene	U		0.352	1.00	1	10/10/2018 17:17	WG1178724
Bromodichloromethane	U		0.380	1.00	1	10/10/2018 17:17	WG1178724
Bromoform	U		0.469	1.00	1	10/10/2018 17:17	WG1178724
Bromomethane	U		0.866	5.00	1	10/10/2018 17:17	WG1178724
n-Butylbenzene	U		0.361	1.00	1	10/10/2018 17:17	WG1178724
sec-Butylbenzene	0.553	J	0.365	1.00	1	10/10/2018 17:17	WG1178724
tert-Butylbenzene	U		0.399	1.00	1	10/10/2018 17:17	WG1178724
Carbon tetrachloride	U		0.379	1.00	1	10/10/2018 17:17	WG1178724
Chlorobenzene	U		0.348	1.00	1	10/10/2018 17:17	WG1178724
Chlorodibromomethane	U		0.327	1.00	1	10/10/2018 17:17	WG1178724
Chloroethane	U		0.453	5.00	1	10/10/2018 17:17	WG1178724
Chloroform	U		0.324	5.00	1	10/10/2018 17:17	WG1178724
Chloromethane	U		0.276	2.50	1	10/10/2018 17:17	WG1178724
2-Chlorotoluene	U		0.375	1.00	1	10/10/2018 17:17	WG1178724
4-Chlorotoluene	U		0.351	1.00	1	10/10/2018 17:17	WG1178724
1,2-Dibromo-3-Chloropropane	U		1.33	5.00	1	10/10/2018 17:17	WG1178724
1,2-Dibromoethane	U		0.381	1.00	1	10/10/2018 17:17	WG1178724
Dibromomethane	U		0.346	1.00	1	10/10/2018 17:17	WG1178724
1,2-Dichlorobenzene	U		0.349	1.00	1	10/10/2018 17:17	WG1178724
1,3-Dichlorobenzene	U		0.220	1.00	1	10/10/2018 17:17	WG1178724
1,4-Dichlorobenzene	U		0.274	1.00	1	10/10/2018 17:17	WG1178724
Dichlorodifluoromethane	U	J4	0.551	5.00	1	10/10/2018 17:17	WG1178724
1,1-Dichloroethane	U		0.259	1.00	1	10/10/2018 17:17	WG1178724
1,2-Dichloroethane	0.371	J	0.361	1.00	1	10/10/2018 17:17	WG1178724
1,1-Dichloroethene	U		0.398	1.00	1	10/10/2018 17:17	WG1178724
cis-1,2-Dichloroethene	U		0.260	1.00	1	10/10/2018 17:17	WG1178724
trans-1,2-Dichloroethene	U		0.396	1.00	1	10/10/2018 17:17	WG1178724
1,2-Dichloropropane	U		0.306	1.00	1	10/10/2018 17:17	WG1178724
1,1-Dichloropropene	U		0.352	1.00	1	10/10/2018 17:17	WG1178724
1,3-Dichloropropane	U		0.366	1.00	1	10/10/2018 17:17	WG1178724
cis-1,3-Dichloropropene	U		0.418	1.00	1	10/10/2018 17:17	WG1178724
trans-1,3-Dichloropropene	U		0.419	1.00	1	10/10/2018 17:17	WG1178724
2,2-Dichloropropane	U		0.321	1.00	1	10/10/2018 17:17	WG1178724
Di-isopropyl ether	U		0.320	1.00	1	10/10/2018 17:17	WG1178724
Ethylbenzene	U		0.384	1.00	1	10/10/2018 17:17	WG1178724
Hexachloro-1,3-butadiene	U		0.256	1.00	1	10/10/2018 17:17	WG1178724
Isopropylbenzene	0.421	J	0.326	1.00	1	10/10/2018 17:17	WG1178724
p-Isopropyltoluene	U		0.350	1.00	1	10/10/2018 17:17	WG1178724
2-Butanone (MEK)	U		3.93	10.0	1	10/10/2018 17:17	WG1178724
Methylene Chloride	U		1.00	5.00	1	10/10/2018 17:17	WG1178724
4-Methyl-2-pentanone (MIBK)	U		2.14	10.0	1	10/10/2018 17:17	WG1178724
Methyl tert-butyl ether	3.02		0.367	1.00	1	10/10/2018 17:17	WG1178724
Naphthalene	U		1.00	5.00	1	10/10/2018 17:17	WG1178724
n-Propylbenzene	U		0.349	1.00	1	10/10/2018 17:17	WG1178724
Styrene	U		0.307	1.00	1	10/10/2018 17:17	WG1178724

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260C

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
1,1,1,2-Tetrachloroethane	U		0.385	1.00	1	10/10/2018 17:17	WG1178724
1,1,2,2-Tetrachloroethane	U		0.130	1.00	1	10/10/2018 17:17	WG1178724
1,1,2-Trichlorotrifluoroethane	U		0.303	1.00	1	10/10/2018 17:17	WG1178724
Tetrachloroethene	U		0.372	1.00	1	10/10/2018 17:17	WG1178724
Toluene	U		0.412	1.00	1	10/10/2018 17:17	WG1178724
1,2,3-Trichlorobenzene	U		0.230	1.00	1	10/10/2018 17:17	WG1178724
1,2,4-Trichlorobenzene	U		0.355	1.00	1	10/10/2018 17:17	WG1178724
1,1,1-Trichloroethane	U		0.319	1.00	1	10/10/2018 17:17	WG1178724
1,1,2-Trichloroethane	U		0.383	1.00	1	10/10/2018 17:17	WG1178724
Trichloroethene	U		0.398	1.00	1	10/10/2018 17:17	WG1178724
Trichlorofluoromethane	U		1.20	5.00	1	10/10/2018 17:17	WG1178724
1,2,3-Trichloropropane	U		0.807	2.50	1	10/10/2018 17:17	WG1178724
1,2,4-Trimethylbenzene	U		0.373	1.00	1	10/10/2018 17:17	WG1178724
1,2,3-Trimethylbenzene	U		0.321	1.00	1	10/10/2018 17:17	WG1178724
1,3,5-Trimethylbenzene	U		0.387	1.00	1	10/10/2018 17:17	WG1178724
Vinyl chloride	U		0.259	1.00	1	10/10/2018 17:17	WG1178724
Xylenes, Total	U		1.06	3.00	1	10/10/2018 17:17	WG1178724
(S) Toluene-d8	*104*			*80.0-120*		*10/10/2018 17:17*	WG1178724
(S) Dibromofluoromethane	*99.3*			*75.0-120*		*10/10/2018 17:17*	WG1178724
(S) 4-Bromofluorobenzene	*104*			*77.0-126*		*10/10/2018 17:17*	WG1178724

Semi-Volatile Organic Compounds (GC) by Method AK102/103

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
AK102 DRO C10-C25	1310		170	800	1	10/13/2018 23:52	WG1178967
AK103 RRO C25-C36	6040		460	800	1	10/13/2018 23:52	WG1178967
(S) o-Terphenyl	*81.8*			*50.0-150*		*10/13/2018 23:52*	WG1178967
(S) n-Triacontane d62	*52.9*			*50.0-150*		*10/13/2018 23:52*	WG1178967

Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Anthracene	U		0.00800	0.0500	1	10/11/2018 18:50	WG1178312
Acenaphthene	U		0.0100	0.0500	1	10/11/2018 18:50	WG1178312
Acenaphthylene	U		0.00700	0.0500	1	10/11/2018 18:50	WG1178312
Benzo(a)anthracene	0.0190	J	0.00830	0.0500	1	10/11/2018 18:50	WG1178312
Benzo(a)pyrene	U		0.0158	0.0500	1	10/11/2018 18:50	WG1178312
Benzo(b)fluoranthene	0.00914	J	0.00212	0.0500	1	10/11/2018 18:50	WG1178312
Benzo(g,h,i)perylene	0.0161	B J	0.00227	0.0500	1	10/11/2018 18:50	WG1178312
Benzo(k)fluoranthene	U		0.0255	0.0500	1	10/11/2018 18:50	WG1178312
Chrysene	U		0.0144	0.0500	1	10/11/2018 18:50	WG1178312
Dibenz(a,h)anthracene	U		0.00454	0.0500	1	10/11/2018 18:50	WG1178312
Fluoranthene	U		0.0165	0.0500	1	10/11/2018 18:50	WG1178312
Fluorene	U		0.00898	0.0500	1	10/11/2018 18:50	WG1178312
Indeno(1,2,3-cd)pyrene	U		0.00739	0.0500	1	10/11/2018 18:50	WG1178312
Naphthalene	0.0655	J	0.0123	0.250	1	10/11/2018 18:50	WG1178312
Phenanthrene	U		0.0184	0.0500	1	10/11/2018 18:50	WG1178312
Pyrene	0.0241	J	0.0155	0.0500	1	10/11/2018 18:50	WG1178312
1-Methylnaphthalene	U		0.0189	0.250	1	10/11/2018 18:50	WG1178312
2-Methylnaphthalene	U		0.0155	0.250	1	10/11/2018 18:50	WG1178312
2-Chloronaphthalene	U		0.0165	0.250	1	10/11/2018 18:50	WG1178312
(S) Nitrobenzene-d5	*54.6*			*11.0-135*		*10/11/2018 18:50*	WG1178312
(S) 2-Fluorobiphenyl	*87.1*			*32.0-120*		*10/11/2018 18:50*	WG1178312
(S) p-Terphenyl-d14	*94.9*			*23.0-122*		*10/11/2018 18:50*	WG1178312

Volatile Organic Compounds (GC/MS) by Method 8260C

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Acetone	U		10.0	50.0	1	10/10/2018 17:38	WG1178724
Acrolein	U		8.87	50.0	1	10/10/2018 17:38	WG1178724
Acrylonitrile	U		1.87	10.0	1	10/10/2018 17:38	WG1178724
Benzene	42.9		0.331	1.00	1	10/10/2018 17:38	WG1178724
Bromobenzene	U		0.352	1.00	1	10/10/2018 17:38	WG1178724
Bromodichloromethane	U		0.380	1.00	1	10/10/2018 17:38	WG1178724
Bromoform	U		0.469	1.00	1	10/10/2018 17:38	WG1178724
Bromomethane	U		0.866	5.00	1	10/10/2018 17:38	WG1178724
n-Butylbenzene	U		0.361	1.00	1	10/10/2018 17:38	WG1178724
sec-Butylbenzene	0.582	J	0.365	1.00	1	10/10/2018 17:38	WG1178724
tert-Butylbenzene	U		0.399	1.00	1	10/10/2018 17:38	WG1178724
Carbon tetrachloride	U		0.379	1.00	1	10/10/2018 17:38	WG1178724
Chlorobenzene	U		0.348	1.00	1	10/10/2018 17:38	WG1178724
Chlorodibromomethane	U		0.327	1.00	1	10/10/2018 17:38	WG1178724
Chloroethane	U		0.453	5.00	1	10/10/2018 17:38	WG1178724
Chloroform	U		0.324	5.00	1	10/10/2018 17:38	WG1178724
Chloromethane	U		0.276	2.50	1	10/10/2018 17:38	WG1178724
2-Chlorotoluene	U		0.375	1.00	1	10/10/2018 17:38	WG1178724
4-Chlorotoluene	U		0.351	1.00	1	10/10/2018 17:38	WG1178724
1,2-Dibromo-3-Chloropropane	U		1.33	5.00	1	10/10/2018 17:38	WG1178724
1,2-Dibromoethane	U		0.381	1.00	1	10/10/2018 17:38	WG1178724
Dibromomethane	U		0.346	1.00	1	10/10/2018 17:38	WG1178724
1,2-Dichlorobenzene	U		0.349	1.00	1	10/10/2018 17:38	WG1178724
1,3-Dichlorobenzene	U		0.220	1.00	1	10/10/2018 17:38	WG1178724
1,4-Dichlorobenzene	U		0.274	1.00	1	10/10/2018 17:38	WG1178724
Dichlorodifluoromethane	U	J4	0.551	5.00	1	10/10/2018 17:38	WG1178724
1,1-Dichloroethane	U		0.259	1.00	1	10/10/2018 17:38	WG1178724
1,2-Dichloroethane	U		0.361	1.00	1	10/10/2018 17:38	WG1178724
1,1-Dichloroethene	U		0.398	1.00	1	10/10/2018 17:38	WG1178724
cis-1,2-Dichloroethene	U		0.260	1.00	1	10/10/2018 17:38	WG1178724
trans-1,2-Dichloroethene	U		0.396	1.00	1	10/10/2018 17:38	WG1178724
1,2-Dichloropropane	U		0.306	1.00	1	10/10/2018 17:38	WG1178724
1,1-Dichloropropene	U		0.352	1.00	1	10/10/2018 17:38	WG1178724
1,3-Dichloropropane	U		0.366	1.00	1	10/10/2018 17:38	WG1178724
cis-1,3-Dichloropropene	U		0.418	1.00	1	10/10/2018 17:38	WG1178724
trans-1,3-Dichloropropene	U		0.419	1.00	1	10/10/2018 17:38	WG1178724
2,2-Dichloropropane	U		0.321	1.00	1	10/10/2018 17:38	WG1178724
Di-isopropyl ether	U		0.320	1.00	1	10/10/2018 17:38	WG1178724
Ethylbenzene	U		0.384	1.00	1	10/10/2018 17:38	WG1178724
Hexachloro-1,3-butadiene	U		0.256	1.00	1	10/10/2018 17:38	WG1178724
Isopropylbenzene	0.454	J	0.326	1.00	1	10/10/2018 17:38	WG1178724
p-Isopropyltoluene	U		0.350	1.00	1	10/10/2018 17:38	WG1178724
2-Butanone (MEK)	U		3.93	10.0	1	10/10/2018 17:38	WG1178724
Methylene Chloride	U		1.00	5.00	1	10/10/2018 17:38	WG1178724
4-Methyl-2-pentanone (MIBK)	U		2.14	10.0	1	10/10/2018 17:38	WG1178724
Methyl tert-butyl ether	2.93		0.367	1.00	1	10/10/2018 17:38	WG1178724
Naphthalene	U		1.00	5.00	1	10/10/2018 17:38	WG1178724
n-Propylbenzene	U		0.349	1.00	1	10/10/2018 17:38	WG1178724
Styrene	U		0.307	1.00	1	10/10/2018 17:38	WG1178724
1,1,1,2-Tetrachloroethane	U		0.385	1.00	1	10/10/2018 17:38	WG1178724
1,1,2,2-Tetrachloroethane	U		0.130	1.00	1	10/10/2018 17:38	WG1178724
1,1,2-Trichlorotrifluoroethane	U		0.303	1.00	1	10/10/2018 17:38	WG1178724
Tetrachloroethene	U		0.372	1.00	1	10/10/2018 17:38	WG1178724
Toluene	U		0.412	1.00	1	10/10/2018 17:38	WG1178724
1,2,3-Trichlorobenzene	U		0.230	1.00	1	10/10/2018 17:38	WG1178724
1,2,4-Trichlorobenzene	U		0.355	1.00	1	10/10/2018 17:38	WG1178724

Volatile Organic Compounds (GC/MS) by Method 8260C

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
1,1,1-Trichloroethane	U		0.319	1.00	1	10/10/2018 17:38	WG1178724
1,1,2-Trichloroethane	U		0.383	1.00	1	10/10/2018 17:38	WG1178724
Trichloroethene	U		0.398	1.00	1	10/10/2018 17:38	WG1178724
Trichlorofluoromethane	U		1.20	5.00	1	10/10/2018 17:38	WG1178724
1,2,3-Trichloropropane	U		0.807	2.50	1	10/10/2018 17:38	WG1178724
1,2,4-Trimethylbenzene	U		0.373	1.00	1	10/10/2018 17:38	WG1178724
1,2,3-Trimethylbenzene	U		0.321	1.00	1	10/10/2018 17:38	WG1178724
1,3,5-Trimethylbenzene	U		0.387	1.00	1	10/10/2018 17:38	WG1178724
Vinyl chloride	U		0.259	1.00	1	10/10/2018 17:38	WG1178724
Xylenes, Total	U		1.06	3.00	1	10/10/2018 17:38	WG1178724
(S) Toluene-d8	*105*			*80.0-120*		*10/10/2018 17:38*	WG1178724
(S) Dibromofluoromethane	*98.0*			*75.0-120*		*10/10/2018 17:38*	WG1178724
(S) 4-Bromofluorobenzene	*104*			*77.0-126*		*10/10/2018 17:38*	WG1178724

Semi-Volatile Organic Compounds (GC) by Method AK102/103

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
AK102 DRO C10-C25	958		170	800	1	10/14/2018 00:14	WG1178967
AK103 RRO C25-C36	4340		460	800	1	10/14/2018 00:14	WG1178967
(S) o-Terphenyl	*84.5*			*50.0-150*		*10/14/2018 00:14*	WG1178967
(S) n-Triacontane d62	*52.2*			*50.0-150*		*10/14/2018 00:14*	WG1178967

Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Anthracene	U		0.00800	0.0500	1	10/11/2018 19:13	WG1178312
Acenaphthene	U		0.0100	0.0500	1	10/11/2018 19:13	WG1178312
Acenaphthylene	U		0.00700	0.0500	1	10/11/2018 19:13	WG1178312
Benzo(a)anthracene	0.0120	J	0.00830	0.0500	1	10/11/2018 19:13	WG1178312
Benzo(a)pyrene	U		0.0158	0.0500	1	10/11/2018 19:13	WG1178312
Benzo(b)fluoranthene	0.00409	J	0.00212	0.0500	1	10/11/2018 19:13	WG1178312
Benzo(g,h,i)perylene	0.00657	B J	0.00227	0.0500	1	10/11/2018 19:13	WG1178312
Benzo(k)fluoranthene	U		0.0255	0.0500	1	10/11/2018 19:13	WG1178312
Chrysene	U		0.0144	0.0500	1	10/11/2018 19:13	WG1178312
Dibenz(a,h)anthracene	U		0.00454	0.0500	1	10/11/2018 19:13	WG1178312
Fluoranthene	U		0.0165	0.0500	1	10/11/2018 19:13	WG1178312
Fluorene	U		0.00898	0.0500	1	10/11/2018 19:13	WG1178312
Indeno(1,2,3-cd)pyrene	U		0.00739	0.0500	1	10/11/2018 19:13	WG1178312
Naphthalene	0.0635	J	0.0123	0.250	1	10/11/2018 19:13	WG1178312
Phenanthrene	U		0.0184	0.0500	1	10/11/2018 19:13	WG1178312
Pyrene	U		0.0155	0.0500	1	10/11/2018 19:13	WG1178312
1-Methylnaphthalene	U		0.0189	0.250	1	10/11/2018 19:13	WG1178312
2-Methylnaphthalene	U		0.0155	0.250	1	10/11/2018 19:13	WG1178312
2-Chloronaphthalene	U		0.0165	0.250	1	10/11/2018 19:13	WG1178312
(S) Nitrobenzene-d5	*56.6*			*11.0-135*		*10/11/2018 19:13*	WG1178312
(S) 2-Fluorobiphenyl	*88.8*			*32.0-120*		*10/11/2018 19:13*	WG1178312
(S) p-Terphenyl-d14	*109*			*23.0-122*		*10/11/2018 19:13*	WG1178312

Volatile Organic Compounds (GC/MS) by Method 8260C

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Acetone	15.3	J J0	10.0	50.0	1	10/10/2018 18:00	WG1178724
Acrolein	U		8.87	50.0	1	10/10/2018 18:00	WG1178724
Acrylonitrile	U		1.87	10.0	1	10/10/2018 18:00	WG1178724
Benzene	37.2		0.331	1.00	1	10/10/2018 18:00	WG1178724
Bromobenzene	U		0.352	1.00	1	10/10/2018 18:00	WG1178724
Bromodichloromethane	U		0.380	1.00	1	10/10/2018 18:00	WG1178724
Bromoform	U		0.469	1.00	1	10/10/2018 18:00	WG1178724
Bromomethane	U		0.866	5.00	1	10/10/2018 18:00	WG1178724
n-Butylbenzene	U		0.361	1.00	1	10/10/2018 18:00	WG1178724
sec-Butylbenzene	U		0.365	1.00	1	10/10/2018 18:00	WG1178724
tert-Butylbenzene	U		0.399	1.00	1	10/10/2018 18:00	WG1178724
Carbon tetrachloride	U		0.379	1.00	1	10/10/2018 18:00	WG1178724
Chlorobenzene	U		0.348	1.00	1	10/10/2018 18:00	WG1178724
Chlorodibromomethane	U		0.327	1.00	1	10/10/2018 18:00	WG1178724
Chloroethane	U		0.453	5.00	1	10/10/2018 18:00	WG1178724
Chloroform	U		0.324	5.00	1	10/10/2018 18:00	WG1178724
Chloromethane	U		0.276	2.50	1	10/10/2018 18:00	WG1178724
2-Chlorotoluene	U		0.375	1.00	1	10/10/2018 18:00	WG1178724
4-Chlorotoluene	U		0.351	1.00	1	10/10/2018 18:00	WG1178724
1,2-Dibromo-3-Chloropropane	U		1.33	5.00	1	10/10/2018 18:00	WG1178724
1,2-Dibromoethane	U		0.381	1.00	1	10/10/2018 18:00	WG1178724
Dibromomethane	U		0.346	1.00	1	10/10/2018 18:00	WG1178724
1,2-Dichlorobenzene	U		0.349	1.00	1	10/10/2018 18:00	WG1178724
1,3-Dichlorobenzene	U		0.220	1.00	1	10/10/2018 18:00	WG1178724
1,4-Dichlorobenzene	U		0.274	1.00	1	10/10/2018 18:00	WG1178724
Dichlorodifluoromethane	U	J4	0.551	5.00	1	10/10/2018 18:00	WG1178724
1,1-Dichloroethane	U		0.259	1.00	1	10/10/2018 18:00	WG1178724
1,2-Dichloroethane	U		0.361	1.00	1	10/10/2018 18:00	WG1178724
1,1-Dichloroethene	U		0.398	1.00	1	10/10/2018 18:00	WG1178724
cis-1,2-Dichloroethene	U		0.260	1.00	1	10/10/2018 18:00	WG1178724
trans-1,2-Dichloroethene	U		0.396	1.00	1	10/10/2018 18:00	WG1178724
1,2-Dichloropropane	U		0.306	1.00	1	10/10/2018 18:00	WG1178724
1,1-Dichloropropene	U		0.352	1.00	1	10/10/2018 18:00	WG1178724
1,3-Dichloropropane	U		0.366	1.00	1	10/10/2018 18:00	WG1178724
cis-1,3-Dichloropropene	U		0.418	1.00	1	10/10/2018 18:00	WG1178724
trans-1,3-Dichloropropene	U		0.419	1.00	1	10/10/2018 18:00	WG1178724
2,2-Dichloropropane	U		0.321	1.00	1	10/10/2018 18:00	WG1178724
Di-isopropyl ether	3.53		0.320	1.00	1	10/10/2018 18:00	WG1178724
Ethylbenzene	U		0.384	1.00	1	10/10/2018 18:00	WG1178724
Hexachloro-1,3-butadiene	U		0.256	1.00	1	10/10/2018 18:00	WG1178724
Isopropylbenzene	U		0.326	1.00	1	10/10/2018 18:00	WG1178724
p-Isopropyltoluene	U		0.350	1.00	1	10/10/2018 18:00	WG1178724
2-Butanone (MEK)	U		3.93	10.0	1	10/10/2018 18:00	WG1178724
Methylene Chloride	U		1.00	5.00	1	10/10/2018 18:00	WG1178724
4-Methyl-2-pentanone (MIBK)	U		2.14	10.0	1	10/10/2018 18:00	WG1178724
Methyl tert-butyl ether	30.3		0.367	1.00	1	10/10/2018 18:00	WG1178724
Naphthalene	U		1.00	5.00	1	10/10/2018 18:00	WG1178724
n-Propylbenzene	U		0.349	1.00	1	10/10/2018 18:00	WG1178724
Styrene	U		0.307	1.00	1	10/10/2018 18:00	WG1178724
1,1,1,2-Tetrachloroethane	U		0.385	1.00	1	10/10/2018 18:00	WG1178724
1,1,2,2-Tetrachloroethane	U		0.130	1.00	1	10/10/2018 18:00	WG1178724
1,1,2-Trichlorotrifluoroethane	U		0.303	1.00	1	10/10/2018 18:00	WG1178724
Tetrachloroethene	U		0.372	1.00	1	10/10/2018 18:00	WG1178724
Toluene	U		0.412	1.00	1	10/10/2018 18:00	WG1178724
1,2,3-Trichlorobenzene	U		0.230	1.00	1	10/10/2018 18:00	WG1178724
1,2,4-Trichlorobenzene	U		0.355	1.00	1	10/10/2018 18:00	WG1178724

Volatile Organic Compounds (GC/MS) by Method 8260C

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
1,1,1-Trichloroethane	U		0.319	1.00	1	10/10/2018 18:00	WG1178724
1,1,2-Trichloroethane	U		0.383	1.00	1	10/10/2018 18:00	WG1178724
Trichloroethene	U		0.398	1.00	1	10/10/2018 18:00	WG1178724
Trichlorofluoromethane	U		1.20	5.00	1	10/10/2018 18:00	WG1178724
1,2,3-Trichloropropane	U		0.807	2.50	1	10/10/2018 18:00	WG1178724
1,2,4-Trimethylbenzene	U		0.373	1.00	1	10/10/2018 18:00	WG1178724
1,2,3-Trimethylbenzene	U		0.321	1.00	1	10/10/2018 18:00	WG1178724
1,3,5-Trimethylbenzene	U		0.387	1.00	1	10/10/2018 18:00	WG1178724
Vinyl chloride	U		0.259	1.00	1	10/10/2018 18:00	WG1178724
Xylenes, Total	1.40	J	1.06	3.00	1	10/10/2018 18:00	WG1178724
(S) Toluene-d8	*105*			*80.0-120*		*10/10/2018 18:00*	WG1178724
(S) Dibromofluoromethane	*97.3*			*75.0-120*		*10/10/2018 18:00*	WG1178724
(S) 4-Bromofluorobenzene	*103*			*77.0-126*		*10/10/2018 18:00*	WG1178724

Volatile Organic Compounds (GC/MS) by Method 8260C

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Acetone	U		10.0	50.0	1	10/10/2018 12:41	WG1178724
Acrolein	U		8.87	50.0	1	10/10/2018 12:41	WG1178724
Acrylonitrile	U		1.87	10.0	1	10/10/2018 12:41	WG1178724
Benzene	U		0.331	1.00	1	10/10/2018 12:41	WG1178724
Bromobenzene	U		0.352	1.00	1	10/10/2018 12:41	WG1178724
Bromodichloromethane	U		0.380	1.00	1	10/10/2018 12:41	WG1178724
Bromoform	U		0.469	1.00	1	10/10/2018 12:41	WG1178724
Bromomethane	U		0.866	5.00	1	10/10/2018 12:41	WG1178724
n-Butylbenzene	U		0.361	1.00	1	10/10/2018 12:41	WG1178724
sec-Butylbenzene	U		0.365	1.00	1	10/10/2018 12:41	WG1178724
tert-Butylbenzene	U		0.399	1.00	1	10/10/2018 12:41	WG1178724
Carbon tetrachloride	U		0.379	1.00	1	10/10/2018 12:41	WG1178724
Chlorobenzene	U		0.348	1.00	1	10/10/2018 12:41	WG1178724
Chlorodibromomethane	U		0.327	1.00	1	10/10/2018 12:41	WG1178724
Chloroethane	U		0.453	5.00	1	10/10/2018 12:41	WG1178724
Chloroform	U		0.324	5.00	1	10/10/2018 12:41	WG1178724
Chloromethane	U		0.276	2.50	1	10/10/2018 12:41	WG1178724
2-Chlorotoluene	U		0.375	1.00	1	10/10/2018 12:41	WG1178724
4-Chlorotoluene	U		0.351	1.00	1	10/10/2018 12:41	WG1178724
1,2-Dibromo-3-Chloropropane	U		1.33	5.00	1	10/10/2018 12:41	WG1178724
1,2-Dibromoethane	U		0.381	1.00	1	10/10/2018 12:41	WG1178724
Dibromomethane	U		0.346	1.00	1	10/10/2018 12:41	WG1178724
1,2-Dichlorobenzene	U		0.349	1.00	1	10/10/2018 12:41	WG1178724
1,3-Dichlorobenzene	U		0.220	1.00	1	10/10/2018 12:41	WG1178724
1,4-Dichlorobenzene	U		0.274	1.00	1	10/10/2018 12:41	WG1178724
Dichlorodifluoromethane	U	J4	0.551	5.00	1	10/10/2018 12:41	WG1178724
1,1-Dichloroethane	U		0.259	1.00	1	10/10/2018 12:41	WG1178724
1,2-Dichloroethane	U		0.361	1.00	1	10/10/2018 12:41	WG1178724
1,1-Dichloroethene	U		0.398	1.00	1	10/10/2018 12:41	WG1178724
cis-1,2-Dichloroethene	U		0.260	1.00	1	10/10/2018 12:41	WG1178724
trans-1,2-Dichloroethene	U		0.396	1.00	1	10/10/2018 12:41	WG1178724
1,2-Dichloropropane	U		0.306	1.00	1	10/10/2018 12:41	WG1178724
1,1-Dichloropropene	U		0.352	1.00	1	10/10/2018 12:41	WG1178724
1,3-Dichloropropane	U		0.366	1.00	1	10/10/2018 12:41	WG1178724
cis-1,3-Dichloropropene	U		0.418	1.00	1	10/10/2018 12:41	WG1178724
trans-1,3-Dichloropropene	U		0.419	1.00	1	10/10/2018 12:41	WG1178724
2,2-Dichloropropane	U		0.321	1.00	1	10/10/2018 12:41	WG1178724
Di-isopropyl ether	U		0.320	1.00	1	10/10/2018 12:41	WG1178724
Ethylbenzene	U		0.384	1.00	1	10/10/2018 12:41	WG1178724
Hexachloro-1,3-butadiene	U		0.256	1.00	1	10/10/2018 12:41	WG1178724
Isopropylbenzene	U		0.326	1.00	1	10/10/2018 12:41	WG1178724
p-Isopropyltoluene	U		0.350	1.00	1	10/10/2018 12:41	WG1178724
2-Butanone (MEK)	U		3.93	10.0	1	10/10/2018 12:41	WG1178724
Methylene Chloride	U		1.00	5.00	1	10/10/2018 12:41	WG1178724
4-Methyl-2-pentanone (MIBK)	U		2.14	10.0	1	10/10/2018 12:41	WG1178724
Methyl tert-butyl ether	U		0.367	1.00	1	10/10/2018 12:41	WG1178724
Naphthalene	U		1.00	5.00	1	10/10/2018 12:41	WG1178724
n-Propylbenzene	U		0.349	1.00	1	10/10/2018 12:41	WG1178724
Styrene	U		0.307	1.00	1	10/10/2018 12:41	WG1178724
1,1,1,2-Tetrachloroethane	U		0.385	1.00	1	10/10/2018 12:41	WG1178724
1,1,2,2-Tetrachloroethane	U		0.130	1.00	1	10/10/2018 12:41	WG1178724
1,1,2-Trichlorotrifluoroethane	U		0.303	1.00	1	10/10/2018 12:41	WG1178724
Tetrachloroethene	U		0.372	1.00	1	10/10/2018 12:41	WG1178724
Toluene	U		0.412	1.00	1	10/10/2018 12:41	WG1178724
1,2,3-Trichlorobenzene	U		0.230	1.00	1	10/10/2018 12:41	WG1178724
1,2,4-Trichlorobenzene	U		0.355	1.00	1	10/10/2018 12:41	WG1178724

Volatile Organic Compounds (GC/MS) by Method 8260C

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
1,1,1-Trichloroethane	U		0.319	1.00	1	10/10/2018 12:41	WG1178724
1,1,2-Trichloroethane	U		0.383	1.00	1	10/10/2018 12:41	WG1178724
Trichloroethene	U		0.398	1.00	1	10/10/2018 12:41	WG1178724
Trichlorofluoromethane	U		1.20	5.00	1	10/10/2018 12:41	WG1178724
1,2,3-Trichloropropane	U		0.807	2.50	1	10/10/2018 12:41	WG1178724
1,2,4-Trimethylbenzene	U		0.373	1.00	1	10/10/2018 12:41	WG1178724
1,2,3-Trimethylbenzene	U		0.321	1.00	1	10/10/2018 12:41	WG1178724
1,3,5-Trimethylbenzene	U		0.387	1.00	1	10/10/2018 12:41	WG1178724
Vinyl chloride	U		0.259	1.00	1	10/10/2018 12:41	WG1178724
Xylenes, Total	U		1.06	3.00	1	10/10/2018 12:41	WG1178724
(S) Toluene-d8	*104*			*80.0-120*		*10/10/2018 12:41*	WG1178724
(S) Dibromofluoromethane	*99.1*			*75.0-120*		*10/10/2018 12:41*	WG1178724
(S) 4-Bromofluorobenzene	*104*			*77.0-126*		*10/10/2018 12:41*	WG1178724

Method Blank (MB)

(MB) R3350236-2 10/09/18 10:45

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
TPHGAK C6 to C10	U		10.0	100
(S) a,a,a-Trifluorotoluene(FID)	*84.2*			*50.0-150*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3350236-1 10/09/18 09:56 • (LCSD) R3350236-3 10/09/18 15:45

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPHGAK C6 to C10	400	393	395	98.4	98.8	60.0-120			0.422	20
(S) a,a,a-Trifluorotoluene(FID)				*87.5*	*83.1*	*50.0-150*				

Method Blank (MB)

(MB) R3350603-2 10/14/18 22:26

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
TPHGAK C6 to C10	U		10.0	100
(S) a,a,a-Trifluorotoluene(FID)	*82.8*			*50.0-150*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3350603-1 10/14/18 21:37 • (LCSD) R3350603-3 10/15/18 02:13

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPHGAK C6 to C10	400	359	364	89.7	90.9	60.0-120			1.26	20
(S) a,a,a-Trifluorotoluene(FID)				*84.6*	*82.4*	*50.0-150*				

Method Blank (MB)

(MB) R3349588-3 10/10/18 10:15

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Acetone	U		10.0	50.0
Acrolein	U		8.87	50.0
Acrylonitrile	U		1.87	10.0
Benzene	U		0.331	1.00
Bromobenzene	U		0.352	1.00
Bromodichloromethane	U		0.380	1.00
Bromoform	U		0.469	1.00
Bromomethane	U		0.866	5.00
n-Butylbenzene	U		0.361	1.00
sec-Butylbenzene	U		0.365	1.00
tert-Butylbenzene	U		0.399	1.00
Carbon tetrachloride	U		0.379	1.00
Chlorobenzene	U		0.348	1.00
Chlorodibromomethane	U		0.327	1.00
Chloroethane	U		0.453	5.00
Chloroform	U		0.324	5.00
Chloromethane	U		0.276	2.50
2-Chlorotoluene	U		0.375	1.00
4-Chlorotoluene	U		0.351	1.00
1,2-Dibromo-3-Chloropropane	U		1.33	5.00
1,2-Dibromoethane	U		0.381	1.00
Dibromomethane	U		0.346	1.00
1,2-Dichlorobenzene	U		0.349	1.00
1,3-Dichlorobenzene	U		0.220	1.00
1,4-Dichlorobenzene	U		0.274	1.00
Dichlorodifluoromethane	U		0.551	5.00
1,1-Dichloroethane	U		0.259	1.00
1,2-Dichloroethane	U		0.361	1.00
1,1-Dichloroethene	U		0.398	1.00
cis-1,2-Dichloroethene	U		0.260	1.00
trans-1,2-Dichloroethene	U		0.396	1.00
1,1-Dichloropropene	U		0.352	1.00
1,2-Dichloropropane	U		0.306	1.00
1,3-Dichloropropane	U		0.366	1.00
cis-1,3-Dichloropropene	U		0.418	1.00
2,2-Dichloropropane	U		0.321	1.00
trans-1,3-Dichloropropene	U		0.419	1.00
Di-isopropyl ether	U		0.320	1.00
Ethylbenzene	U		0.384	1.00
Hexachloro-1,3-butadiene	U		0.256	1.00

Method Blank (MB)

(MB) R3349588-3 10/10/18 10:15

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
p-Isopropyltoluene	U		0.350	1.00
Isopropylbenzene	U		0.326	1.00
2-Butanone (MEK)	U		3.93	10.0
Methylene Chloride	U		1.00	5.00
4-Methyl-2-pentanone (MIBK)	U		2.14	10.0
Methyl tert-butyl ether	U		0.367	1.00
Naphthalene	U		1.00	5.00
n-Propylbenzene	U		0.349	1.00
1,1,1,2-Tetrachloroethane	U		0.385	1.00
Styrene	U		0.307	1.00
1,1,2,2-Tetrachloroethane	U		0.130	1.00
1,1,2-Trichlorotrifluoroethane	U		0.303	1.00
Tetrachloroethene	U		0.372	1.00
Toluene	U		0.412	1.00
1,2,3-Trichlorobenzene	U		0.230	1.00
1,2,3-Trichloropropane	U		0.807	2.50
1,2,4-Trichlorobenzene	U		0.355	1.00
1,1,1-Trichloroethane	U		0.319	1.00
1,2,3-Trimethylbenzene	U		0.321	1.00
1,1,2-Trichloroethane	U		0.383	1.00
1,2,4-Trimethylbenzene	U		0.373	1.00
1,3,5-Trimethylbenzene	U		0.387	1.00
Trichloroethene	U		0.398	1.00
Trichlorofluoromethane	U		1.20	5.00
Vinyl chloride	U		0.259	1.00
Xylenes, Total	U		1.06	3.00
(S) Toluene-d8	*105*			*80.0-120*
(S) Dibromofluoromethane	*98.3*			*75.0-120*
(S) 4-Bromofluorobenzene	*103*			*77.0-126*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3349588-1 10/10/18 09:12 • (LCSD) R3349588-2 10/10/18 09:33

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Bromobenzene	25.0	25.1	25.3	100	101	73.0-121			0.722	20
n-Butylbenzene	25.0	27.4	27.4	110	110	73.0-125			0.0182	20
sec-Butylbenzene	25.0	27.0	26.6	108	106	75.0-125			1.36	20
tert-Butylbenzene	25.0	26.8	26.7	107	107	76.0-124			0.492	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3349588-1 10/10/18 09:12 • (LCSD) R3349588-2 10/10/18 09:33

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	125	157	163	125	131	19.0-160			4.20	27
Acrolein	125	129	132	103	106	10.0-160			2.76	26
Acrylonitrile	125	133	137	107	110	55.0-149			3.09	20
Benzene	25.0	24.9	24.7	99.5	98.9	70.0-123			0.614	20
Bromodichloromethane	25.0	24.8	25.5	99.1	102	75.0-120			2.77	20
2-Chlorotoluene	25.0	25.6	25.7	103	103	76.0-123			0.109	20
Bromoform	25.0	25.2	26.1	101	105	68.0-132			3.61	20
4-Chlorotoluene	25.0	25.7	25.5	103	102	75.0-122			0.586	20
Bromomethane	25.0	20.0	17.5	80.2	70.0	10.0-160			13.5	25
1,2-Dibromo-3-Chloropropane	25.0	26.0	27.2	104	109	58.0-134			4.49	20
1,2-Dibromoethane	25.0	25.7	26.6	103	106	80.0-122			3.25	20
Dibromomethane	25.0	25.5	25.6	102	102	80.0-120			0.140	20
Carbon tetrachloride	25.0	24.0	23.8	95.8	95.3	68.0-126			0.575	20
Chlorobenzene	25.0	25.6	25.8	102	103	80.0-121			0.585	20
Chlorodibromomethane	25.0	24.9	25.8	99.5	103	77.0-125			3.63	20
Chloroethane	25.0	27.3	26.3	109	105	47.0-150			3.89	20
Chloroform	25.0	25.4	25.0	102	99.9	73.0-120			1.76	20
Chloromethane	25.0	30.5	30.0	122	120	41.0-142			1.48	20
cis-1,2-Dichloroethene	25.0	25.1	24.7	100	98.8	73.0-120			1.63	20
1,1-Dichloropropene	25.0	25.9	25.4	104	102	74.0-126			1.93	20
1,3-Dichloropropane	25.0	25.5	25.5	102	102	80.0-120			0.307	20
1,2-Dichlorobenzene	25.0	25.8	26.2	103	105	79.0-121			1.54	20
1,3-Dichlorobenzene	25.0	25.9	26.2	104	105	79.0-120			1.01	20
1,4-Dichlorobenzene	25.0	25.3	25.2	101	101	79.0-120			0.186	20
2,2-Dichloropropane	25.0	25.8	26.5	103	106	58.0-130			2.54	20
Di-isopropyl ether	25.0	25.1	25.3	100	101	58.0-138			0.797	20
Dichlorodifluoromethane	25.0	47.8	47.5	191	190	51.0-149	J4	J4	0.601	20
1,1-Dichloroethane	25.0	25.2	25.0	101	99.9	70.0-126			1.04	20
1,2-Dichloroethane	25.0	24.7	24.8	98.9	99.2	70.0-128			0.354	20
1,1-Dichloroethene	25.0	26.4	25.9	106	104	71.0-124			1.86	20
Hexachloro-1,3-butadiene	25.0	26.8	27.1	107	108	54.0-138			1.03	20
trans-1,2-Dichloroethene	25.0	26.3	26.1	105	104	73.0-120			0.827	20
1,2-Dichloropropane	25.0	25.1	25.6	100	103	77.0-125			2.23	20
p-Isopropyltoluene	25.0	27.2	27.1	109	108	76.0-125			0.514	20
cis-1,3-Dichloropropene	25.0	25.0	25.5	100	102	80.0-123			2.05	20
trans-1,3-Dichloropropene	25.0	25.5	25.7	102	103	78.0-124			0.585	20
Ethylbenzene	25.0	25.2	24.9	101	99.7	79.0-123			1.27	20
Naphthalene	25.0	26.0	26.9	104	107	54.0-135			3.29	20
n-Propylbenzene	25.0	26.2	26.3	105	105	77.0-124			0.0975	20
1,1,1,2-Tetrachloroethane	25.0	25.2	25.1	101	100	75.0-125			0.350	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3349588-1 10/10/18 09:12 • (LCSD) R3349588-2 10/10/18 09:33

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Isopropylbenzene	25.0	26.3	26.2	105	105	76.0-127			0.584	20
2-Butanone (MEK)	125	144	150	115	120	44.0-160			4.06	20
Methylene Chloride	25.0	23.7	23.7	94.9	94.9	67.0-120			0.0129	20
4-Methyl-2-pentanone (MIBK)	125	131	135	105	108	68.0-142			3.00	20
Methyl tert-butyl ether	25.0	24.7	25.1	99.0	100	68.0-125			1.44	20
Styrene	25.0	26.2	26.9	105	108	73.0-130			2.69	20
1,2,3-Trichloropropane	25.0	26.8	27.5	107	110	73.0-130			2.73	20
1,1,2,2-Tetrachloroethane	25.0	25.7	26.5	103	106	65.0-130			3.00	20
1,2,3-Trimethylbenzene	25.0	25.6	25.7	102	103	77.0-120			0.375	20
1,1,2-Trichlorotrifluoroethane	25.0	27.6	27.1	111	108	69.0-132			1.94	20
1,2,4-Trimethylbenzene	25.0	26.1	26.1	104	104	76.0-121			0.0400	20
1,3,5-Trimethylbenzene	25.0	26.1	26.2	105	105	76.0-122			0.230	20
Tetrachloroethene	25.0	26.1	25.5	104	102	72.0-132			2.14	20
Toluene	25.0	24.7	24.6	98.8	98.4	79.0-120			0.448	20
1,2,3-Trichlorobenzene	25.0	26.4	26.4	105	105	50.0-138			0.0239	20
1,2,4-Trichlorobenzene	25.0	26.8	26.9	107	108	57.0-137			0.261	20
1,1,1-Trichloroethane	25.0	25.1	25.1	100	101	73.0-124			0.0553	20
1,1,2-Trichloroethane	25.0	25.2	25.8	101	103	80.0-120			2.34	20
Trichloroethene	25.0	26.1	25.4	105	102	78.0-124			2.72	20
Trichlorofluoromethane	25.0	29.9	29.5	120	118	59.0-147			1.53	20
Vinyl chloride	25.0	31.7	31.8	127	127	67.0-131			0.0620	20
Xylenes, Total	75.0	76.4	75.9	102	101	79.0-123			0.657	20
(S) Toluene-d8				*102*	*102*	*80.0-120*				
(S) Dibromofluoromethane				*99.2*	*99.2*	*75.0-120*				
(S) 4-Bromofluorobenzene				*102*	*101*	*77.0-126*				

Method Blank (MB)

(MB) R3350037-3 10/11/18 10:59

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Benzene	U		0.331	1.00
1,2-Dichloroethane	U		0.361	1.00
(S) Toluene-d8	*110*			*80.0-120*
(S) Dibromofluoromethane	*95.2*			*75.0-120*
(S) 4-Bromofluorobenzene	*102*			*77.0-126*

Laboratory Control Sample (LCS)

(LCS) R3350037-1 10/11/18 09:58

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	25.0	23.5	94.2	70.0-123	
1,2-Dichloroethane	25.0	24.3	97.3	70.0-128	
(S) Toluene-d8			*108*	*80.0-120*	
(S) Dibromofluoromethane			*95.0*	*75.0-120*	
(S) 4-Bromofluorobenzene			*99.0*	*77.0-126*	

Method Blank (MB)

(MB) R3350439-1 10/13/18 16:53

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
AK102 DRO C10-C25	U		170	800
AK103 RRO C25-C36	U		460	800
(S) n-Triacontane d62	*95.6*			*50.0-150*
(S) o-Terphenyl	*73.0*			*50.0-150*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3350439-2 10/13/18 17:15 • (LCSD) R3350439-3 10/13/18 17:37

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
AK102 DRO C10-C25	3000	2760	3090	92.0	103	75.0-125			11.3	20
(S) n-Triacontane d62				*64.3*	*65.6*	*50.0-150*				
(S) o-Terphenyl				*97.5*	*99.0*	*50.0-150*				

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3350439-4 10/13/18 17:59 • (LCSD) R3350439-5 10/13/18 18:22

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
AK103 RRO C25-C36	3000	2910	3020	97.0	101	60.0-120			3.71	20
(S) n-Triacontane d62				*190*	*188*	*50.0-150*	J1	J1		
(S) o-Terphenyl				*78.3*	*82.2*	*50.0-150*				

Method Blank (MB)

(MB) R3349649-1 10/11/18 09:26

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Anthracene	U		0.00800	0.0500
Acenaphthene	U		0.0100	0.0500
Acenaphthylene	U		0.00700	0.0500
Benzo(a)anthracene	U		0.00830	0.0500
Benzo(a)pyrene	U		0.0158	0.0500
Benzo(b)fluoranthene	U		0.00212	0.0500
Benzo(g,h,i)perylene	0.00238	J	0.00227	0.0500
Benzo(k)fluoranthene	U		0.0255	0.0500
Chrysene	U		0.0144	0.0500
Dibenz(a,h)anthracene	U		0.00454	0.0500
Fluoranthene	U		0.0165	0.0500
Fluorene	U		0.00898	0.0500
Indeno(1,2,3-cd)pyrene	U		0.00739	0.0500
Naphthalene	U		0.0123	0.250
Phenanthrene	U		0.0184	0.0500
Pyrene	U		0.0155	0.0500
1-Methylnaphthalene	U		0.0189	0.250
2-Methylnaphthalene	U		0.0155	0.250
2-Chloronaphthalene	U		0.0165	0.250
(S) Nitrobenzene-d5	*61.5*			*11.0-135*
(S) 2-Fluorobiphenyl	*103*			*32.0-120*
(S) p-Terphenyl-d14	*112*			*23.0-122*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3349649-2 10/11/18 09:49 • (LCSD) R3349649-3 10/11/18 10:12

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Anthracene	2.00	1.98	2.18	99.0	109	43.0-127			9.62	20
Acenaphthene	2.00	2.06	2.23	103	111	42.0-120			7.93	20
Acenaphthylene	2.00	1.86	2.07	93.0	103	43.0-120			10.7	20
Benzo(a)anthracene	2.00	2.08	2.23	104	111	46.0-120			6.96	20
Benzo(a)pyrene	2.00	2.02	2.21	101	111	44.0-122			8.98	20
Benzo(b)fluoranthene	2.00	2.12	2.33	106	117	43.0-122			9.44	20
Benzo(g,h,i)perylene	2.00	2.23	2.43	111	122	25.0-137			8.58	23
Benzo(k)fluoranthene	2.00	2.27	2.31	114	115	39.0-128			1.75	22
Chrysene	2.00	2.24	2.35	112	117	42.0-129			4.79	20
Dibenz(a,h)anthracene	2.00	2.20	2.46	110	123	25.0-139			11.2	22
Fluoranthene	2.00	2.41	2.56	120	128	48.0-131			6.04	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3349649-2 10/11/18 09:49 • (LCSD) R3349649-3 10/11/18 10:12

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Fluorene	2.00	1.89	2.01	94.5	100	42.0-120			6.15	20
Indeno(1,2,3-cd)pyrene	2.00	2.30	2.51	115	125	37.0-133			8.73	20
Naphthalene	2.00	1.50	1.71	75.0	85.5	30.0-120			13.1	22
Phenanthrene	2.00	1.97	2.10	98.5	105	42.0-120			6.39	20
Pyrene	2.00	2.06	2.17	103	108	38.0-124			5.20	20
1-Methylnaphthalene	2.00	1.81	1.98	90.5	99.0	43.0-120			8.97	20
2-Methylnaphthalene	2.00	1.70	1.89	85.0	94.5	40.0-120			10.6	20
2-Chloronaphthalene	2.00	1.91	2.07	95.5	103	39.0-120			8.04	20
(S) Nitrobenzene-d5				*58.5*	*66.0*	*11.0-135*				
(S) 2-Fluorobiphenyl				*103*	*111*	*32.0-120*				
(S) p-Terphenyl-d14				*114*	*119*	*23.0-122*				

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J0	J0: Calibration verification outside of acceptance limits. Result is estimated.
J1	Surrogate recovery limits have been exceeded; values are outside upper control limits.
J2	Surrogate recovery limits have been exceeded; values are outside lower control limits.
J4	The associated batch QC was outside the established quality control range for accuracy.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T 104704245-17-14
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

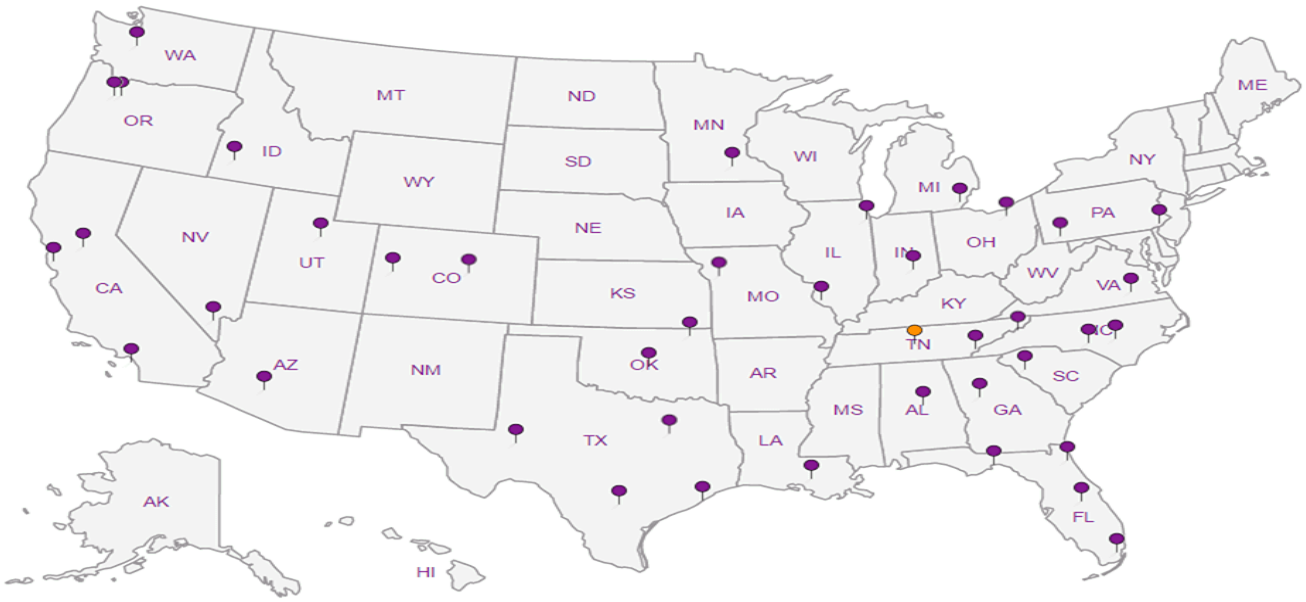
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



GES, Inc. - Concord, CA

5046 Commercial Circle, Ste. F
Concord, CA 94520

Billing Information:
GES Accounts Payable
440 Creamery Way
Ste. 500
Exton, PA 19341

Report to: Mark Peterson

Email To: mpeterson@gesonline.com; ~~aweiner@gesonline.com~~ czablocki

Project Description:

City/State Collected:

Phone: 866-507-1411
Fax: 925-825-2021

Client Project # 3016006-800006-214

Lab Project # GESCCA-ANCHORAGE

Collected by (print): Amy Zablocki

Site/Facility ID # 919 E. DIMOND BLVD.

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y X

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Pres Chk	8270PAHSIMD PAHs 100ml Amb-NoPres	AK101 40mlAmb HCl	AK102/103 100ml Amb HCl	VOCs V8260C 40mlAmb-HCl	trip blk AK101 40mlAmb-HCl-Blk	trip blk VOCs V8260C 40mlAmb-HCl-Blk					Remarks	Sample # (lab only)
MW-9		GW		10/4/18	1150	10		X	X	X	X								-01
MW-10		GW		10/5/18	1145	10		X	X	X	X								02
~~MW-11~~		~~GW~~				~~10~~		~~X~~	~~X~~	~~X~~	~~X~~								
MW-12		GW		10/5/18	1305	10		X	X	X	X								03
MW-13		GW		10/5/18	1415	10		X	X	X	X								04
DUP-1 (~~DMW-1~~)		GW		10/4/18	1545	~~10~~ 7		X	X	X	X								05
DMW-1		GW		10/4/18	1545	7		X		X	X								06
DMW-2		GW		10/4/18	1010	3					X								07
~~DMW-4C~~		~~GW~~				~~3~~					~~X~~								
~~DMW-5~~ TRIP BLANK		GW		10/4/18	1010	~~2~~ 1					~~X~~ X		X						08

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L# L1032640

Table #

Acctnum: GESCCA
Template: T135051
Prelogin: P673259
TSR: 110 - Brian Ford
PB: TB 9-20-18

Shipped Via: FedEX 2nd Day

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking # 462429911795

Sample Receipt Checklist
COC Seal Present/Intact: NP Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
	10/5/18	1936	FedEx
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: Yes / No
HCl / MeoH
TBR

Temp: 0.1 °C Bottles Received: 57
1.2 ± 0 = 1.2

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

Date: 10/8/18 Time: 1030

APPENDIX D

DEC Laboratory Data Review Checklist

MEMORANDUM

TO: **Mark C. Peterson, Project Manager**
Amy Zablocki

FROM: **Bonnie Janowiak, Ph.D.**

RE: **Data Evaluation Narrative**
Project: Shell – 919 Dimond Blvd., AK
Groundwater and Environmental Services
Matrix: Groundwater – Sampled October 4 and 5, 2018
Pace Analytical Report Number L1032690

Review completed November 2, 2018

1. Data Review Criteria

Groundwater & Environmental Services, Inc. (GES) reviewed the analytical data from the **Shell – 919 Dimond Blvd., Anchorage, Alaska Site** (Site) October 2018 sampling event in order to determine accuracy and precision for each analysis as well as to determine overall data usability. Organic and inorganic data were reviewed for holding times, method and field blank results, surrogate or system monitoring compound recoveries, Matrix Spike/Matrix Spike Duplicate (MS/MSD) and Laboratory Control Spike/Laboratory Control Spike Duplicate (LCS/LCSD) LCS recoveries. All data necessary to complete the data review were provided by the laboratory.

Monitoring well samples from six locations were collected from the site on October 4 and 5, 2018.

The samples were sent to Pace Analytical laboratory and analyzed by the following methodologies as requested on the Chain of Custody:

All samples were analyzed for Volatile Organic Compounds (GC/MS) by Method 8260B. In addition, monitoring well samples were analyzed as follows:

MW-9, MW-10, MW-12, MW-13

- Semi-Volatile Organic Compounds (GC) by Method AK102/103,
- Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM,
- Volatile Organic Compounds (GC) by Method 8021/AK101

For DMW-1 sample

- Semi-Volatile Organic Compounds (GC) by Method AK102/103,
- Semi Volatile Organic Compounds (GC/MS) by Method 8270 D-SIM

The analytical results were reviewed using laboratory acceptance criteria, procedures, and guidelines contained in the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, revised January 2017.

2. Data Qualifiers Assigned

TABLE 1. QUALIFIED ANALYTICAL DATA

Field Identification	Analyte	Qualification	Reason for Qualification
DMW-1 DMW-2	Benzo(g,h,i)perylene	U at PQL (non-detect at PQL)	Positive blank result
MW-9 MW-10	AK103 RRO C25-C36	J-	Low surrogate recovery
DMW-1 DUP-1	DRO, RRO	J	RPDs ≥ 30%

J: Estimated value
J-: Estimated value with a possible low bias
U at PQL: Non-detect at PQL/RL

3. Data Quality

Data was overall usable.

3.1. Holding Times

Analytical holding times were met.

3.2. Blank Results

Benzo(g,h,i)perylene was positive in the blank below the PQL but above the MDL: EPA guidelines requires the field sample concentrations to exceed by five times those of the blank to be considered representative of the sample. Under these guidelines, the positive analytical detections in associated samples for benzo(g,h,i)perylene are qualified as non-detect at the PQL. Affected data are listed in **Table 1**.

3.3. LCS/LCSD

All LCS/LCSD recoveries were within laboratory-specified criteria.

3.4. MS/MSD

All associated MS/MSD recoveries and RPDs were within laboratory-specified criteria.

3.5. Preservation

Samples were collected and subsequently stored in amber sample bottles. Coolers arrived at the laboratory at above recommended temperature (4° ± 2° C) at 1.25°C. Samples were stored in appropriate bottleware with correct preservation until prepared and analyzed.

3.6. Surrogates Recoveries and Accuracy

The surrogate recoveries were all within laboratory-specified ranges with the exception of the following:

- N-Triacontane-d62 recovered below laboratory criteria for samples MW-9 and MW-10.
- Nitrobenzene-d5 recovered below the minimum EPA 10% requirement for valid data in MW-10.
- p-Terphenyl recovered high in the SVOC analysis for MW-9.

The low n-triacontane recoveries indicate a possible low bias for the RRO concentrations reported for the samples. The high recoveries for p-terphenyl indicate a possible high bias in the naphthalene result for MW-9. The below EPA compliance level recovery of nitrobenzene-d5 does

not impact the data, as the other two surrogates recovered are at or near 100%, and indicate there is not overall issue with the methodology.

RRO detections in MW-9 and MW-10 are qualified as estimated with a possible low bias. Naphthalene in MW-9 is qualified as estimated with a possible high bias. MW-10 SVOCs are usable as reported.

3.7. Duplicate Analyses and Precision

Precision is the distribution of a set of reported values about the mean, or the closeness of agreement between individual test results obtained under prescribed and similar conditions. Precision is best expressed in terms of relative percent difference (RPD).

The blind field duplicate was sampled from location DMW-1 and labeled DUP-1. All RPDs of analytes above the reporting limit were below the EPA recommended 30%, with the following exception:

- Field duplicates for the AK102/103 analyses had RPDs ≥ 30%. (DRO 30%, RRO 32%).

The positive analytical results for DRO and RRO in DMW-1 and DUP-1 are qualified as estimated due to precision issues.

Analysis of the laboratory precision employed evaluation of laboratory LCS/LCSD and MS/MSD relative percent difference RPD against provided ranges. All RPD values fell within range for the quality control samples with the exceptions listed above in Section 3.4.

3.8. Accuracy

Accuracy is a measure of the closeness of an observed value to the “true” value, e.g., theoretical or reference value, or population mean. Accuracy includes a combination of random error and systematic error (bias) that result from sampling and analytical operations. Analytical batch accuracy is measured through the analyses of recoveries in LCSs and MS/MSDs. Sample specific accuracy is measured with surrogate recovery. All surrogate recoveries and all recoveries reported in the LCS with the above noted exceptions, and any MS/MSD results were within laboratory-specified criteria, with the exception of the VOC recoveries noted in section 3.4. Accuracy for this sampling event and report is 97%.

3.9. Sensitivity

Sensitivity is the measure of how low a concentration can be detected/reported. Sensitivity is measured using PQLs or RLs with additional sensitivity achieved by reporting to the method detection limit (MDL). Analytes reported with a positive detection between the RL and the MDL are considered present, but the quantity is estimated. The PQL levels are sufficient to compare to the DEC standards, and analytes reported below the PQL are also below the corresponding direct contact standard. No analyte was detected at or near regulatory levels.

4. Summary

Analytical data are usable and considered definitive data and suitable for comparison to regulatory standards,

Please do not hesitate to contact me if you have comments or questions.

Sincerely,

Bonnie Janowiak, Ph.D.
Senior Chemist
708 N Main, Suite 201
Blacksburg, VA 24060

Laboratory Data Review Checklist

Completed by:	Bonnie Janowiak		
Title:	Project Chemist	Date:	Nov 1, 2018
CS Report Name:	Second Semi-Annual 2017 Groundwater Monitoring Report	Report Date:	Oct 16, 2018
Consultant Firm:	Groundwater & Environmental Services		
Laboratory Name:	Pace Analytical	Laboratory Report Number:	L1032183
ADEC File Number:	2100.26.106	ADEC RecKey Number:	1990210019102

1. Laboratory

a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

(•) Yes ( ) No ( ) NA (Please explain.) Comments:

b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

( ) Yes ( ) No (•) NA (Please explain) Comments:

No samples were transferred or subcontracted.

2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Correct analyses requested?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

1.2 Degrees Celsius

b. Sample preservation acceptable - acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. Sample condition documented - broken, leaking (Methanol), zero headspace (VOC vials)?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

d. If there were any discrepancies, were they documented? - For example, incorrect sample containers/ preservation, sample temperature outside of acceptance range, insufficient or missing samples, etc.?

( ) Yes (•) No ( ) NA (Please explain) Comments:

The laboratory does not have a sample specific case narrative. The laboratory provides a liability statement indicating that all data has been reviewed and all issues have been identified.

e. Data quality or usability affected? (Please explain)

Comments:

No.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

The laboratory does not have a sample specific case narrative. The laboratory provides a liability statement indicating that all data has been reviewed and all issues have been identified.

b. Discrepancies, errors or QC failures identified by the lab?

( ) Yes (•) No ( ) NA (Please explain) Comments:

c. Were all corrective actions documented?

( ) Yes ( ) No (•) NA (Please explain) Comments:

see comment a.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. All applicable holding times met?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

( ) Yes ( ) No (•) NA (Please explain) Comments:

Aqueous samples only.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

e. Data quality or usability affected? (Please explain)

Comments:

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Benzo(g,h,i)perylene had a method blank detection between the RL and MDL. All associated samples with detections of this analyte below the RL are qualified as non-detect at the reporting level.

iii. If above PQL, what samples are affected? Comments:

DMW-1 and DMW-2

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

(•) Yes ( ) No (•) NA (Please explain) Comments:

v. Data quality or usability affected? (Please explain) Comments:

The benzo(g,h,i)perylene concentrations reported in DMW-1 and DMW-2 is qualified as non-detect at the reporting limit.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics - One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. Metals/Inorganics - One LCS and one sample duplicate reported per matrix, analysis and 20 samples?

( ) Yes ( ) No (•) NA (Please explain) Comments:

No metals or inorganics reported

iii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

(•) Yes ( ) No ( ) NA (Please explain) Comments:

All data associated with the site is reported within method or laboratory limits.

iv. Precision - All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/DMSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

( ) Yes (•) No ( ) NA (Please explain) Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

DMW-1 and DUP-1

vi. Do the affected samples(s) have data flags? If so, are the data flags clearly defined?

○ Yes ○ No ◉ NA (Please explain) Comments:

No data flags

vii. Data quality or usability affected? (Please explain) Comments:

c. Surrogates - Organics Only

i. Are surrogate recoveries reported for organic analyses - field, QC and laboratory samples?

◉ Yes ○ No ○ NA (Please explain) Comments:

ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

○ Yes ◉ No ○ NA (Please explain) Comments:

.n-Tricontane-d62 recovered below laboratory criteria for samples MW-9 and MW-10. Nitrobenzene-d5 recovered below the minimum EPA 10% requirement for valid data in MW-10. p-Terphenyl recovered high in SVOC data for MW-9.

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

○ Yes ◉ No ○ NA (Please explain) Comments:

The low n-triacontane recoveries indicate a possible low bias for the RRO concentrations reported for the samples. The high recoveries for p-terphenyl indicate a possible high bias in the naphthalene result for MW-9. The below EPA compliance level recovery of nitrobenzene-d5 does not impact the data, as the other two surrogates recovered are at or near 100% and indicate there is no overall issue with the methodology.

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

○ Yes ◉ No ○ NA (Please explain) Comments:

RRO detections in MW-9 and MW-10 are qualified as estimated with a possible low bias. Napthalene in MW-9 is qualified as estimated with a possible high bias. MW-10 SVOCs are usable as reported.

d. Trip Blank - Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

◉ Yes ○ No ○ NA (Please explain.) Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

◉ Yes ○ No ○ NA (Please explain.) Comments:

iii. All results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

v. Data quality or usability affected? (Please explain.)

Comments:

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

◉ Yes ○ No ○ NA (Please explain) Comments:

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iii. Precision - All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute Value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

○ Yes ◉ No ○ NA (Please explain) Comments:

Field duplicates for the AK102/103 analyses had RPDs > 30%. (DRO 30%, RRO 32%).

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

◉ Yes ○ No ○ NA (Please explain) Comments:

The positive analytical results for DRO and RRO in DMW-1 and DUP-1 are qualified as estimated due to precision issues.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ◉ No ○ NA (Please explain) Comments:

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

No equipment blank in the analytical batch.

ii. If above PQL, what samples are affected?

Comments:

iii. Data quality or usability affected? (Please explain.)

Comments:

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain) Comments: