September 18, 2016

TO: Cris Matthews (Ecology)
FROM: Karen Mixon (URS)

CC: Mike Droppo (Kinder Morgan), Patrick Davis (Trans Mountain), Cary Brown (URS), Demetrio Cabanillas (URS), Dan Heimbigner (Whatcom Environmental)

RE:	URS Progress Report – April 1 to August 31, 2016
PROJECT:	Cleanup Action Consent Decree No. 14-2-01294-9 (effective 6-5-2014) Laurel Station 1009 E. Smith Road, Bellingham, Washington
TRANS MOUNTAIN PM:	Mike Droppo
ECOLOGY CASE MGR:	Cris Matthews
URS PROJ NO:	60485368
URS PROJ MGR:	Karen Mixon

Introduction:
This progress report is presented in accordance with Consent Decree 14-2-01294-9 (effective 6-5-2014) and is intended to present the information as noted under Section XI PROGRESS REPORTS in the Consent Decree. The period presented in this report extends past the quarter (April through June) to August 31, 2016 due to delay for the 2nd quarter report.

Work Accomplished During Reporting Period:

DPE System Operation
The DPE well locations are shown on attached **Figure 2 Site Plan and DPE Well Locations**. The DPE system operated in SVE mode during the period from April 1 through August 31, 2016. All 10 wells (DPE-1 through DPE-10) were operated in April through part of May. On May 17, 2016, wells DPE-4, -5, -9, and -10 were shutdown based on low mass removal at these locations. Ceasing operation at these 4 wells allowed increased flow at the six remaining wells to improve removal rates at DPE-1, -2, -3, -6, -7, and -8. At the end of this reporting period (August 2016), approximately 2,488 pounds of constituents of concern (COCs) have been removed since the system startup in July 2015 (13 months ago). Graphs showing the cumulative removal of COCs by the system are attached to this report and indicate ongoing strong performance. The pounds removed are based on calculations made using PID measurements at the combined vapor monitoring point prior to the vapor GAC system and flow measurements. No treated groundwater was discharged from the system during this reporting period. Approximately 30,339 gallons of water have been removed since the system was started in July 2015 with most of the volume removed during DPE mode operation in March 2016. No measureable product has been observed or recovered by the system to date.

Air monitoring using FID and PID field instruments was conducted by Whatcom Environmental twice weekly to monitor the vapor GAC treatment system from April through May. Based on carbon usage (carbon was changed out on March 29, 2016), a decision was made to reduce the monitoring to one-time weekly beginning in June. Sampling ports are located before the first carbon unit (pre-treatment), between the first and second units (mid-treatment), and after the 2nd

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unit (post-treatment). The carbon was changed out if the PID measurements at the mid-treatment location exceeded 50 ppm. During this reporting period the vapor GAC was changed out 3 times (June 6, July 8, and August 9, 2016).

Groundwater Monitoring

URS conducted the second quarter 2016 groundwater sample collection on June 27, 2016. The sample collection on June 27, 2016 was conducted consistent with the sampling events in December 2015 and March 2016 (see progress report dated April 11, 2016). The sampling program was revised from the plan presented in the Compliance Monitoring Plan (CMP, URS 2015) following a discussion with Cris Matthews on October 1, 2015. The revision was necessary to account for the change to the well installations for the DPE system and monitoring well network during the construction phase of the cleanup action. See attached **Figure 2 Site Plan and DPE Well Locations** for well locations. Wells MW-4, MW-6, MW-15, MW-16, and DPE-4 are intended to be sampled quarterly.

The DPE system was shut down on Friday June 24, 2016 to allow the groundwater to equilibrate before sample collection. On June 27, 2016, water levels were measured from wells MW-3, MW-4, MW-6, MW-8, MW-11 through MW-16, SW-1, SW-2, and SW-3. Well DPE-4 was gauged on June 23, 2016 and was dry. Wells MW-8 and MW-11 through MW-16 were also dry. Wells MW-3 and MW-4 had less than 1 foot of water present in each well. Wells MW-6, SW-1 and SW-2 had at least 8 feet of water present and well SW-3 was dry. Only well MW-6 of the wells scheduled to be sampled contained enough water to allow sample collection. A cumulative water elevation table summary from April 2015 through June 2016 is attached to this report.

The sample was collected using low-flow method with a portable bladder pump with sample intake set approximately 22 feet below top of casing. The well was purged approximately 1/2-hour while measuring pH, temperature, specific conductance, dissolved oxygen, and oxidation-reduction potential. All parameters were within the low flow criteria when purging was stopped. The sample and a field duplicate were collected directly into laboratory supplied containers for BTEX/NWTPH-Gx, NWTPH-Dx, and PAH analysis and submitted to Analytical Resources, Inc. the next day via Federal Express.

URS completed the data review for the first quarter and second quarter 2016 groundwater sample collection. The summary data table, data validation memos, and laboratory reports are attached to this progress report.

Additional Investigation

URS submitted a letter work plan to Ecology on July 11, 2016 for additional investigation in the Pump Station Area. The proposed investigation was to refine the lateral limits of petroleum hydrocarbons in soil previously identified at boring location SU1-B11 during the site remedial investigation (URS 2014). Ecology approved the work plan on July 13, 2016. The field work was completed on July 18, 2016 as described in the work plan. The data has been received. A letter report summarizing the field work and data will be submitted to Ecology in September 2016.

Submittals

- URS submitted two paper copies of the February 5, 2016 version of the DPE O&M manual for Ecology's project file during this period. Please note this document is considered a 'living' document and will be updated as necessary during the operation of the DPE system.

- Kinder Morgan submitted a letter on July 6, 2016 via email to Ecology providing the documentation for the Financial Assurance requirement in Article XXI of the consent decree.

- URS submitted a letter work plan on July 11, 2015 for additional investigation around boring SU1-B11.

- The CMP update is in internal review at URS.

- The Completion Report is in internal review at URS.

Deviations to Approved Plans Not Previously Documented:
None

Deviation to Scope of Work and Schedule as Presented in the Cleanup Action Plan (Exhibit A of Consent Decree):
There were no changes from previous progress reports to the overall Scope of Work described in the Cleanup Action Plan (CAP).

Data Received During Reporting Period:

- Groundwater monitoring data collected on March 29 and June 27, 2016
- Soil data associated with SU1-B11 investigation completed on July 18, 2016

Plans for the Next Reporting Period:
The following are planned activities for the period from September 1 through December 31, 2016.

- Continue to operate and maintain the DPE system.

- Submit a letter report to Ecology summarizing the results of the field investigation to refine the limits of petroleum hydrocarbon contamination at previous boring SU1-B11 in the pump station area.

- Complete the supplement to the Compliance Monitoring Plan for air and NPDES monitoring associated with discharges from the DPE treatment systems.

- Submit the Completion Report for the cleanup action through DPE installation.

- Complete the 3rd quarter and 4th quarter 2016 groundwater sample collection in September and December 2016, respectively. Review data and prepare for submittal with progress report in January 2017.

- Present a draft Environmental Restrictive Covenant for the site as related to remaining TPH contamination.

Please contact Karen Mixon at (206) 438-2234 if you have any questions or comments regarding this progress report.

References:

URS Corporation, 2014. Final Remedial Investigation/Feasibility Study Report, Laurel Station, 1009 East Smith Road, Bellingham, Washington, June 2, 2014.

URS Corporation, 2015. Final Compliance Monitoring Plan, Laurel Station, 1009 East Smith Road, Bellingham, Washington, January 16, 2015.

URS Corporation, 2016. Letter Work Plan, Additional Investigation – SU1-B11, Laurel Station, 1009 East Smith Road, Bellingham, Washington, July 11, 2016.

Attachments:

Figure 2, Site Plan and DPE Well Locations (from the O&M Manual, February 5, 2016)
DPE System Performance Graphs, August 2016
Table – Monitoring Well Groundwater Elevation Data Summary
Table – Quarterly Groundwater Monitoring Results
Data Validation Report March 2016
ARI Lab Report AYK4
Data Validation Report June 2016
ARI Lab Report BCQ4

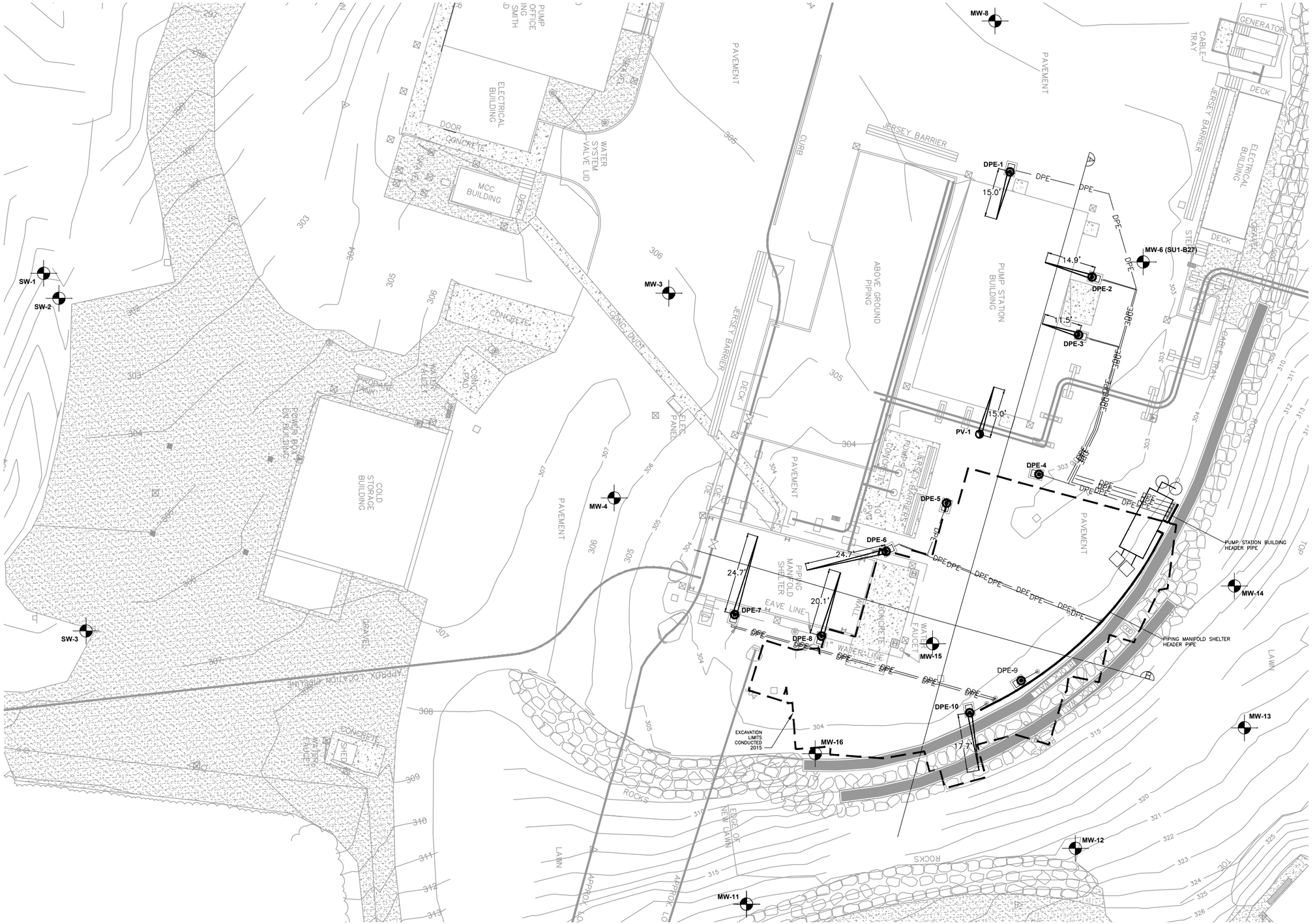


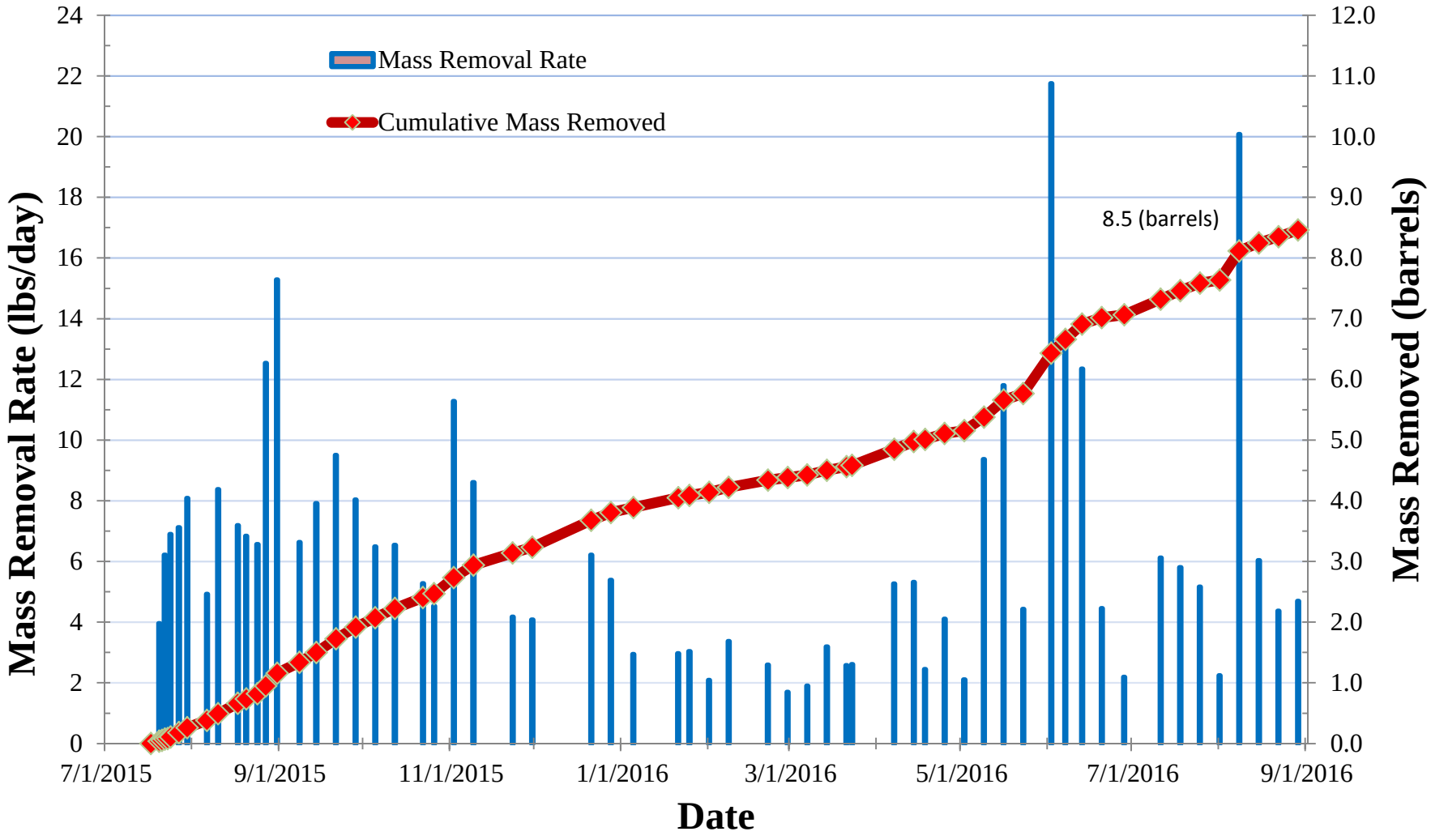
Figure 2
Site Plan and DPE Well Locations

Laurel Station
Bellingham, Washington

URS

COMBINED SYSTEM MASS REMOVAL DATA

Laurel Station DPE System

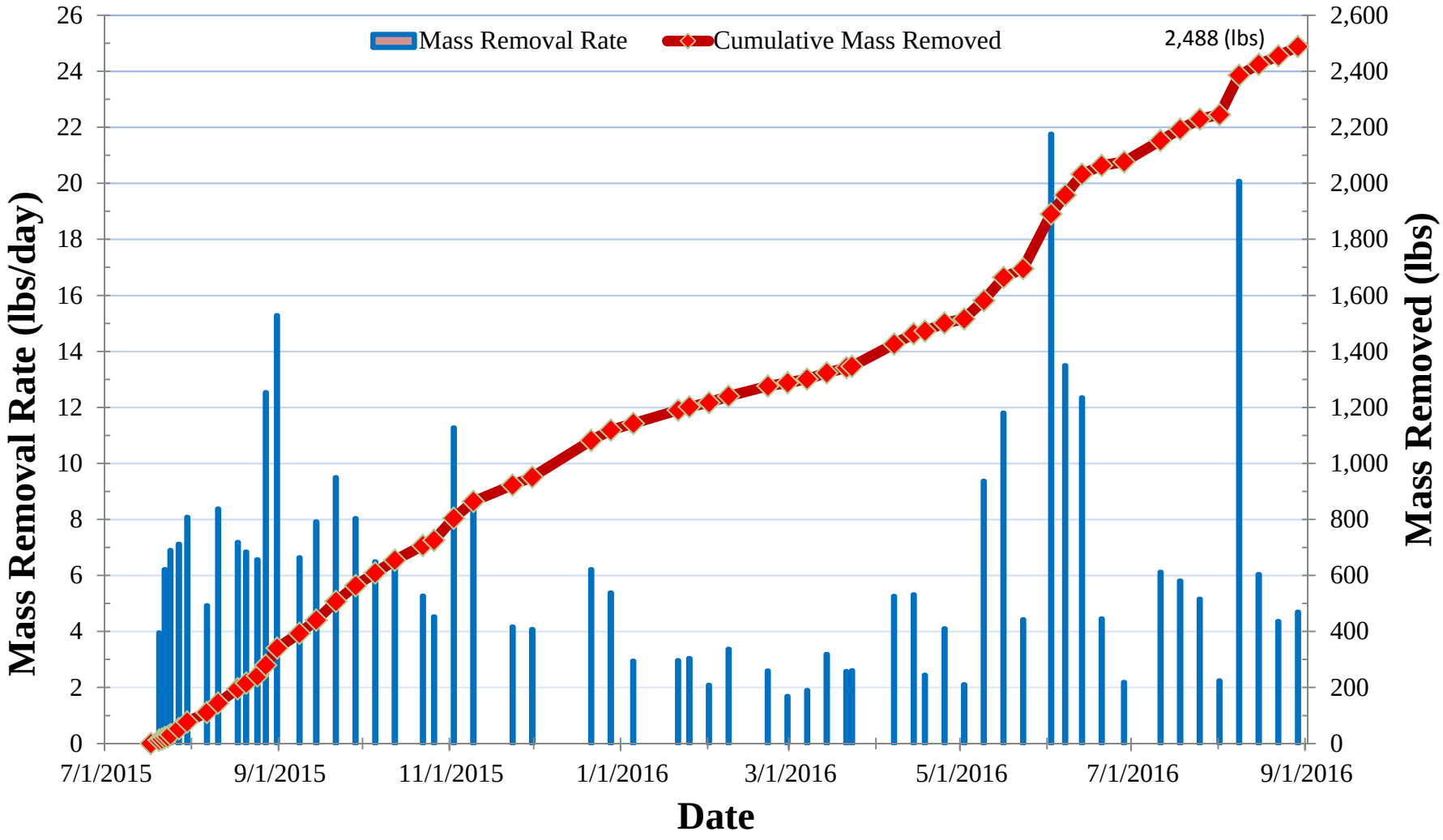


Notes:

1. Data shown from July 17, 2015 through August 29, 2016, after approximately 13 months of operation.
2. The Cumulative Mass Removed is based on data taken from the pre-treatment sampling port directly before carbon treatment.

COMBINED SYSTEM MASS REMOVAL DATA

Laurel Station DPE System

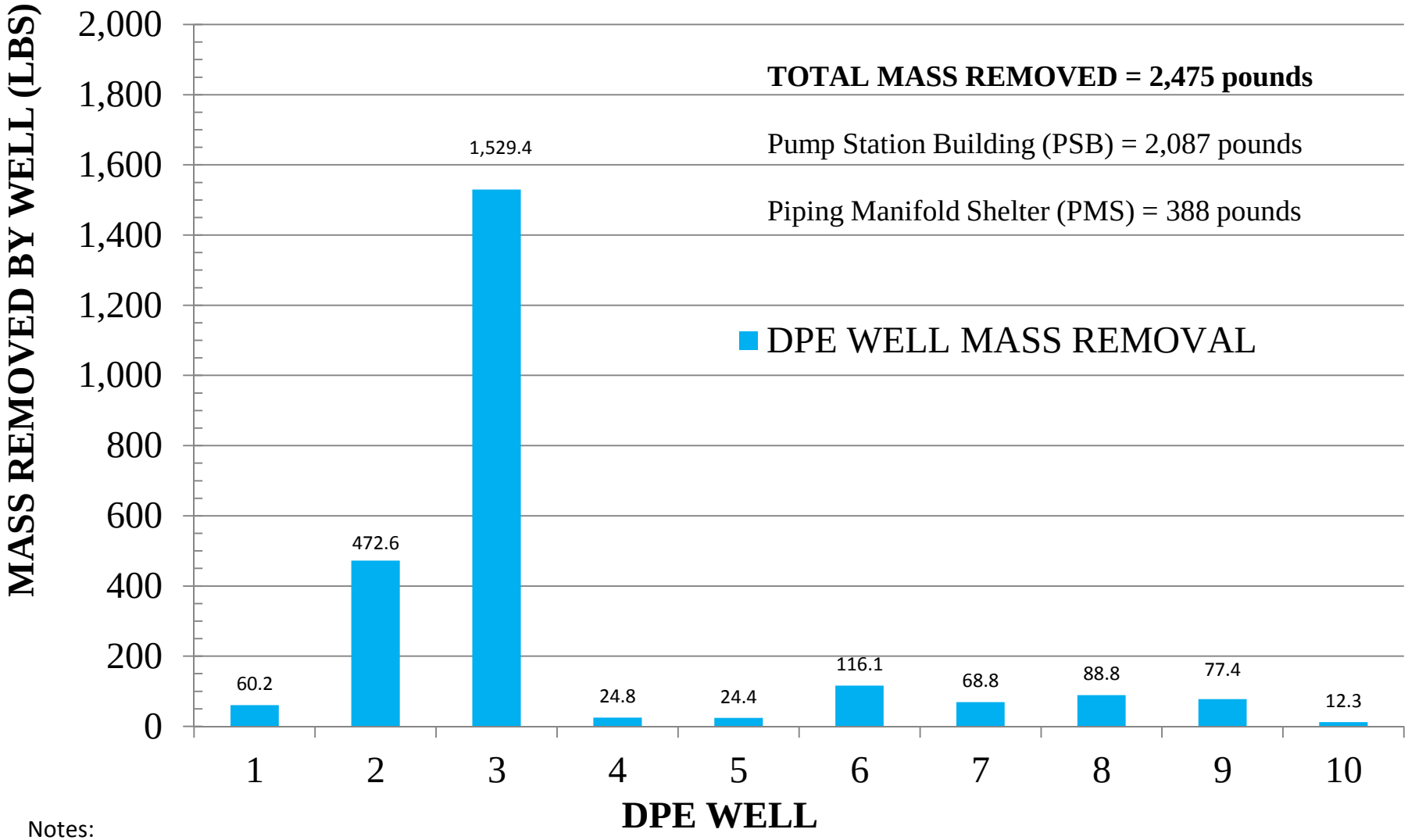


Notes:

1. Data shown from July 17, 2015 through August 29, 2016, after approximately 13 months of operation.
2. The Cumulative Mass Removed is based on data taken from the pre-treatment sampling port directly before carbon treatment.

MASS REMOVAL DISTRIBUTION - Cumulative

Laurel Station DPE System

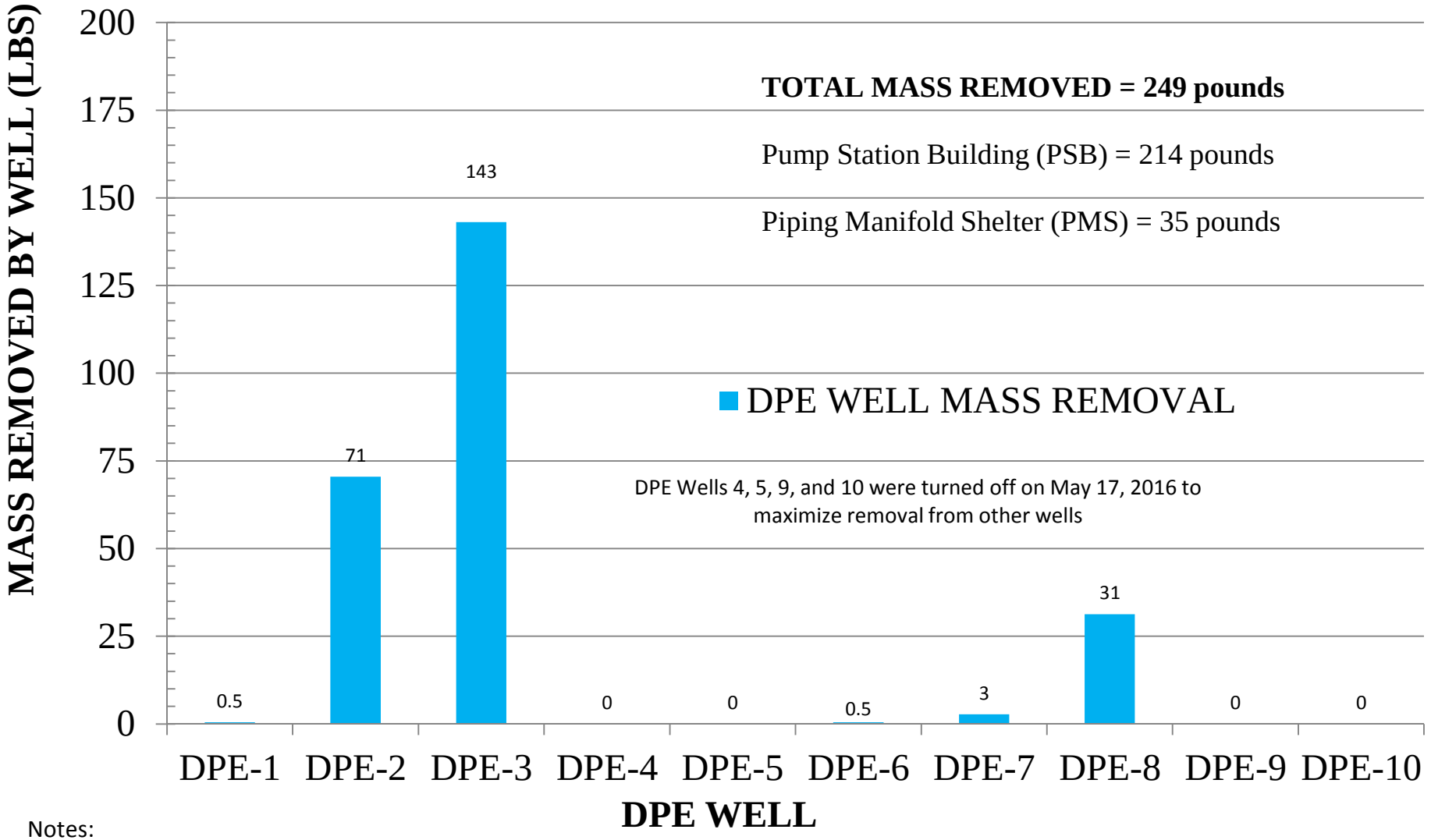


Notes:

1. Estimated mass removal from July 17, 2015 through August 29, 2016
2. The TOTAL represents the sum of all 10 individual wells
3. Mass removed from the PSB and PMS were calculated based on the mass removed from individual wells
4. DPE-1 through 4 are PSB wells, DPE-5 through 10 are PMS wells.

MASS REMOVAL DISTRIBUTION - August 2016

Laurel Station DPE System



Notes:

1. Estimated mass removal for August 2016
2. The TOTAL represents the sum of all 10 individual wells
3. Mass removed from the PSB and PMS was calculated based on the mass removed from individual wells
4. DPE-1 through 4 are PSB wells , DPE-5 through 10 are PMS wells.

Table
Monitoring Well Groundwater Elevation Data Summary
Laurel Station Cleanup Action
Bellingham, Washington

Well ID	Date Measured	Total Depth[a] (ft-TOC)	TOC Elevation[b] (ft-NAVD88)	Approximate Screen Interval (ft-bgs)	Approximate Screen Interval Elevation (ft-NAVD88)	Depth to Groundwater (ft-TOC)	Groundwater Elevation (ft-NAVD88)	Thickness of Water Column (ft)
SW-1	4/23/2015	18.50	300.64	5 - 20	295.64 - 280.64	4.30	296.34	14.20
	12/14/2015	18.35				4.10	296.54	14.25
	1/25/2016	18.68				5.09	295.55	13.59
	2/22/2016	17.39				14.20	286.44	3.19
	3/21/2016	18.57				5.08	295.56	13.49
	4/25/2016	18.59				18.59	282.05	NC
	5/23/2016	18.62				18.62	282.02	NC
	6/27/2016	18.40				4.72	295.92	13.68
SW-2	4/23/2015	49.75	301.37	40 - 50	261.37 - 251.37	37.59	263.78	12.16
	2/22/2016	50.26				DRY	NC	NC
	3/21/2016	50.03				36.86	264.51	13.17
	4/25/2016	50.25				50.25	251.12	NC
	5/23/2016	50.15				50.15	251.22	NC
	6/27/2016	49.75				37.61	263.76	12.14
SW-3[c]	4/23/2015	34.75	309.48	22 - 32	284.48 - 274.48	32.19	277.29	2.56
	12/14/2015	34.78				33.11	276.37	1.67
	1/25/2016	35.12				32.40	277.08	2.72
	2/22/2016	34.86				DRY	NC	NC
	3/21/2016	34.91				31.98	277.50	2.93
	4/25/2016	34.91				34.91	274.57	NC
	5/23/2016	35.03				35.03	274.45	NC
	6/27/2016	34.70				34.70	274.78	NC
DPE-4[d]	4/23/2015	16.91	301.76	6.5 - 16.5	298.51 - 288.51	8.46	293.30	8.45
	10/26/2015	17.00				16.50	285.80	0.50
	12/14/2015	15.70				15.50	286.80	0.20
	1/25/2016	15.70				14.77	287.53	0.93
	2/22/2016	16.14				15.90	286.40	0.24
	3/21/2016	#REF!				14.95	287.35	0.14
	4/25/2016	15.14				15.14	287.16	NC
	5/23/2016	15.15				15.14	287.16	NC
	6/23/2016	15.13				15.13	287.17	NC
MW-3	4/23/2015	33.40	305.83	24 - 34	281.83 - 271.83	DRY	NC	NC
	12/14/2015	33.55				DRY	NC	NC
	1/25/2016	33.39				DRY	NC	NC
	2/22/2016	33.48				DRY	NC	NC
	3/21/2016	33.99				33.36	272.47	0.63
	4/25/2016	34.91				34.91	270.92	NC
	5/23/2016	33.86				33.86	271.97	NC
	6/23/2016	35.10				34.50	271.33	0.60
	6/27/2016	34.60				33.73	272.10	0.87
MW-4	4/23/2015	30.15	305.67	20 - 30	285.67 - 275.67	28.07	277.60	2.08
	12/14/2015	30.16				DRY	NC	NC
	1/25/2016	30.34				29.04	276.63	1.30
	2/22/2016	30.37				24.33	281.34	6.04
	3/21/2016	30.35				25.86	279.81	4.49
	4/25/2016	33.79				33.79	271.88	NC
	5/23/2016	30.47				30.47	275.20	NC
	6/23/2016	30.15				29.84	275.83	0.31
	6/27/2016	30.12				29.85	275.82	0.27
MW-6	4/23/2015	26.55	302.78	11 - 26	291.78 - 276.78	16.51	286.27	10.04
	11/30/2015	NA				16.17	286.61	10.38
	12/14/2015	26.56				12.92	289.86	13.64
	1/25/2016	26.74				13.59	289.19	13.15
	2/22/2016	26.77				12.89	289.89	13.88
	3/21/2016	26.65				13.02	289.76	13.63
	4/25/2016	26.73				26.73	276.05	NC
	5/23/2016	26.84				26.84	275.94	NC
	6/23/2016	26.78				19.17	283.61	7.61
	6/27/2016	26.70				18.52	284.26	8.18
MW-8	4/23/2015	37.10	302.24	23 - 38	279.24 - 264.24	DRY	NC	NC
	12/14/2015	37.08				DRY	NC	NC
	1/25/2016	37.28				DRY	NC	NC
	2/22/2016	37.13				36.91	265.33	0.22
	3/21/2016	37.45				37.00	265.24	0.45
	4/25/2016	37.41				37.41	264.83	NC
	5/23/2016	37.55				37.05	265.19	0.50
	6/23/2016	37.50				37.04	265.20	0.46
	6/27/2016	37.20				37.20	265.04	NC

Table
Monitoring Well Groundwater Elevation Data Summary
Laurel Station Cleanup Action
Bellingham, Washington

MW-11[c]	4/23/2015	48.15	321.31	25 - 45	293.31 - 273.31	DRY	NC	NC
	11/30/2015	NA				47.54	273.77	0.61
	12/14/2015	48.17				47.21	274.10	0.96
	1/25/2016	46.93				DRY	NC	NC
	2/22/2016	48.21				46.86	274.45	1.35
	3/21/2016	48.52				46.96	274.35	1.56
	4/25/2016	48.69				48.69	272.62	NC
	5/23/2016	48.73				48.73	272.58	NC
	6/27/2016	48.30				48.30	273.01	NC
MW-12[c]	4/23/2015	51.60	323.53	29 - 49	291.53 - 271.53	DRY	NC	NC
	11/30/2015	NA				50.69	272.84	0.91
	12/14/2015	51.80				51.20	272.33	0.60
	1/25/2016	52.12				DRY	NC	NC
	2/22/2016	51.99				DRY	NC	NC
	3/21/2016	52.20				51.74	271.79	0.46
	4/25/2016	52.12				52.12	271.41	NC
	5/23/2016	52.22				52.22	271.31	NC
	6/27/2016	51.75				51.75	271.78	NC
MW-13[c]	4/23/2015	62.45	323.20	39 - 59	281.20 - 261.20	DRY	NC	NC
	11/30/2015	NA				63.48	NC	NC
	12/14/2015	62.62				DRY	NC	NC
	1/25/2016	63.21				62.45	260.75	0.76
	2/22/2016	62.56				DRY	NC	NC
	3/21/2016	63.06				63.06	NC	NC
	4/25/2016	63.09				63.09	260.11	NC
	5/23/2016	63.11				63.11	260.09	NC
	6/27/2016	62.60				62.60	260.60	NC
MW-14	4/23/2015	50.75	316.79	30 - 50	286.77 - 266.77	DRY	NC	NC
	11/30/2015	NA				50.72	266.07	0.03
	12/14/2015	50.94				DRY	NC	NC
	1/25/2016	51.37				DRY	NC	NC
	2/22/2016	51.24				50.77	266.02	0.47
	3/21/2016	51.46				50.73	266.06	0.73
	4/25/2016	51.46				51.46	265.33	NC
	5/23/2016	51.12				51.12	265.67	NC
	6/27/2016	50.90				50.90	265.89	NC
MW-15	4/23/2015	34.25	303.12	25 - 35	278.12 - 268.12	DRY	NC	NC
	10/26/2015	33.76				33.72	269.40	0.04
	11/30/2015	NA				33.82	269.30	NC
	12/14/2015	34.24				33.79	269.33	0.45
	1/25/2016	35.15				33.80	269.32	1.35
	2/22/2016	33.39				33.19	269.93	0.20
	3/21/2016	34.82				33.78	269.34	1.04
	4/25/2016	34.71				34.71	268.41	NC
	5/23/2016	34.80				34.80	268.32	NC
	6/27/2016	33.52				33.52	269.60	NC
MW-16	4/23/2015	34.82	303.91	25 - 35	278.91 - 268.91	DRY	NC	NC
	10/26/2015	34.91				34.80	269.11	0.11
	12/14/2015	34.83				DRY	NC	NC
	1/25/2016	35.73				DRY	NC	NC
	2/22/2016	35.72				34.97	268.94	0.75
	3/21/2016	35.61				33.81	270.10	1.80
	4/25/2016	35.41				35.41	268.50	NC
	5/23/2016	35.58				35.58	268.33	NC
	6/27/2016	34.70				34.70	269.21	NC

[a]Total depth was measured by sounding the wells prior to sampling and may differ from total depth as installed.

[b]Source of TOC elevations prior to 2011 is from Dames & Moore 1992a. Source of TOC elevations for 2011 is Larry Steele & Associates 2011. Vertical elevation datum prior to 2011 was National Geodetic Vertical Datum 29, and 2011 vertical elevation datum is NAVD 88 (ft).

[c]Stick-up well monument; Well MW-14 casing re-surveyed April 2015 as casing was cut during site work in 2014.

[d]TOC elevation is an estimate as the measurement does not account for the additional length due to DPE well head installation.

Notes:

Highlighted cells recorded a water column less than 0.7 foot. This is an indication that the well is dry and the water measured in the well is due to the collection of water in the bottom cap of the well.

Well is dry.

ft - foot

ft-TOC - feet below top of well casing

ft-NAVD88 - vertical elevation in feet relative to North American Vertical Datum of 1988

ft-bgs - feet below ground surface

NC - not calculated

NM - not measured

Quarterly Groundwater Monitoring Results
Laurel Station Cleanup Action
Bellingham, Washington

Sample ID	Groundwater	MW4	MW-6						PV-1	DPE-1	DPE-2	DPE-3	DPE-4	DPE-5	DPE-8
Sample Date	Cleanup Levels	4/23/15	4/23/15	4/23/15 (DUP)	12/14/15	3/29/16	3/29/16 (DUP)	6/27/16	6/27/16 (DUP)	4/24/15	4/24/15	4/24/15	4/23/15	4/24/15	4/24/15	4/23/15
Total Petroleum Hydrocarbons (mg/L)																
Gasoline-range (Gx)	0.8/1.0 [a]	0.25 U	0.25 U	0.25 U	0.25 U	0.10 U	0.10 U	0.10 U	0.10 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Diesel-range (Dx)	NE	**0.94**	0.10 U	0.13 U	**0.12**	0.10 U	0.10 U	**0.11**	0.10 U	**0.38**	**2.1**	**0.59**	**0.86**	**0.14**	**0.46**	**0.60**
Motor Oil-range	NE	**0.47**	0.20 U	0.25 U	**0.22**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.54**	**0.23**	**0.82**	0.20 U	0.20 U	0.20 U
Total TPH (Sum Dx, Oil-range, mg/L)	0.5	**1.41**	ND	ND	**0.34**	ND	ND	**0.11**	ND	**0.38**	**2.64**	**0.82**	**1.68**	**0.14**	**0.46**	**0.60**
BTEX (ug/L)																
Benzene	5	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Toluene	640	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	**0.26**	0.20 U	**0.55**	**0.37**	0.20 U	0.20 U	**0.44**
Ethylbenzene	700	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
m,p-Xylene	1,600	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
o-Xylene	1,600	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Polycyclic Aromatic Hydrocarbons (ug/L)																
1-Methylnaphthalene	1.51	NA	0.010 U	NA	0.010 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	**0.010**	**0.019**	0.010 U	0.010 U	0.010 U
2-Methylnaphthalene	32	NA	**0.019**	NA	0.010 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.010 U	**0.022**	0.010 U	0.010 U	0.010 U
Acenaphthene	960	NA	0.010 U	NA	0.010 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Acenaphthylene	NE	NA	0.010 U	NA	0.010 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Anthracene	4,800	NA	0.010 U	NA	0.010 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Benzo(a)anthracene [1]	0.12	NA	**0.013**	NA	0.010 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Benzo(b)fluoranthene [1]	0.12	NA	**0.011**	NA	0.010 U	NA	NA	NA	NA	0.010 U	**0.015**	0.010 U	**0.016**	0.010 U	0.010 U	0.010 U
Benzo(k)fluoranthene [1]	1.2	NA	0.010 U	NA	0.010 U	NA	NA	NA	NA	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Benzo(a)pyrene [1]	0.12	NA	**0.012**	NA	0.010 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Benzo(g,h,i)perylene	NE	NA	0.010 U	NA	0.010 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.010 U	**0.015**	0.010 U	0.010 U	0.010 U
Chrysene [1]	12	NA	**0.015**	NA	**0.012**	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	**0.098**	**0.013**	**0.044**	0.010 U	0.010 U	**0.011**
Dibenz(a,h)anthracene [1]	0.012	NA	0.010 U	NA	0.010 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Dibenzofuran	16	NA	0.010 U	NA	0.010 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.010 U	**0.012**	0.010 U	0.010 U	0.010 U
Fluoranthene	640	NA	**0.017**	NA	**0.013**	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Fluorene	640	NA	0.010 U	NA	0.010 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	**0.018**	**0.012**	0.010 U	**0.027**	0.010 U
Indeno(1,2,3-cd)pyrene [1]	0.12	NA	0.010 U	NA	0.010 U	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Naphthalene	160	NA	0.010 U	NA	0.010 U	0.10 U	0.10 U	**0.22**	**0.15**	0.010 U	0.021 U	0.031 U	0.010 U	0.019 U	0.033 U	0.020 U
Phenanthrene	NE	NA	0.010 U	NA	**0.010**	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	0.010 U	0.010 U	**0.013**	0.010 U	0.010 U	0.010 U
Pyrene	480	NA	**0.022**	NA	**0.014**	0.10 U	0.10 U	0.10 U	0.10 U	0.010 U	**0.057**	**0.020**	**0.031**	0.010 U	0.010 U	**0.012**
Total Benzofluoranthenes [2]	0.12	NA	**0.024 J**	NA	0.020 U	0.10 U	0.10 U	0.10 U	0.10 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
TTEC	0.12	NA	0.015	NA	0.00012	NC	NC	NC	NC	NC	0.0025	0.00013	0.0020	NC	NC	0.00011

Notes:

Bolded values indicate that analyte was detected above the laboratory reporting limit.

Bolded and highlighted values exceed the project cleanup levels.

BTEX - benzene, toluene, ethylbenzene, and xylenes

J - estimated value

mg/L - milligram per liter

NA - not analyzed or not applicable

NC- not calculable

ND - not detected

NE - not established

TTEC - Total Toxicity Equivalent Concentration, reference WAC173-340-708

U - Compound was analyzed for but not detected above the reporting limit shown.

UJ - Compound was analyzed for but not detected above the reporting limit shown. Reporting limit is an estimated value.

ug/L - microgram per liter

[a] Gasoline with benzene present/without benzene present

[1] This is considered a carcinogenic polycyclic aromatic hydrocarbon compound.

[2] Total benzofluoranthenes is the sum of the benzo(b)fluoranthene, benzo(j)fluoranthene, and benzo(k)fluoranthene isomers. The cleanup level of 0.12 ug/L is based on benzo(b)fluoranthene.

Memo

Century Square
1111 3rd Avenue, Suite 1600
Seattle, Washington 98101
206.438.2700 Telephone
206.438.2699 Fax

To:	Karen Mixon, Project Manager	**Info:**	**FINAL**
From:	Christine T. Gebel, Chemist Jennifer B. Garner, Chemist	**Date:**	April 28, 2016 Revised August 5, 2016
RE:	Data Quality Review Quarterly Groundwater Monitoring Samples – March 2016 Laurel Station Cleanup Action		

The data quality review of 2 groundwater samples, one equipment blank, and one trip blank collected on March 29, 2016, has been completed. The samples were analyzed by Analytical Resources, Incorporated (ARI) located in Tukwila, Washington for benzene, toluene, ethylbenzene, m,p-xylene, and o-xylene (BTEX) by EPA Method 8260C, total petroleum hydrocarbons (TPHs) by Washington State Department of Ecology (Ecology) Methods NWTPH-Gx (gasoline-range TPH) and NWTPH-Dx (diesel-range and motor oil-range TPH), and/or low-level polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8270D modified by selected ion monitoring (SIM). Samples were analyzed for the chemical constituents as described in the *Final Compliance Monitoring Plan, Laurel Station, 1009 East Smith Road, Bellingham, Washington* dated January 16, 2015 (CMP). Due to changes in laboratory procedures, NWTPH-Gx analysis was performed using GC/MS instrumentation instead of GC/FID.

The analyses were performed in general accordance with methods specified in EPA's *Test Methods for Evaluating Solid Waste (SW-846)* and Ecology's *Analytical Methods for Petroleum Hydrocarbons*, June 1997. The laboratory provided a full data package containing sample results and associated QA/QC data. The following samples are associated with ARI group AYK4:

Sample ID	Laboratory ID	Requested Analyses
MW-6	AYK4A	BTEX, TPH-Gx, TPH-Dx, PAHs
Duplicate	AYK4B	BTEX, TPH-Gx, TPH-Dx, PAHs
Equipment Blank	AYK4C	Not applicable
Trip Blank	AYK4D	BTEX, TPH-Gx

The following comments refer to ARI's performance in meeting the quality control specifications described in the analytical methods. Data were qualified based on the method criteria and guidance provided in the EPA document *USEPA National Functional Guidelines for Superfund Organic Methods Data Review*, August 2014. Data qualifiers that may be assigned to data from this laboratory group include:

- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
- DNR - Do Not Report. Multiple results reported from different analytical dates and/or dilutions. Value from another analysis should be used.

Sample Receipt

Upon receipt by ARI, the sample jar information was compared to the chain-of-custody (COC) and the cooler temperatures were recorded. No discrepancies relating to sample identification were noted by ARI and the coolers were received at temperatures within the EPA-recommended limits of greater than 0°C and less than or equal to 6°C.

An equipment blank was submitted to the laboratory and placed on hold at the request of URS Corporation. Only one well was sampled, so the equipment blank was determined to be not necessary for project purposes.

The laboratory noted that large air bubbles (>6 mm) were present in the 2 vials submitted for the trip blank. The results for VOCs in the trip blank were qualified as estimated and flagged 'UJ' based on the presence of large air bubbles in the sample vials.

Organic Analyses

Samples were analyzed for BTEX, TPHs, and/or PAHs by the methods identified in the introduction to this report.

1. Holding Times – Acceptable

2. Instrument Performance Checks (GCMS Tunes) – Acceptable

3. Initial and Continuing Calibrations – Acceptable

4. Blanks – Acceptable

5. Surrogates – Acceptable

6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) – Acceptable

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) – Acceptable

   General – An MS/MSD was performed using MW-6 for all parameters. Results were acceptable.

8. Field Duplicates – Acceptable

   General – A field duplicate was submitted for MW-6 and identified as Duplicate. Results were comparable for all parameters.

9. Reporting Limits – Acceptable except as noted below:

   PAHs by Method 8270D-SIM – The reporting limits for PAHs were elevated in MW-6 and Duplicate due to multiple communication errors between the field, laboratory, and URS office. The error was identified during review of the June 2016 groundwater sampling data. The elevated reporting limits meet the cleanup levels for all compounds except dibenzo(a,h)anthracene. The error does not affect the data use at this time. URS has implemented a corrective action to avoid similar issues during future sample collection starting with the September 2016 sampling event.

Overall Assessment of Data

The data reported in this laboratory group, as reported, are considered to be usable for meeting project objectives. The completeness for laboratory group AYK4 is 100%.

Table of Contents: ARI Job AYK4

Client: URS

Project: 60485368 Laurel Station

AV
Signature

April-14-2016
Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

April 14, 2016

Karen Mixon
AECOM
1111 Third Avenue, Suite 1600
Seattle, WA 98101

RE: Laurel Station
ARI Job: AYK4

Dear Karen:

Please find enclosed the original Chain-of-Custody (COC) records, sample receipt documentation, and the final data package for the project referenced above.

Sample receipt information and analytical details are addressed in the Case Narrative.

An electronic copy of this data package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com
www.arilabs.com

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Documentation

ARI Job ID: AYK4

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: AYK4	Turn-around Requested:	Page: 1 of 1	
ARI Client Company: AECOM	Phone: 206 438 2700	Date: 3/29/16	Ice Present? Yes
Client Contact: KAREN MIKON / CHRISTINE GEBEL		No. of Coolers: 2	Cooler Temps: 2.4, 4.5
Client Project Name: LAUREL STATION			
Client Project #: 60485368	Samplers: SN / IPV		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: NWTPH-Dx	NWTPH-Gx / BTEX	PAHs @ 270D						Notes/Comments
MW-6	3/29/16	1420	H_2O	12	X	X	X						
DUPLICATE	3/29/16	—	H_2O	6	X	X	X						
EQUIPMENT BLANK	3/29/16	1500	H_2O	6	X	X	X						HOLD
TRIP BLANK	3/29/16	—	H_2O	2	X	X	X						

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: IAN VERMEERE	Printed Name: Tyler Rankin	Printed Name:	Printed Name:
	Company: AECOM	Company: ARI	Company:	Company:
	Date & Time: 3/29/16 1600	Date & Time: 3-30-16 1019	Date & Time:	Date & Time:

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Aecom Project Name: Laurel Station

COC No(s): _____ NA Delivered by: (Fed-Ex) UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: AYK4 Tracking No: 8095 2432 8479 (NA) TR
8095 2432 8468

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	(YES)	NO
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 2.4 4.5
Time: _____

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D005276

Cooler Accepted by: TR Date: 3-30-16 Time: 1019

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used?	(Bubble Wrap) (Wet Ice) Gel Packs Baggies Foam Block Paper Other: _____		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	(NO)
Were all VOC vials free of air bubbles?	NA	YES	(NO)
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	NA	12/11/15	

Was Sample Split by ARI : (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: TR Date: 3-30-16 Time: 1055

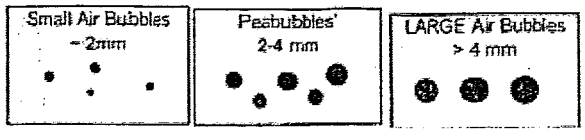
***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

1 of 2 VOA vials for sample "Equipment Blank" have "pb" bubbles
2 of 2 VOA vials for sample "Trip Blank" have "lg" bubbles.
Logged sample MW-6 as MS/MSD.

By: TR Date: 3-30-16



Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

Case Narrative, Data Qualifiers, Control Limits

ARI Job ID: AYK4

Sample Receipt:

Analytical Resources, Inc. (ARI) received three water samples and a trip blank on March 30, 2016 logged under ARI Sample Delivery Group (SDG) AYK4. The samples were analyzed for NWTPH-Dx, SIM PAHs and NWTPH-Gx plus BTEX. Select analyses were cancelled per AECOM.

SIM PAHs by 8270D SIM:

There were no anomalies associated with these samples.

Diesel Range Organics by NWTPH-D Extended:

There were no anomalies associated with these samples.

Gasoline Range Organics by NWTPH-Gx plus BTEX by 8260C/NWTPHG:

There were no anomalies associated with these samples.

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: AYK4
Client: URS
Project Event: 60485368
Project Name: Laurel Station

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	MW-6	AYK4A	16-5191	Water	03/29/16 14:20	03/30/16 10:19
2.	Duplicate	AYK4B	16-5192	Water	03/29/16	03/30/16 10:19
3.	Equipment Blank	AYK4C	16-5193	Water	03/29/16 15:00	03/30/16 10:19
4.	Trip Blank	AYK4D	16-5194	Water	03/29/16	03/30/16 10:19

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NR	Spiked compound recovery is not reported due to chromatographic interference
NS	The flagged analyte was not spiked into the sample
M	Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
Y	The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
EMPC	Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
C	The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
P	The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
X	Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
Z	Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

Analytical Method Information

Printed: 04/14/2016 12:58 pm

8260C VOA in Water (EPA 8260C)

Preservation: pH<2; HCL, Cool <6°C

Container: VOA Vial, Clear, 40 mL, HCL

Amount Required: 120 mL

Hold Time: 14 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Chloromethane	0.0948	0.500 ug/L		30	59-134	30	59-134	30
Vinyl Chloride	0.0572	0.200 ug/L		30	70-130	30	70-130	30
Bromomethane	0.252	1.00 ug/L		30	52-142	30	52-142	30
Chloroethane	0.0861	0.200 ug/L		30	47-172	30	47-172	30
Trichlorofluoromethane	0.0375	0.200 ug/L		30	70-138	30	70-138	30
Acrolein	2.48	5.00 ug/L		30	45-144	30	45-144	30
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.0429	0.200 ug/L		30	73-125	30	73-125	30
Acetone	2.06	5.00 ug/L		30	46-157	30	46-157	30
1,1-Dichloroethene	0.0540	0.200 ug/L		30	76-123	30	76-123	30
Bromoethane	0.0412	0.200 ug/L		30	72-125	30	72-125	30
Iodomethane	0.227	1.00 ug/L		30	46-143	30	46-143	30
Methylene Chloride	0.485	1.00 ug/L		30	68-129	30	68-129	30
Acrylonitrile	0.604	1.00 ug/L		30	65-124	30	65-124	30
Carbon Disulfide	0.0370	0.200 ug/L		30	69-129	30	69-129	30
trans-1,2-Dichloroethene	0.0485	0.200 ug/L		30	72-124	30	72-124	30
Vinyl Acetate	0.0688	0.200 ug/L		30	62-133	30	62-133	30
1,1-Dichloroethane	0.0533	0.200 ug/L		30	77-122	30	77-122	30
2-Butanone	0.814	5.00 ug/L		30	67-134	30	67-134	30
2,2-Dichloropropane	0.0518	0.200 ug/L		30	71-134	30	71-134	30
cis-1,2-Dichloroethene	0.0427	0.200 ug/L		30	79-120	30	79-120	30
Chloroform	0.0273	0.200 ug/L		30	77-123	30	77-123	30
Bromochloromethane	0.0607	0.200 ug/L		30	77-120	30	77-120	30
1,1,1-Trichloroethane	0.0408	0.200 ug/L		30	78-124	30	78-124	30
1,1-Dichloropropene	0.0340	0.200 ug/L		30	78-120	30	78-120	30
Carbon tetrachloride	0.0439	0.200 ug/L		30	69-129	30	69-139	30
1,2-Dichloroethane	0.0717	0.200 ug/L		30	71-125	30	71-125	30
Benzene	0.0266	0.200 ug/L		30	80-120	30	80-120	30
Trichloroethene	0.0489	0.200 ug/L		30	80-120	30	80-120	30
1,2-Dichloropropane	0.0352	0.200 ug/L		30	79-120	30	79-120	30
Bromodichloromethane	0.0506	0.200 ug/L		30	78-120	30	78-120	30
Dibromomethane	0.145	0.200 ug/L		30	77-120	30	77-120	30
2-Chloroethyl vinyl ether	0.250	1.00 ug/L		30	67-125	30	67-125	30
4-Methyl-2-Pentanone	0.974	5.00 ug/L		30	72-132	30	72-132	30
cis-1,3-Dichloropropene	0.0610	0.200 ug/L		30	79-124	30	79-124	30
Toluene	0.0399	0.200 ug/L		30	80-120	30	80-120	30
trans-1,3-Dichloropropene	0.0815	0.200 ug/L		30	77-126	30	77-126	30
2-Hexanone	0.902	5.00 ug/L		30	70-135	30	70-135	30
1,1,2-Trichloroethane	0.129	0.200 ug/L		30	77-120	30	77-120	30
1,3-Dichloropropane	0.0622	0.200 ug/L		30	80-120	30	80-120	30
Tetrachloroethene	0.0474	0.200 ug/L		30	80-120	30	80-120	30
Dibromochloromethane	0.0481	0.200 ug/L		30	74-121	30	74-121	30
1,2-Dibromoethane	0.0745	0.200 ug/L		30	79-120	30	79-120	30
Chlorobenzene	0.0230	0.200 ug/L		30	80-120	30	80-120	30
Ethylbenzene	0.0371	0.200 ug/L		30	78-122	30	78-122	30
1,1,1,2-Tetrachloroethane	0.0396	0.200 ug/L		30	76-123	30	76-123	30
m,p-Xylene	0.0522	0.400 ug/L		30	78-126	30	78-126	30
o-Xylene	0.0349	0.200 ug/L		30	76-127	30	76-127	30
Xylenes, total	0.0871	0.600 ug/L		30	76-127	30	76-127	30
Styrene	0.0454	0.200 ug/L		30	79-129	30	79-129	30
Bromoform	0.0618	0.200 ug/L		30	57-131	30	57-131	30
1,1,2,2-Tetrachloroethane	0.0598	0.200 ug/L		30	73-120	30	73-120	30
1,2,3-Trichloropropane	0.131	0.500 ug/L		30	69-127	30	69-127	30
trans-1,4-Dichloro 2-Butene	0.324	1.00 ug/L		30	49-144	30	49-144	30
n-Propylbenzene	0.0235	0.200 ug/L		30	73-130	30	73-130	30

AYKU : 00011

Analytical Method Information

(Continued)

Printed: 04/14/2016 12:58 pm

8260C VOA in Water (EPA 8260C) (Continued)

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Bromobenzene	0.0605	0.200 ug/L		30	79-120	30	79-120	30
Isopropyl Benzene	0.0212	0.200 ug/L		30	78-129	30	79-129	30
2-Chlorotoluene	0.0236	0.200 ug/L		30	80-121	30	80-121	30
4-Chlorotoluene	0.0159	0.200 ug/L		30	78-122	30	78-122	30
t-Butylbenzene	0.0256	0.200 ug/L		30	73-129	30	73-129	30
1,3,5-Trimethylbenzene	0.0150	0.200 ug/L		30	77-128	30	77-128	30
1,2,4-Trimethylbenzene	0.0243	0.200 ug/L		30	76-129	30	76-129	30
s-Butylbenzene	0.0237	0.200 ug/L		30	75-128	30	75-128	30
4-Isopropyl Toluene	0.0263	0.200 ug/L		30	74-131	30	74-121	30
1,3-Dichlorobenzene	0.0362	0.200 ug/L		30	79-120	30	79-120	30
1,4-Dichlorobenzene	0.0397	0.200 ug/L		30	77-120	30	77-120	30
n-Butylbenzene	0.0248	0.200 ug/L		30	73-130	30	73-130	30
1,2-Dichlorobenzene	0.0365	0.200 ug/L		30	78-120	30	78-120	30
1,2-Dibromo-3-chloropropane	0.366	0.500 ug/L		30	60-124	30	60-124	30
1,2,4-Trichlorobenzene	0.107	0.500 ug/L		30	54-131	30	54-131	30
Hexachloro-1,3-Butadiene	0.0734	0.500 ug/L		30	55-132	30	55-132	30
Naphthalene	0.118	0.500 ug/L		30	50-135	30	50-135	30
1,2,3-Trichlorobenzene	0.110	0.500 ug/L		30	45-137	30	45-137	30
Dichlorodifluoromethane	0.0521	0.200 ug/L		30	41-159	30	41-159	30
Methyl tert-butyl Ether	0.0729	0.500 ug/L		30	74-127	30	74-127	30
n-Hexane	0.100	0.200 ug/L		30	70-130	30	70-130	30
2-Pentanone	5.00	5.00 ug/L		30	64-184	30	64-184	30
Surr: Dibromofluoromethane			80-120					
Surr: 1,2-Dichloroethane-d4			80-129					
Surr: Toluene-d8			80-120					
Surr: 4-Bromofluorobenzene			80-120					
Surr: 1,2-Dichlorobenzene-d4			80-120					
Pentafluorobenzene								
Chlorobenzene-d5								
1,4-Difluorobenzene								
1,4-Dichlorobenzene-d4								

Analytical Method Information

Printed: 04/14/2016 12:58 pm

8260C Gas (NWTPH) in Water (NWTPHg)

Preservation: pH<2; HCL, Cool <6°C

Container: VOA Vial, Clear, 40 mL, HCL

Amount Required: 120 mL **Hold Time:** 14 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Gasoline Range Organics (Tol-Nap)	9.06	100 ug/L		30	80-120	30	80-120	30
Gasoline Range Organics (2MP-TMB)	15.8	100 ug/L		30	80-120	30	80-120	30
Gasoline Range Organics (Tol-C12)	9.13	100 ug/L		30	80-120	30	80-120	30
Gasoline Range Organics (C6-C10)	16.8	100 ug/L		30	80-120	30	80-120	30
Gasoline Range Organics (C5-C12)		100 ug/L		30	30-160	30	30-160	30
Surr: 1,2-Dichloroethane-d4			80-128					
Surr: 1,2-Dichlorobenzene-d4			80-120					
Surr: Toluene-d8			80-120					
Surr: 4-Bromofluorobenzene			80-120					
Surr: Dibromofluoromethane			80-120					
Pentafluorobenzene								
Chlorobenzene-d5								
1,4-Difluorobenzene								
1,4-Dichlorobenzene-d4								

ATK4 : 00013

Analytical Method Information

Printed: 04/14/2016 12:59 pm

8270D-SIM PAH (0.1 ug/L) in Water (EPA 8270D-SIM)

Preservation: Cool <6°C

Container: Glass NM, Amber, 500 mL

Amount Required: 1000

Hold Time: 7 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Naphthalene	0.0296	0.100 ug/L		30	33-120	30	33-120	30
2-Methylnaphthalene	0.0302	0.100 ug/L		30	29-120	30	29-120	30
1-Methylnaphthalene	0.0289	0.100 ug/L		30	37-120	30	37-120	30
Biphenyl				30	30-160	30	30-160	40
2,6-Dimethylnaphthalene				30	30-160	30	30-160	40
Acenaphthylene	0.0380	0.100 ug/L		30	32-120	30	32-120	30
Acenaphthene	0.0304	0.100 ug/L		30	38-120	30	38-120	30
Dibenzofuran	0.0280	0.100 ug/L		30	38-120	30	38-120	30
2,3,5-Trimethylnaphthalene				30				
Fluorene	0.0278	0.100 ug/L		30	41-120	30	41-120	30
Dibenzothiophene				30				
Phenanthrene	0.0279	0.100 ug/L		30	49-120	30	49-120	30
Anthracene	0.0352	0.100 ug/L		30	39-120	30	39-120	30
Carbazole				30	30-160	30	30-160	40
1-Methylphenanthrene				30	30-160	30	30-160	40
Fluoranthene	0.0347	0.100 ug/L		30	48-120	30	48-120	30
Pyrene	0.0434	0.100 ug/L		30	48-120	30	48-120	30
Benzo(a)anthracene	0.0399	0.100 ug/L		30	37-120	30	37-120	30
Chrysene	0.0321	0.100 ug/L		30	48-120	30	48-120	30
Benzo(b)fluoranthene	0.0417	0.100 ug/L		30	38-128	30	38-128	30
Benzo(k)fluoranthene	0.0433	0.100 ug/L		30	36-130	30	36-130	30
Benzo(j)fluoranthene	0.0376	0.100 ug/L		30	49-120	30	49-120	30
Benzo(e)pyrene				30	30-160	30	30-160	30
Benzo(a)pyrene	0.0429	0.100 ug/L		30	25-120	30	25-120	30
Perylene	0.0420	0.100 ug/L		30	30-160	30	30-160	30
Indeno(1,2,3-cd)pyrene	0.0422	0.100 ug/L		30	32-120	30	32-120	30
Dibenzo(a,h)anthracene	0.0535	0.100 ug/L		30	21-120	30	21-120	30
Benzo(g,h,i)perylene	0.0388	0.100 ug/L		30	28-120	30	28-120	30
Benzofluoranthenes, Total	0.0850	0.200 ug/L		30	46-120	30	46-120	30
Surr: 2-Methylnaphthalene-d10			31-120					
Surr: Dibenzo[a,h]anthracene-d14			10-125					
Surr: Fluoranthene-d10			46-121					
Naphthalene-d8								
Acenaphthene-d10								
Phenanthrene-d10								
Chrysene-d12								
Perylene-d12								

Analytical Method Information

Printed: 04/14/2016 12:59 pm

TPH NW (Extractables) in Water (NWTPH-Dx)

Preservation: Cool <6°C

Container: Glass NM, Amber, 500 mL **Amount Required:** 1000 mL **Hold Time:** 7 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Diesel Range Organics (C12-C24)	0.0330	0.100 mg/L		30	70-120	30	70-120	30
Diesel Range Organics (C10-C25)	0.0390	0.100 mg/L		30	75-125	30	75-125	30
Diesel Range Organics (Tol-C18)				30	30-160	30	30-160	30
Diesel Range Organics (C10-24)				30	30-160	30	30-160	30
Diesel Range Organics (C10-C28)				30	30-160	30	30-160	30
Diesel Range Organics (C12-C22)		0.100 mg/L		30	30-160	30	30-160	30
Motor Oil Range Organics (C24-C38)	0.0560	0.200 mg/L		30		30	30-160	30
Motor Oil Range Organics (C25-C36)	0.0650	0.200 mg/L		30		30	60-120	30
Motor Oil Range Organics (C24-C40)				30		30	30-160	30
Residual Range Organics (C23-C32)		0.200 mg/L		30		30	30-160	30
Mineral Spirits Range Organics (Tol-C12)				30		30	30-160	30
Mineral Oil Range Organics (C16-C28)	0.100	0.200 mg/L		30		30	30-160	30
Kerosene Range Organics (Tol-C18)				30		30	30-160	30
JP8 Range Organics (C8-C18)				30		30	30-160	30
JP5 Range Organics (C10-C16)				30		30	30-160	30
JP4 Range Organics (Tol-C14)				30		30	30-160	30
Jet-A Range Organics (C10-C18)				30		30	30-160	30
Creosote Range Organics (C12-C22)				30		30	30-160	30
Bunker C Range Organics (C10-C38)				30		30	30-160	30
Stoddard Range Organics (C8-C12)				30		30	30-160	30
Transformer Oil Range Organics (C12-C28)				30		30	30-160	30
Surr: o-Terphenyl			50-150					
Surr: n-Triacontane			50-150					

AYK4 : 00015

Volatile Analysis
Report and Summary QC Forms

ARI Job ID: AYK4

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by P&T GC/MS-Method SW8260C/NWTPHG **Sample ID: MW-6**
Page 1 of 1 **SAMPLE**

Lab Sample ID: AYK4A
LIMS ID: 16-5191
Matrix: Water
Data Release Authorized:
Reported: 04/07/16

QC Report No: AYK4-URS
Project: Laurel Station
60485368
Date Sampled: 03/29/16
Date Received: 03/30/16

Instrument/Analyst: NT2/PKC
Date Analyzed: 04/06/16 21:08

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q	TPHG ID
71-43-2	Benzene	0.20	< 0.20	U	
108-88-3	Toluene	0.20	< 0.20	U	
100-41-4	Ethylbenzene	0.20	< 0.20	U	
179601-23-1	m,p-Xylene	0.40	< 0.40	U	
95-47-6	o-Xylene	0.20	< 0.20	U	
	Reported in µg/L (ppb)				
86290-81-5	Gasoline Range Hydrocarbons	0.10	< 0.10	U	---
	Reported in mg/L (ppm)				

Volatile Surrogate Recovery

d8-Toluene	104%
Bromofluorobenzene	87.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by P&T GC/MS-Method SW8260C/NWTPHG **Sample ID: Duplicate**
Page 1 of 1 **SAMPLE**

Lab Sample ID: AYK4B
LIMS ID: 16-5192
Matrix: Water
Data Release Authorized:
Reported: 04/07/16

QC Report No: AYK4-URS
Project: Laurel Station
60485368
Date Sampled: 03/29/16
Date Received: 03/30/16

Instrument/Analyst: NT2/PKC
Date Analyzed: 04/06/16 21:29

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q	TPHG ID
71-43-2	Benzene	0.20	< 0.20	U	
108-88-3	Toluene	0.20	< 0.20	U	
100-41-4	Ethylbenzene	0.20	< 0.20	U	
179601-23-1	m,p-Xylene	0.40	< 0.40	U	
95-47-6	o-Xylene	0.20	< 0.20	U	
	Reported in µg/L (ppb)				
86290-81-5	Gasoline Range Hydrocarbons	0.10	< 0.10	U	---
	Reported in mg/L (ppm)				

Volatile Surrogate Recovery

d8-Toluene	101%
Bromofluorobenzene	89.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by P&T GC/MS-Method SW8260C/NWTPHG **Sample ID: Trip Blank**
Page 1 of 1 **SAMPLE**

Lab Sample ID: AYK4D
LIMS ID: 16-5194
Matrix: Water
Data Release Authorized:
Reported: 04/07/16

QC Report No: AYK4-URS
Project: Laurel Station
60485368
Date Sampled: 03/29/16
Date Received: 03/30/16

Instrument/Analyst: NT2/PKC
Date Analyzed: 04/06/16 21:50

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q	TPHG ID
71-43-2	Benzene	0.20	< 0.20	U	
108-88-3	Toluene	0.20	< 0.20	U	
100-41-4	Ethylbenzene	0.20	< 0.20	U	
179601-23-1	m,p-Xylene	0.40	< 0.40	U	
95-47-6	o-Xylene	0.20	< 0.20	U	
	Reported in µg/L (ppb)				
86290-81-5	Gasoline Range Hydrocarbons	0.10	< 0.10	U	---
	Reported in mg/L (ppm)				

Volatile Surrogate Recovery

d8-Toluene	102%
Bromofluorobenzene	88.2%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: AYK4-URS
Project: Laurel Station
60485368

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
MB-040616A	Method Blank	10	NA	96.0%	88.0%	NA	0
LCS-040616A	Lab Control	10	NA	105%	92.2%	NA	0
LCSD-040616A	Lab Control Dup	10	NA	108%	91.6%	NA	0
AYK4A	MW-6	10	NA	104%	87.8%	NA	0
AYK4AMS	MW-6	10	NA	108%	93.2%	NA	0
AYK4AMSD	MW-6	10	NA	106%	93.2%	NA	0
AYK4B	Duplicate	10	NA	101%	89.0%	NA	0
AYK4D	Trip Blank	10	NA	102%	88.2%	NA	0

SW8260C	LCS/MB LIMITS	QC LIMITS
(DCE) = d4-1,2-Dichloroethane	(80-129)	(80-129)
(TOL) = d8-Toluene	(80-120)	(80-120)
(BFB) = Bromofluorobenzene	(80-120)	(80-120)
(DCB) = d4-1,2-Dichlorobenzene	(80-120)	(80-120)

Prep Method: SW5030B
Log Number Range: 16-5191 to 16-5194

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by P&T GC/MS-Method SW8260C/NWTPHG **Sample ID: MW-6**
Page 1 of 1 **MATRIX SPIKE**

Lab Sample ID: AYK4A
LIMS ID: 16-5191
Matrix: Water
Data Release Authorized:
Reported: 04/07/16

QC Report No: AYK4-URS
Project: Laurel Station
60485368
Date Sampled: 03/29/16
Date Received: 03/30/16

Instrument/Analyst MS: NT2/PKC
MSD: NT2/PKC
Date Analyzed MS: 04/06/16 22:11
MSD: 04/06/16 22:33

Sample Amount MS: 10.0 mL
MSD: 10.0 mL
Purge Volume MS: 10.0 mL
MSD: 10.0 mL

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Benzene	< 0.20 U	7.99	7.33	109%	7.94	7.33	108%	0.6%
Toluene	< 0.20 U	60.9	53.1	115%	58.2	53.1	110%	4.5%
Ethylbenzene	< 0.20 U	14.5	13.6	107%	14.2	13.6	104%	2.1%
m,p-Xylene	< 0.40 U	48.9	43.4	113%	47.2	43.4	109%	3.5%
o-Xylene	< 0.20 U	18.8	16.9	111%	18.6	16.9	110%	1.1%
Reported in µg/L (ppb)								
Gasoline Range Hydrocarbons	< 0.10 U	0.93	1.00	93.0%	0.93	1.00	93.0%	0.0%
Reported in mg/L (ppm)								

RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by P&T GC/MS-Method SW8260C/NWTPHG **Sample ID: MW-6**
MATRIX SPIKE
Page 1 of 1

Lab Sample ID: AYK4A
LIMS ID: 16-5191
Matrix: Water
Data Release Authorized:
Reported: 04/07/16

QC Report No: AYK4-URS
Project: Laurel Station
60485368
Date Sampled: 03/29/16
Date Received: 03/30/16

Instrument/Analyst: NT2/PKC
Date Analyzed: 04/06/16 22:11

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	---	
108-88-3	Toluene	0.20	---	
100-41-4	Ethylbenzene	0.20	---	
179601-23-1	m,p-Xylene	0.40	---	
95-47-6	o-Xylene	0.20	---	
	Reported in µg/L (ppb)			
86290-81-5	Gasoline Range Hydrocarbons	0.10	---	
	Reported in mg/L (ppm)			

Volatile Surrogate Recovery

d8-Toluene	108%
Bromofluorobenzene	93.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by P&T GC/MS-Method SW8260C/NWTPHG **Sample ID: MW-6**
MATRIX SPIKE DUP
Page 1 of 1

Lab Sample ID: AYK4A
LIMS ID: 16-5191
Matrix: Water
Data Release Authorized:
Reported: 04/07/16

QC Report No: AYK4-URS
Project: Laurel Station
60485368
Date Sampled: 03/29/16
Date Received: 03/30/16

Instrument/Analyst: NT2/PKC
Date Analyzed: 04/06/16 22:33

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	---	
108-88-3	Toluene	0.20	---	
100-41-4	Ethylbenzene	0.20	---	
179601-23-1	m,p-Xylene	0.40	---	
95-47-6	o-Xylene	0.20	---	
	Reported in µg/L (ppb)			
86290-81-5	Gasoline Range Hydrocarbons	0.10	---	
	Reported in mg/L (ppm)			

Volatile Surrogate Recovery

d8-Toluene	106%
Bromofluorobenzene	93.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by P&T GC/MS-Method SW8260C/NWTPHG **Sample ID: LCS-040616A**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-040616A
LIMS ID: 16-5191
Matrix: Water
Data Release Authorized:
Reported: 04/07/16

QC Report No: AYK4-URS
Project: Laurel Station
60485368
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT2/PKC
LCSD: NT2/PKC
Date Analyzed LCS: 04/06/16 15:26
LCSD: 04/06/16 15:48

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	7.25	7.33	98.9%	7.87	7.33	107%	8.2%
Toluene	53.1	53.1	100%	57.4	53.1	108%	7.8%
Ethylbenzene	12.7	13.6	93.4%	13.8	13.6	101%	8.3%
m,p-Xylene	43.0	43.4	99.1%	46.4	43.4	107%	7.6%
o-Xylene	16.6	16.9	98.2%	17.5	16.9	104%	5.3%
Reported in µg/L (ppb)							
Gasoline Range Hydrocarbons	0.80	1.00	80.0%	0.85	1.00	85.0%	6.1%
Reported in mg/L (ppm)							

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d8-Toluene	105%	108%
Bromofluorobenzene	92.2%	91.6%

4A
VOLATILE METHOD BLANK SUMMARY

Method Blank ID.

MB0406

Lab Name: ANALYTICAL RESOURCES | Client: URS

ARI Job No: AYK4 | Project: LAUREL STATION

Lab File ID: 04061609 | Lab Sample ID: MB0406

Date Analyzed: 04/06/16 | Time Analyzed: 1609

Instrument ID: NT2 | Heated Purge: (Y/N) N

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	GICV	GICV	04061603	1401
02	GLCS	GLCS	04061607	1526
03	GLCS	GLCS	04061608	1548
04	MW-6	AYK4A	04061623	2108
05	DUPLICATE	AYK4B	04061624	2129
06	TRIP BLANK	AYK4D	04061625	2150
07	MW-6 MS	AYK4AMS	04061626	2211
08	MW-6 MSD	AYK4AMSD	04061627	2233
09	GCCV	GCCV	04061628	2254
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
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28				
29				
30				

COMMENTS:

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by P&T GC/MS-Method SW8260C/NWTPHG **Sample ID: MB-040616A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-040616A
LIMS ID: 16-5191
Matrix: Water
Data Release Authorized:
Reported: 04/07/16

QC Report No: AYK4-URS
Project: Laurel Station
60485368
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT2/PKC
Date Analyzed: 04/06/16 16:09

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q	TPHG ID
71-43-2	Benzene	0.20	< 0.20	U	
108-88-3	Toluene	0.20	< 0.20	U	
100-41-4	Ethylbenzene	0.20	< 0.20	U	
179601-23-1	m,p-Xylene	0.40	< 0.40	U	
95-47-6	o-Xylene	0.20	< 0.20	U	
	Reported in µg/L (ppb)				
86290-81-5	Gasoline Range Hydrocarbons	0.10	< 0.10	U	---
	Reported in mg/L (ppm)				

Volatile Surrogate Recovery

d8-Toluene	96.0%
Bromofluorobenzene	88.0%

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES Contract: URS

Lab Code: ARI Case No.: LAUREL STATION SDG No.: AYK4

Lab File ID: 03291602 BFB Injection Date: 03/29/16

Instrument ID: NT2 BFB Injection Time: 1131

GC Column: RTXVMS ID: 0.18 (mm)

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	18.3
75	30.0 - 60.0% of mass 95	48.9
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.3
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 100.0% of mass 95	86.5
175	5.0 - 9.0% of mass 174	6.1 (7.1)1
176	95.0 - 101.0% of mass 174	82.3 (95.1)1
177	5.0 - 9.0% of mass 176	5.3 (6.5)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD80	SEC0063-CAL8	03291610	03/29/16	1733
02	VSTD40	SEC0063-CAL7	03291611	03/29/16	1754
03	VSTD20	SEC0063-CAL6	03291612	03/29/16	1816
04	VSTD10	SEC0063-CAL5	03291613	03/29/16	1837
05	VSTD02	SEC0063-CAL4	03291614	03/29/16	1859
06	VSTD01	SEC0063-CAL3	03291615	03/29/16	1920
07	VSTD0.5	SEC0063-CAL2	03291616	03/29/16	1941
08	VSTD0.2	SEC0063-CAL1	03291617	03/29/16	2003
09	SCV	SEC0063-SCV1	03291618	03/29/16	2024
10	Gas 5.0	SEC0063-CALE	03291619	03/29/16	2045
11	Gas 2.5	SEC0063-CALD	03291620	03/29/16	2107
12	Gas 1.0	SEC0063-CALC	03291621	03/29/16	2128
13	Gas 0.5	SEC0063-CALB	03291622	03/29/16	2150
14	Gas 0.25	SEC0063-CALA	03291623	03/29/16	2211
15	Gas 0.10	SEC0063-CAL9	03291624	03/29/16	2232
16	Gas SCV	SEC0063-SCV2	03291625	03/29/16	2254
17					
18					
19					
20					

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ANALYTICAL RESOURCES Contract: URS

Lab Code: ARI Case No.: LAUREL STATION SDG No.: AYK4

Lab File ID: 04061602 BFB Injection Date: 04/06/16

Instrument ID: NT2 BFB Injection Time: 1315

GC Column: RTXVMS ID: 0.18 (mm)

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	22.2
75	30.0 - 60.0% of mass 95	54.8
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.0
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 100.0% of mass 95	87.6
175	5.0 - 9.0% of mass 174	6.4 (7.4)1
176	95.0 - 101.0% of mass 174	85.5 (97.6)1
177	5.0 - 9.0% of mass 176	5.5 (6.4)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	GICV	GICV	04061603	04/06/16	1401
02	VICV	VICV	04061604	04/06/16	1423
03	GLCS	GLCS	04061607	04/06/16	1526
04	GLCS	GLCS	04061608	04/06/16	1548
05	MB0406	MB0406	04061609	04/06/16	1609
06	MW-6	AYK4A	04061623	04/06/16	2108
07	DUPLICATE	AYK4B	04061624	04/06/16	2129
08	TRIP BLANK	AYK4D	04061625	04/06/16	2150
09	MW-6 MS	AYK4AMS	04061626	04/06/16	2211
10	MW-6 MSD	AYK4AMSD	04061627	04/06/16	2233
11	GCCV	GCCV	04061628	04/06/16	2254
12					
13					
14					
15					
16					
17					
18					
19					
20					

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES Client: URS

ARI Job No: AYK4 Project: LAUREL STATION

Instrument ID: NT2 Calibration Date: 03/29/16

LAB FILE ID: RF0.2: 03291617 RF0.5: 03291616 RF1: 03291615
RF2: 03291614 RF10: 03291613

COMPOUND	RF0.2	RF0.5	RF1	RF2	RF10
Benzene	1.320	1.365	1.452	1.401	1.382
Toluene	0.883	0.912	0.960	0.919	0.890
Ethyl Benzene	0.542	0.592	0.610	0.615	0.627
m,p-xylene	0.672	0.704	0.783	0.784	0.777
o-Xylene	0.551	0.640	0.728	0.736	0.741
d4-1,2-Dichloroethane	0.620	0.613	0.560	0.555	0.555
d8-Toluene	1.174	1.182	1.199	1.173	1.146
4-Bromofluorobenzene	0.373	0.400	0.416	0.405	0.411
d4-1,2-Dichlorobenzene	0.954	0.956	0.967	0.941	0.956
Dibromofluoromethane	0.476	0.479	0.473	0.483	0.479

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES Client: URS

ARI Job No: AYK4 Project: LAUREL STATION

Instrument ID: NT2 Calibration Date: 03/29/16

LAB FILE ID: RF20: 03291612 RF40: 03291611 RF80: 03291610

COMPOUND	RF20	RF40	RF80
Benzene	1.437	1.314	1.062
Toluene	0.924	0.867	0.739
Ethyl Benzene	0.625	0.594	0.543
m,p-xylene	0.769	0.718	0.582
o-Xylene	0.737	0.705	0.622
d4-1,2-Dichloroethane	0.562	0.559	0.502
d8-Toluene	1.212	1.192	1.195
4-Bromofluorobenzene	0.416	0.420	0.420
d4-1,2-Dichlorobenzene	0.963	0.963	0.948
Dibromofluoromethane	0.486	0.480	0.469

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ANALYTICAL RESOURCES Client: URS

ARI Job No: AYK4 Project: LAUREL STATION

Instrument ID: NT2 Calibration Date: 03/29/16

COMPOUND	CURVE TYPE	AVE RF	%RSD OR R^2
Benzene	AVRG	1.342	9.2
Toluene	AVRG	0.887	7.5
Ethyl Benzene	AVRG	0.594	5.7
m,p-xylene	AVRG	0.724	9.8
o-Xylene	AVRG	0.682	10.3
d4-1,2-Dichloroethane	AVRG	0.566	6.5
d8-Toluene	AVRG	1.184	1.7
4-Bromofluorobenzene	AVRG	0.408	3.8
d4-1,2-Dichlorobenzene	AVRG	0.956	0.9
Dibromofluoromethane	AVRG	0.478	1.1

<- Indicates value outside QC limits:
(%RSD < 20% or R^2 > 0.990)

6a

8260 GAS INITIAL CALIBRATION

Lab Name: ANALYTICAL RESOURCES, INC.

Client: URS

Instrument: NT2.I

Project: Laurel Station

Calibration Date: 29-MAR-2016

SDG No.: AYK4

Gas Range	RF1 0.1	RF2 0.25	RF3 0.5	RF4 1.0	RF5 2.5	RF6 5	Ave RF	%RSD
WA Gas	38501187	48112079	49111625	51185622	51287480	49855104	48008849	10.0
AK Gas	49662511	59116003	59473285	60464211	61192091	62329725	58706304	7.8
NW Gas	39259679	48930855	50264215	52493344	52751277	51520615	49203331	10.3
8015Gas	71404863	82873502	83743651	85008808	87381849	88932569	83224207	7.5

<- Indicates %RSD outside limits
Surrogate areas are not included in RF calculation.
Surrogate calibration is from BETX curve files.

Quant Ranges :

WA Gas	Toluene - nC12
AK Gas	nC6 - nC10
NW Gas	Toluene - Naphthalene
Cal Gas	nC6 - nC12
8015 Gas	2-Methylpentane - 1,2,4-Trimethylbenzene

Gas Cal. Files	Analysis Time
03291624.D	29-MAR-2016 22:32
03291623.D	29-MAR-2016 22:11
03291622.D	29-MAR-2016 21:50
03291621.D	29-MAR-2016 21:28
03291620.D	29-MAR-2016 21:07
03291619.D	29-MAR-2016 20:45

FORM VI-GAS

7a

GAS CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC.

Client: URS

ICal Date: 29-MAR-2016

Project: Laurel Station

CCal Date: 06-APR-2016

SDG No.: AYK4

Lab File Name: 04061603.D

Inst: NT2.I

Gas Range	Area*	CalcAmt	NomAmt	%D
WAGas (Tol-C12)	44296658	0.92	1.0	-7.7
AKGas (C6-C10)	57222116	0.97	1.0	-2.5
NWGas (Tol-Nap)	45156845	0.92	1.0	-8.2
8015C (2MP-TMB)	80068621	0.96	1.0	-3.8

* Surrogate areas are subtracted from Total Area
<- Indicates an RPD outside QC limits

FORM VII-GAS

GAS CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC.

Client: URS

ICal Date: 29-MAR-2016

Project: Laurel Station

CCal Date: 06-APR-2016

SDG No.: AYK4

Lab File Name: 04061628.D

Inst: NT2.I

Gas Range	Area*	CalcAmt	NomAmt	%D
WAGas (Tol-C12)	42296730	0.88	1.0	-11.9
AKGas (C6-C10)	50278964	0.86	1.0	-14.4
NWGas (Tol-Nap)	43231138	0.88	1.0	-12.1
8015C (2MP-TMB)	72063177	0.87	1.0	-13.4

* Surrogate areas are subtracted from Total Area
<- Indicates an RPD outside QC limits

FORM VII-GAS

7A

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ANALYTICAL RESOURCES | Client: URS

ARI Job No: AYK4 | Project: LAUREL STATION

Instrument ID: NT2 | Cont. Calib. Date: 04/06/16

Init. Calib. Date: 03/29/16 | Cont. Calib. Time: 1423

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
Benzene	1.342	1.4525	0.010	AVRG	8.2
Toluene	0.887	0.8938	0.010	AVRG	0.8
Ethyl Benzene	0.594	0.5926	0.010	AVRG	-0.2
m,p-xylene	0.724	0.7328	0.010	AVRG	1.2
o-Xylene	0.682	0.6844	0.010	AVRG	0.4
d4-1,2-Dichloroethane	0.566	0.5992	0.010	AVRG	5.9
d8-Toluene	1.184	1.2448	0.010	AVRG	5.1
4-Bromofluorobenzene	0.408	0.3839	0.010	AVRG	-5.9
d4-1,2-Dichlorobenzene	0.956	0.9670	0.010	AVRG	1.2
Dibromofluoromethane	0.478	0.5012	0.010	AVRG	4.8

<- Exceeds QC limit of 20% D

* RF less than minimum RF

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES | Client: URS

ARI Job No: AYK4 | Project: LAUREL STATION

Ical Midpoint ID: 03291613 | Ical Date: 03/29/16

Instrument ID: NT2 | Project Run Date: 03/29/16

		IS1(PFB) AREA #	RT #	IS2(DFB) AREA #	RT #	IS3(CLB) AREA #	RT #
	ICAL MIDPT	350375	5.33	562526	5.72	502371	7.78
	UPPER LIMIT	700750	5.83	1125052	6.22	1004742	8.28
	LOWER LIMIT	175188	4.83	281263	5.22	251186	7.28
	Sample ID						
01	SCV	333646	5.33	527779	5.72	486532	7.78
02	Gas 5.0	386746	5.33	615798	5.72	554896	7.78
03	Gas 2.5	366346	5.33	580475	5.72	530399	7.78
04	Gas 1.0	356093	5.33	560609	5.72	525882	7.78
05	Gas 0.5	335026	5.33	526989	5.72	495230	7.78
06	Gas 0.25	330180	5.33	523950	5.72	490395	7.78
07	Gas 0.10	303542	5.33	482197	5.72	459677	7.78
08	Gas SCV	347854	5.33	555254	5.72	518670	7.78
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS1 (PFB) = Pentafluorobenzene
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CLB) = d5-Chlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES | Client: URS

ARI Job No: AYK4 | Project: LAUREL STATION

Ical Midpoint ID: 03291613 | Ical Date: 03/29/16

Instrument ID: NT2 | Project Run Date: 03/29/16

		IS4 (DCB) AREA #	RT #	AREA #	RT #	AREA #	RT #
	ICAL MIDPT	277950	9.48				
	UPPER LIMIT	555900	9.98				
	LOWER LIMIT	138975	8.98				
	Sample ID						
01	SCV	269269	9.48				
02	Gas 5.0	296516	9.48				
03	Gas 2.5	284779	9.48				
04	Gas 1.0	278120	9.48				
05	Gas 0.5	263670	9.48				
06	Gas 0.25	259889	9.48				
07	Gas 0.10	241501	9.48				
08	Gas SCV	276192	9.48				
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS4 (DCB) = d4-1,4-Dichlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES | Client: URS

ARI Job No: AYK4 | Project: LAUREL STATION

Ical Midpoint ID: 03291613 | Ical Date: 03/29/16

Instrument ID: NT2 | Project Run Date: 04/06/16

		IS1(PFB) AREA #	RT #	IS2(DFB) AREA #	RT #	IS3(CLB) AREA #	RT #
	ICAL MIDPT	350375	5.33	562526	5.72	502371	7.78
	UPPER LIMIT	700750	5.83	1125052	6.22	1004742	8.28
	LOWER LIMIT	175188	4.83	281263	5.22	251186	7.28
	Sample ID						
01	GICV	275752	5.33	461198	5.72	430026	7.78
02	GLCS	252274	5.33	418651	5.72	383434	7.78
03	GLCS	249059	5.33	418366	5.72	390693	7.78
04	MB0406	230135	5.33	390532	5.72	338300	7.78
05	MW-6	253216	5.33	410802	5.72	378479	7.78
06	DUPLICATE	234513	5.33	382934	5.72	352013	7.78
07	TRIP BLANK	222571	5.33	365936	5.72	333215	7.78
08	MW-6 MS	253264	5.33	405547	5.72	383757	7.78
09	MW-6 MSD	254383	5.33	428189	5.72	390187	7.78
10	GCCV	253209	5.33	411525	5.72	377151	7.78
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS1 (PFB) = Pentafluorobenzene
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CLB) = d5-Chlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ANALYTICAL RESOURCES | Client: URS

ARI Job No: AYK4 | Project: LAUREL STATION

Ical Midpoint ID: 03291613 | Ical Date: 03/29/16

Instrument ID: NT2 | Project Run Date: 04/06/16

		IS4 (DCB) AREA #	RT #	AREA #	RT #	AREA #	RT #
	ICAL MIDPT	277950	9.48				
	UPPER LIMIT	555900	9.98				
	LOWER LIMIT	138975	8.98				
	Sample ID						
01	GICV	212968	9.49				
02	GLCS	197859	9.48				
03	GLCS	200329	9.48				
04	MB0406	163729	9.48				
05	MW-6	187113	9.48				
06	DUPLICATE	174843	9.48				
07	TRIP BLANK	163986	9.48				
08	MW-6 MS	202325	9.48				
09	MW-6 MSD	195276	9.48				
10	GCCV	194894	9.48				
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS4 (DCB) = d4-1,4-Dichlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

SIM PAH Analysis
Report and Summary QC Forms

ARI Job ID: AYK4

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: MW-6
SAMPLE

Lab Sample ID: AYK4A
LIMS ID: 16-5191
Matrix: Water
Data Release Authorized:
Reported: 04/11/16

QC Report No: AYK4-URS
Project: Laurel Station
Event: 60485368
Date Sampled: 03/29/16
Date Received: 03/30/16

Date Extracted: 04/04/16
Date Analyzed: 04/07/16 23:27
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
91-20-3	Naphthalene	0.10	< 0.10 U
91-57-6	2-Methylnaphthalene	0.10	< 0.10 U
90-12-0	1-Methylnaphthalene	0.10	< 0.10 U
208-96-8	Acenaphthylene	0.10	< 0.10 U
83-32-9	Acenaphthene	0.10	< 0.10 U
86-73-7	Fluorene	0.10	< 0.10 U
85-01-8	Phenanthrene	0.10	< 0.10 U
120-12-7	Anthracene	0.10	< 0.10 U
206-44-0	Fluoranthene	0.10	< 0.10 U
129-00-0	Pyrene	0.10	< 0.10 U
56-55-3	Benzo(a)anthracene	0.10	< 0.10 U
218-01-9	Chrysene	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.10	< 0.10 U
191-24-2	Benzo(g,h,i)perylene	0.10	< 0.10 U
132-64-9	Dibenzofuran	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	88.0%
d10-2-Methylnaphthalene	69.7%
d14-Dibenzo(a,h)anthracene	88.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: Duplicate SAMPLE

Lab Sample ID: AYK4B
LIMS ID: 16-5192
Matrix: Water
Data Release Authorized:
Reported: 04/11/16

QC Report No: AYK4-URS
Project: Laurel Station
Event: 60485368
Date Sampled: 03/29/16
Date Received: 03/30/16

Date Extracted: 04/04/16
Date Analyzed: 04/08/16 00:44
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
91-20-3	Naphthalene	0.10	< 0.10 U
91-57-6	2-Methylnaphthalene	0.10	< 0.10 U
90-12-0	1-Methylnaphthalene	0.10	< 0.10 U
208-96-8	Acenaphthylene	0.10	< 0.10 U
83-32-9	Acenaphthene	0.10	< 0.10 U
86-73-7	Fluorene	0.10	< 0.10 U
85-01-8	Phenanthrene	0.10	< 0.10 U
120-12-7	Anthracene	0.10	< 0.10 U
206-44-0	Fluoranthene	0.10	< 0.10 U
129-00-0	Pyrene	0.10	< 0.10 U
56-55-3	Benzo(a)anthracene	0.10	< 0.10 U
218-01-9	Chrysene	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.10	< 0.10 U
191-24-2	Benzo(g,h,i)perylene	0.10	< 0.10 U
132-64-9	Dibenzofuran	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	90.7%
d10-2-Methylnaphthalene	70.0%
d14-Dibenzo(a,h)anthracene	100%

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: AYK4-URS
Project: Laurel Station
60485368

Client ID	FLN	MNP	DBA	TOT OUT
MB-040416	95.3%	74.7%	105%	0
LCS-040416	89.3%	71.3%	90.7%	0
LCSD-040416	88.7%	59.7%	78.7%	0
MW-6	88.0%	69.7%	88.0%	0
MW-6 MS	84.3%	69.7%	71.3%	0
MW-6 MSD	93.7%	75.0%	71.3%	0
Duplicate	90.7%	70.0%	100%	0

	QC LIMITS
(FLN) = d10-Fluoranthene	(46-121)
(MNP) = d10-2-Methylnaphthalene	(31-120)
(DBA) = d14-Dibenzo(a,h)anthracene	(10-125)

Prep Method: SW3520C
Log Number Range: 16-5191 to 16-5192

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS

ANALYTICAL RESOURCES INCORPORATED

Sample ID: MW-6
MATRIX SPIKE

Lab Sample ID: AYK4A
LIMS ID: 16-5191
Matrix: Water
Data Release Authorized:
Reported: 04/11/16

QC Report No: AYK4-URS
Project: Laurel Station
Event: 60485368
Date Sampled: 03/29/16
Date Received: 03/30/16

Date Extracted MS/MSD: 04/04/16

Date Analyzed MS: 04/07/16 23:53
MSD: 04/08/16 00:19
Instrument/Analyst MS: NT8/JZ
MSD: NT8/JZ

Sample Amount MS: 500 mL
MSD: 500 mL
Final Extract Volume MS: 0.50 mL
MSD: 0.50 mL
Dilution Factor MS: 1.00
MSD: 1.00

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Naphthalene	< 0.10 U	1.88	3.00	62.7%	2.05	3.00	68.3%	8.7%
2-Methylnaphthalene	< 0.10 U	2.03	3.00	67.7%	2.24	3.00	74.7%	9.8%
1-Methylnaphthalene	< 0.10 U	1.95	3.00	65.0%	2.20	3.00	73.3%	12.0%
Acenaphthylene	< 0.10 U	2.06	3.00	68.7%	2.28	3.00	76.0%	10.1%
Acenaphthene	< 0.10 U	2.07	3.00	69.0%	2.23	3.00	74.3%	7.4%
Fluorene	< 0.10 U	2.41	3.00	80.3%	2.58	3.00	86.0%	6.8%
Phenanthrene	< 0.10 U	2.38	3.00	79.3%	2.65	3.00	88.3%	10.7%
Anthracene	< 0.10 U	2.41	3.00	80.3%	2.70	3.00	90.0%	11.4%
Fluoranthene	< 0.10 U	2.58	3.00	86.0%	2.82	3.00	94.0%	8.9%
Pyrene	< 0.10 U	2.42	3.00	80.7%	2.73	3.00	91.0%	12.0%
Benzo(a)anthracene	< 0.10 U	2.44	3.00	81.3%	2.78	3.00	92.7%	13.0%
Chrysene	< 0.10 U	2.33	3.00	77.7%	2.65	3.00	88.3%	12.9%
Benzo(a)pyrene	< 0.10 U	2.34	3.00	78.0%	2.75	3.00	91.7%	16.1%
Indeno(1,2,3-cd)pyrene	< 0.10 U	2.23	3.00	74.3%	2.45	3.00	81.7%	9.4%
Dibenz(a,h)anthracene	< 0.10 U	2.16	3.00	72.0%	2.27	3.00	75.7%	5.0%
Benzo(g,h,i)perylene	< 0.10 U	2.18	3.00	72.7%	2.45	3.00	81.7%	11.7%
Dibenzofuran	< 0.10 U	2.25	3.00	75.0%	2.40	3.00	80.0%	6.5%
Total Benzofluoranthenes	< 0.10 U	7.70	9.00	85.6%	9.07	9.00	101%	16.3%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: MW-6
MATRIX SPIKE

Lab Sample ID: AYK4A
LIMS ID: 16-5191
Matrix: Water
Data Release Authorized:
Reported: 04/11/16

QC Report No: AYK4-URS
Project: Laurel Station
Event: 60485368
Date Sampled: 03/29/16
Date Received: 03/30/16

Date Extracted: 04/04/16
Date Analyzed: 04/07/16 23:53
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
91-20-3	Naphthalene	0.10	---
91-57-6	2-Methylnaphthalene	0.10	---
90-12-0	1-Methylnaphthalene	0.10	---
208-96-8	Acenaphthylene	0.10	---
83-32-9	Acenaphthene	0.10	---
86-73-7	Fluorene	0.10	---
85-01-8	Phenanthrene	0.10	---
120-12-7	Anthracene	0.10	---
206-44-0	Fluoranthene	0.10	---
129-00-0	Pyrene	0.10	---
56-55-3	Benzo(a)anthracene	0.10	---
218-01-9	Chrysene	0.10	---
50-32-8	Benzo(a)pyrene	0.10	---
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	---
53-70-3	Dibenz(a,h)anthracene	0.10	---
191-24-2	Benzo(g,h,i)perylene	0.10	---
132-64-9	Dibenzofuran	0.10	---
TOTBFA	Total Benzofluoranthenes	0.10	---

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	84.3%
d10-2-Methylnaphthalene	69.7%
d14-Dibenzo(a,h)anthracene	71.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C

Sample ID: MW-6
MATRIX SPIKE DUPLICATE

Lab Sample ID: AYK4A
LIMS ID: 16-5191
Matrix: Water
Data Release Authorized:
Reported: 04/11/16

QC Report No: AYK4-URS
Project: Laurel Station
Event: 60485368
Date Sampled: 03/29/16
Date Received: 03/30/16

Date Extracted: 04/04/16
Date Analyzed: 04/08/16 00:19
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
91-20-3	Naphthalene	0.10	---
91-57-6	2-Methylnaphthalene	0.10	---
90-12-0	1-Methylnaphthalene	0.10	---
208-96-8	Acenaphthylene	0.10	---
83-32-9	Acenaphthene	0.10	---
86-73-7	Fluorene	0.10	---
85-01-8	Phenanthrene	0.10	---
120-12-7	Anthracene	0.10	---
206-44-0	Fluoranthene	0.10	---
129-00-0	Pyrene	0.10	---
56-55-3	Benzo(a)anthracene	0.10	---
218-01-9	Chrysene	0.10	---
50-32-8	Benzo(a)pyrene	0.10	---
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	---
53-70-3	Dibenz(a,h)anthracene	0.10	---
191-24-2	Benzo(g,h,i)perylene	0.10	---
132-64-9	Dibenzofuran	0.10	---
TOTBFA	Total Benzofluoranthenes	0.10	---

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	93.7%
d10-2-Methylnaphthalene	75.0%
d14-Dibenzo(a,h)anthracene	71.3%

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS

ANALYTICAL RESOURCES INCORPORATED

Sample ID: LCS-040416
LAB CONTROL SAMPLE

Lab Sample ID: LCS-040416
LIMS ID: 16-5191
Matrix: Water
Data Release Authorized:
Reported: 04/11/16

QC Report No: AYK4-URS
Project: Laurel Station
Event: 60485368
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 04/04/16

Date Analyzed LCS: 04/07/16 18:42
LCSD: 04/07/16 19:08
Instrument/Analyst LCS: NT8/JZ
LCSD: NT8/JZ

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 0.50 mL
LCSD: 0.50 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Naphthalene	1.89	3.00	63.0%	1.58	3.00	52.7%	17.9%
2-Methylnaphthalene	2.02	3.00	67.3%	1.77	3.00	59.0%	13.2%
1-Methylnaphthalene	2.04	3.00	68.0%	1.81	3.00	60.3%	11.9%
Acenaphthylene	2.00	3.00	66.7%	1.60	3.00	53.3%	22.2%
Acenaphthene	2.11	3.00	70.3%	1.74	3.00	58.0%	19.2%
Fluorene	2.48	3.00	82.7%	2.14	3.00	71.3%	14.7%
Phenanthrene	2.55	3.00	85.0%	2.37	3.00	79.0%	7.3%
Anthracene	2.38	3.00	79.3%	2.24	3.00	74.7%	6.1%
Fluoranthene	2.69	3.00	89.7%	2.74	3.00	91.3%	1.8%
Pyrene	2.61	3.00	87.0%	2.68	3.00	89.3%	2.6%
Benzo(a)anthracene	2.60	3.00	86.7%	2.68	3.00	89.3%	3.0%
Chrysene	2.56	3.00	85.3%	2.58	3.00	86.0%	0.8%
Benzo(a)pyrene	2.58	3.00	86.0%	2.46	3.00	82.0%	4.8%
Indeno(1,2,3-cd)pyrene	2.76	3.00	92.0%	2.56	3.00	85.3%	7.5%
Dibenz(a,h)anthracene	2.78	3.00	92.7%	2.42	3.00	80.7%	13.8%
Benzo(g,h,i)perylene	2.71	3.00	90.3%	2.49	3.00	83.0%	8.5%
Dibenzofuran	2.27	3.00	75.7%	1.94	3.00	64.7%	15.7%
Total Benzofluoranthenes	9.26	9.00	103%	9.24	9.00	103%	0.2%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

SIM Semivolatile Surrogate Recovery

	LCS	LCSD
d10-Fluoranthene	89.3%	88.7%
d10-2-Methylnaphthalene	71.3%	59.7%
d14-Dibenzo(a,h)anthracene	90.7%	78.7%

4B

SEMIVOLATILE METHOD BLANK SUMMARY

BLANK NO.

AYK4MBW1

Lab Name: ARI

Client: URS

ARI Job No: AYK4

Project: LAUREAL STATION

Lab File ID: 16040703

Date Extracted: 04/04/16

Instrument ID: NT8

Date Analyzed: 04/07/16

Matrix: LIQUID

Time Analyzed: 1816

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	AYK1LCSW1	AYK1LCSW1	16040704	04/07/16
02	AYK1LCSDW1	AYK1LCSDW1	16040705	04/07/16
03	MW-6	AYK4A	16040715	04/07/16
04	MW-6 MS	AYK4AMS	16040716	04/07/16
05	MW-6 MSD	AYK4AMSD	16040717	04/08/16
06	DUPLICATE	AYK4B	16040718	04/08/16
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FORM IV SV

AYK4 00048 Rev

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C

Sample ID: MB-040416
METHOD BLANK

Lab Sample ID: MB-040416
LIMS ID: 16-5191
Matrix: Water
Data Release Authorized:
Reported: 04/11/16

QC Report No: AYK4-URS
Project: Laurel Station
Event: 60485368
Date Sampled: NA
Date Received: NA

Date Extracted: 04/04/16
Date Analyzed: 04/07/16 18:16
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
91-20-3	Naphthalene	0.10	< 0.10 U
91-57-6	2-Methylnaphthalene	0.10	< 0.10 U
90-12-0	1-Methylnaphthalene	0.10	< 0.10 U
208-96-8	Acenaphthylene	0.10	< 0.10 U
83-32-9	Acenaphthene	0.10	< 0.10 U
86-73-7	Fluorene	0.10	< 0.10 U
85-01-8	Phenanthrene	0.10	< 0.10 U
120-12-7	Anthracene	0.10	< 0.10 U
206-44-0	Fluoranthene	0.10	< 0.10 U
129-00-0	Pyrene	0.10	< 0.10 U
56-55-3	Benzo(a)anthracene	0.10	< 0.10 U
218-01-9	Chrysene	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.10	< 0.10 U
191-24-2	Benzo(g,h,i)perylene	0.10	< 0.10 U
132-64-9	Dibenzofuran	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	95.3%
d10-2-Methylnaphthalene	74.7%
d14-Dibenzo(a,h)anthracene	105%

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: ARI | Client: URS

Instrument ID: NT8 | Project: LAUREAL STATION

DFTPP Injection Date: 01/08/16 | DFTPP Injection Time: 1132

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	10.0 - 80.0% of mass 198	23.6
68	Less than 2.0% of mass 69	0.9 (1.7)1
69	Mass 69 relative abundance	55.4
70	Less than 2.0% of mass 69	0.3 (0.5)1
127	10.0 - 80.0% of mass 198	55.3
197	Less than 2.0% of mass 198	0.6
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	7.7
275	10.0 - 60.0% of mass 198	36.2
365	Greater than 1.0% of mass 198	5.16
441	0.0 - 24.0% of mass 442	8.7 (14.7)2
442	50.0 - 200.0% of mass 198	59.5
443	15.0 - 24.0% of mass 442	12.3 (20.7)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	IC25160108	SEA0017-CAL4	16010802	01/08/16	1154
02	IC01160108	SEA0017-CAL1	16010803	01/08/16	1219
03	IC05160801	SEA0017-CAL2	16010804	01/08/16	1245
04	IC1160108	SEA0017-CAL3	16010805	01/08/16	1311
05	IC5160108	SEA0017-CAL5	16010806	01/08/16	1336
06	IC10160108	SEA0017-CAL6	16010807	01/08/16	1402
07	SCV160108	SEA0017-SCV1	16010808	01/08/16	1428
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FORM V SV

AYK4:00050 RW

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK

DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: ARI | Client: URS

Instrument ID: NT8 | Project: LAUREAL STATION

DFTPP Injection Date: 04/07/16 | DFTPP Injection Time: 1736

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	10.0 - 80.0% of mass 198	18.4
68	Less than 2.0% of mass 69	0.8 (1.7)1
69	Mass 69 relative abundance	44.5
70	Less than 2.0% of mass 69	0.2 (0.5)1
127	10.0 - 80.0% of mass 198	50.1
197	Less than 2.0% of mass 198	0.7
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	7.3
275	10.0 - 60.0% of mass 198	38.6
365	Greater than 1.0% of mass 198	5.20
441	0.0 - 24.0% of mass 442	7.7 (15.4)2
442	50.0 - 200.0% of mass 198	50.2
443	15.0 - 24.0% of mass 442	10.0 (20.0)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	ICV160407	ICV160407	16040702	04/07/16	1751
02	AYK1MBW1	AYK1MBW1	16040703	04/07/16	1816
03	AYK1LCSW1	AYK1LCSW1	16040704	04/07/16	1842
04	AYK1LCSDW1	AYK1LCSDW1	16040705	04/07/16	1908
05	MW-6	AYK4A	16040715	04/07/16	2327
06	MW-6 MS	AYK4AMS	16040716	04/07/16	2353
07	MW-6 MSD	AYK4AMSD	16040717	04/08/16	0019
08	DUPLICATE	AYK4B	16040718	04/08/16	0044
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14					
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16					
17					
18					
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20					

FORM V SV

6B

SEMIVOLATILE 8270-D INITIAL CALIBRATION DATA

Lab Name: ARI | Client: URS

ARI Job No: AYK4 | Project: LAUREAL STATION

Instrument ID: NT8 | Calibration Date: 01/08/16

LAB FILE ID: RRF0.1=16010803 RRF0.5=16010804 RRF1 =16010805
RRF2.5=16010802 RRF5 =16010806 RRF10 =16010807

COMPOUND	RRF 0.1	RRF 0.5	RRF 1	RRF 2.5	RRF 5	RRF 10	$\overline{RRF}$	%RSD /R^2
Naphthalene	1.095	0.980	0.961	0.964	0.990	0.892	0.980	6.7
2-Methylnaphthalene	0.565	0.537	0.542	0.553	0.550	0.507	0.542	3.6
Acenaphthylene	1.723	1.583	1.687	1.749	1.766	1.628	1.689	4.2
Acenaphthene	1.135	1.062	1.087	1.073	1.085	1.010	1.075	3.8
Dibenzofuran	1.760	1.547	1.535	1.546	1.566	1.436	1.565	6.8
Fluorene	1.282	1.216	1.190	1.243	1.272	1.198	1.234	3.1
Phenanthrene	1.025	0.948	0.953	0.948	0.958	0.884	0.953	4.7
Anthracene	0.976	0.854	0.898	0.939	0.952	0.870	0.915	5.3
Fluoranthene	1.218	1.140	1.089	1.087	1.100	1.012	1.108	6.2
Pyrene	1.046	0.918	0.965	0.991	1.000	0.924	0.974	5.0
Benzo(a)anthracene	0.983	0.930	0.974	0.990	1.020	0.954	0.975	3.2
Chrysene	1.126	0.934	0.976	0.973	0.992	0.915	0.986	7.5
Benzo(b)fluoranthene	1.044	0.987	1.014	1.026	1.077	1.010	1.026	3.0
Benzo(k)fluoranthene	1.088	0.986	1.037	1.039	1.084	1.018	1.042	3.7
Benzo(j)fluoranthene	1.042	0.896	0.873	0.923	0.964	0.919	0.936	6.4
Benzo(a)pyrene	1.056	0.902	0.968	0.970	1.042	0.980	0.986	5.7
Indeno(1,2,3-cd)pyrene	1.301	1.121	1.120	1.158	1.245	1.204	1.192	6.1
Dibenzo(a,h)anthracene	1.032	0.898	0.944	0.967	1.026	1.030	0.983	5.6
Benzo(g,h,i)perylene	1.177	1.007	0.968	1.016	1.057	1.016	1.040	7.0
1-methylnaphthalene	0.563	0.512	0.519	0.533	0.540	0.483	0.525	5.2
Perylene	1.089	0.928	0.958	0.970	1.042	0.981	0.995	6.0
2-Methylnaphthalene-d10	0.558	0.548	0.587	0.582	0.598	0.552	0.571	3.7
Dibenzo(a,h)anthracene-d14	0.799	0.725	0.700	0.738	0.781	0.754	0.750	4.9
Fluoranthene-d10	1.059	0.933	0.976	0.992	1.015	0.948	0.987	4.7

<- Outside QC limits: %RSD <20% or R^2 > 0.990

SEMIVOLATILE 8270-D CONTINUING CALIBRATION CHECK

Lab Name: ARI | Client: URS

ARI Job No: AYK4 | Project: LAUREAL STATION

Instrument ID: NT8 | Cont. Calib. Date: 01/08/16

Init. Calib. Date: 01/08/16 | Cont. Calib. Time: 1154

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
Naphthalene	0.980	0.964	0.700	AVRG	-1.6
2-Methylnaphthalene	0.542	0.553	0.400	AVRG	2.0
Acenaphthylene	1.689	1.749	0.900	AVRG	3.6
Acenaphthene	1.075	1.073	0.900	AVRG	-0.2
Dibenzofuran	1.565	1.546	0.800	AVRG	-1.2
Fluorene	1.234	1.243	0.900	AVRG	0.7
Phenanthrene	0.953	0.948	0.700	AVRG	-0.5
Anthracene	0.915	0.939	0.700	AVRG	2.6
Fluoranthene	1.108	1.087	0.600	AVRG	-1.9
Pyrene	0.974	0.991	0.600	AVRG	1.7
Benzo(a)anthracene	0.975	0.990	0.800	AVRG	1.5
Chrysene	0.986	0.973	0.700	AVRG	-1.3
Benzo(b)fluoranthene	1.026	1.026	0.700	AVRG	0.0
Benzo(k)fluoranthene	1.042	1.039	0.700	AVRG	-0.3
Benzo(j)fluoranthene	0.936	0.923	0.010	AVRG	-1.4
Benzo(a)pyrene	0.986	0.970	0.700	AVRG	-1.6
Indeno(1,2,3-cd)pyrene	1.192	1.158	0.500	AVRG	-2.8
Dibenzo(a,h)anthracene	0.983	0.967	0.400	AVRG	-1.6
Benzo(g,h,i)perylene	1.040	1.016	0.500	AVRG	-2.3
1-methylnaphthalene	0.525	0.533	0.010	AVRG	1.5
Perylene	0.995	0.970	0.010	AVRG	-2.5
2-Methylnaphthalene-d10	0.571	0.582	0.010	AVRG	1.9
Dibenzo(a,h)anthracene-d14	0.750	0.738	0.010	AVRG	-1.6
Fluoranthene-d10	0.987	0.992	0.010	AVRG	0.5

<- Exceeds QC limit of 20% D

* RF less than minimum RF

FORM VII SV-1

7B

SEMIVOLATILE 8270-D CONTINUING CALIBRATION CHECK

Lab Name: ARI | Client: URS

ARI Job No: AYK4 | Project: LAUREAL STATION

Instrument ID: NT8 | Cont. Calib. Date: 04/07/16

Init. Calib. Date: 01/08/16 | Cont. Calib. Time: 1751

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
Naphthalene	0.980	0.911	0.700	AVRG	-7.0
2-Methylnaphthalene	0.542	0.572	0.400	AVRG	5.5
Acenaphthylene	1.689	1.622	0.900	AVRG	-4.0
Acenaphthene	1.075	1.058	0.900	AVRG	-1.6
Dibenzofuran	1.565	1.649	0.800	AVRG	5.4
Fluorene	1.234	1.311	0.900	AVRG	6.2
Phenanthrene	0.953	0.928	0.700	AVRG	-2.6
Anthracene	0.915	0.884	0.700	AVRG	-3.4
Fluoranthene	1.108	1.164	0.600	AVRG	5.0
Pyrene	0.974	0.907	0.600	AVRG	-6.9
Benzo(a)anthracene	0.975	0.920	0.800	AVRG	-5.6
Chrysene	0.986	0.924	0.700	AVRG	-6.3
Benzo(b)fluoranthene	1.026	0.999	0.700	AVRG	-2.6
Benzo(k)fluoranthene	1.042	1.032	0.700	AVRG	-1.0
Benzo(j)fluoranthene	0.936	0.896	0.010	AVRG	-4.3
Benzo(a)pyrene	0.986	0.927	0.700	AVRG	-6.0
Indeno(1,2,3-cd)pyrene	1.192	1.138	0.500	AVRG	-4.5
Dibenzo(a,h)anthracene	0.983	0.962	0.400	AVRG	-2.1
Benzo(g,h,i)perylene	1.040	0.952	0.500	AVRG	-8.5
1-methylnaphthalene	0.525	0.547	0.010	AVRG	4.2
Perylene	0.995	0.950	0.010	AVRG	-4.5
2-Methylnaphthalene-d10	0.571	0.616	0.010	AVRG	7.9
Dibenzo(a,h)anthracene-d14	0.750	0.672	0.010	AVRG	-10.4
Fluoranthene-d10	0.987	1.023	0.010	AVRG	3.6

<- Exceeds QC limit of 20% D

* RF less than minimum RF

FORM VII SV-1

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ARI

Client: URS

ARI Job No: AYK4

Project: LAUREAL STATION

Ical Midpoint ID: 16010802

Ical Date: 01/08/16

Instrument ID: NT8

Cont. Cal Date: 01/08/16

		IS1(NPT) AREA #	RT #	IS2(ANT) AREA #	RT #	IS3(PHN) AREA #	RT #
	ICAL MIDPT	340385	4.81	191651	7.09	360067	9.12
	UPPER LIMIT	680770		383302		720134	
	LOWER LIMIT	170193		95826		180034	
	CCAL	340385	4.81	191651	7.09	360067	9.12
	UPPER LIMIT		5.31		7.59		9.62
	LOWER LIMIT		4.31		6.59		8.62
01	SCV160108	344038	4.82	190622	7.09	366091	9.11
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

IS1 = Naphthalene-d8
IS2 = Acenaphthene-d10
IS3 = Phenanthrene-d10

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ARI | Client: URS

ARI Job No: AYK4 | Project: LAUREAL STATION

Ical Midpoint ID: 16010802 | Ical Date: 01/08/16

Instrument ID: NT8 | Cont. Cal Date: 01/08/16

		IS4(CRY) AREA #	RT #	IS5(PRY) AREA #	RT #	AREA #	RT #
	ICAL MIDPT	412900	13.97	419317	17.82		
	UPPER LIMIT	825800		838634			
	LOWER LIMIT	206450		209659			
	CCAL	412900	13.97	419317	17.82		
	UPPER LIMIT		14.47		18.32		
	LOWER LIMIT		13.47		17.32		
01	SCV160108	414616	13.96	415814	17.82		
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

IS4 = Chrysene-d12
IS5 = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

FORM VIII SV-2

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ARI | Client: URS

ARI Job No: AYK4 | Project: LAUREAL STATION

Ical Midpoint ID: 16010802 | Ical Date: 01/08/16

Instrument ID: NT8 | Cont. Cal Date: 04/07/16

		IS1 (NPT) AREA #	RT #	IS2 (ANT) AREA #	RT #	IS3 (PHN) AREA #	RT #
	ICAL MIDPT	340385	4.81	191651	7.09	360067	9.12
	UPPER LIMIT	680770		383302		720134	
	LOWER LIMIT	170193		95826		180034	
	CCAL	199730	4.61	124956	6.88	264596	8.91
	UPPER LIMIT		5.11		7.38		9.41
	LOWER LIMIT		4.11		6.38		8.41
01	AYK1MBW1	313881	4.60	186284	6.88	405385	8.91
02	AYK1LCSW1	332164	4.59	211122	6.88	435898	8.91
03	AYK1LCSDW1	328987	4.59	207944	6.88	427445	8.91
04	MW-6	343653	4.59	207493	6.88	437174	8.91
05	MW-6 MS	357975	4.59	212619	6.87	442626	8.91
06	MW-6 MSD	344951	4.59	211582	6.88	442016	8.91
07	DUPLICATE	340118	4.59	206224	6.88	437951	8.91
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

IS1 = Naphthalene-d8
IS2 = Acenaphthene-d10
IS3 = Phenanthrene-d10

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AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ARI

Client: URS

ARI Job No: AYK4

Project: LAUREAL STATION

Ical Midpoint ID: 16010802

Ical Date: 01/08/16

Instrument ID: NT8

Cont. Cal Date: 04/07/16

		IS4 (CRY) AREA #	RT #	IS5 (PRY) AREA #	RT #	AREA #	RT #
	ICAL MIDPT	412900	13.97	419317	17.82		
	UPPER LIMIT	825800		838634			
	LOWER LIMIT	206450		209659			
	CCAL	347439	13.64	335326	17.44		
	UPPER LIMIT		14.14		17.94		
	LOWER LIMIT		13.14		16.94		
01	AYK1MBW1	484867	13.63	389194	17.43		
02	AYK1LCSW1	526795	13.63	440952	17.44		
03	AYK1LCSDW1	515725	13.63	452589	17.44		
04	MW-6	550116	13.63	466572	17.44		
05	MW-6 MS	553586	13.63	500453	17.44		
06	MW-6 MSD	552721	13.63	482289	17.44		
07	DUPLICATE	532765	13.63	455897	17.43		
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

IS4 = Chrysene-d12
IS5 = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

FORM VIII SV-2

TPHD Analysis
Report and Summary QC Forms

ARI Job ID: AYK4

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3510C
Page 1 of 1

QC Report No: AYK4-URS
Project: Laurel Station
60485368

Matrix: Water

Date Received: 03/30/16

Data Release Authorized: B
Reported: 04/12/16

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
MB-040416	Method Blank	04/04/16	04/08/16	1.00	Diesel Range	0.10	< 0.10 U
16-5191	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		86.2%
AYK4A	MW-6	04/04/16	04/08/16	1.00	Diesel Range	0.10	< 0.10 U
16-5191	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		90.8%
AYK4B	Duplicate	04/04/16	04/08/16	1.00	Diesel Range	0.10	< 0.10 U
16-5192	HC ID: ---		FID3B	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		87.8%

Reported in mg/L (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: AYK4-URS
Project: Laurel Station
60485368

Client ID	OTER	TOT OUT
MB-040416	86.2%	0
LCS-040416	96.2%	0
LCSD-040416	92.0%	0
MW-6	90.8%	0
MW-6 MS	90.5%	0
MW-6 MSD	89.8%	0
Duplicate	87.8%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3510C
Log Number Range: 16-5191 to 16-5192

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: MW-6
MS/MSD

Lab Sample ID: AYK4A
LIMS ID: 16-5191
Matrix: Water
Data Release Authorized:
Reported: 04/12/16

QC Report No: AYK4-URS
Project: Laurel Station
60485368
Date Sampled: 03/29/16
Date Received: 03/30/16

Date Extracted MS/MSD: 04/04/16

Sample Amount MS: 500 mL
MSD: 500 mL

Date Analyzed MS: 04/08/16 13:34
MSD: 04/08/16 13:58

Final Extract Volume MS: 1.0 mL
MSD: 1.0 mL

Instrument/Analyst MS: FID3B/ML
MSD: FID3B/ML

Dilution Factor MS: 1.00
MSD: 1.00

Range	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Diesel	< 0.10 U	2.53	3.00	84.3%	2.63	3.00	87.7%	3.9%

TPHD Surrogate Recovery

	MS	MSD
o-Terphenyl	90.5%	89.8%

Results reported in mg/L
RPD calculated using sample concentrations per SW846.

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID

ANALYTICAL RESOURCES INCORPORATED

Sample ID: LCS-040416
LCS/LCSD

Lab Sample ID: LCS-040416
LIMS ID: 16-5191
Matrix: Water
Data Release Authorized:
Reported: 04/12/16

QC Report No: AYK4-URS
Project: Laurel Station
60485368
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 04/04/16

Date Analyzed LCS: 04/08/16 12:21
LCSD: 04/08/16 12:45
Instrument/Analyst LCS: FID3B/ML
LCSD: FID3B/ML

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 1.0 mL
LCSD: 1.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	2.61	3.00	87.0%	2.50	3.00	83.3%	4.3%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	96.2%	92.0%

Results reported in mg/L
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Water
Date Received: 03/30/16

ARI Job: AYK4
Project: Laurel Station
60485368

ARI ID	Client ID	Samp Amt	Final Vol	Prep Date
16-5191-040416MB1	Method Blank	500 mL	1.00 mL	04/04/16
16-5191-040416LCS1	Lab Control	500 mL	1.00 mL	04/04/16
16-5191-040416LCSD1	Lab Control Dup	500 mL	1.00 mL	04/04/16
16-5191-AYK4A	MW-6	500 mL	1.00 mL	04/04/16
16-5191-AYK4AMS	MW-6	500 mL	1.00 mL	04/04/16
16-5191-AYK4AMSD	MW-6	500 mL	1.00 mL	04/04/16
16-5192-AYK4B	Duplicate	500 mL	1.00 mL	04/04/16

TPH METHOD BLANK SUMMARY

BLANK NO.

AYK4MBW1

Lab Name: ARI

Client: URS

SDG No.: AYK4

Project No.: LAUREL STATION

Date Extracted: 04/04/16

Matrix: LIQUID

Date Analyzed : 04/08/16

Instrument ID : FID3B

Time Analyzed : 1156

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	AYK4LCSW1	AYK4LCSW1	04/08/16
02	AYK4LCSDW1	AYK4LCSDW1	04/08/16
03	MW-6	AYK4A	04/08/16
04	MW-6 MS	AYK4AMS	04/08/16
05	MW-6 MSD	AYK4AMSD	04/08/16
06	DUPLICATE	AYK4B	04/08/16
07			
08			
09			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			

FORM IV TPH

6a
DIESEL INITIAL CALIBRATION

Lab Name: ANALYTICAL RESOURCES, INC.

Client: URS

Instrument: FID3B.I

Project: Laurel Station

Calibration Date: 16-FEB-2016

SDG No.: AYK4

Diesel Range	RF1 50	RF2 100	RF3 250	RF4 500	RF5 1000	RF6 2500	Ave RF	%RSD
WA Diesel	17472	18025	17417	17374	17079	17524	17482	1.8
AK Diesel	20123	21033	20460	20416	20095	20597	20454	1.7
OR Diesel	20397	21258	20618	20534	20221	20717	20624	1.7
Cal Diesel	20000	20929	20381	20363	20030	20529	20372	1.7
o-Terph	22236	22485	22607	23297	22579	22596	22633	1.6

<- Indicates %RSD outside limits
Surrogate areas are not included in Diesel RF calculation.

Quant Ranges :

WA Diesel	C12-C24	(4.389-8.242)
AK Diesel	C10-C25	(3.520-8.544)
OR Diesel	C10-C28	(3.520-9.403)
Cal Diesel	C10-C24	(3.520-8.242)

Calibration Files	Analysis Time
f1	16-FEB-2016 17:14
f2	16-FEB-2016 17:38
f3	16-FEB-2016 18:02
f4	16-FEB-2016 18:26
f5	16-FEB-2016 18:50
f6	16-FEB-2016 19:13

FORM VI-Diesel

6a

NW MOTOR OIL RANGE INITIAL CALIBRATION

Lab Name: ANALYTICAL RESOURCES, INC.

Client: URS

Instrument: FID3B.I

Project: Laurel Station

Calibration Date: 16-FEB-2016

SDG No.: AYK4

Product Range	RF1 100	RF2 250	RF3 500	RF4 1000	RF5 2500	RF6 5000	Ave RF	%RSD
WA M.Oil C24-C38	15459	14916	14626	14046	13988	13291	14388	5.4
Triac Surr	20088	20192	20004	19235	19170	18102	19465	4.1

<- Indicates %RSD outside limits
Surrogate areas are not included in Motor Oil RF calculation.

Calibration Files	Analysis Time
f1	16-FEB-2016 20:24
f2	16-FEB-2016 20:48
f3	16-FEB-2016 21:12
f4	16-FEB-2016 21:35
f5	16-FEB-2016 21:59
f6	16-FEB-2016 22:22

FORM VI-M.Oil

7a

DIESEL CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC.
Client: URS

ICal Date: 16-FEB-2016
Project: Laurel Station

CCal Date: 08-APR-2016
SDG No.: AYK4

Analysis Time: 11:03
Lab ID: DIESEL#1

Instrument: FID3B.I
Lab File Name: 16040803.D

Diesel Range	Area*	CalcAmnt	NomAmnt	% D
WADies(C12-C24)	4626638	264.7	250	5.9
AK102 (C10-C25)	5398073	263.9	250	5.6
ITDIES (C10-C24)	5371689	263.7	250	5.5
Terphenyl	978228	43.2	45	-4.0

* Surrogate areas are subtracted from range areas
<- Indicates a %D outside QC limits

Quant Ranges : WA Diesel C12-C24
AK Diesel C10-C25
IT Diesel C10-C24

MOTOR OIL CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC.
Client: URS

ICal Date: 16-FEB-2016
Project: Laurel Station

CCal Date: 08-APR-2016
SDG No.: AYK4

Analysis Time: 11:27
Lab ID: MOIL#1

Instrument: FID3B.I
Lab File Name: 16040804.D

M.oil Range	Area*	CalcAmnt	NomAmnt	% D
WAMoil(C24-C38)	6314671	438.9	500	-12.2
AK103 (C25-C36)	5603789	399.2	500	-20.2
n-Triacontane	930527	47.8	45	6.2

* Surrogate areas are subtracted from range areas
<- Indicates a %D outside QC limits

Quant Ranges : WA M.Oil C24-C38
AK M.Oil C25-C36

FORM VII-Diesel

7a

DIESEL CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC.

Client: URS

ICal Date: 16-FEB-2016

Project: Laurel Station

CCal Date: 08-APR-2016

SDG No.: AYK4

Analysis Time: 15:36

Lab ID: DIESEL#2

Instrument: FID3B.I

Lab File Name: 16040814.D

Diesel Range	Area*	CalcAmnt	NomAmnt	% D
WADies(C12-C24)	4582311	262.1	250	4.8
AK102 (C10-C25)	5371156	262.6	250	5.0
ITDIES (C10-C24)	5342634	262.3	250	4.9
Terphenyl	990016	43.7	45	-2.8

* Surrogate areas are subtracted from range areas
<- Indicates a %D outside QC limits

Quant Ranges : WA Diesel C12-C24
AK Diesel C10-C25
IT Diesel C10-C24

7a

MOTOR OIL CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC.
Client: URS

ICal Date: 16-FEB-2016
Project: Laurel Station

CCal Date: 08-APR-2016
SDG No.: AYK4

Analysis Time: 16:00
Lab ID: MOIL#2

Instrument: FID3B.I
Lab File Name: 16040815.D

M.oil Range	Area*	CalcAmnt	NomAmnt	% D
WAMoil(C24-C38)	6205499	431.3	500	-13.7
AK103 (C25-C36)	5523622	393.5	500	-21.3
n-Triacontane	929538	47.8	45	6.1

* Surrogate areas are subtracted from range areas
<- Indicates a %D outside QC limits

Quant Ranges : WA M.Oil C24-C38
AK M.Oil C25-C36

FORM VII-Diesel

TPH ANALYTICAL SEQUENCE

Lab Name: ARI

Client: URS

SDG No.: AYK4

Project: LAUREL STATION

Instrument ID: FID3B

GC Column: RTX-1

THE ANALYTICAL SEQUENCE OF BLANKS, SAMPLES, AND STANDARDS, IS GIVEN BELOW:

SURROGATE RT FROM DAILY STANDARD
TERPH: 6.60 TRIAC: 10.06

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	TERPH RT #	TRIAC RT #
01	RT	RT	04/08/16	1015	6.60	10.06
02	IB	IB	04/08/16	1039	6.59	10.06
03	LAUREL STATI	DIESEL#1	04/08/16	1103	6.60	10.06
04	LAUREL STATI	MOIL#1	04/08/16	1127	6.60	10.07
05	AYK4MBW1	AYK4MBW1	04/08/16	1156	6.59	10.06
06	AYK4LCSW1	AYK4LCSW1	04/08/16	1221	6.60	10.06
07	AYK4LCSDW1	AYK4LCSDW1	04/08/16	1245	6.60	10.06
08	MW-6	AYK4A	04/08/16	1309	6.59	10.06
09	MW-6 MS	AYK4AMS	04/08/16	1334	6.60	10.06
10	MW-6 MSD	AYK4AMSD	04/08/16	1358	6.60	10.06
11	DUPLICATE	AYK4B	04/08/16	1423	6.59	10.06
12	LAUREL STATI	DIESEL#2	04/08/16	1536	6.60	10.06
13	LAUREL STATI	MOIL#2	04/08/16	1600	6.60	10.06

QC LIMITS

TERPH = o-terph (+/- 0.05 MINUTES)
TRIAC = Triacon Surr (+/- 0.05 MINUTES)

* Values outside of QC limits.

FORM VIII TPH

TPH ANALYTICAL SEQUENCE

Lab Name: ARI

Client: URS

SDG No.: AYK4

Project: Laurel Station

Instrument ID: FID3B

GC Column: RTX-1

THE ANALYTICAL SEQUENCE OF BLANKS, SAMPLES, AND STANDARDS, IS GIVEN BELOW:

SURROGATE RT FROM DAILY STANDARD
TERPH: 6.50 TRIAC: 9.96

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	TERPH RT #	TRIAC RT #
01		SEB0024-IBL1	02/16/16	1626	6.50	9.96
02		SEB0024-IBL2	02/16/16	1650	6.49	9.96
03		SEB0024-CAL1	02/16/16	1714	6.50	10.05
04		SEB0024-CAL2	02/16/16	1738	6.49	9.97
05		SEB0024-CAL3	02/16/16	1802	6.50	9.96
06		SEB0024-CAL4	02/16/16	1826	6.51	9.97
07		SEB0024-CAL5	02/16/16	1850	6.52	9.97
08		SEB0024-CAL6	02/16/16	1913	6.55	9.97
09		SEB0024-SCV1	02/16/16	2001	6.50	9.97
10		SEB0024-CAL7	02/16/16	2024	6.56	9.94
11		SEB0024-CAL8	02/16/16	2048	6.56	9.95
12		SEB0024-CAL9	02/16/16	2112	6.56	9.96
13		SEB0024-CALA	02/16/16	2135	6.56	9.98
14		SEB0024-CALB	02/16/16	2159	6.55	10.01*
15		SEB0024-CALC	02/16/16	2222	6.55	10.05*
16		SEB0024-SCV2	02/16/16	2310	6.55	9.96

QC LIMITS

TERPH = o-terph (+/- 0.05 MINUTES)
TRIAC = Triacon Surr (+/- 0.05 MINUTES)

* Values outside of QC limits.

Memo

Century Square
1111 3rd Avenue, Suite 1600
Seattle, Washington 98101
206.438.2700 Telephone
206.438.2699 Fax

To:	Karen Mixon, Project Manager	**Info:**	**FINAL**
From:	Christine T. Gebel, Chemist Jennifer B. Garner, Chemist	**Date:**	August 5, 2016
RE:	Data Quality Review Quarterly Groundwater Monitoring Samples – June 2016 Laurel Station Cleanup Action		

The data quality review of 2 groundwater samples collected on June 27, 2016, has been completed. The samples were analyzed by Analytical Resources, Incorporated (ARI) located in Tukwila, Washington for benzene, toluene, ethylbenzene, m,p-xylene, and o-xylene (BTEX) by EPA Method 8260C, total petroleum hydrocarbons (TPHs) by Washington State Department of Ecology (Ecology) Methods NWTPH-Gx (gasoline-range TPH) and NWTPH-Dx (diesel-range and motor oil-range TPH), and low-level polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8270D modified by selected ion monitoring (SIM). Samples were analyzed for the chemical constituents as described in the *Final Compliance Monitoring Plan, Laurel Station, 1009 East Smith Road, Bellingham, Washington* dated January 16, 2015 (CMP). Due to changes in laboratory procedures, NWTPH-Gx analysis was performed using GC/MS instrumentation instead of GC/FID.

The analyses were performed in general accordance with methods specified in EPA's *Test Methods for Evaluating Solid Waste (SW-846)* and Ecology's *Analytical Methods for Petroleum Hydrocarbons*, June 1997. The laboratory provided a full data package containing sample results and associated QA/QC data. The following samples are associated with ARI group BCQ4:

Sample ID	Laboratory ID	Requested Analyses
MW-6	BCQ4A	BTEX, TPH-Gx, TPH-Dx, PAHs
DUP (Duplicate of MW-6)	BCQ4B	BTEX, TPH-Gx, TPH-Dx, PAHs

The following comments refer to ARI's performance in meeting the quality control specifications described in the analytical methods. Data were qualified based on the method criteria and guidance provided in the EPA document *USEPA National Functional Guidelines for Superfund Organic Methods Data Review*, August 2014. Data qualifiers that may be assigned to data from this laboratory group include:

- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
- DNR - Do Not Report. Multiple results reported from different analytical dates and/or dilutions. Value from another analysis should be used.

Sample Receipt

Upon receipt by ARI, the sample jar information was compared to the chain-of-custody (COC) and the cooler temperature was recorded. No discrepancies relating to sample identification were noted by ARI and the cooler was received at a temperature within the EPA-recommended limits of greater than 0°C and less than or equal to 6°C.

Due to a laboratory oversight, the bottle order for this sampling event was not shipped from ARI to Laurel Station. Sample containers were obtained from an alternate analytical laboratory located in Bellingham, Washington.

Organic Analyses

Samples were analyzed for BTEX, TPHs, and PAHs by the methods identified in the introduction to this report.

1. Holding Times – Acceptable

2. Instrument Performance Checks (GC/MS Tunes) – Acceptable where applicable

3. Initial and Continuing Calibrations – Acceptable

4. Blanks – Acceptable except as noted below:

   BTEX by Method 8260C-Modified and NWTPH-Gx – As noted above, sample containers were obtained from an alternate source. A trip blank was not provided in the bottle shipment; therefore, a trip blank was not analyzed with this data set.

5. Surrogates – Acceptable

6. Internal Standards – Acceptable where applicable

7. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) – Acceptable

8. Matrix Spike/Matrix Spike Duplicate (MS/MSD) – Acceptable

   General – An MS/MSD was performed using MW-6 for all parameters. Results were acceptable.

9. Field Duplicate – Acceptable

   General – A field duplicate was submitted for MW-6 and identified as DUP. Results were comparable for all parameters.

10. Reporting Limits – Acceptable except as noted below:

    PAHs by Method 8270D-SIM – The reporting limits for PAHs were elevated in MW-6 and DUP due to multiple communication errors between the field, laboratory, and URS office. The error was identified during this quarterly sampling review. The elevated reporting limits meet the cleanup levels for all compounds except dibenzo(a,h)anthracene. The error does not affect the data use at this time. URS has implemented a corrective action to avoid similar issues during future sample collection starting with the September 2016 sampling event.

11. Other Items of Note:

    NWTPH-Dx – The laboratory indicated that the diesel-range TPH chromatogram for MW-6 did not match the laboratory standard chromatogram for diesel.

Overall Assessment of Data

The data reported in this laboratory group, as reported, are considered to be usable for meeting project objectives. The completeness for laboratory group BCQ4 is 100%.

Table of Contents: ARI Job BCQ4

Client: AECOM

Project: # Laurel Station

Signature

July-13-2016
Date

Analytical Resources, Incorporated
Analytical Chemists and Consultants

July 13, 2016

Karen Mixon
AECOM
1111 Third Avenue, Suite 1600
Seattle, WA 98101

RE: Laurel Station
ARI Job: BCQ4

Dear Karen:

Please find enclosed the original Chain-of-Custody (COC) records, sample receipt documentation, and the final data package for the project referenced above.

Sample receipt information and analytical details are addressed in the Case Narrative.

An electronic copy of this data package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com
www.arilabs.com

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Documentation

ARI Job ID: BCQ4

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: BCQ4	Turn-around Requested: ST	Page: 1 of 1	
ARI Client Company: AECOM	Phone: 206 438 2234	Date: 6/27/16	Ice Present? Yes
Client Contact: KAREN MIXON		No. of Coolers: 1	Cooler Temps: 5-6
Client Project Name: LAUREL STATION			
Client Project #:	Samplers: SN + IPV		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: BTEX 8021B	NWTPH-Gx	NWTPH-Dx	PAHs 8270D					Notes/Comments
MW-6	6/27	1230	H2O	14	X	X	X	X					EXTRA VOLUME FOR MS/MSD
DUP	6/27		H2O	7	X	X	X	X					

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: IAN VERMEGREN	Printed Name: Tyler Ranken	Printed Name:	Printed Name:
	Company: AECOM	Company: ARI	Company:	Company:
	Date & Time: 6/27 1300	Date & Time: 6-28-16 @ 0941	Date & Time:	Date & Time:

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Aecom

Project Name: Laurel Station

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: BCQ4

Tracking No: 7834 5803 5268 NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES NO

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 5.6

Time: _____

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D005276

Cooler Accepted by: TR Date: 6-28-16 Time: 0941

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? NA YES NO

Were all bottles sealed in individual plastic bags? YES NO

Did all bottles arrive in good condition (unbroken)? YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES NO

Were all VOC vials free of air bubbles? NA YES NO

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI... NA _____

Was Sample Split by ARI : NA YES Date/Time: _____ Equipment: _____ Split by: _____

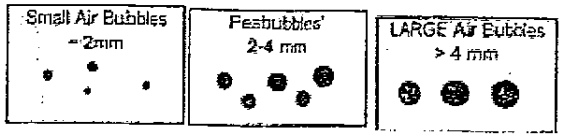
Samples Logged by: JM Date: 6-28-16 Time: 16:04

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:



Small → "sm" (< 2 mm)

Peabubbles → "pb" (2 to < 4 mm)

Large → "lg" (4 to < 6 mm)

Headspace → "hs" (> 6 mm)

BCQ4 : 00000

Case Narrative, Data Qualifiers, Control Limits

ARI Job ID: BCQ4

Sample Receipt:

Analytical Resources, Inc. (ARI) received two water samples and on June 28, 2016 logged under ARI Sample Delivery Group (SDG) BCQ4. The samples were analyzed for NWTPH-Dx, SIM PAHs and NWTPH-Gx plus BTEX.

SIM PAHs by 8270D SIM:

There were no anomalies associated with these samples.

Diesel Range Organics by NWTPH-D Extended:

There were no anomalies associated with these samples.

Gasoline Range Organics by NWTPH-Gx plus BTEX by 8260C/NWTPHG:

There were no anomalies associated with these samples.

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: BCQ4
Client: AECOM
Project Event: N/A
Project Name: Laurel Station

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	MW-6	BCQ4A	16-9825	Water	06/27/16 12:30	06/28/16 09:41
2.	DUP	BCQ4B	16-9826	Water	06/27/16	06/28/16 09:41

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NR	Spiked compound recovery is not reported due to chromatographic interference
NS	The flagged analyte was not spiked into the sample
M	Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
Y	The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
EMPC	Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
C	The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
P	The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
X	Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
Z	Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

Analytical Method Information

Printed: 07/13/2016 12:16 pm

8260C Gas (NWTPH) in Water (NWTPHg)

Preservation: pH<2; HCL, Cool <6°C

Container: VOA Vial, Clear, 40 mL, HCL **Amount Required:** 120 mL **Hold Time:** 14 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Gasoline Range Organics (Tol-Nap)	9.06	100 ug/L		30	80-120	30	80-120	30
Gasoline Range Organics (2MP-TMB)	15.8	100 ug/L		30	80-120	30	80-120	30
Gasoline Range Organics (Tol-C12)	9.13	100 ug/L		30	80-120	30	80-120	30
Gasoline Range Organics (C6-C10)	16.8	100 ug/L		30	80-120	30	80-120	30
Gasoline Range Organics (C5-C12)		100 ug/L		30	30-160	30	30-160	30
Surr: 1,2-Dichloroethane-d4			80-128					
Surr: 1,2-Dichlorobenzene-d4			80-120					
Surr: Toluene-d8			80-120					
Surr: 4-Bromofluorobenzene			80-120					
Surr: Dibromofluoromethane			80-120					
Pentafluorobenzene								
Chlorobenzene-d5								
1,4-Difluorobenzene								
1,4-Dichlorobenzene-d4								

Analytical Method Information

Printed: 07/13/2016 12:16 pm

8260C VOA in Water (EPA 8260C)

Preservation: pH<2; HCL, Cool <6°C

Container: VOA Vial, Clear, 40 mL, HCL **Amount Required:** 120 mL **Hold Time:** 14 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Chloromethane	0.0948	0.500 ug/L		30	60-138	30	60-138	30
Vinyl Chloride	0.0572	0.200 ug/L		30	66-133	30	66-133	30
Bromomethane	0.252	1.00 ug/L		30	72-131	30	72-131	30
Chloroethane	0.0861	0.200 ug/L		30	60-155	30	60-155	30
Trichlorofluoromethane	0.0375	0.200 ug/L		30	80-129	30	80-129	30
Acrolein	2.48	5.00 ug/L		30	52-144	30	52-144	30
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.0429	0.200 ug/L		30	76-129	30	76-129	30
Acetone	2.06	5.00 ug/L		30	58-142	30	58-142	30
1,1-Dichloroethene	0.0540	0.200 ug/L		30	69-135	30	69-135	30
Bromoethane	0.0412	0.200 ug/L		30	78-128	30	78-128	30
Iodomethane	0.227	1.00 ug/L		30	56-147	30	56-147	30
Methylene Chloride	0.485	1.00 ug/L		30	65-135	30	65-135	30
Acrylonitrile	0.604	1.00 ug/L		30	64-134	30	64-134	30
Carbon Disulfide	0.0370	0.200 ug/L		30	78-125	30	78-125	30
trans-1,2-Dichloroethene	0.0485	0.200 ug/L		30	78-128	30	78-128	30
Vinyl Acetate	0.0688	0.200 ug/L		30	55-138	30	55-138	30
1,1-Dichloroethane	0.0533	0.200 ug/L		30	76-124	30	76-124	30
2-Butanone	0.814	5.00 ug/L		30	61-140	30	61-140	30
2,2-Dichloropropane	0.0518	0.200 ug/L		30	78-125	30	78-125	30
cis-1,2-Dichloroethene	0.0427	0.200 ug/L		30	80-121	30	80-121	30
Chloroform	0.0273	0.200 ug/L		30	80-122	30	80-122	30
Bromochloromethane	0.0607	0.200 ug/L		30	80-121	30	80-121	30
1,1,1-Trichloroethane	0.0408	0.200 ug/L		30	79-123	30	79-123	30
1,1-Dichloropropene	0.0340	0.200 ug/L		30	80-120	30	80-120	30
Carbon tetrachloride	0.0439	0.200 ug/L		30	53-137	30	53-137	30
1,2-Dichloroethane	0.0717	0.200 ug/L		30	75-123	30	75-123	30
Benzene	0.0266	0.200 ug/L		30	80-120	30	80-120	30
Trichloroethene	0.0489	0.200 ug/L		30	80-120	30	80-120	30
1,2-Dichloropropane	0.0352	0.200 ug/L		30	80-120	30	80-120	30
Bromodichloromethane	0.0506	0.200 ug/L		30	80-121	30	80-121	30
Dibromomethane	0.145	0.200 ug/L		30	80-120	30	80-120	30
2-Chloroethyl vinyl ether	0.250	1.00 ug/L		30	74-127	30	74-127	30
4-Methyl-2-Pentanone	0.974	5.00 ug/L		30	67-133	30	67-133	30
cis-1,3-Dichloropropene	0.0610	0.200 ug/L		30	80-124	30	80-124	30
Toluene	0.0399	0.200 ug/L		30	80-120	30	80-120	30
trans-1,3-Dichloropropene	0.0815	0.200 ug/L		30	71-127	30	71-127	30
2-Hexanone	0.902	5.00 ug/L		30	69-133	30	69-133	30
1,1,2-Trichloroethane	0.129	0.200 ug/L		30	80-121	30	80-121	30
1,3-Dichloropropane	0.0622	0.200 ug/L		30	80-120	30	80-120	30
Tetrachloroethene	0.0474	0.200 ug/L		30	80-120	30	80-120	30
Dibromochloromethane	0.0481	0.200 ug/L		30	65-135	30	65-135	30
1,2-Dibromoethane	0.0745	0.200 ug/L		30	80-121	30	80-121	30
Chlorobenzene	0.0230	0.200 ug/L		30	80-120	30	80-120	30
Ethylbenzene	0.0371	0.200 ug/L		30	80-120	30	80-120	30
1,1,1,2-Tetrachloroethane	0.0396	0.200 ug/L		30	80-120	30	80-120	30
m,p-Xylene	0.0522	0.400 ug/L		30	80-121	30	80-121	30
o-Xylene	0.0349	0.200 ug/L		30	80-121	30	80-121	30
Xylenes, total	0.0871	0.600 ug/L		30	76-127	30	76-127	30
Styrene	0.0454	0.200 ug/L		30	80-124	30	80-124	30
Bromoform	0.0618	0.200 ug/L		30	51-134	30	51-134	30
1,1,2,2-Tetrachloroethane	0.0598	0.200 ug/L		30	77-123	30	77-123	30
1,2,3-Trichloropropane	0.131	0.500 ug/L		30	76-125	30	76-125	30
trans-1,4-Dichloro 2-Butene	0.324	1.00 ug/L		30	55-129	30	55-129	30
n-Propylbenzene	0.0235	0.200 ug/L		30	78-130	30	78-130	30

Analytical Method Information

(Continued)

Printed: 07/13/2016 12:16 pm

8260C VOA in Water (EPA 8260C) (Continued)

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Bromobenzene	0.0605	0.200 ug/L		30	80-120	30	80-120	30
Isopropyl Benzene	0.0212	0.200 ug/L		30	80-128	30	80-128	30
2-Chlorotoluene	0.0236	0.200 ug/L		30	78-122	30	78-122	30
4-Chlorotoluene	0.0159	0.200 ug/L		30	80-121	30	80-121	30
t-Butylbenzene	0.0256	0.200 ug/L		30	78-125	30	78-125	30
1,3,5-Trimethylbenzene	0.0150	0.200 ug/L		30	80-129	30	80-129	30
1,2,4-Trimethylbenzene	0.0243	0.200 ug/L		30	80-127	30	80-127	30
s-Butylbenzene	0.0237	0.200 ug/L		30	78-129	30	78-129	30
4-Isopropyl Toluene	0.0263	0.200 ug/L		30	79-130	30	79-130	30
1,3-Dichlorobenzene	0.0362	0.200 ug/L		30	80-120	30	80-120	30
1,4-Dichlorobenzene	0.0397	0.200 ug/L		30	80-120	30	80-120	30
n-Butylbenzene	0.0248	0.200 ug/L		30	74-129	30	74-129	30
1,2-Dichlorobenzene	0.0365	0.200 ug/L		30	80-120	30	80-120	30
1,2-Dibromo-3-chloropropane	0.366	0.500 ug/L		30	62-123	30	62-123	30
1,2,4-Trichlorobenzene	0.107	0.500 ug/L		30	64-124	30	64-124	30
Hexachloro-1,3-Butadiene	0.0734	0.500 ug/L		30	58-123	30	58-123	30
Naphthalene	0.118	0.500 ug/L		30	50-134	30	50-134	30
1,2,3-Trichlorobenzene	0.110	0.500 ug/L		30	49-133	30	49-133	30
Dichlorodifluoromethane	0.0521	0.200 ug/L		30	48-147	30	48-147	30
Methyl tert-butyl Ether	0.0729	0.500 ug/L		30	71-132	30	71-132	30
n-Hexane	0.100	0.200 ug/L		30	70-130	30	70-130	30
2-Pentanone	5.00	5.00 ug/L		30	69-134	30	69-134	30
Surr: Dibromofluoromethane			80-120					
Surr: 1,2-Dichloroethane-d4			80-129					
Surr: Toluene-d8			80-120					
Surr: 4-Bromofluorobenzene			80-120					
Surr: 1,2-Dichlorobenzene-d4			80-120					
Pentafluorobenzene								
Chlorobenzene-d5								
1,4-Difluorobenzene								
1,4-Dichlorobenzene-d4								

Analytical Method Information

Printed: 07/13/2016 12:17 pm

TPH NW (Extractables) in Water (NWTPH-Dx)

Preservation: Cool <6°C

Container: Glass NM, Amber, 500 mL **Amount Required:** 1000 mL **Hold Time:** 7 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Diesel Range Organics (C12-C24)	0.0330	0.100 mg/L		30	70-120	30	70-120	30
Diesel Range Organics (C10-C25)	0.0390	0.100 mg/L		30	75-125	30	75-125	30
Diesel Range Organics (Tol-C18)	0.0500	0.100 mg/L		30	30-160	30	30-160	30
Diesel Range Organics (C10-24)	0.0500	0.100 mg/L		30	30-160	30	30-160	30
Diesel Range Organics (C10-C28)	0.0500	0.100 mg/L		30	30-160	30	30-160	30
Diesel Range Organics (C12-C22)	0.0500	0.100 mg/L		30	30-160	30	30-160	30
Motor Oil Range Organics (C24-C38)	0.0560	0.200 mg/L		30		30		30
Motor Oil Range Organics (C25-C36)	0.0650	0.200 mg/L		30		30		30
Motor Oil Range Organics (C24-C40)	0.100	0.200 mg/L		30		30		30
Residual Range Organics (C23-C32)	0.100	0.200 mg/L		30		30		30
Mineral Spirits Range Organics (Tol-C12)	0.100	0.200 mg/L		30		30		30
Mineral Oil Range Organics (C16-C28)	0.100	0.200 mg/L		30		30		30
Kerosene Range Organics (Tol-C18)	0.0500	0.100 mg/L		30		30		30
JP8 Range Organics (C8-C18)	0.0500	0.100 mg/L		30		30		30
JP5 Range Organics (C10-C16)	0.0500	0.100 mg/L		30		30		30
JP4 Range Organics (Tol-C14)	0.0500	0.100 mg/L		30		30		30
Jet-A Range Organics (C10-C18)	0.0500	0.100 mg/L		30		30		30
Creosote Range Organics (C12-C22)	0.0500	0.100 mg/L		30		30		30
Bunker C Range Organics (C10-C38)	0.0500	0.100 mg/L		30		30		30
Stoddard Range Organics (C8-C12)	0.0500	0.100 mg/L		30		30		30
Transformer Oil Range Organics (C12-C28)	0.0500	0.100 mg/L		30		30		30
Surr: o-Terphenyl			50-150					
Surr: n-Triacontane			50-150					

Analytical Method Information

Printed: 07/13/2016 12:17 pm

8270D-SIM PAH (0.1 ug/L or 5 ug/kg) in Water (EPA 8270D-SIM)

Preservation: Cool <6°C

Container: Glass NM, Amber, 500 mL **Amount Required:** 1000 **Hold Time:** 7 days

Analyte	MDL	Reporting Limit	Surrogate %Rec	Duplicate RPD	----Matrix Spike---- %Rec	RPD	--Blank Spike / LCS-- %Rec	RPD
Naphthalene	0.0296	0.100 ug/L		30	33-120	30	33-120	30
2-Methylnaphthalene	0.0302	0.100 ug/L		30	29-120	30	29-120	30
1-Methylnaphthalene	0.0289	0.100 ug/L		30	37-120	30	37-120	30
Biphenyl				30	30-160	30	30-160	40
2,6-Dimethylnaphthalene				30	30-160	30	30-160	40
Acenaphthylene	0.0380	0.100 ug/L		30	32-120	30	32-120	30
Acenaphthene	0.0304	0.100 ug/L		30	38-120	30	38-120	30
Dibenzofuran	0.0280	0.100 ug/L		30	38-120	30	38-120	30
2,3,5-Trimethylnaphthalene				30				
Fluorene	0.0278	0.100 ug/L		30	41-120	30	41-120	30
Dibenzothiophene				30				
Phenanthrene	0.0279	0.100 ug/L		30	49-120	30	49-120	30
Anthracene	0.0352	0.100 ug/L		30	39-120	30	39-120	30
Carbazole				30	30-160	30	30-160	40
1-Methylphenanthrene				30	30-160	30	30-160	40
Fluoranthene	0.0347	0.100 ug/L		30	48-120	30	48-120	30
Pyrene	0.0434	0.100 ug/L		30	48-120	30	48-120	30
Benzo(a)anthracene	0.0399	0.100 ug/L		30	37-120	30	37-120	30
Chrysene	0.0321	0.100 ug/L		30	48-120	30	48-120	30
Benzo(b)fluoranthene	0.0417	0.100 ug/L		30	38-128	30	38-128	30
Benzo(k)fluoranthene	0.0433	0.100 ug/L		30	36-130	30	36-130	30
Benzo(j)fluoranthene	0.0376	0.100 ug/L		30	49-120	30	49-120	30
Benzo(e)pyrene				30	30-160	30	30-160	30
Benzo(a)pyrene	0.0429	0.100 ug/L		30	25-120	30	25-120	30
Perylene	0.0420	0.100 ug/L		30	30-160	30	30-160	30
Indeno(1,2,3-cd)pyrene	0.0422	0.100 ug/L		30	32-120	30	32-120	30
Dibenzo(a,h)anthracene	0.0535	0.100 ug/L		30	21-120	30	21-120	30
Benzo(g,h,i)perylene	0.0388	0.100 ug/L		30	28-120	30	28-120	30
Benzofluoranthenes, Total	0.0850	0.200 ug/L		30	46-120	30	46-120	30
Surr: 2-Methylnaphthalene-d10			31-120					
Surr: Dibenzo[a,h]anthracene-d14			10-125					
Surr: Fluoranthene-d10			46-121					
Naphthalene-d8								
Acenaphthene-d10								
Phenanthrene-d10								
Chrysene-d12								
Perylene-d12								

Volatile Analysis
Report and Summary QC Forms

ARI Job ID: BCQ4

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by P&T GC/MS-Method SW8260C/NWTPHG **Sample ID: MW-6**
Page 1 of 1 **SAMPLE**

Lab Sample ID: BCQ4A
LIMS ID: 16-9825
Matrix: Water
Data Release Authorized: MW
Reported: 07/08/16

QC Report No: BCQ4-AECOM
Project: Laurel Station
#
Date Sampled: 06/27/16
Date Received: 06/28/16

Instrument/Analyst: NT2/ML
Date Analyzed: 07/05/16 14:17

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q	TPHG ID
71-43-2	Benzene	0.20	< 0.20	U	
108-88-3	Toluene	0.20	< 0.20	U	
100-41-4	Ethylbenzene	0.20	< 0.20	U	
179601-23-1	m,p-Xylene	0.40	< 0.40	U	
95-47-6	o-Xylene	0.20	< 0.20	U	
	Reported in µg/L (ppb)				
86290-81-5	Gasoline Range Hydrocarbons	0.10	< 0.10	U	---
	Reported in mg/L (ppm)				

Volatile Surrogate Recovery

d8-Toluene	93.0%
Bromofluorobenzene	96.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by P&T GC/MS-Method SW8260C/NWTPHG **Sample ID: DUP**
Page 1 of 1 **SAMPLE**

Lab Sample ID: BCQ4B
LIMS ID: 16-9826
Matrix: Water
Data Release Authorized:
Reported: 07/08/16

QC Report No: BCQ4-AECOM
Project: Laurel Station
#
Date Sampled: 06/27/16
Date Received: 06/28/16

Instrument/Analyst: NT2/ML
Date Analyzed: 07/05/16 14:37

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q	TPHG ID
71-43-2	Benzene	0.20	< 0.20	U	
108-88-3	Toluene	0.20	< 0.20	U	
100-41-4	Ethylbenzene	0.20	< 0.20	U	
179601-23-1	m,p-Xylene	0.40	< 0.40	U	
95-47-6	o-Xylene	0.20	< 0.20	U	
	Reported in µg/L (ppb)				
86290-81-5	Gasoline Range Hydrocarbons	0.10	< 0.10	U	---
	Reported in mg/L (ppm)				

Volatile Surrogate Recovery

d8-Toluene	95.0%
Bromofluorobenzene	97.8%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: BCQ4-AECOM
Project: Laurel Station #

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
MB-070516A	Method Blank	10	NA	92.2%	96.6%	NA	0
LCS-070516A	Lab Control	10	NA	99.8%	100%	NA	0
LCSD-070516A	Lab Control Dup	10	NA	98.0%	101%	NA	0
BCQ4A	MW-6	10	NA	93.0%	96.8%	NA	0
BCQ4AMS	MW-6	10	NA	103%	98.8%	NA	0
BCQ4AMSD	MW-6	10	NA	98.4%	99.6%	NA	0
BCQ4B	DUP	10	NA	95.0%	97.8%	NA	0

SW8260C	LCS/MB LIMITS	QC LIMITS
(DCE) = d4-1,2-Dichloroethane	(80-129)	(80-129)
(TOL) = d8-Toluene	(80-120)	(80-120)
(BFB) = Bromofluorobenzene	(80-120)	(80-120)
(DCB) = d4-1,2-Dichlorobenzene	(80-120)	(80-120)

Prep Method: SW5030B
Log Number Range: 16-9825 to 16-9826

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by P&T GC/MS-Method SW8260C/NWTPHG **Sample ID: MW-6**
Page 1 of 1 **MATRIX SPIKE**

Lab Sample ID: BCQ4A
LIMS ID: 16-9825
Matrix: Water
Data Release Authorized:
Reported: 07/08/16

QC Report No: BCQ4-AECOM
Project: Laurel Station
#
Date Sampled: 06/27/16
Date Received: 06/28/16

Instrument/Analyst MS: NT2/ML
MSD: NT2/ML
Date Analyzed MS: 07/05/16 17:01
MSD: 07/05/16 17:21

Sample Amount MS: 10.0 mL
MSD: 10.0 mL
Purge Volume MS: 10.0 mL
MSD: 10.0 mL

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Benzene	< 0.20 U	7.85	7.33	107%	7.69	7.33	105%	2.1%
Toluene	< 0.20 U	58.7	53.1	111%	57.9	53.1	109%	1.4%
Ethylbenzene	< 0.20 U	14.5	13.6	107%	15.0	13.6	110%	3.4%
m,p-Xylene	< 0.40 U	48.4	43.4	112%	49.9	43.4	115%	3.1%
o-Xylene	< 0.20 U	19.2	16.9	114%	19.6	16.9	116%	2.1%
Reported in µg/L (ppb)								
Gasoline Range Hydrocarbons	< 0.10 U	1.09	1.00	109%	1.06	1.00	106%	2.8%
Reported in mg/L (ppm)								

RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by P&T GC/MS-Method SW8260C/NWTPHG **Sample ID: MW-6**
Page 1 of 1 **MATRIX SPIKE**

Lab Sample ID: BCQ4A
LIMS ID: 16-9825
Matrix: Water
Data Release Authorized: MW
Reported: 07/08/16

QC Report No: BCQ4-AECOM
Project: Laurel Station
#
Date Sampled: 06/27/16
Date Received: 06/28/16

Instrument/Analyst: NT2/ML
Date Analyzed: 07/05/16 17:01

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	---	
108-88-3	Toluene	0.20	---	
100-41-4	Ethylbenzene	0.20	---	
179601-23-1	m,p-Xylene	0.40	---	
95-47-6	o-Xylene	0.20	---	
	Reported in µg/L (ppb)			
86290-81-5	Gasoline Range Hydrocarbons	0.10	---	
	Reported in mg/L (ppm)			

Volatile Surrogate Recovery

d8-Toluene	103%
Bromofluorobenzene	98.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by P&T GC/MS-Method SW8260C/NWTPHG **Sample ID: MW-6**
Page 1 of 1 **MATRIX SPIKE DUP**

Lab Sample ID: BCQ4A
LIMS ID: 16-9825
Matrix: Water
Data Release Authorized:
Reported: 07/08/16

QC Report No: BCQ4-AECOM
Project: Laurel Station
#
Date Sampled: 06/27/16
Date Received: 06/28/16

Instrument/Analyst: NT2/ML
Date Analyzed: 07/05/16 17:21

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
71-43-2	Benzene	0.20	---	
108-88-3	Toluene	0.20	---	
100-41-4	Ethylbenzene	0.20	---	
179601-23-1	m,p-Xylene	0.40	---	
95-47-6	o-Xylene	0.20	---	
	Reported in µg/L (ppb)			
86290-81-5	Gasoline Range Hydrocarbons	0.10	---	
	Reported in mg/L (ppm)			

Volatile Surrogate Recovery

d8-Toluene	98.4%
Bromofluorobenzene	99.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by P&T GC/MS-Method SW8260C/NWTPHG **Sample ID: LCS-070516A**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-070516A
LIMS ID: 16-9825
Matrix: Water
Data Release Authorized:
Reported: 07/08/16

QC Report No: BCQ4-AECOM
Project: Laurel Station
#
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT2/ML
LCSD: NT2/ML
Date Analyzed LCS: 07/05/16 08:41
LCSD: 07/05/16 09:01

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	6.55	7.33	89.4%	7.20	7.33	98.2%	9.5%
Toluene	49.5	53.1	93.2%	53.7	53.1	101%	8.1%
Ethylbenzene	12.7	13.6	93.4%	14.1	13.6	104%	10.4%
m,p-Xylene	42.7	43.4	98.4%	46.7	43.4	108%	8.9%
o-Xylene	16.9	16.9	100%	18.6	16.9	110%	9.6%
Reported in µg/L (ppb)							
Gasoline Range Hydrocarbons	1.09	1.00	109%	1.11	1.00	111%	1.8%
Reported in mg/L (ppm)							

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d8-Toluene	99.8%	98.0%
Bromofluorobenzene	100%	101%

4A

VOLATILE METHOD BLANK SUMMARY

Method Blank ID.

MB0705

Lab Name: ARI

Client: AECOM

ARI Job No: BCQ4

Project: LAUREL STATION

Lab File ID: 07051607

Lab Sample ID: MB0705

Date Analyzed: 07/05/16

Time Analyzed: 1002

Instrument ID: NT2

Heated Purge: (Y/N) N

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	SCV	SEF0063-SCV1	06151612	1137
02	GICVLCS	GICV/LCS	07051603	0841
03	GLCSD	GLCSD	07051604	0901
04	MW-6	BCQ4A	07051619	1417
05	DUP	BCQ4B	07051620	1437
06	MW-6 MS	BCQ4AMS	07051627	1701
07	MW-6 MSD	BCQ4AMSD	07051628	1721
08				
09				
10				
11				
12				
13				
14				
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29				
30				

COMMENTS:

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by P&T GC/MS-Method SW8260C/NWTPHG **Sample ID: MB-070516A**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-070516A
LIMS ID: 16-9825
Matrix: Water
Data Release Authorized:
Reported: 07/08/16

QC Report No: BCQ4-AECOM
Project: Laurel Station
#
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT2/ML
Date Analyzed: 07/05/16 10:02

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q	TPHG ID
71-43-2	Benzene	0.20	< 0.20	U	
108-88-3	Toluene	0.20	< 0.20	U	
100-41-4	Ethylbenzene	0.20	< 0.20	U	
179601-23-1	m,p-Xylene	0.40	< 0.40	U	
95-47-6	o-Xylene	0.20	< 0.20	U	
	Reported in µg/L (ppb)				
86290-81-5	Gasoline Range Hydrocarbons	0.10	< 0.10	U	---
	Reported in mg/L (ppm)				

Volatile Surrogate Recovery

d8-Toluene	92.2%
Bromofluorobenzene	96.6%

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ARI Contract: AECOM

Lab Code: BCQ4 Case No.: LAUREL STATION SDG No.: BCQ4

Lab File ID: 06151602 BFB Injection Date: 06/15/16

Instrument ID: NT2 BFB Injection Time: 0759

GC Column: RTXVMS ID: 0.18 (mm)

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	21.1
75	30.0 - 60.0% of mass 95	53.6
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.1
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 100.0% of mass 95	85.2
175	5.0 - 9.0% of mass 174	6.4 (7.6)1
176	95.0 - 101.0% of mass 174	83.6 (98.0)1
177	5.0 - 9.0% of mass 176	5.7 (6.8)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	VSTD0.1	SEF0063-CAL1	06151603	06/15/16	0833
02	VSTD0.2	SEF0063-CAL2	06151604	06/15/16	0853
03	VSTD0.5	SEF0063-CAL3	06151605	06/15/16	0914
04	VSTD80	SEF0063-CAL9	06151606	06/15/16	0934
05	VSTD40	SEF0063-CAL8	06151607	06/15/16	0955
06	VSTD20	SEF0063-CAL7	06151608	06/15/16	1015
07	VSTD10	SEF0063-CAL6	06151609	06/15/16	1036
08	VSTD02	SEF0063-CAL5	06151610	06/15/16	1056
09	VSTD01	SEF0063-CAL4	06151611	06/15/16	1117
10	SCV	SEF0063-SCV1	06151612	06/15/16	1137
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ARI Contract: AECOM

Lab Code: BCQ4 Case No.: LAUREL STATION SDG No.: BCQ4

Lab File ID: 07051602 BFB Injection Date: 07/05/16

Instrument ID: NT2 BFB Injection Time: 0759

GC Column: RTXVMS ID: 0.18 (mm)

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	22.6
75	30.0 - 60.0% of mass 95	53.2
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.2
173	Less than 2.0% of mass 174	0.2 (0.3)1
174	50.0 - 100.0% of mass 95	85.0
175	5.0 - 9.0% of mass 174	6.1 (7.2)1
176	95.0 - 101.0% of mass 174	81.8 (96.3)1
177	5.0 - 9.0% of mass 176	5.9 (7.2)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	GICVLCS	GICV/LCS	07051603	07/05/16	0841
02	GICVLCS	GICV/LCS	07051603ICV	07/05/16	0841
03	GLCSD	GLCSD	07051604	07/05/16	0901
04	MB0705	MB0705	07051607	07/05/16	1002
05	MW-6	BCQ4A	07051619	07/05/16	1417
06	DUP	BCQ4B	07051620	07/05/16	1437
07	MW-6 MS	BCQ4AMS	07051627	07/05/16	1701
08	MW-6 MSD	BCQ4AMSD	07051628	07/05/16	1721
09	GASCCV	GASCCV	07051631	07/05/16	1822
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ARI Client: AECOM

ARI Job No: BCQ4 Project: LAUREL STATION

Instrument ID: NT2 Calibration Date: 06/15/16

LAB FILE ID: RF0.2: 06151604 RF0.5: 06151605 RF1: 06151611
RF2: 06151610 RF10: 06151609

COMPOUND	RF0.2	RF0.5	RF1	RF2	RF10
Benzene	1.642	1.537	1.525	1.365	1.530
Toluene	1.048	0.962	0.951	0.865	0.931
Ethyl Benzene	0.594	0.593	0.618	0.558	0.657
m,p-xylene	0.703	0.694	0.759	0.686	0.808
o-Xylene	0.648	0.612	0.687	0.635	0.753
d4-1,2-Dichloroethane	0.475	0.498	0.507	0.511	0.508
d8-Toluene	1.205	1.212	1.161	1.153	1.167
4-Bromofluorobenzene	0.356	0.367	0.385	0.384	0.377
d4-1,2-Dichlorobenzene	0.916	0.912	0.909	0.934	0.948
Dibromofluoromethane	0.420	0.429	0.437	0.439	0.467

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ARI Client: AECOM

ARI Job No: BCQ4 Project: LAUREL STATION

Instrument ID: NT2 Calibration Date: 06/15/16

LAB FILE ID: RF20: 06151608 RF40: 06151607 RF80: 06151606
RF0.1: 06151603

COMPOUND	RF20	RF40	RF80	RF0.1
Benzene	1.525	1.399	1.478	
Toluene	0.954	0.881	0.996	
Ethyl Benzene	0.649	0.583	0.704	
m,p-xylene	0.807	0.736	0.801	
o-Xylene	0.755	0.675	0.793	
d4-1,2-Dichloroethane	0.491	0.496	0.474	0.488
d8-Toluene	1.186	1.241	1.203	1.133
4-Bromofluorobenzene	0.374	0.368	0.347	0.353
d4-1,2-Dichlorobenzene	0.926	0.938	0.946	0.895
Dibromofluoromethane	0.468	0.487	0.498	0.440

FORM 6
VOLATILE INITIAL CALIBRATION DATA

Lab Name: ARI Client: AECOM

ARI Job No: BCQ4 Project: LAUREL STATION

Instrument ID: NT2 Calibration Date: 06/15/16

COMPOUND	CURVE TYPE	AVE RF	%RSD OR R^2
Benzene	AVRG	1.500	5.8
Toluene	AVRG	0.948	6.2
Ethyl Benzene	AVRG	0.620	7.7
m,p-xylene	AVRG	0.749	7.0
o-Xylene	AVRG	0.695	9.4
d4-1,2-Dichloroethane	AVRG	0.494	2.8
d8-Toluene	AVRG	1.184	2.9
4-Bromofluorobenzene	AVRG	0.368	3.7
d4-1,2-Dichlorobenzene	AVRG	0.929	1.6
Dibromofluoromethane	AVRG	0.454	6.0

<- Indicates value outside QC limits:
(%RSD < 20% or R^2 > 0.990)

8260 GAS INITIAL CALIBRATION

Lab Name: ANALYTICAL RESOURCES, INC. Client: AECOM

Instrument: NT2.I Project: Laurel Station

Calibration Date: 29-MAR-2016 SDG No.: BCQ4

Gas Range	RF1 0.1	RF2 0.25	RF3 0.5	RF4 1.0	RF5 2.5	RF6 5	Ave RF	%RSD
WA Gas	38501187	48112079	49111625	51185622	51287480	49855104	48008849	10.0
AK Gas	49662511	59116003	59473285	60464211	61192091	62329725	58706304	7.8
NW Gas	39259679	48930855	50264215	52493344	52751277	51520615	49203331	10.3
8015Gas	71404863	82873502	83743651	85008808	87381849	88932569	83224207	7.5

<- Indicates %RSD outside limits
Surrogate areas are not included in RF calculation.
Surrogate calibration is from BETX curve files.

Quant Ranges :

WA Gas	Toluene - nC12
AK Gas	nC6 - nC10
NW Gas	Toluene - Naphthalene
Cal Gas	nC6 - nC12
8015 Gas	2-Methylpentane - 1,2,4-Trimethylbenzene

Gas Cal. Files	Analysis Time
03291624.D	29-MAR-2016 22:32
03291623.D	29-MAR-2016 22:11
03291622.D	29-MAR-2016 21:50
03291621.D	29-MAR-2016 21:28
03291620.D	29-MAR-2016 21:07
03291619.D	29-MAR-2016 20:45

7A

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ARI Client: AECOM

ARI Job No: BCQ4 Project: LAUREL STATION

Instrument ID: NT2 Cont. Calib. Date: 07/05/16

Init. Calib. Date: 06/15/16 Cont. Calib. Time: 0841

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
Benzene	7.327	6.554	0.010	AVRG	-10.5
Toluene	53.08	49.520	0.010	AVRG	-6.71
Ethyl Benzene	13.62	12.703	0.010	AVRG	-6.76
m,p-xylene	43.36	42.728	0.010	AVRG	-1.45
o-Xylene	16.87	16.944	0.010	AVRG	.46
d4-1,2-Dichloroethane	0.494	0.5520	0.010	AVRG	11.7
d8-Toluene	1.184	1.1813	0.010	AVRG	-0.2
4-Bromofluorobenzene	0.368	0.3680	0.010	AVRG	0.0
d4-1,2-Dichlorobenzene	0.925	0.9432	0.010	AVRG	2.0
Dibromofluoromethane	0.454	0.4612	0.010	AVRG	1.6

<- Exceeds QC limit of 20% D

* RF less than minimum RF

FORM VII VOA

7A

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: ARI Client: AECOM

ARI Job No: BCQ4 Project: LAUREL STATION

Instrument ID: NT2 Cont. Calib. Date: 07/05/16

Init. Calib. Date: 06/15/16 Cont. Calib. Time: 1822

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift	
Benzene	7.327	7.427	0.010	AVRG	1.37	
Toluene	53.083	56.451	0.010	AVRG	6.34	
Ethyl Benzene	13.623	13.292	0.010	AVRG	-2.43	
m,p-xylene	43.355	44.775	0.010	AVRG	3.27	
o-Xylene	16.867	17.615	0.010	AVRG	4.44	
d4-1,2-Dichloroethane	0.494	0.6031	0.010	AVRG	22.1	<-
d8-Toluene	1.184	1.2570	0.010	AVRG	6.2	
4-Bromofluorobenzene	0.368	0.3696	0.010	AVRG	0.4	
d4-1,2-Dichlorobenzene	0.925	0.9303	0.010	AVRG	0.6	
Dibromofluoromethane	0.454	0.4729	0.010	AVRG	4.2	

<- Exceeds QC limit of 20% D

* RF less than minimum RF

FORM VII VOA

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ARI | Client: AECOM

ARI Job No: BCQ4 | Project: LAUREL STATION

Ical Midpoint ID: 06151609 | Ical Date: 06/15/16

Instrument ID: NT2 | Project Run Date: 06/15/16

		IS1(PFB) AREA #	RT #	IS2(DFB) AREA #	RT #	IS3(CLB) AREA #	RT #
	ICAL MIDPT	247878	5.33	400954	5.71	354752	7.78
	UPPER LIMIT	495756	5.83	801908	6.21	709504	8.28
	LOWER LIMIT	123939	4.83	200477	5.21	177376	7.28
	Sample ID						
01	SCV	239851	5.33	396595	5.72	360400	7.78
02							
03							
04							
05							
06							
07							
08							
09							
10							
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12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS1 (PFB) = Pentafluorobenzene
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CLB) = d5-Chlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ARI | Client: AECOM

ARI Job No: BCQ4 | Project: LAUREL STATION

Ical Midpoint ID: 06151609 | Ical Date: 06/15/16

Instrument ID: NT2 | Project Run Date: 06/15/16

		IS4 (DCB) AREA #	RT #	AREA #	RT #	AREA #	RT #
	ICAL MIDPT	191489	9.48				
	UPPER LIMIT	382978	9.98				
	LOWER LIMIT	95745	8.98				
	Sample ID						
01	SCV	191196	9.48				
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS4 (DCB) = d4-1,4-Dichlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ARI | Client: AECOM

ARI Job No: BCQ4 | Project: LAUREL STATION

Ical Midpoint ID: 06151609 | Ical Date: 06/15/16

Instrument ID: NT2 | Project Run Date: 07/05/16

		IS1(PFB) AREA #	RT #	IS2(DFB) AREA #	RT #	IS3(CLB) AREA #	RT #
	ICAL MIDPT	247878	5.33	400954	5.71	354752	7.78
	UPPER LIMIT	495756	5.83	801908	6.21	709504	8.28
	LOWER LIMIT	123939	4.83	200477	5.21	177376	7.28
	Sample ID						
01	GICVLCS	324623	5.33	547772	5.72	490480	7.78
02	GLCSD	302791	5.33	519136	5.72	455968	7.78
03	MB0705	274823	5.33	487209	5.72	420963	7.78
04	MW-6	247319	5.33	443731	5.71	385625	7.78
05	DUP	237690	5.33	413785	5.71	371210	7.78
06	MW-6 MS	295310	5.33	489557	5.72	449582	7.78
07	MW-6 MSD	287993	5.33	494346	5.72	432033	7.78
08							
09							
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17							
18							
19							
20							
21							
22							

IS1 (PFB) = Pentafluorobenzene
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CLB) = d5-Chlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ARI | Client: AECOM

ARI Job No: BCQ4 | Project: LAUREL STATION

Ical Midpoint ID: 06151609 | Ical Date: 06/15/16

Instrument ID: NT2 | Project Run Date: 07/05/16

		IS4(DCB) AREA #	RT #	AREA #	RT #	AREA #	RT #
	ICAL MIDPT	191489	9.48				
	UPPER LIMIT	382978	9.98				
	LOWER LIMIT	95745	8.98				
	Sample ID						
01	GICVLCS	249630	9.48				
02	GLCSD	238586	9.48				
03	MB0705	209386	9.48				
04	MW-6	190578	9.48				
05	DUP	182051	9.48				
06	MW-6 MS	230139	9.48				
07	MW-6 MSD	211954	9.48				
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS4 (DCB) = d4-1,4-Dichlorobenzene

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Ical midpoint
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Ical midpoint

* Values outside of QC limits.

BETX/GAS ANALYTICAL SEQUENCE

Lab Name: ARI Client: AECOM

SDG No.: BCQ4 Project: Laurel Station

Instrument ID: NT2 GC Detector: RTXVMS

Run Date: 03/29/16

THE ANALYTICAL SEQUENCE OF BLANKS, SAMPLES, AND STANDARDS, IS GIVEN BELOW:

METHOD SURROGATE RT
S1 : 8.65 S2 : 4.95

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED
01	RTBFB0329	SEC0063-TUN1	03/29/16	1131
02	GSTD5	SEC0063-CALE	03/29/16	2045
03	GSTD2.5	SEC0063-CALD	03/29/16	2107
04	GSTD1	SEC0063-CALC	03/29/16	2128
05	GSTD0.5	SEC0063-CALB	03/29/16	2150
06	GSTD0.25	SEC0063-CALA	03/29/16	2211
07	GSTD0.1	SEC0063-CAL9	03/29/16	2232
08	GSCV	SEC0063-SCV2	03/29/16	2254

SIM PAH Analysis
Report and Summary QC Forms

ARI Job ID: BCQ4

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: MW-6
SAMPLE

Lab Sample ID: BCQ4A
LIMS ID: 16-9825
Matrix: Water
Data Release Authorized:
Reported: 07/06/16

QC Report No: BCQ4-AECOM
Project: Laurel Station
Event: NA
Date Sampled: 06/27/16
Date Received: 06/28/16

Date Extracted: 06/29/16
Date Analyzed: 07/01/16 19:29
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
91-20-3	**Naphthalene**	**0.10**	**0.22**
91-57-6	2-Methylnaphthalene	0.10	< 0.10 U
90-12-0	1-Methylnaphthalene	0.10	< 0.10 U
208-96-8	Acenaphthylene	0.10	< 0.10 U
83-32-9	Acenaphthene	0.10	< 0.10 U
86-73-7	Fluorene	0.10	< 0.10 U
85-01-8	Phenanthrene	0.10	< 0.10 U
120-12-7	Anthracene	0.10	< 0.10 U
206-44-0	Fluoranthene	0.10	< 0.10 U
129-00-0	Pyrene	0.10	< 0.10 U
56-55-3	Benzo(a)anthracene	0.10	< 0.10 U
218-01-9	Chrysene	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.10	< 0.10 U
191-24-2	Benzo(g,h,i)perylene	0.10	< 0.10 U
132-64-9	Dibenzofuran	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	86.3%
d10-2-Methylnaphthalene	63.3%
d14-Dibenzo(a,h)anthracene	103%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS **Sample ID: DUP**
Extraction Method: SW3520C **SAMPLE**

Lab Sample ID: BCQ4B
LIMS ID: 16-9826
Matrix: Water
Data Release Authorized:
Reported: 07/06/16

QC Report No: BCQ4-AECOM
Project: Laurel Station
Event: NA
Date Sampled: 06/27/16
Date Received: 06/28/16

Date Extracted: 06/29/16
Date Analyzed: 07/01/16 20:47
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
91-20-3	**Naphthalene**	**0.10**	**0.15**
91-57-6	2-Methylnaphthalene	0.10	< 0.10 U
90-12-0	1-Methylnaphthalene	0.10	< 0.10 U
208-96-8	Acenaphthylene	0.10	< 0.10 U
83-32-9	Acenaphthene	0.10	< 0.10 U
86-73-7	Fluorene	0.10	< 0.10 U
85-01-8	Phenanthrene	0.10	< 0.10 U
120-12-7	Anthracene	0.10	< 0.10 U
206-44-0	Fluoranthene	0.10	< 0.10 U
129-00-0	Pyrene	0.10	< 0.10 U
56-55-3	Benzo(a)anthracene	0.10	< 0.10 U
218-01-9	Chrysene	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.10	< 0.10 U
191-24-2	Benzo(g,h,i)perylene	0.10	< 0.10 U
132-64-9	Dibenzofuran	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	96.3%
d10-2-Methylnaphthalene	75.0%
d14-Dibenzo(a,h)anthracene	100%

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: BCQ4-AECOM
Project: Laurel Station
#

Client ID	FLN	MNP	DBA	TOT OUT
MB-062916	96.3%	75.0%	119%	0
LCS-062916	90.0%	74.3%	110%	0
LCSD-062916	84.3%	60.3%	103%	0
MW-6	86.3%	63.3%	103%	0
MW-6 MS	95.7%	77.7%	113%	0
MW-6 MSD	88.3%	72.0%	91.3%	0
DUP	96.3%	75.0%	100%	0

	QC LIMITS
(FLN) = d10-Fluoranthene	(46-121)
(MNP) = d10-2-Methylnaphthalene	(31-120)
(DBA) = d14-Dibenzo(a,h)anthracene	(10-125)

Prep Method: SW3520C
Log Number Range: 16-9825 to 16-9826

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Page 1 of 1

Sample ID: MW-6
MATRIX SPIKE

Lab Sample ID: BCQ4A
LIMS ID: 16-9825
Matrix: Water
Data Release Authorized:
Reported: 07/06/16

QC Report No: BCQ4-AECOM
Project: Laurel Station
Event: NA
Date Sampled: 06/27/16
Date Received: 06/28/16

Date Extracted MS/MSD: 06/29/16

Date Analyzed MS: 07/01/16 19:55
MSD: 07/01/16 20:21
Instrument/Analyst MS: NT8/JZ
MSD: NT8/JZ

Sample Amount MS: 500 mL
MSD: 500 mL
Final Extract Volume MS: 0.50 mL
MSD: 0.50 mL
Dilution Factor MS: 1.00
MSD: 1.00

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Naphthalene	0.22	2.55	3.00	77.7%	2.34	3.00	70.7%	8.6%
2-Methylnaphthalene	< 0.10 U	2.39	3.00	79.7%	2.15	3.00	71.7%	10.6%
1-Methylnaphthalene	< 0.10 U	2.46	3.00	82.0%	2.25	3.00	75.0%	8.9%
Acenaphthylene	< 0.10 U	2.42	3.00	80.7%	2.24	3.00	74.7%	7.7%
Acenaphthene	< 0.10 U	2.54	3.00	84.7%	2.34	3.00	78.0%	8.2%
Fluorene	< 0.10 U	2.62	3.00	87.3%	2.42	3.00	80.7%	7.9%
Phenanthrene	< 0.10 U	2.83	3.00	94.3%	2.69	3.00	89.7%	5.1%
Anthracene	< 0.10 U	2.80	3.00	93.3%	2.69	3.00	89.7%	4.0%
Fluoranthene	< 0.10 U	2.98	3.00	99.3%	2.84	3.00	94.7%	4.8%
Pyrene	< 0.10 U	3.04	3.00	101%	2.96	3.00	98.7%	2.7%
Benzo(a)anthracene	< 0.10 U	2.92	3.00	97.3%	2.69	3.00	89.7%	8.2%
Chrysene	< 0.10 U	2.94	3.00	98.0%	2.69	3.00	89.7%	8.9%
Benzo(a)pyrene	< 0.10 U	2.82	3.00	94.0%	2.52	3.00	84.0%	11.2%
Indeno(1,2,3-cd)pyrene	< 0.10 U	3.23	3.00	108%	2.65	3.00	88.3%	19.7%
Dibenz(a,h)anthracene	< 0.10 U	3.34	3.00	111%	2.75	3.00	91.7%	19.4%
Benzo(g,h,i)perylene	< 0.10 U	3.14	3.00	105%	2.62	3.00	87.3%	18.1%
Dibenzofuran	< 0.10 U	2.58	3.00	86.0%	2.34	3.00	78.0%	9.8%
Total Benzofluoranthenes	< 0.10 U	8.81	9.00	97.9%	7.68	9.00	85.3%	13.7%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS **Sample ID: MW-6**
Extraction Method: SW3520C **MATRIX SPIKE**

Lab Sample ID: BCQ4A
LIMS ID: 16-9825
Matrix: Water
Data Release Authorized:
Reported: 07/06/16

QC Report No: BCQ4-AECOM
Project: Laurel Station
Event: NA
Date Sampled: 06/27/16
Date Received: 06/28/16

Date Extracted: 06/29/16
Date Analyzed: 07/01/16 19:55
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
91-20-3	Naphthalene	0.10	---
91-57-6	2-Methylnaphthalene	0.10	---
90-12-0	1-Methylnaphthalene	0.10	---
208-96-8	Acenaphthylene	0.10	---
83-32-9	Acenaphthene	0.10	---
86-73-7	Fluorene	0.10	---
85-01-8	Phenanthrene	0.10	---
120-12-7	Anthracene	0.10	---
206-44-0	Fluoranthene	0.10	---
129-00-0	Pyrene	0.10	---
56-55-3	Benzo(a)anthracene	0.10	---
218-01-9	Chrysene	0.10	---
50-32-8	Benzo(a)pyrene	0.10	---
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	---
53-70-3	Dibenz(a,h)anthracene	0.10	---
191-24-2	Benzo(g,h,i)perylene	0.10	---
132-64-9	Dibenzofuran	0.10	---
TOTBFA	Total Benzofluoranthenes	0.10	---

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	95.7%
d10-2-Methylnaphthalene	77.7%
d14-Dibenzo(a,h)anthracene	113%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: MW-6
MATRIX SPIKE DUPLICATE

Lab Sample ID: BCQ4A
LIMS ID: 16-9825
Matrix: Water
Data Release Authorized:
Reported: 07/06/16

QC Report No: BCQ4-AECOM
Project: Laurel Station
Event: NA
Date Sampled: 06/27/16
Date Received: 06/28/16

Date Extracted: 06/29/16
Date Analyzed: 07/01/16 20:21
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
91-20-3	Naphthalene	0.10	---
91-57-6	2-Methylnaphthalene	0.10	---
90-12-0	1-Methylnaphthalene	0.10	---
208-96-8	Acenaphthylene	0.10	---
83-32-9	Acenaphthene	0.10	---
86-73-7	Fluorene	0.10	---
85-01-8	Phenanthrene	0.10	---
120-12-7	Anthracene	0.10	---
206-44-0	Fluoranthene	0.10	---
129-00-0	Pyrene	0.10	---
56-55-3	Benzo(a)anthracene	0.10	---
218-01-9	Chrysene	0.10	---
50-32-8	Benzo(a)pyrene	0.10	---
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	---
53-70-3	Dibenz(a,h)anthracene	0.10	---
191-24-2	Benzo(g,h,i)perylene	0.10	---
132-64-9	Dibenzofuran	0.10	---
TOTBFA	Total Benzofluoranthenes	0.10	---

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	88.3%
d10-2-Methylnaphthalene	72.0%
d14-Dibenzo(a,h)anthracene	91.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Page 1 of 1

Sample ID: LCS-062916
LAB CONTROL SAMPLE

Lab Sample ID: LCS-062916
LIMS ID: 16-9825
Matrix: Water
Data Release Authorized:
Reported: 07/06/16

QC Report No: BCQ4-AECOM
Project: Laurel Station
Event: NA
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 06/29/16

Date Analyzed LCS: 07/01/16 18:37
LCSD: 07/01/16 19:03
Instrument/Analyst LCS: NT8/JZ
LCSD: NT8/JZ

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 0.50 mL
LCSD: 0.50 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Naphthalene	2.25	3.00	75.0%	1.86	3.00	62.0%	19.0%
2-Methylnaphthalene	2.28	3.00	76.0%	1.86	3.00	62.0%	20.3%
1-Methylnaphthalene	2.35	3.00	78.3%	1.96	3.00	65.3%	18.1%
Acenaphthylene	2.24	3.00	74.7%	2.11	3.00	70.3%	6.0%
Acenaphthene	2.36	3.00	78.7%	2.20	3.00	73.3%	7.0%
Fluorene	2.51	3.00	83.7%	2.37	3.00	79.0%	5.7%
Phenanthrene	2.67	3.00	89.0%	2.60	3.00	86.7%	2.7%
Anthracene	2.65	3.00	88.3%	2.42	3.00	80.7%	9.1%
Fluoranthene	2.85	3.00	95.0%	2.77	3.00	92.3%	2.8%
Pyrene	2.99	3.00	99.7%	2.80	3.00	93.3%	6.6%
Benzo(a)anthracene	2.80	3.00	93.3%	2.67	3.00	89.0%	4.8%
Chrysene	2.83	3.00	94.3%	2.75	3.00	91.7%	2.9%
Benzo(a)pyrene	2.59	3.00	86.3%	2.41	3.00	80.3%	7.2%
Indeno(1,2,3-cd)pyrene	3.13	3.00	104%	3.04	3.00	101%	2.9%
Dibenz(a,h)anthracene	3.25	3.00	108%	3.13	3.00	104%	3.8%
Benzo(g,h,i)perylene	3.07	3.00	102%	2.91	3.00	97.0%	5.4%
Dibenzofuran	2.40	3.00	80.0%	2.25	3.00	75.0%	6.5%
Total Benzofluoranthenes	8.59	9.00	95.4%	8.12	9.00	90.2%	5.6%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

SIM Semivolatile Surrogate Recovery

	LCS	LCSD
d10-Fluoranthene	90.0%	84.3%
d10-2-Methylnaphthalene	74.3%	60.3%
d14-Dibenzo(a,h)anthracene	110%	103%

4B

SEMIVOLATILE METHOD BLANK SUMMARY

BLANK NO.

BCQ4MBW1

Lab Name: ARI

Client: AECOM

ARI Job No: BCQ4

Project: LAUREL STATION

Lab File ID: 16070113

Date Extracted: 06/29/16

Instrument ID: NT8

Date Analyzed: 07/01/16

Matrix: LIQUID

Time Analyzed: 1812

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	BCQ4LCSW1	BCQ4LCSW1	16070114	07/01/16
02	BCQ4LCSDW1	BCQ4LCSDW1	16070115	07/01/16
03	MW-6	BCQ4A	16070116	07/01/16
04	MW-6 MS	BCQ4AMS	16070117	07/01/16
05	MW-6 MSD	BCQ4AMSD	16070118	07/01/16
06	DUP	BCQ4B	16070119	07/01/16
07				
08				
09				
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FORM IV SV

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: MB-062916
METHOD BLANK

Lab Sample ID: MB-062916
LIMS ID: 16-9825
Matrix: Water
Data Release Authorized:
Reported: 07/06/16

QC Report No: BCQ4-AECOM
Project: Laurel Station
Event: NA
Date Sampled: NA
Date Received: NA

Date Extracted: 06/29/16
Date Analyzed: 07/01/16 18:12
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	LOQ	Result
91-20-3	Naphthalene	0.10	< 0.10 U
91-57-6	2-Methylnaphthalene	0.10	< 0.10 U
90-12-0	1-Methylnaphthalene	0.10	< 0.10 U
208-96-8	Acenaphthylene	0.10	< 0.10 U
83-32-9	Acenaphthene	0.10	< 0.10 U
86-73-7	Fluorene	0.10	< 0.10 U
85-01-8	Phenanthrene	0.10	< 0.10 U
120-12-7	Anthracene	0.10	< 0.10 U
206-44-0	Fluoranthene	0.10	< 0.10 U
129-00-0	Pyrene	0.10	< 0.10 U
56-55-3	Benzo(a)anthracene	0.10	< 0.10 U
218-01-9	Chrysene	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.10	< 0.10 U
191-24-2	Benzo(g,h,i)perylene	0.10	< 0.10 U
132-64-9	Dibenzofuran	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	96.3%
d10-2-Methylnaphthalene	75.0%
d14-Dibenzo(a,h)anthracene	119%

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: ARI Client: AECOM

Instrument ID: NT8 Project: LAUREL STATION

DFTPP Injection Date: 06/22/16 DFTPP Injection Time: 1224

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	10.0 - 80.0% of mass 198	20.9
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	44.8
70	Less than 2.0% of mass 69	0.3 (0.6)1
127	10.0 - 80.0% of mass 198	50.2
197	Less than 2.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	8.9
275	10.0 - 60.0% of mass 198	38.2
365	Greater than 1.0% of mass 198	4.54
441	0.0 - 24.0% of mass 442	10.6 (15.9)2
442	50.0 - 200.0% of mass 198	66.7
443	15.0 - 24.0% of mass 442	14.5 (21.7)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	IC25160622	SEF0117-CAL4	16062202	06/22/16	1328
02	IC01160622	SEF0117-CAL1	16062203	06/22/16	1354
03	IC05160622	SEF0117-CAL2	16062204	06/22/16	1420
04	IC1160622	SEF0117-CAL3	16062205	06/22/16	1446
05	IC5160622	SEF0117-CAL5	16062206	06/22/16	1512
06	IC10160622	SEF0117-CAL6	16062207	06/22/16	1538
07	SCV160622	SEF0117-SCV1	16062208	06/22/16	1737
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20					

5B

SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: ARI | Client: AECOM

Instrument ID: NT8 | Project: LAUREL STATION

DFTPP Injection Date: 07/01/16 | DFTPP Injection Time: 1310

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
51	10.0 - 80.0% of mass 198	22.2	
68	Less than 2.0% of mass 69	0.4	(0.9)1
69	Mass 69 relative abundance	46.5	
70	Less than 2.0% of mass 69	0.4	(0.8)1
127	10.0 - 80.0% of mass 198	51.4	
197	Less than 2.0% of mass 198	0.5	
198	Base Peak, 100% relative abundance	100.0	
199	5.0 to 9.0% of mass 198	9.0	
275	10.0 - 60.0% of mass 198	39.5	
365	Greater than 1.0% of mass 198	4.70	
441	0.0 - 24.0% of mass 442	11.2	(16.2)2
442	50.0 - 200.0% of mass 198	68.8	
443	15.0 - 24.0% of mass 442	15.3	(22.3)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	ICV160701	ICV160701	16070102	07/01/16	1327
02	BCQ4MBW1	BCQ4MBW1	16070113	07/01/16	1812
03	BCQ4LCSW1	BCQ4LCSW1	16070114	07/01/16	1837
04	BCQ4LCSDW1	BCQ4LCSDW1	16070115	07/01/16	1903
05	MW-6	BCQ4A	16070116	07/01/16	1929
06	MW-6 MS	BCQ4AMS	16070117	07/01/16	1955
07	MW-6 MSD	BCQ4AMSD	16070118	07/01/16	2021
08	DUP	BCQ4B	16070119	07/01/16	2047
09					
10					
11					
12					
13					
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15					
16					
17					
18					
19					
20					

6B

SEMIVOLATILE 8270-D INITIAL CALIBRATION DATA

Lab Name: ARI | Client: AECOM

ARI Job No: BCQ4 | Project: LAUREL STATION

Instrument ID: NT8 | Calibration Date: 06/22/16

LAB FILE ID: RRF0.1=16062203 RRF0.5=16062204 RRF1 =16062205
RRF2.5=16062202 RRF5 =16062206 RRF10 =16062207

COMPOUND	RRF 0.1	RRF 0.5	RRF 1	RRF 2.5	RRF 5	RRF 10	___ RRF	%RSD /R^2
Naphthalene	0.965	0.881	0.859	0.932	1.002	0.952	0.932	5.8
2-Methylnaphthalene	0.613	0.553	0.540	0.579	0.603	0.564	0.575	5.0
1-methylnaphthalene	0.591	0.506	0.498	0.535	0.569	0.529	0.538	6.7
Biphenyl	1.540	1.347	1.295	1.398	1.513	1.457	1.425	6.7
2,6-Dimethylnaphthalene	1.089	1.009	0.975	1.012	1.136	1.080	1.050	5.8
Acenaphthylene	1.838	1.650	1.628	1.746	1.890	1.778	1.755	5.9
Acenaphthene	1.139	0.999	0.964	1.064	1.159	1.105	1.072	7.3
Dibenzofuran	1.736	1.483	1.450	1.540	1.652	1.554	1.569	6.8
1,6,7-Trimethylnaphthalene	1.142	0.940	0.967	1.010	1.126	1.071	1.043	8.0
Fluorene	1.407	1.220	1.182	1.288	1.405	1.344	1.308	7.2
Dibenzothiophene	0.993	0.846	0.831	0.897	0.964	0.903	0.906	7.0
Phenanthrene	0.989	0.897	0.884	0.940	1.005	0.942	0.943	5.1
Anthracene	0.964	0.840	0.840	0.932	1.000	0.939	0.919	7.2
Carbazole	0.843	0.715	0.683	0.796	0.875	0.850	0.794	9.9
1-Methylphenanthrene	0.828	0.698	0.704	0.755	0.825	0.797	0.768	7.6
Fluoranthene	1.200	1.043	1.022	1.115	1.209	1.122	1.118	6.9
Pyrene	1.118	1.002	0.986	1.082	1.185	1.095	1.078	6.9
Benzo(a)anthracene	1.147	0.988	0.931	1.080	1.178	1.126	1.075	9.0
Chrysene	1.159	0.928	0.940	1.031	1.141	1.077	1.046	9.4
Benzo(b)fluoranthene	1.180	0.940	0.926	1.046	1.208	1.164	1.077	11.6
Benzo(k)fluoranthene	1.108	0.904	0.927	1.045	1.222	1.142	1.058	11.8
Benzo(j)fluoranthene	1.056	0.868	0.838	0.938	1.079	1.021	0.967	10.4
Benzo(e)pyrene	1.138	0.929	0.910	1.005	1.139	1.098	1.036	10.0
Benzo(a)pyrene	1.003	0.861	0.835	0.974	1.128	1.082	0.980	11.9
Perylene	1.003	0.869	0.854	0.982	1.128	1.090	0.988	11.3
Indeno(1,2,3-cd)pyrene	1.087	0.954	0.953	1.088	1.270	1.248	1.100	12.5
Dibenzo(a,h)anthracene	0.878	0.720	0.742	0.878	1.012	1.007	0.873	14.3
Benzo(g,h,i)perylene	1.000	0.833	0.834	0.948	1.103	1.082	0.967	12.1
2-Methylnaphthalene-d10	0.589	0.566	0.544	0.594	0.628	0.599	0.587	4.9
Fluoranthene-d10	1.084	0.943	0.938	1.017	1.109	1.059	1.025	7.0
Dibenzo(a,h)anthracene-d14	0.627	0.538	0.544	0.660	0.778	0.788	0.656	16.6

<- Outside QC limits: %RSD <20% or R^2 > 0.990

7B

SEMIVOLATILE 8270-D CONTINUING CALIBRATION CHECK

Lab Name: ARI | Client: AECOM

ARI Job No: BCQ4 | Project: LAUREL STATION

Instrument ID: NT8 | Cont. Calib. Date: 06/22/16

Init. Calib. Date: 06/22/16 | Cont. Calib. Time: 1328

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
Naphthalene	0.932	0.932	0.700	AVRG	0.0
2-Methylnaphthalene	0.575	0.579	0.400	AVRG	0.7
Acenaphthylene	1.755	1.746	0.900	AVRG	-0.5
Acenaphthene	1.072	1.064	0.900	AVRG	-0.7
Dibenzofuran	1.569	1.540	0.800	AVRG	-1.8
Fluorene	1.308	1.288	0.900	AVRG	-1.5
Phenanthrene	0.943	0.940	0.700	AVRG	-0.3
Anthracene	0.919	0.932	0.700	AVRG	1.4
Fluoranthene	1.118	1.115	0.600	AVRG	-0.3
Pyrene	1.078	1.082	0.600	AVRG	0.4
Benzo(a)anthracene	1.075	1.080	0.800	AVRG	0.5
Chrysene	1.046	1.031	0.700	AVRG	-1.4
Benzo(b)fluoranthene	1.077	1.046	0.700	AVRG	-2.9
Benzo(k)fluoranthene	1.058	1.045	0.700	AVRG	-1.2
Benzo(j)fluoranthene	0.967	0.938	0.010	AVRG	-3.0
Benzo(a)pyrene	0.980	0.974	0.700	AVRG	-0.6
Indeno(1,2,3-cd)pyrene	1.100	1.088	0.500	AVRG	-1.1
Dibenzo(a,h)anthracene	0.873	0.878	0.400	AVRG	0.6
Benzo(g,h,i)perylene	0.967	0.948	0.500	AVRG	-2.0
1-methylnaphthalene	0.538	0.535	0.010	AVRG	-0.6
Perylene	0.988	0.982	0.010	AVRG	-0.6
2-Methylnaphthalene-d10	0.587	0.594	0.010	AVRG	1.2
Dibenzo(a,h)anthracene-d14	0.656	0.660	0.010	AVRG	0.6
Fluoranthene-d10	1.025	1.017	0.010	AVRG	-0.8

<- Exceeds QC limit of 20% D

* RF less than minimum RF

FORM VII SV-1

7B

SEMIVOLATILE 8270-D CONTINUING CALIBRATION CHECK

Lab Name: ARI | Client: AECOM

ARI Job No: BCQ4 | Project: LAUREL STATION

Instrument ID: NT8 | Cont. Calib. Date: 07/01/16

Init. Calib. Date: 06/22/16 | Cont. Calib. Time: 1327

COMPOUND	CalAmt or ARF	CC Amt or RF	MIN RRF	CURVE TYPE	%D or Drift
Naphthalene	0.932	0.945	0.700	AVRG	1.4
2-Methylnaphthalene	0.575	0.585	0.400	AVRG	1.7
Acenaphthylene	1.755	1.752	0.900	AVRG	-0.2
Acenaphthene	1.072	1.077	0.900	AVRG	0.5
Dibenzofuran	1.569	1.549	0.800	AVRG	-1.3
Fluorene	1.308	1.322	0.900	AVRG	1.1
Phenanthrene	0.943	0.916	0.700	AVRG	-2.9
Anthracene	0.919	0.918	0.700	AVRG	-0.1
Fluoranthene	1.118	1.091	0.600	AVRG	-2.4
Pyrene	1.078	1.106	0.600	AVRG	2.6
Benzo(a)anthracene	1.075	1.049	0.800	AVRG	-2.4
Chrysene	1.046	1.031	0.700	AVRG	-1.4
Benzo(b)fluoranthene	1.077	1.050	0.700	AVRG	-2.5
Benzo(k)fluoranthene	1.058	1.013	0.700	AVRG	-4.2
Benzo(j)fluoranthene	0.967	0.938	0.010	AVRG	-3.0
Benzo(a)pyrene	0.980	0.946	0.700	AVRG	-3.5
Indeno(1,2,3-cd)pyrene	1.100	1.144	0.500	AVRG	4.0
Dibenzo(a,h)anthracene	0.873	0.924	0.400	AVRG	5.8
Benzo(g,h,i)perylene	0.967	0.994	0.500	AVRG	2.8
1-methylnaphthalene	0.538	0.564	0.010	AVRG	4.8
Perylene	0.988	0.965	0.010	AVRG	-2.3
2-Methylnaphthalene-d10	0.587	0.609	0.010	AVRG	3.7
Dibenzo(a,h)anthracene-d14	0.656	0.723	0.010	AVRG	10.2
Fluoranthene-d10	1.025	1.003	0.010	AVRG	-2.1

<- Exceeds QC limit of 20% D
* RF less than minimum RF

FORM VII SV-1

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ARI | Client: AECOM

ARI Job No: BCQ4 | Project: LAUREL STATION

Ical Midpoint ID: 16062202 | Ical Date: 06/22/16

Instrument ID: NT8 | Cont. Cal Date: 06/22/16

		IS1 (NPT) AREA #	RT #	IS2 (ANT) AREA #	RT #	IS3 (PHN) AREA #	RT #
	ICAL MIDPT	434515	4.84	252887	7.12	495801	9.16
	UPPER LIMIT	869030		505774		991602	
	LOWER LIMIT	217258		126444		247901	
	CCAL	434515	4.84	252887	7.12	495801	9.16
	UPPER LIMIT		5.34		7.62		9.66
	LOWER LIMIT		4.34		6.62		8.66
01	SCV160622	375410	4.83	206987	7.12	402535	9.16
02							
03							
04							
05							
06							
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20							

IS1 = Naphthalene-d8
IS2 = Acenaphthene-d10
IS3 = Phenanthrene-d10

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ARI | Client: AECOM

ARI Job No: BCQ4 | Project: LAUREL STATION

Ical Midpoint ID: 16062202 | Ical Date: 06/22/16

Instrument ID: NT8 | Cont. Cal Date: 06/22/16

		IS4 (CRY) AREA #	RT #	IS5 (PRY) AREA #	RT #	AREA #	RT #
	ICAL MIDPT	522758	14.06	483534	17.94		
	UPPER LIMIT	1045516		967068			
	LOWER LIMIT	261379		241767			
	CCAL	522758	14.06	483534	17.94		
	UPPER LIMIT		14.56		18.44		
	LOWER LIMIT		13.56		17.44		
01	SCV160622	423086	14.06	389609	17.94		
02							
03							
04							
05							
06							
07							
08							
09							
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12							
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14							
15							
16							
17							
18							
19							
20							

IS4 = Chrysene-d12
IS5 = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ARI | Client: AECOM

ARI Job No: BCQ4 | Project: LAUREL STATION

Ical Midpoint ID: 16062202 | Ical Date: 06/22/16

Instrument ID: NT8 | Cont. Cal Date: 07/01/16

		IS1 (NPT) AREA #	RT #	IS2 (ANT) AREA #	RT #	IS3 (PHN) AREA #	RT #
	ICAL MIDPT	434515	4.84	252887	7.12	495801	9.16
	UPPER LIMIT	869030		505774		991602	
	LOWER LIMIT	217258		126444		247901	
	CCAL	467838	4.80	279143	7.08	566874	9.12
	UPPER LIMIT		5.30		7.58		9.62
	LOWER LIMIT		4.30		6.58		8.62
01	BCQ4MBW1	398809	4.79	232242	7.08	463694	9.12
02	BCQ4LCSW1	439745	4.78	256796	7.08	500674	9.12
03	BCQ4LCSDW1	435520	4.78	250121	7.08	507216	9.12
04	MW-6	413622	4.79	242039	7.08	472194	9.12
05	MW-6 MS	421400	4.78	243027	7.08	483091	9.12
06	MW-6 MSD	440389	4.78	253254	7.08	488423	9.12
07	DUP	422078	4.78	243273	7.08	477858	9.12
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19							
20							

IS1 = Naphthalene-d8
IS2 = Acenaphthene-d10
IS3 = Phenanthrene-d10

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ARI | Client: AECOM

ARI Job No: BCQ4 | Project: LAUREL STATION

Ical Midpoint ID: 16062202 | Ical Date: 06/22/16

Instrument ID: NT8 | Cont. Cal Date: 07/01/16

		IS4 (CRY) AREA #	RT #	IS5 (PRY) AREA #	RT #	AREA #	RT #
	ICAL MIDPT	522758	14.06	483534	17.94		
	UPPER LIMIT	1045516		967068			
	LOWER LIMIT	261379		241767			
	CCAL	584847	14.00	551326	17.87		
	UPPER LIMIT		14.50		18.37		
	LOWER LIMIT		13.50		17.37		
01	BCQ4MBW1	462950	14.00	448750	17.87		
02	BCQ4LCSW1	504829	13.99	479633	17.87		
03	BCQ4LCSDW1	523892	13.99	476077	17.86		
04	MW-6	483906	13.99	445021	17.86		
05	MW-6 MS	515914	13.99	463752	17.86		
06	MW-6 MSD	505951	13.99	469030	17.86		
07	DUP	503293	13.99	463479	17.86		
08							
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18							
19							
20							

IS4 = Chrysene-d12
IS5 = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area from Ical midpoint
AREA LOWER LIMIT = - 50% of internal standard area from Ical midpoint
RT UPPER LIMIT = + 0.50 minutes of internal standard RT from Cont. Cal
RT LOWER LIMIT = - 0.50 minutes of internal standard RT from Cont. Cal

* Values outside of QC limits.

TPHD Analysis
Report and Summary QC Forms

ARI Job ID: BCQ4

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3510C
Page 1 of 1

QC Report No: BCQ4-AECOM
Project: Laurel Station
#

Matrix: Water

Date Received: 06/28/16

Data Release Authorized:
Reported: 07/06/16

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
MB-062916	Method Blank	06/29/16	07/01/16	1.00	Diesel Range	0.10	< 0.10 U
16-9825	HC ID: ---		FID4A	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		75.9%
BCQ4A	MW-6	06/29/16	07/01/16	1.00	**Diesel Range**	**0.10**	**0.11**
16-9825	HC ID: **DRO**		FID4A	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		73.9%
BCQ4B	DUP	06/29/16	07/01/16	1.00	Diesel Range	0.10	< 0.10 U
16-9826	HC ID: ---		FID4A	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		79.9%

Reported in mg/L (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: BCQ4-AECOM
Project: Laurel Station #

Client ID	OTER	TOT OUT
MB-062916	75.9%	0
LCS-062916	74.2%	0
LCSD-062916	85.8%	0
MW-6	73.9%	0
MW-6 MS	87.9%	0
MW-6 MSD	91.9%	0
DUP	79.9%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3510C
Log Number Range: 16-9825 to 16-9826

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-062916
LCS/LCSD

Lab Sample ID: LCS-062916
LIMS ID: 16-9825
Matrix: Water
Data Release Authorized:
Reported: 07/06/16

QC Report No: BCQ4-AECOM
Project: Laurel Station
#
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 06/29/16

Date Analyzed LCS: 07/01/16 15:06
LCSD: 07/01/16 15:28
Instrument/Analyst LCS: FID4A/ML
LCSD: FID4A/ML

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 1.0 mL
LCSD: 1.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	2.25	3.00	75.0%	2.34	3.00	78.0%	3.9%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	74.2%	85.8%

Results reported in mg/L
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: BCQ4
Matrix: Water Project: Laurel Station
Date Received: 06/28/16 #

ARI ID	Client ID	Samp Amt	Final Vol	Prep Date
16-9825-062916MB1	Method Blank	500 mL	1.00 mL	06/29/16
16-9825-062916LCS1	Lab Control	500 mL	1.00 mL	06/29/16
16-9825-062916LCSD1	Lab Control Dup	500 mL	1.00 mL	06/29/16
16-9825-BCQ4A	MW-6	500 mL	1.00 mL	06/29/16
16-9825-BCQ4AMS	MW-6	500 mL	1.00 mL	06/29/16
16-9825-BCQ4AMSD	MW-6	500 mL	1.00 mL	06/29/16
16-9826-BCQ4B	DUP	500 mL	1.00 mL	06/29/16

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: MW-6
MS/MSD

Lab Sample ID: BCQ4A
LIMS ID: 16-9825
Matrix: Water
Data Release Authorized:
Reported: 07/13/16

QC Report No: BCQ4-AECOM
Project: Laurel Station
#
Date Sampled: 06/27/16
Date Received: 06/28/16

Date Extracted MS/MSD: 06/29/16

Date Analyzed MS: 07/01/16 16:36
MSD: 07/01/16 16:59
Instrument/Analyst MS: FID4A/ML
MSD: FID4A/ML

Sample Amount MS: 500 mL
MSD: 500 mL
Final Extract Volume MS: 1.0 mL
MSD: 1.0 mL
Dilution Factor MS: 1.00
MSD: 1.00

Range	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Diesel	0.11	2.45	3.00	78.0%	2.57	3.00	82.0%	4.8%

TPHD Surrogate Recovery

	MS	MSD
o-Terphenyl	87.9%	91.9%

Results reported in mg/L
RPD calculated using sample concentrations per SW846.

TPH METHOD BLANK SUMMARY

BLANK NO.

BCO8MBW1

Lab Name: ARI

Client: AECOM

SDG No.: BCQ4

Project No.: LAUREL STATION

Date Extracted: 06/29/16

Matrix: LIQUID

Date Analyzed : 07/01/16

Instrument ID : FID4A

Time Analyzed : 1443

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	BCO8LCSW1	BCO8LCSW1	07/01/16
02	BCO8LCSDW1	BCO8LCSDW1	07/01/16
03	MW-6	BCQ4A	07/01/16
04	MW-6 MS	BCQ4AMS	07/01/16
05	MW-6 MSD	BCQ4AMSD	07/01/16
06	DUP	BCQ4B	07/01/16
07			
08			
09			
10			
11			
12			
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6a
DIESEL INITIAL CALIBRATION

Lab Name: ANALYTICAL RESOURCES, INC. Client: AECOM

Instrument: FID4A.I Project: Laurel Station

Calibration Date: 09-MAR-2016 SDG No.: BCQ4

Diesel Range	RF1 50	RF2 100	RF3 250	RF4 500	RF5 1000	RF6 2500	Ave RF	%RSD
WA Diesel	21551	22001	21272	20941	20168	18582	20753	5.9
AK Diesel	26320	26113	25109	24721	24086	22017	24728	6.4
OR Diesel	26426	26230	25247	24866	24235	22142	24858	6.3
Cal Diesel	26274	26058	25051	24647	24013	21946	24665	6.4
C12-C22	20997	21409	20671	20343	19568	18067	20176	6.0
o-Terph	28289	28560	28244	28653	27692	25723	27860	3.9

<- Indicates %RSD outside limits
Surrogate areas are not included in Diesel RF calculation.

Quant Ranges : WA Diesel C12-C24 (3.837-7.652)
AK Diesel C10-C25 (3.024-7.950)
OR Diesel C10-C28 (3.024-8.771)
Cal Diesel C10-C24 (3.024-7.652)
C12-C22 C12-C22 (3.837-7.026)

Calibration Files	Analysis Time
f1	09-MAR-2016 17:54
f2	09-MAR-2016 18:16
f3	09-MAR-2016 18:38
f4	09-MAR-2016 19:01
f5	09-MAR-2016 19:22
f6	09-MAR-2016 19:45

NW MOTOR OIL RANGE INITIAL CALIBRATION

Lab Name: ANALYTICAL RESOURCES, INC. Client: AECOM

Instrument: FID4A.I Project: Laurel Station

Calibration Date: 15-MAR-2016 SDG No.: BCQ4

Product Range	RF1 100	RF2 250	RF3 500	RF4 1000	RF5 2500	RF6 5000	Ave RF	%RSD
WA M.Oil C24-C38	18714	16494	15831	16601	16112	13969	16287	9.4
CA M.Oil C23-C32	14807	12827	12602	13320	13142	11143	12973	9.13
AS Bunk C C23-C32	14005	13041	12964	12626	-----	12212	12969	5.13
Triac Surr	26860	24515	23872	24943	24499	22320	24502	6.0

<- Indicates %RSD outside limits
Surrogate areas are not included in Motor Oil RF calculation.

Calibration Files	Analysis Time
f1	15-MAR-2016 11:54
f2	15-MAR-2016 12:17
f3	15-MAR-2016 12:39
f4	15-MAR-2016 13:03
f5	15-MAR-2016 13:26
f6	15-MAR-2016 13:48

7a

DIESEL CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC. Client: AECOM

ICal Date: 15-MAR-2016 Project: Laurel Station

CCal Date: 01-JUL-2016 SDG No.: BCQ4

Analysis Time: 10:37 Lab ID: DIESEL#1

Instrument: FID4A.I Lab File Name: 16070103.D

Diesel Range	Area*	CalcAmnt	NomAmnt	% D
WADies(C12-C24)	5170909	249.2	250	-0.3
AK102 (C10-C25)	6166653	249.4	250	-0.2
NASDies(C10-C24)	6144962	249.1	250	-0.3
Terphenyl	1119873	40.2	45	-10.7
Creos (C12-C22)	5007061	248.2	250	-0.7

* Surrogate areas are subtracted from range areas
<- Indicates a %D outside QC limits

7a

MOTOR OIL CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC. Client: AECOM

ICal Date: 15-MAR-2016 Project: Laurel Station

CCal Date: 01-JUL-2016 SDG No.: BCQ4

Analysis Time: 10:59 Lab ID: MOIL#1

Instrument: FID4A.I Lab File Name: 16070104.D

M.oil Range	Area*	CalcAmnt	NomAmnt	% D
WAMoil(C24-C38)	7684736	471.8	500	-5.6
AK103 (C25-C36)	6779692	470.3	500	-5.9
OR MOIL(C28-C40)	5833004	772.3	500	54.5
CRUDE(Tol-C40)	8837378	1170.1	500	134.0
n-Triacontane	1077265	44.0	45	-2.3

* Surrogate areas are subtracted from range areas

<- Indicates a %D outside QC limits

7a

DIESEL CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC. Client: AECOM

ICal Date: 15-MAR-2016 Project: Laurel Station

CCal Date: 01-JUL-2016 SDG No.: BCQ4

Analysis Time: 12:06 Lab ID: DIESEL#2

Instrument: FID4A.I Lab File Name: 16070107.D

Diesel Range	Area*	CalcAmnt	NomAmnt	% D
WADies(C12-C24)	4842745	233.4	250	-6.7
AK102 (C10-C25)	5692074	230.2	250	-7.9
NASDies(C10-C24)	5655431	229.3	250	-8.3
Terphenyl	1128728	40.5	45	-10.0
Creos (C12-C22)	4654715	230.7	250	-7.7

* Surrogate areas are subtracted from range areas
<- Indicates a %D outside QC limits

7a

MOTOR OIL CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC. Client: AECOM

ICal Date: 15-MAR-2016 Project: Laurel Station

CCal Date: 01-JUL-2016 SDG No.: BCQ4

Analysis Time: 12:29 Lab ID: MOIL#2

Instrument: FID4A.I Lab File Name: 16070108.D

M.oil Range	Area*	CalcAmnt	NomAmnt	% D
WAMoil(C24-C38)	8146772	500.2	500	0.0
AK103 (C25-C36)	7159031	496.6	500	-0.7
OR MOIL(C28-C40)	6240453	826.2	500	65.2
CRUDE(Tol-C40)	9572593	1267.4	500	153.5
n-Triacontane	1110674	45.3	45	0.7

* Surrogate areas are subtracted from range areas

<- Indicates a %D outside QC limits

7a

DIESEL CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC. Client: AECOM

ICal Date: 15-MAR-2016 Project: Laurel Station

CCal Date: 01-JUL-2016 SDG No.: BCQ4

Analysis Time: 19:34 Lab ID: DIESEL#3

Instrument: FID4A.I Lab File Name: 16070127.D

Diesel Range	Area*	CalcAmnt	NomAmnt	% D
WADies(C12-C24)	4994201	240.6	250	-3.7
AK102 (C10-C25)	5860222	237.0	250	-5.2
NASDies(C10-C24)	5827315	236.3	250	-5.5
Terphenyl	1178048	42.3	45	-6.0
Creos (C12-C22)	4800973	238.0	250	-4.8

* Surrogate areas are subtracted from range areas
<- Indicates a %D outside QC limits

7a

MOTOR OIL CONTINUING CALIBRATION VERIFICATION

Lab Name: ANALYTICAL RESOURCES, INC. Client: AECOM

ICal Date: 15-MAR-2016 Project: Laurel Station

CCal Date: 01-JUL-2016 SDG No.: BCQ4

Analysis Time: 19:57 Lab ID: MOIL#3

Instrument: FID4A.I Lab File Name: 16070128.D

M.oil Range	Area*	CalcAmnt	NomAmnt	% D
WAMoil(C24-C38)	8232761	505.5	500	1.1
AK103 (C25-C36)	7248455	502.8	500	0.6
OR MOIL(C28-C40)	6156224	815.1	500	63.0
CRUDE(Tol-C40)	9466915	1253.4	500	150.7
n-Triacontane	1167515	47.7	45	5.9

* Surrogate areas are subtracted from range areas
<- Indicates a %D outside QC limits

TPH ANALYTICAL SEQUENCE

Lab Name: ARI | Client: AECOM

SDG No.: BCQ4 | Project: LAUREL STATION

Instrument ID: FID4A | GC Column: RTX-1

THE ANALYTICAL SEQUENCE OF BLANKS, SAMPLES, AND STANDARDS, IS GIVEN BELOW:

SURROGATE RT FROM DAILY STANDARD
TERPH: 5.74 TRIAC: 9.07

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	TERPH RT #	TRIAC RT #
01	RT	RT	07/01/16	0952	5.74	9.07
02	IB	IB	07/01/16	1014	5.74	9.07
03	LAUREL STATI	DIESEL#1	07/01/16	1037	5.74	9.09
04	LAUREL STATI	MOIL#1	07/01/16	1059	5.73	9.07
05	LAUREL STATI	DIESEL#2	07/01/16	1206	5.74	9.07
06	LAUREL STATI	MOIL#2	07/01/16	1229	5.74	9.10
07	BCO8MBW1	BCO8MBW1	07/01/16	1443	5.75	9.09
08	BCO8LCSW1	BCO8LCSW1	07/01/16	1506	5.75	9.08
09	BCO8LCSDW1	BCO8LCSDW1	07/01/16	1528	5.75	9.09
10	MW-6	BCQ4A	07/01/16	1614	5.75	9.09
11	MW-6 MS	BCQ4AMS	07/01/16	1636	5.75	9.09
12	MW-6 MSD	BCQ4AMSD	07/01/16	1659	5.75	9.09
13	DUP	BCQ4B	07/01/16	1720	5.75	9.09
14	LAUREL STATI	DIESEL#3	07/01/16	1934	5.75	9.07
15	LAUREL STATI	MOIL#3	07/01/16	1957	5.74	9.10

QC LIMITS

TERPH = o-terph (+/- 0.05 MINUTES)
TRIAC = Triacon Surr (+/- 0.05 MINUTES)

* Values outside of QC limits.

FORM VIII TPH

TPH ANALYTICAL SEQUENCE

Lab Name: ARI | Client: AECOM

SDG No.: BCQ4 | Project: Laurel Station

Instrument ID: FID4A | GC Column: RTX-1

THE ANALYTICAL SEQUENCE OF BLANKS, SAMPLES, AND STANDARDS, IS GIVEN BELOW:

SURROGATE RT FROM DAILY STANDARD
TERPH: 5.92 TRIAC: 9.26

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	TERPH RT #	TRIAC RT #
01		SEC0025-IBL1	03/09/16	1710	5.92	9.26
02		SEC0025-IBL2	03/09/16	1732	5.91	9.24
03		SEC0025-CAL1	03/09/16	1754	5.90	9.24
04		SEC0025-CAL2	03/09/16	1816	5.90	9.24
05		SEC0025-CAL3	03/09/16	1838	5.91	9.24
06		SEC0025-CAL4	03/09/16	1901	5.92	9.24
07		SEC0025-CAL5	03/09/16	1922	5.94	9.24
08		SEC0025-CAL6	03/09/16	1945	5.97	9.23
09		SEC0025-SCV1	03/09/16	2006	5.91	9.23
10		SEQ-IBL1	03/15/16	1109	5.91	9.24
11		SEQ-IBL2	03/15/16	1130	5.91	9.24
12		SEQ-CAL1	03/15/16	1154	5.90	9.23
13		SEQ-CAL2	03/15/16	1217	5.90	9.23
14		SEQ-CAL3	03/15/16	1239	5.92	9.24
15		SEQ-CAL4	03/15/16	1303	5.91	9.26
16		SEQ-CAL5	03/15/16	1326	5.88	9.30
17		SEQ-CAL6	03/15/16	1348	5.90	9.33*
18		SEQ-SCV1	03/15/16	1411	5.91	9.24
19		SEQ-CAL7	03/16/16	0342	5.87	9.22
20		SEQ-CAL8	03/16/16	0403	5.93	9.23
21		SEQ-CAL9	03/16/16	0424	5.93	9.24
22		SEQ-CALA	03/16/16	0447	5.92	9.25
23		SEQ-CALB	03/16/16	0508	5.92	9.25
24		SEQ-CALC	03/16/16	0529	5.92	9.31*

QC LIMITS

TERPH = o-terph (+/- 0.05 MINUTES)
TRIAC = Triacon Surr (+/- 0.05 MINUTES)

* Values outside of QC limits.