MEMO

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From:
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Date:
April 15, 2020

Arcadis Project No.:
30003608

Subject:
Fourth Quarter 2019 Groundwater Sampling Summary
Northern Cold Springs Terminal
Hillside Road, Lysander, New York

Arcadis U.S., Inc. (Arcadis) is pleased to submit this groundwater monitoring memorandum and supporting attachments for the above-referenced site for the fourth quarter 2019 groundwater sampling event on behalf of the Northern Terminal Group. The site location is shown on **Figure 1**.

The groundwater monitoring field event was completed by Arcadis personnel October 28 through 30, 2019. Quarterly groundwater monitoring events at the subject site began in May 2018 and are conducted in compliance with the Arcadis Supplemental Characterization and Interim Remedial Action Work Plan (Work Plan), dated February 21, 2018. Included herein are summaries of the field activities, field observations, and analytical results for groundwater sampling completed during the October 2019 event.

FIELD ACTIVITIES AND OBSERVATIONS

During the October 2019 event, Arcadis completed groundwater monitoring and gauging. An interface probe was used to gauge each monitoring well for non-aqueous phase liquid (NAPL) and measure groundwater levels at each monitoring well identified in the Work Plan with an accuracy of approximately 0.01 feet. The following 21 monitoring well locations were scheduled to be sampled: BMW2, BMW3, BMW5, BMW6, BMW7, BMW8, BMW9, BMW13, BMW14R, MW-201, MW-202, MW-203, MW-204, MW-205, MW-206, MW-207, MW-208, MW-209, MW-210, MW-211, PZ106S (shown on **Figure 2**). However, only 14 monitoring wells were able to be sampled. Monitoring wells BMW5 and BMW13 were not sampled due to the presence of NAPL and monitoring wells BMW6, BMW7, MW-201, MW-202, and MW- 203 were not sampled because there was insufficient water column. The remaining 14 monitoring wells were purged and sampled using disposable bailers and a three-volume purge technique. Purge water and equipment rinse water was containerized and was sent for off-site disposal at Covanta Environmental

Solutions – Mohawk, located at 120 Dry Road in Oriskany, New York (Formerly Industrial Oil Services). Following collection, all samples were packed on ice and submitted to Pace Analytical in accordance with chain-of-custody procedures. Groundwater samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), carbon dioxide, sulfate, alkalinity, ferrous iron, and manganese.

ANALYTICAL RESULTS

Groundwater Flow Conditions

A summary of the groundwater elevation data is provided in **Table 1** and illustrated on **Figure 3**. Groundwater flow across the site was generally towards the south during the data collection event.

Groundwater Analytical Results

Current and historical groundwater laboratory analytical results for benzene, toluene, ethylbenzene, and xylenes (BTEX); total VOCs; and total SVOCs are summarized in **Table 2**. The detailed fourth quarter 2019 groundwater analytical data are presented in **Table 3**. Current and historical groundwater results and Total VOCs and Total SVOCs are illustrated on **Figure 4**. The complete laboratory report for the sampling event is included as **Attachment A**.

During the October 2019 event, samples collected from two (2) of the 14 sampled monitoring wells (BMW14R and MW-204) exhibited one (1) or more VOC constituents at concentrations greater than the New York State Department of Environmental Conservation (NYSDEC) ambient water quality standards and guidance values presented in the NYSDEC's Technical and Operational Guidance Series (TOGS) 1.1.1. Samples collected from monitoring wells BMW3, BMW8, BMW9, BMW14R, MW-204, MW-208, MW-210, and PZ106S exhibited concentrations of manganese greater than the TOGS 1.1.1 ambient water quality standards and guidance values.

SVOC detections in monitoring wells MW-206 and MW-209 are likely due to handling at the lab as there are no corresponding indications of VOC and the duplicate of MW-206 shows no detections. The dissolved-phase analytical results from the 2018 sampling events (second, third, and fourth quarters) and the 2019 sampling events (first, second, third, and fourth quarters) are generally consistent.

SUMMARY AND FUTURE PLANNED ACTIVITES

Groundwater samples were collected from a total of 14 monitoring wells during the fourth quarter monitoring event to provide a representation of current dissolved-phase constituent concentrations at the subject site and to monitor NAPL thicknesses at locations across the site. One (1) or more individual dissolved-phase BTEX concentrations above the TOGS 1.1.1 quality standards and guidance values were detected at two (2) of the 14 monitoring wells. During the pre-sampling groundwater gauging event, NAPL was detected at monitoring wells BMW5 and BMW13. No other monitoring wells gauged during this event indicated the presence of NAPL. The first quarter 2020 groundwater sampling was conducted on February 17 through 19, 2020, Reporting for this event will include a recommendation for the future groundwater monitoring program at the site.

If there are any questions regarding this memorandum, please contact Vin Maresco of Arcadis at 315.671.9256.

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Attachments:

Tables

Table 1 – 2019 Groundwater Measurements
Table 2 – Historical Summary of Groundwater Constituents of Concern
Table 3 – Groundwater Analytical Data

Figures

Figure 1 – Site Location Map
Figure 2 – Northern Terminal Groundwater Monitoring Well Network
Figure 3 – Groundwater Contour Map
Figure 4 – Total VOC and SVOC Concentrations

Attachments

Attachment A – Laboratory Reports

TABLES

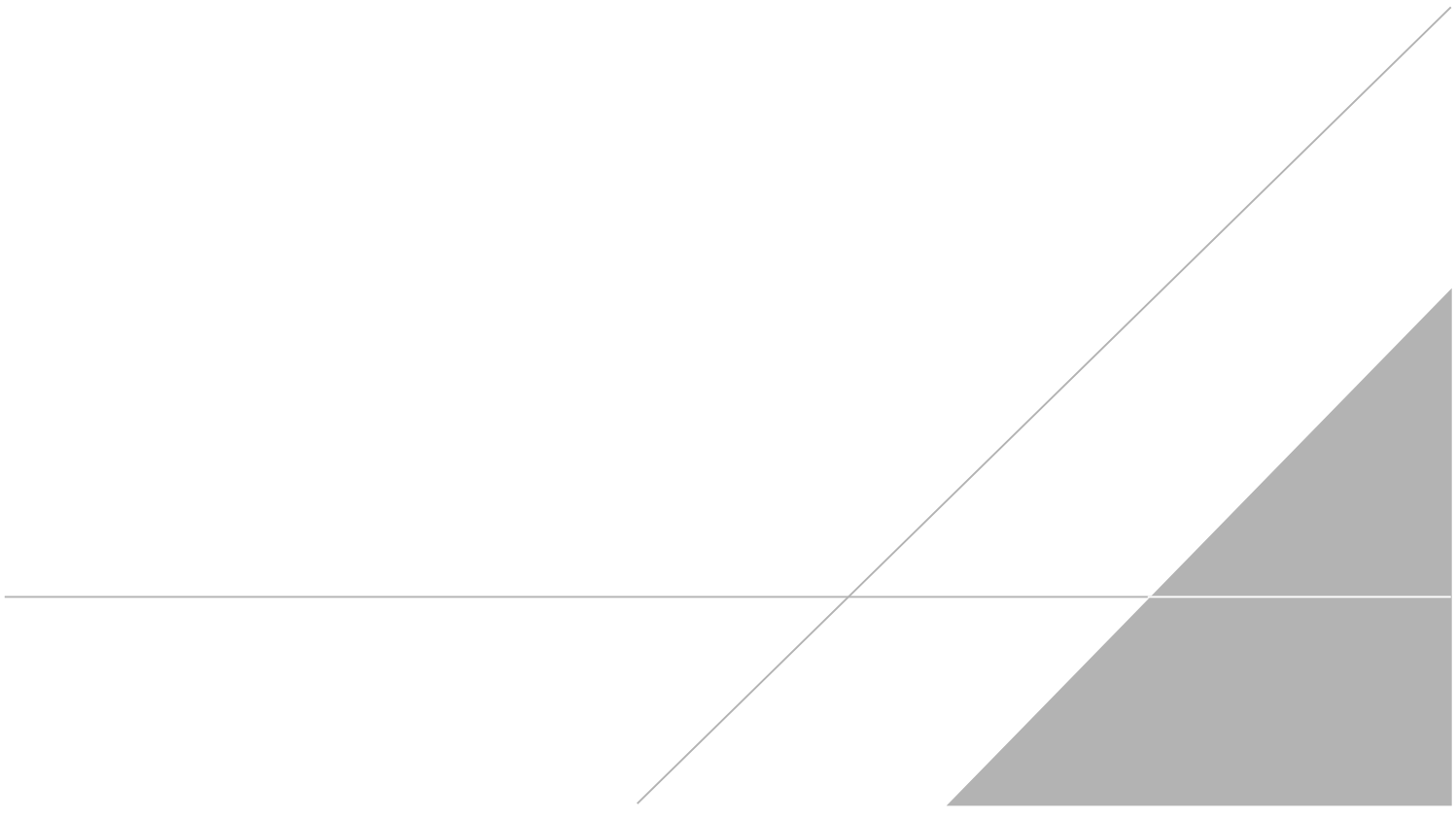


Table 1
2019 Groundwater Measurements

Groundwater Sampling Summary 2019 - Fourth Quarter
Northern Cold Springs Terminal
Lysander, New York

Well ID	Northing	Easting	Measuring Point	Diameter (inches)	Screen Interval (ft bgs)	DTP (bmp)	DTW* (bmp)	Apparent Product Thickness	GWE	Corrected GWE	Notes
BMW2	1141472.09	909051.25	396.65	2	15.3-34.0	ND	9.82	ND	386.83	386.83	
BMW3	1141323.86	908969.02	395.30	2	3.5-29.0	ND	22.14	ND	373.16	373.16	
BMW5	1141248.92	908820.46	389.50	2	10.0-30.0	24.88	24.88	<0.01	364.62	364.62	No sample collected due to the presence of NAPL.
BMW6	1141286.17	908914.24	394.88	2	10.0-30.0	ND	30.23	ND	364.65	364.65	No sample collected, insufficient water column to sample. LL collected.
BMW7	1141347.84	908824.60	397.61	2	5.0-15.0	ND	15.19	ND	382.42	382.42	No sample collected, insufficient water column to sample. LL collected.
BMW8	1141420.52	908826.55	399.86	2	5.0-20.0	ND	10.13	ND	389.73	389.73	
BMW9	1141334.24	909181.88	380.15	2	5.0-15.0	ND	7.75	ND	372.40	372.40	
BMW13	1141243.20	909014.31	382.60	4	UK	18.63	18.63	<0.01	363.97	363.97	No sample collected due to the presence of NAPL.
BMW14R	1141257.52	909096.329	379.82	2	5.0-20.0	ND	15.90	ND	363.92	363.92	
MW-201	1141290.74	908861.62	395.24	2	14.0-24.0	ND	26.19	ND	369.05	369.05	No sample collected, insufficient water column to sample. LL collected.
MW-202	1141329.17	908898.17	395.25	2	6.0-16.5	ND	17.63	ND	377.62	377.62	No sample collected, insufficient water column to sample. LL collected.
MW-203	1141307.55	909013.86	394.31	2	5.0-20.0	ND	ND	ND	NA	NA	No sample collected, well was dry.
MW-204	1141427.24	908980.08	394.95	2	5.0-20.0	ND	5.85	ND	389.10	389.10	
MW-205	1141543.83	908866.84	397.79	2	10.0-20.0	ND	6.22	ND	391.57	391.57	
MW-206	1141541.04	908921.18	397.68	2	5.0-20.0	ND	2.55	ND	395.13	395.13	
MW-207	1141519.38	908997.73	398.50	2	5.0-20.0	ND	4.77	ND	393.73	393.73	
MW-208	1141526.88	909080.26	397.09	2	5.0-20.0	ND	5.27	ND	391.82	391.82	
MW-209	1141600.72	909076.11	399.62	2	5.0-20.0	ND	4.48	ND	395.14	395.14	
MW-210	1141345.09	909129.64	386.60	2	8.0-18.0	ND	11.96	ND	374.64	374.64	
MW-211	1141377.65	909200.72	387.45	2	5.0-15.0	ND	11.52	ND	375.93	375.93	
PZ106S	1141279.48	909152.97	374.02	2	5.5-15.5	ND	8.14	ND	365.88	365.88	

Notes:

* DTW was above the screened interval for the following wells: BMW2, BMW13, MW-204, MW-205, MW-206, MW-207, MW-208, and MW-209.
Corrected GWE = GWE + (NAPL Specific density (0.79) x Product thickness)
bmp = Below measuring point
DTP = Depth to product
DTW = Depth to water
ft bgs = Feet below ground surface
GWE = Groundwater elevation
ID = Identification
LL = Liquid level
NA = Not applicable
NAPL = Nonaqueous phase liquid
ND = No detection
UK = Unknown

Table 2
Historical Summary of Groundwater Constituents of Concern

Northern Cold Springs Terminal
Lysander, New York

Location ID	Date Collected	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	m&p-Xylene (µg/L)	Total VOCs (µg/L)	Total SVOCs (µg/L)
NYSDEC TOGS 1.1.1 (GA Groundwater):		1	5	5	5	---	---
BMW2	5/17/2018	1 U	1 U	1 U	2 U	200 U	0.099 U
BMW2	9/25/2018	1 U	1 U	1 U	2 U	200 U	0.1 U
BMW2	12/4/2018	1 U	1 U	1 U	2 U	200 U	0.098 U
BMW2	2/20/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
BMW2	5/22/2019	1 U	1 U	1 U	2 U	200 U	0.14 U
BMW2	8/28/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
BMW2	10/30/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
BMW3	5/15/2018	1 U	1 U	1 U	2 U	200 U	0.099 U
BMW3	9/25/2018	1 U	1 U	1 U	2 U	200 U	0.1 U
BMW3	12/4/2018	1 U	1 U	1 U	2 U	200 U	0.11 U
BMW3	2/19/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
BMW3	5/22/2019	1 U	1 U	1 U	2 U	200 U	0.11 U
BMW3	8/29/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
BMW3	10/29/2019	1 U	1 U	1.4	4.4	9.4	0.1 U
BMW5	5/15/2018	NAPL Present					
BMW5	9/25/2018	NAPL Present					
BMW5	12/3/2018	NAPL Present					
BMW5	2/18/2019	NAPL Present					
BMW5	5/20/2019	NAPL Present					
BMW5	8/27/2019	NAPL Present					
BMW5	10/28/2019	NAPL Present					
BMW6	5/16/2018	1 U	2.2	1 U	2 U	4.8	26.2
BMW6	9/25/2018	Dry					
BMW6	12/3/2019	Dry					
BMW6	2/18/2019	Dry					
BMW6	5/20/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
BMW6	8/27/2019	Dry					
BMW6	10/28/2019	Dry					
BMW7	5/14/2018	1 U	1 U	1 U	2 U	200 U	0.099 U
BMW7	9/25/2018	Dry					
BMW7	12/3/2019	Dry					
BMW7	2/19/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
BMW7	5/20/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
BMW7	8/27/2019	Dry					
BMW7	10/28/2019	Dry					
BMW8	5/14/2018	1 U	1 U	1 U	2 U	200 U	0.099 U
BMW8	9/25/2018	1 U	1 U	1 U	2 U	200 U	0.098 U
BMW8	12/4/2018	1 U	1 U	1 U	2 U	200 U	0.099 U
BMW8	2/19/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
BMW8	5/20/2019	1 U	1 U	1 U	2 U	200 U	0.099 U
BMW8	8/28/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
BMW8	10/29/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
BMW9	5/17/2018	1 U	1 U	1 U	2 U	1.3	0.097 U
BMW9	9/25/2018	Dry					
BMW9	12/4/2018	1 U	1 U	1 U	2 U	200 U	0.098 U
BMW9	2/18/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
BMW9	5/21/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
BMW9	8/28/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
BMW9	10/30/2019	1 U	1 U	1 U	2 U	200 U	0.58
BMW13	5/17/2018	**4,890**	**14,600**	**1,390**	**7,340**	25,838	8.8
BMW13	9/25/2018	NAPL Present					
BMW13	12/5/2018	**6,220**	**17,300**	**1,250**	**7,130**	38,276.9	2.05
BMW13	2/18/2019	NAPL Present					
BMW13	5/20/2019	NAPL Present					
BMW13	8/27/2019	NAPL Present					
BMW13	10/28/2019	NAPL Present					
BMW14R	8/6/2018	1 U	1.2	**229**	**843**	2,979.7	1.53
BMW14R	9/25/2018	1 U	1.1	**187**	**796**	4,757.6	6.82
BMW14R	12/5/2018	**2.5**	**17.6**	**149**	**678**	4,345.8	0.93
BMW14R	2/20/2019	1 U	1 U	**202**	**762**	4,156.0	1.92
BMW14R	5/20/2019	NAPL Present					

See Notes on Page 3.

Table 2
Historical Summary of Groundwater Constituents of Concern

Northern Cold Springs Terminal
Lysander, New York

Location ID	Date Collected	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	m&p-Xylene (µg/L)	Total VOCs (µg/L)	Total SVOCs (µg/L)
NYSDEC TOGS 1.1.1 (GA Groundwater):		1	5	5	5	---	---
BMW14R	8/28/2019	1 U	1.6	**101**	**437**	3,422.8	1.24
BMW14R	10/30/2019	1 U	1.9	**64.9**	**372**	3,499.2	0.84
MW-201	5/15/2018	Not Installed					
MW-201	9/25/2018	Dry					
MW-201	12/3/2018	Dry					
MW-201	2/18/2019	Dry					
MW-201	5/20/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
MW-201	8/27/2019	Dry					
MW-201	10/28/2019	Dry					
MW-202	5/15/2018	Not Installed					
MW-202	9/25/2018	Dry					
MW-202	12/3/2018	Dry					
MW-202	2/19/2019	1 U	1 U	1 U	2 U	200 U	0.11 U
MW-202	5/20/2019	1 U	1 U	1 U	2 U	200 U	0.098 U
MW-202	8/27/2019	Dry					
MW-202	10/28/2019	Dry					
MW-203	5/15/2018	Not Installed					
MW-203	9/25/2018	Dry					
MW-203	12/3/2018	Dry					
MW-203	2/19/2019	1 U	1 U	1 U	2 U	200 U	0.11 U
MW-203	5/20/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
MW-203	8/27/2019	Dry					
MW-203	10/28/2019	Dry					
MW-204	5/15/2018	Not Installed					
MW-204	9/25/2018	**6.3**	**11.9**	**17.3**	**42.7**	138.5	0.099 U
MW-204	12/3/2018	1 U	1 U	1.2	2.1	5.3	0.083 U
MW-204	2/18/2019	**4.6**	2.4	4.2	**8.2**	36.1	0.1 U
MW-204	5/22/2019	**1.3**	1 U	1 U	2.4	10.6	0.098 U
MW-204	8/27/2019	**2.4**	**6.1**	**16.7**	**40.5**	103.8	0.099 U
MW-204	10/29/2019	**2.9**	**7.1**	**16.3**	**30.6**	126	0.1 U
MW-205	5/15/2018	Not Installed					
MW-205	9/24/2018	1 U	1.6	1 U	2.3	6	0.1 U
MW-205	12/3/2018	1 U	1 U	1 U	2 U	200 U	0.1 U
MW-205	2/18/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
MW-205	5/21/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
MW-205	8/27/2019	1 U	1 U	1 U	2 U	200 U	0.098 U
MW-205	10/28/2019	1 U	1 U	1 U	2 U	200 U	0.099 U
MW-206	5/15/2018	Not Installed					
MW-206	9/24/2018	1 U	1 U	1 U	2 U	200 U	0.098 U
MW-206	12/3/2018	1 U [1 U]	1 U [1 U]	1 U [1 U]	2 U [2 U]	200 U [200 U]	0.1 U [0.1 U]
MW-206	2/18/2019	Frozen					
MW-206	5/21/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
MW-206	8/27/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
MW-206	10/28/2019	1 U [1 U]	1 U [1 U]	1 U [1 U]	2 U [2 U]	200 U [200 U]	7.72 [0.76]
MW-207	5/15/2018	Not Installed					
MW-207	9/24/2018	1 U	1 U	1 U	2 U	200 U	0.1 U
MW-207	12/3/2018	1 U	1 U	1 U	2 U	200 U	0.1 U
MW-207	2/18/2019	1 U [1 U]	1 U [1 U]	1 U [1 U]	2 U [2 U]	200 U [200 U]	0.1 U [0.12 U]
MW-207	5/21/2019	1 U [1 U]	1 U [1 U]	1 U [1 U]	2 U [2 U]	200 U [200 U]	0.1 U [0.099 U]
MW-207	8/27/2019	1 U [1 U]	1 U [1 U]	1 U [1 U]	2 U [2 U]	200 U [200 U]	0.1 U [0.1 U]
MW-207	10/28/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
MW-208	5/15/2018	Not Installed					
MW-208	9/24/2018	**2**	1.3	**6.7**	**17.8**	202.1	0.099 U
MW-208	12/3/2018	1 U	1 U	4	**11.4**	58.6	0.091 U
MW-208	2/18/2019	1 U	1 U	4.7	**15.6**	94.6	0.1 U
MW-208	5/21/2019	1 U	1 U	3.9	**10.7**	86.8	0.1 U
MW-208	8/27/2019	**1.4**	1	**17.3**	**59.9**	371.5	0.1 U
MW-208	10/29/2019	1 U	1 U	1 U	2 U	11.7	1.07
MW-209	5/15/2018	Not Installed					
MW-209	9/24/2018	1 U [1 U]	1.1 [1]	1 U [1 U]	2 U [2 U]	1.1 [1]	0.099 U [0.099 U]
MW-209	12/3/2018	1 U	1 U	1 U	2 U	200 U	0.091 U

See Notes on Page 3.

Table 2
Historical Summary of Groundwater Constituents of Concern

Northern Cold Springs Terminal
Lysander, New York

Location ID	Date Collected	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	m&p-Xylene (µg/L)	Total VOCs (µg/L)	Total SVOCs (µg/L)
NYSDEC TOGS 1.1.1 (GA Groundwater):		**1**	**5**	**5**	**5**	**---**	**---**
MW-209	2/18/2019	Frozen					
MW-209	5/22/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
MW-209	8/27/2019	1 U	1 U	1 U	2 U	200 U	0.099 UR1
MW-209	10/29/2019	1 U	1 U	1 U	2 U	200 U	1.63
MW-210	5/15/2018	Not Installed					
MW-210	9/26/2018	1 U	1 U	1 U	2 U	200 U	0.13
MW-210	12/5/2018	1 U	1 U	1 U	2 U	200 U	0.098 U
MW-210	2/20/2019	1 U	1 U	1 U	3.7	20.3	0.1 U
MW-210	5/21/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
MW-210	8/28/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
MW-210	10/30/2019	1 U	1 U	1 U	2 U	200 U	0.12
MW-211	5/15/2018	Not Installed					
MW-211	9/25/2018	1 U	1 U	1 U	2 U	200 U	0.29 U
MW-211	12/4/2018	1 U	1 U	1 U	2 U	200 U	0.098 U
MW-211	2/18/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
MW-211	5/21/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
MW-211	8/29/2019	1 U	1 U	1 U	2 U	200 U	0.11 U
MW-211	10/30/2019	1 U	1 U	1 U	2 U	200 U	2.68
PZ106S	5/17/2018	1 U	1 U	1 U	2 U	200 U	0.097 U
PZ106S	9/26/2018	1 U	1 U	1 U	2 U	200 U	0.11 U
PZ106S	12/5/2018	1 U	1 U	1 U	2 U	200 U	0.097 U
PZ106S	2/20/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
PZ106S	5/21/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
PZ106S	8/29/2019	1 U	1 U	1 U	2 U	200 U	0.1 U
PZ106S	10/30/2019	1 U	1 U	1 U	2 U	200 U	0.11 U

Notes:
1. Shaded and bold values indicate a criteria exceedance.
2. Field duplicate sample results are presented in brackets.
3. Total VOCs represents all VOCs analyzed.

ID = Identification
NAPL = Non-aqueous phase liquid
NYSDEC = New York State Department of Environmental Conservation
R1 = RPD value was outside control limits.
SVOC = Semivolatile organic compound
TOGS = Technical and Operational Guidance Series
U = Compound was analyzed for, but not detected.
µg/L = Micrograms per liter
VOC = Volatile organic compound

Table 3
Groundwater Analytical Data

Groundwater Sampling Summary 2019 - Fourth Quarter
Northern Cold Springs Terminal
Lysander, New York

Location ID: / Date Collected: / SDG:	NYSDEC TOGS 1.1.1 (GA Groundwater)	Units	BMW2 10/30/19 30332977	BMW3 10/29/19 30332977	BMW8 10/29/19 30332977	BMW9 10/30/19 30332977	BMW14R 10/30/19 30332977	MW-204 10/29/19 30332977	MW-205 10/28/19 30332332
VOCs (EPA 8260C)									
1,2,4-Trimethylbenzene	5	ug/L	1 U	1 U	1 U	1 U	**1,770**	**41.2**	1 U
1,3,5-Trimethylbenzene	5	ug/L	1 U	1 U	1 U	1 U	**356**	**12.2**	1 U
Benzene	1	ug/L	1 U	1 U	1 U	1 U	1 U	**2.9**	1 U
Ethanol	- -	ug/L	200 UCHL11c	200 UCHL11c	200 UCHL11c	200 UCHL11c	200 UCHL11c	200 UCHL11c	200 UCHMHL12c
Ethylbenzene	5	ug/L	1 U	1.4	1 U	1 U	**64.9**	**16.3**	1 U
Isopropylbenzene	5	ug/L	1 U	1 U	1 U	1 U	**77.4**	3.2	1 U
m&p-Xylene	5	ug/L	2 U	4.4	2 U	2 U	**372**	**30.6**	2 U
Methyl-Tert-Butyl-Ether	10	ug/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Naphthalene	10	ug/L	2 U	2 U	2 U	2 U	**623**	2 U	2 U
n-Butylbenzene	5	ug/L	1 U	1 U	1 U	1 U	**17.5**	1 U	1 U
n-Propylbenzene	5	ug/L	1 U	1 U	1 U	1 U	**170**	**9.4**	1 U
o-Xylene	5	ug/L	1 U	1.7	1 U	1 U	2.1	3.1	1 U
p-Isopropyltoluene	5	ug/L	1 U	1 U	1 U	1 U	**32**	1 U	1 U
sec-Butylbenzene	5	ug/L	1 U	1 U	1 U	1 U	**10.9**	1 U	1 U
Tert-Butylbenzene	5	ug/L	1 U	1.9	1 U	1 U	1.5	1 U	1 U
Toluene	5	ug/L	1 U	1 U	1 U	1 U	1.9	**7.1**	1 U
Total VOCs	- -	ug/L	200 U	9.4	200 U	200 U	3,499.2	126	200 U
SVOCs (EPA 8270D by SIM)									
Acenaphthene	20	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.4	0.1 U	0.099 U1c
Acenaphthylene	- -	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.099 U1c
Anthracene	50	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.099 U1c
Benz(a)Anthracene	0.002	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.099 U1c
Benzo(a)Pyrene	- -	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.099 U1c
Benzo(b)Fluoranthene	0.002	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.099 U1c
Benzo(g,h,i)Perylene	- -	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.099 U1c
Benzo(k)Fluoranthene	0.002	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.099 U1c
Chrysene	0.002	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.099 U1c
Dibenzo(a,h)Anthracene	- -	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.099 U1c
Fluoranthene	50	ug/L	0.1 U	0.1 U	0.1 U	0.16	0.1 U	0.1 U	0.099 U1c
Fluorene	50	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.44	0.1 U	0.099 U1c
Indeno(1,2,3-cd)Pyrene	0.002	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.099 U1c
Phenanthrene	50	ug/L	0.1 U	0.1 U	0.1 U	0.23	0.1 U	0.1 U	0.099 U1c
Pyrene	50	ug/L	0.1 U	0.1 U	0.1 U	0.19	0.1 U	0.1 U	0.099 U1c
Total SVOCs	- -	ug/L	0.1 U	0.1 U	0.1 U	0.58	0.84	0.1 U	0.099 U
Metals (EPA 6010B)									
Manganese	300	ug/L	104	**312**	**1,620**	**320**	**650**	**572**	73.7
Dissolved Metals									
Manganese	300	ug/L	43.9	18.7	**1,820**	298	**400**	**789**	35.1
General Chemistry									
Alkalinity, Carbonate (pH4.5)	- -	mg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Alkalinity, Bicarbonate (pH4.5)	- -	mg/L	250	590	430	520	570	580	380
Alkalinity, Total (CaCO3 pH4.5)	- -	mg/L	250	590	430	520	570	580	380
Iron, Ferrous	- -	mg/L	0.1 UH3H6	0.1 UH3H6	1 H3H6	0.31 H6H1	1.7 H6H1	0.78 H3H6	0.13 H6H1
Nitrogen, NO2 plus NO3	- -	mg/L	0.11	0.1 U	0.11	0.1 U	1 UD3	1 UD3	0.1 U
Sulfate	- -	mg/L	44.9	48	70.2	158	10 U	22.5	449

See Notes on Page 5.

Table 3
Groundwater Analytical Data

Groundwater Sampling Summary 2019 - Fourth Quarter
Northern Cold Springs Terminal
Lysander, New York

Location ID: Date Collected: SDG:	NYSDEC TOGS 1.1.1 (GA Groundwater)	Units	BMW2 10/30/19 30332977	BMW3 10/29/19 30332977	BMW8 10/29/19 30332977	BMW9 10/30/19 30332977	BMW14R 10/30/19 30332977	MW-204 10/29/19 30332977	MW-205 10/28/19 30332332
Field Parameters									
pH	- -		NM	7.09	6.89	6.97	6.91	6.74	7.03
Temperature	- -	C	NM	13.0	13.6	12.9	11.7	14.1	13.3
Conductivity	- -	mS/cm	NM	NC	NC	NC	NC	NC	NC
Dissolved Oxygen	- -	mg/L	NM	3.58	1.62	2.9	0.82	2.20	1.54
ORP	- -	mV	NM	121.4	15.4	88.5	-80.6	-68	-10.9
Turbidity	- -	NTU	NM	5.28	5.28	12.7	0.01	28.5	41.8

See Notes on Page 5.

Table 3
Groundwater Analytical Data

Groundwater Sampling Summary 2019 - Fourth Quarter
Northern Cold Springs Terminal
Lysander, New York

Location ID: Date Collected: SDG:	NYSDEC TOGS 1.1.1 (GA Groundwater)	Units	MW-206 10/28/19 30332332	MW-207 10/28/19 30332332	MW-208 10/29/19 30332977	MW-209 10/29/19 30332977	MW-210 10/30/19 30332977	MW-211 10/30/19 30332977	PZ106S 10/30/19 30332977
VOCs (EPA 8260C)									
1,2,4-Trimethylbenzene	5	ug/L	1 U [1 U]	1 U	3.2	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	5	ug/L	1 U [1 U]	1 U	1.7	1 U	1 U	1 U	1 U
Benzene	1	ug/L	1 U [1 U]	1 U	1 U	1 U	1 U	1 U	1 U
Ethanol	- -	ug/L	200 UCHL12c [200 UCHL12c]	200 UCHL12c	200 UCHL11c	200 UCHL11c	200 UCHL11c	200 UCHL11c	200 UCHL11c
Ethylbenzene	5	ug/L	1 U [1 U]	1 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	5	ug/L	1 U [1 U]	1 U	4.1	1 U	1 U	1 U	1 U
m&p-Xylene	5	ug/L	2 U [2 U]	2 U	2 U	2 U	2 U	2 U	2 U
Methyl-Tert-Butyl-Ether	10	ug/L	1 U [1 U]	1 U	1 U	1 U	1 U	1 U	1 U
Naphthalene	10	ug/L	2 U [2 U]	2 U	2 U	2 U	2 U	2 U	2 U
n-Butylbenzene	5	ug/L	1 U [1 U]	1 U	1 U	1 U	1 U	1 U	1 U
n-Propylbenzene	5	ug/L	1 U [1 U]	1 U	1.4	1 U	1 U	1 U	1 U
o-Xylene	5	ug/L	1 U [1 U]	1 U	1.3	1 U	1 U	1 U	1 U
p-Isopropyltoluene	5	ug/L	1 U [1 U]	1 U	1 U	1 U	1 U	1 U	1 U
sec-Butylbenzene	5	ug/L	1 U [1 U]	1 U	1 U	1 U	1 U	1 U	1 U
Tert-Butylbenzene	5	ug/L	1 U [1 U]	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	5	ug/L	1 U [1 U]	1 U	1 U	1 U	1 U	1 U	1 U
Total VOCs	- -	ug/L	200 U [200 U]	200 U	11.7	200 U	200 U	200 U	200 U
SVOCs (EPA 8270D by SIM)									
Acenaphthene	20	ug/L	0.29 1c [0.1 U1c]	0.1 U1c	0.1 U	0.1 U	0.1 U	0.24	0.11 U
Acenaphthylene	- -	ug/L	0.2 1c [0.1 U1c]	0.1 U1c	0.1 U	0.1 U	0.1 U	0.1 U	0.11 U
Anthracene	50	ug/L	0.23 1c [0.1 U1c]	0.1 U1c	0.1 U	0.1 U	0.1 U	0.12	0.11 U
Benz(a)Anthracene	0.002	ug/L	**0.41 1c [0.1 U1c]**	0.1 U1c	0.1 U	**0.12**	0.1 U	0.1 U	0.11 U
Benzo(a)Pyrene	- -	ug/L	0.29 1c [0.1 U1c]	0.1 U1c	0.1 U	0.1 U	0.1 U	0.1 U	0.11 U
Benzo(b)Fluoranthene	0.002	ug/L	**0.36 ip1c [0.1 U1c]**	0.1 U1c	0.1 U	0.1 U	0.1 U	0.1 U	0.11 U
Benzo(g,h,i)Perylene	- -	ug/L	0.16 1c [0.1 U1c]	0.1 U1c	0.1 U	0.1 U	0.1 U	0.1 U	0.11 U
Benzo(k)Fluoranthene	0.002	ug/L	**0.33 ip1c [0.1 U1c]**	0.1 U1c	0.1 U	0.1 U	0.1 U	0.1 U	0.11 U
Chrysene	0.002	ug/L	**0.3 1c [0.1 U1c]**	0.1 U1c	0.1 U	0.1 U	0.1 U	0.1 U	0.11 U
Dibenzo(a,h)Anthracene	- -	ug/L	0.1 U1c [0.1 U1c]	0.1 U1c	0.1 U	0.1 U	0.1 U	0.1 U	0.11 U
Fluoranthene	50	ug/L	1.2 1c [0.17 1c]	0.1 U1c	0.29	0.41	0.1 U	0.4	0.11 U
Fluorene	50	ug/L	0.34 1c [0.1 U1c]	0.1 U1c	0.1 U	0.11	0.1 U	0.27	0.11 U
Indeno(1,2,3-cd)Pyrene	0.002	ug/L	**0.11 1c [0.1 U1c]**	0.1 U1c	0.1 U	0.1 U	0.1 U	0.1 U	0.11 U
Phenanthrene	50	ug/L	2 1c [0.41 1c]	0.1 U1c	0.37	0.55	0.1 U	1.2 ML	0.11 U
Pyrene	50	ug/L	1.5 1c [0.18 1c]	0.1 U1c	0.41	0.44	0.12	0.45	0.11 U
Total SVOCs	- -	ug/L	7.72 [0.76]	0.1 U	1.07	1.63	0.12	2.68	0.11 U
Metals (EPA 6010B)									
Manganese	300	ug/L	19.2 [64.4]	19.8	**832**	19.8	**1,290**	128	**3,520**
Dissolved Metals									
Manganese	300	ug/L	5 U [5 U]	5 U	**656**	5 U	**333**	5 U	**909**
General Chemistry									
Alkalinity, Carbonate (pH4.5)	- -	mg/L	10 U [10 U]	10 U	10 U	10 U	10 U	10 U	10 U
Alkalinity, Bicarbonate (pH4.5)	- -	mg/L	280 [300]	290	550	320	500	450	500
Alkalinity, Total (CaCO3 pH4.5)	- -	mg/L	280 [300]	290	550	320	500	450	500
Iron, Ferrous	- -	mg/L	0.1 UH6H1 [0.1 UH3H6]	0.1 UH6H1	0.11 H3H6	0.1 UH3H6	0.1 UH3H6	0.1 UH6H1	0.1 UH6H1
Nitrogen, NO2 plus NO3	- -	mg/L	0.48 [0.53]	0.7	0.1 U	0.95	0.1 U	0.1 U	0.1 U
Sulfate	- -	mg/L	32 [29.8]	23.3	38.5	20.8	57.8	92.8	65.8

See Notes on Page 5.

Table 3
Groundwater Analytical Data

Groundwater Sampling Summary 2019 - Fourth Quarter
Northern Cold Springs Terminal
Lysander, New York

Location ID: Date Collected: SDG:	NYSDEC TOGS 1.1.1 (GA Groundwater)	Units	MW-206 10/28/19 30332332	MW-207 10/28/19 30332332	MW-208 10/29/19 30332977	MW-209 10/29/19 30332977	MW-210 10/30/19 30332977	MW-211 10/30/19 30332977	PZ106S 10/30/19 30332977
Field Parameters									
pH	- -		7.23	7.34	6.93	7.34	6.92	7.10	NM
Temperature	- -	C	14.2	13.4	12.5	13.0	12.9	13.3	NM
Conductivity	- -	mS/cm	NC	NC	NC	NC	NC	NC	NM
Dissolved Oxygen	- -	mg/L	5.14	3.33	0.98	4.07	0.78	5.56	NM
ORP	- -	mV	91.2	77.5	37.3	93.2	49.9	73.5	NM
Turbidity	- -	NTU	33.1	4.47	0.0	0.0	86.3	12.7	NM

See Notes on Page 5.

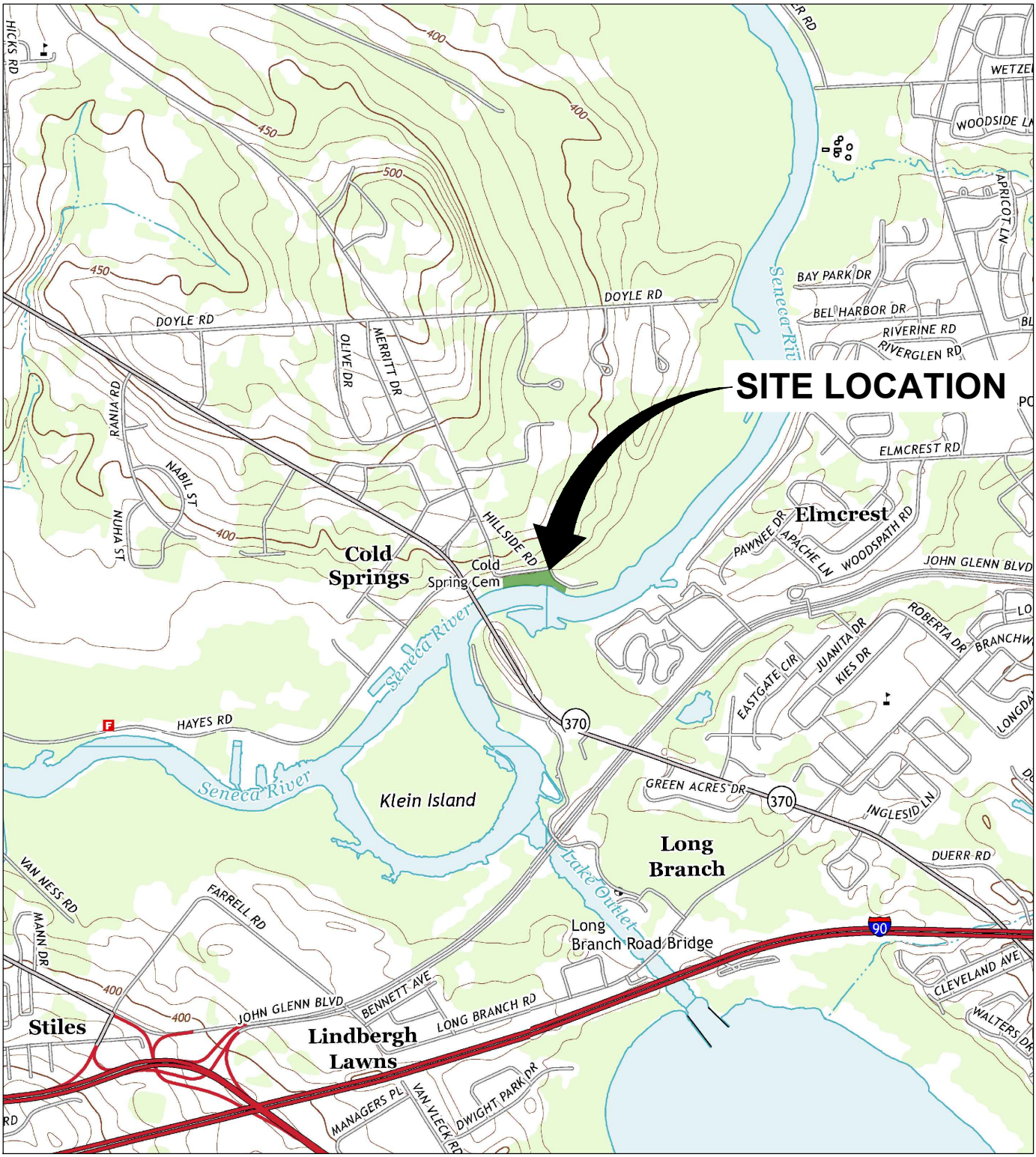
Table 3
Groundwater Analytical Data

Groundwater Sampling Summary 2019 - Fourth Quarter
Northern Cold Springs Terminal
Lysander, New York

Notes:
1. Field parameters measurements were taken prior to sampling.
2. Shaded and bold values indicate a criteria exceedance.
3. Field duplicate sample results are presented in brackets.
ID = Identification
mg/L = Milligrams per liter
NC = Not Collected
NM = Not Measured
NYSDEC = New York State Department of Environmental Conservation
SVOC = Semivolatile organic compound
TOGS = Technical and Operational Guidance Series
ug/L = Micrograms per liter
VOC = Volatile organic compound

Lab Qualifiers	Definition
1c	A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.
H3H6	Sample was received or analysis requested beyond the recognized method holding time. Analysis initiated outside of the 15 minute EPA required holding time.
H6H1	Analysis initiated outside of the 15 minute EPA required holding time. Analysis conducted outside the EPA method holding time.
ip1c	Benzo(b)fluoranthene and benzo(k)fluoranthene were separated in the check standard but did not meet the resolution criteria in SW846 Method 8270D. A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.
ML	Matrix spike recovery and/or matrix spike duplicate recovery was below laboratory control limits. Result may be biased low.
U	Indicates the compound was analyzed for, but not detected.
U1c	Indicates the compound was analyzed for, but not detected. A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.
UCHL11c	Indicates the compound was analyzed for, but not detected. The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high. Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be biased high. A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.
UCHL12c	Indicates the compound was analyzed for, but not detected. The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high. Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be biased high. The analyte did not meet the method recommended minimum RF.
UCHMHL12c	Indicates the compound was analyzed for, but not detected. The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high. Matrix spike recovery and/or matrix spike duplicate recovery was above laboratory control limits. Result may be biased high. Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be biased high. The analyte did not meet the method recommended minimum RF.
UD3	Indicates the compound was analyzed for, but not detected. Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
UH3H6	Indicates the compound was analyzed for, but not detected. Sample was received or analysis requested beyond the recognized method holding time. Analysis initiated outside of the 15 minute EPA required holding time.
UH6H1	Indicates the compound was analyzed for, but not detected. Analysis initiated outside of the 15 minute EPA required holding time. Analysis conducted outside the EPA method holding time.

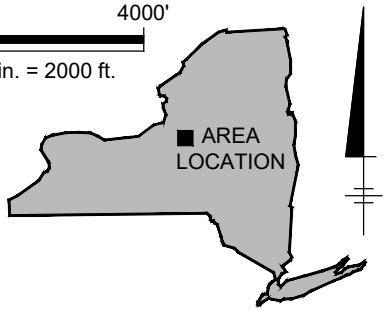
FIGURES



REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., BALDWINSVILLE, BREWERTON, CAMILLUS & SYRACUSE WEST, NY, 2013.

0 2000' 4000'

Approximate Scale: 1 in. = 2000 ft.



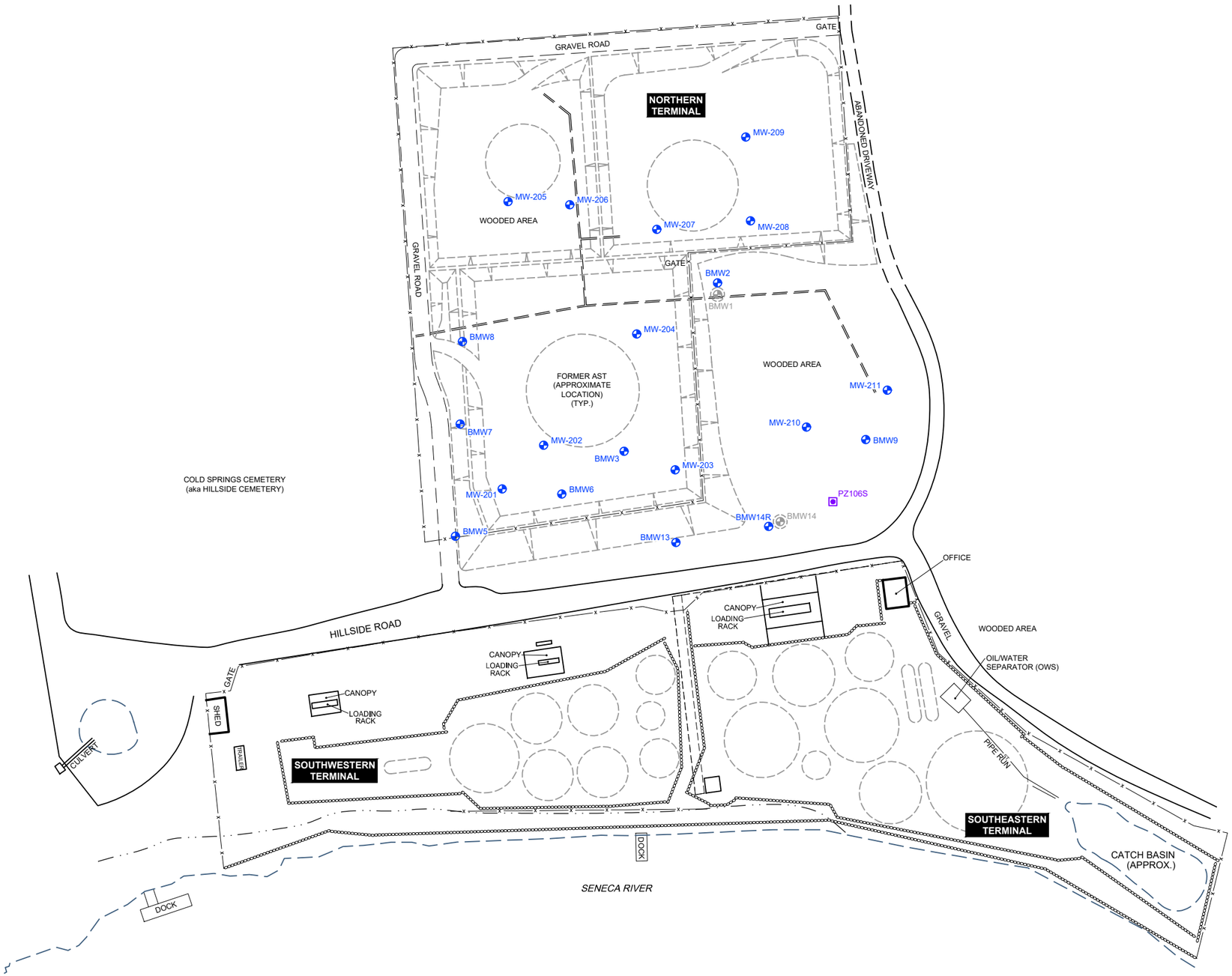
NORTHERN COLD SPRINGS TERMINAL
LYSANDER, NEW YORK

GROUNDWATER SAMPLING SUMMARY
2019 - FOURTH QUARTER

SITE LOCATION MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1



LEGEND:

- MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- PIEZOMETER
- FORMER SITE FEATURE
- FENCE
- RETAINING WALL
- EDGE OF WATER
- EDGE OF BANK

NOTES:

1. BASE MAP REFERENCE: "SITE MAP MONITORING WELLS" BY GROUNDWATER & ENVIRONMENTAL SERVICES, INC. (GES), DATED SEPTEMBER 30, 2015.
2. LOCATION OF PIEZOMETER (PZ106S) WAS SURVEYED ON APRIL 26, 2016 BY C.T. MALE. LOCATION OF MONITORING WELLS MW-201 - MW-210 WERE SURVEYED ON JUNE 7, 2018.
3. AST = ABOVE GROUND STORAGE TANK.

0 100' 200'

GRAPHIC SCALE

NORTHERN COLD SPRINGS TERMINAL
LYSANDER, NEW YORK
GROUNDWATER SAMPLING SUMMARY
2019 - FOURTH QUARTER

NORTHERN TERMINAL GROUNDWATER MONITORING WELL NETWORK

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER PIC: PM: V. MARESCO TM: R. HENSEL TR: N. GRIFFITH LYR:(On|ON=*:OFF=*REF*
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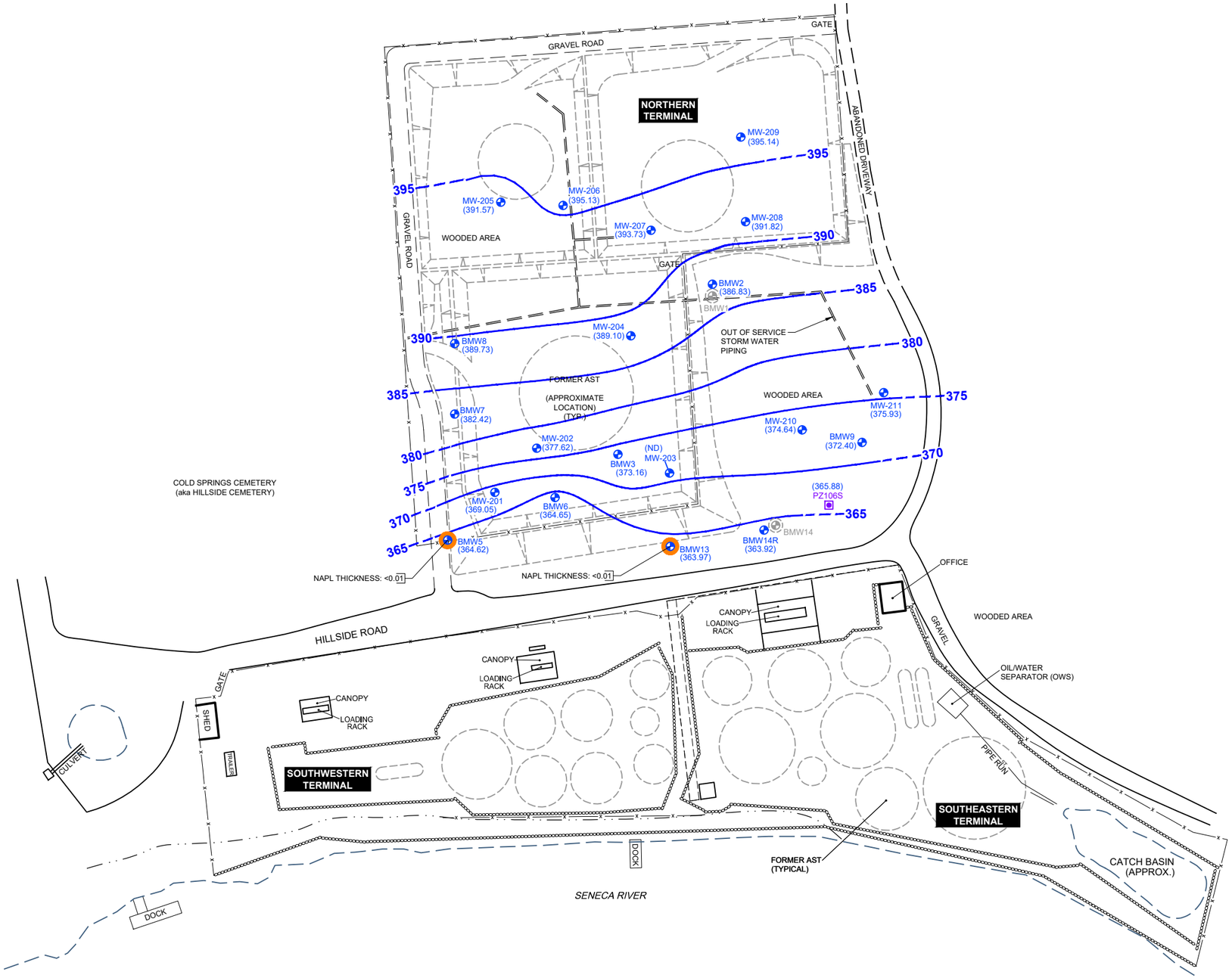
2019Q4-Title Block
X-Base Map



LEGEND:

- MONITORING WELL
- PIEZOMETER
- DECOMMISSIONED MONITORING WELL
- FORMER SITE FEATURE
- FENCE
- RETAINING WALL
- EDGE OF WATER
- EDGE OF BANK
- 375 GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
- (375.93) GROUNDWATER ELEVATION (FT AMSL)
- NAPL DETECTED

NOTES:

1. BASE MAP REFERENCE: "SITE MAP MONITORING WELLS" BY GROUNDWATER & ENVIRONMENTAL SERVICES, INC. (GES), DATED SEPTEMBER 30, 2015.
2. LOCATION OF PIEZOMETER PZ106S WAS SURVEYED ON APRIL 16, 2016 BY C.T. MALE. LOCATION OF MONITORING WELLS MW-201 - MW-210 WERE SURVEYED ON JUNE 7, 2018.
3. AST = ABOVE GROUND STORAGE TANK
   FT AMSL = FEET ABOVE MEAN SEA LEVEL
   NAPL = NON-AQUEOUS PHASE LIQUIDS
   ND = NO DATA
4. GROUNDWATER ELEVATION WAS CORRECTED, IF APPROPRIATE, USING THE FOLLOWING CALCULATION: CORRECTED GROUNDWATER ELEVATION = GROUNDWATER ELEVATION + (NAPL SPECIFIC DENSITY (0.79) x PRODUCT THICKNESS).

0 100' 200'

GRAPHIC SCALE

NORTHERN COLD SPRINGS TERMINAL
LYSANDER, NEW YORK

GROUNDWATER SAMPLING SUMMARY 2019 - FOURTH QUARTER

GROUNDWATER CONTOUR MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE 3

CITY: SYRACUSE NY DIV/GROUP: ENV/CAD DB: E. KRAHMER PIC: PM: V. MARESCO TM: R. HENSEL TR: K. ROSKOFF LYR:(Opt)ON=*;OFF=*REF*
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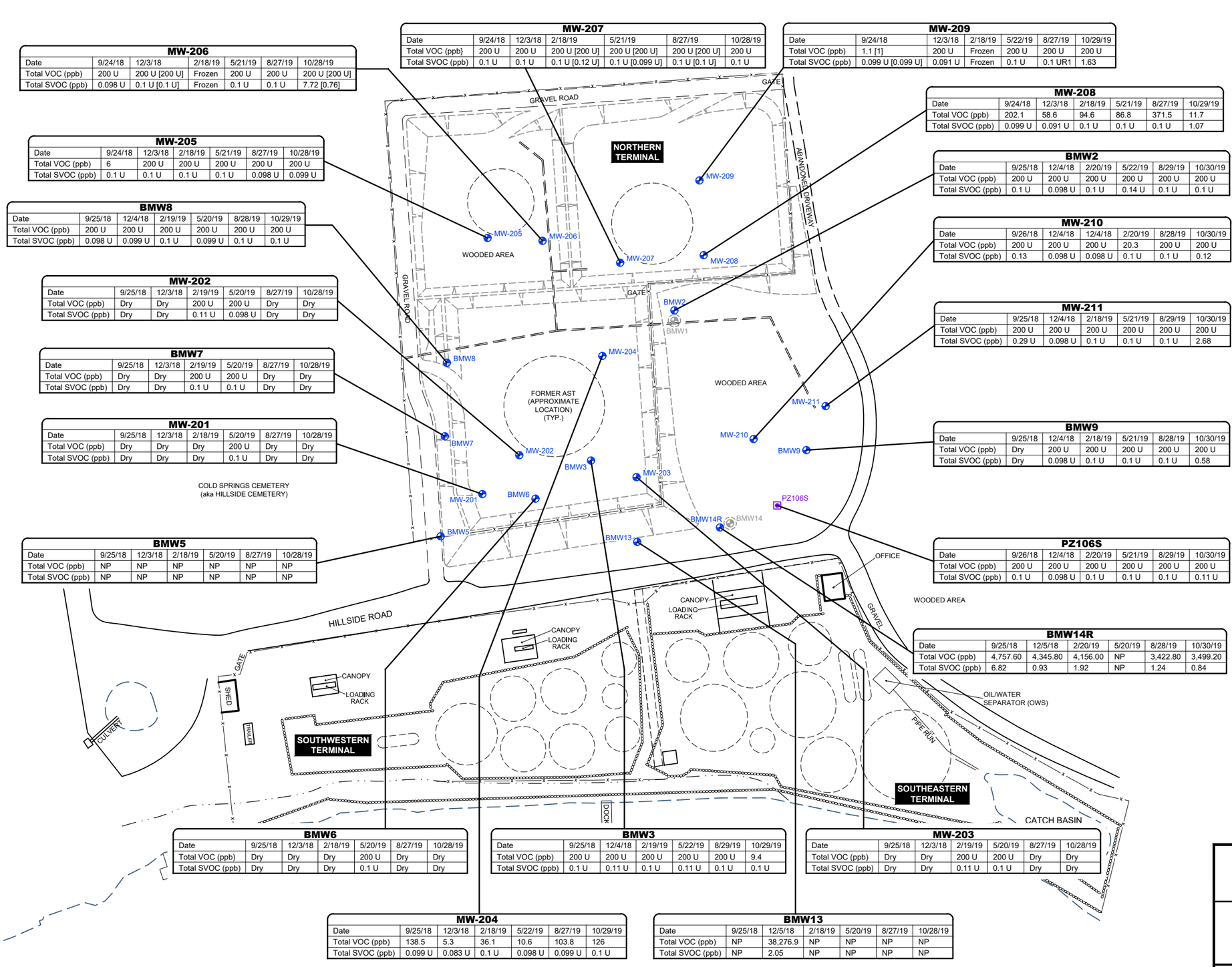
XREFS: IMAGES: PROJECTNAME: ----
2019Q4-Title Block
X-Base Map



MW-206

Date	9/24/18	12/3/18	2/18/19	5/21/19	8/27/19	10/28/19
Total VOC (ppb)	200 U	200 U [200 U]	Frozen	200 U	200 U	200 U [200 U]
Total SVOC (ppb)	0.098 U	0.1 U [0.1 U]	Frozen	0.1 U	0.1 U	7.72 [0.76]

MW-205

Date	9/24/18	12/3/18	2/18/19	5/21/19	8/27/19	10/28/19
Total VOC (ppb)	6	200 U	200 U	200 U	200 U	200 U
Total SVOC (ppb)	0.1 U	0.1 U	0.1 U	0.1 U	0.098 U	0.099 U

BMW8

Date	9/25/18	12/4/18	2/19/19	5/20/19	8/28/19	10/29/19
Total VOC (ppb)	200 U	200 U	200 U	200 U	200 U	200 U
Total SVOC (ppb)	0.098 U	0.099 U	0.1 U	0.099 U	0.1 U	0.1 U

MW-202

Date	9/25/18	12/3/18	2/19/19	5/20/19	8/27/19	10/28/19
Total VOC (ppb)	Dry	Dry	200 U	200 U	Dry	Dry
Total SVOC (ppb)	Dry	Dry	0.11 U	0.098 U	Dry	Dry

BMW7

Date	9/25/18	12/3/18	2/19/19	5/20/19	8/27/19	10/28/19
Total VOC (ppb)	Dry	Dry	200 U	200 U	Dry	Dry
Total SVOC (ppb)	Dry	Dry	0.1 U	0.1 U	Dry	Dry

MW-201

Date	9/25/18	12/3/18	2/18/19	5/20/19	8/27/19	10/28/19
Total VOC (ppb)	Dry	Dry	Dry	200 U	Dry	Dry
Total SVOC (ppb)	Dry	Dry	Dry	0.1 U	Dry	Dry

BMW5

Date	9/25/18	12/3/18	2/18/19	5/20/19	8/27/19	10/28/19
Total VOC (ppb)	NP	NP	NP	NP	NP	NP
Total SVOC (ppb)	NP	NP	NP	NP	NP	NP

BMW6

Date	9/25/18	12/3/18	2/18/19	5/20/19	8/27/19	10/28/19
Total VOC (ppb)	Dry	Dry	Dry	200 U	Dry	Dry
Total SVOC (ppb)	Dry	Dry	Dry	0.1 U	Dry	Dry

MW-204

Date	9/25/18	12/3/18	2/18/19	5/22/19	8/27/19	10/29/19
Total VOC (ppb)	138.5	5.3	36.1	10.6	103.8	126
Total SVOC (ppb)	0.099 U	0.083 U	0.1 U	0.098 U	0.099 U	0.1 U

MW-207

Date	9/24/18	12/3/18	2/18/19	5/21/19	8/27/19	10/28/19
Total VOC (ppb}	200 U	200 U	200 U [200 U]	200 U [200 U]	200 U [200 U]	200 U
Total SVOC (ppb)	0.1 U	0.1 U	0.1 U [0.12 U]	0.1 U [0.099 U]	0.1 U [0.1 U]	0.1 U

BMW3

Date	9/25/18	12/4/18	2/19/19	5/22/19	8/29/19	10/29/19
Total VOC (ppb)	200 U	200 U	200 U	200 U	200 U	9.4
Total SVOC (ppb)	0.1 U	0.11 U	0.1 U	0.11 U	0.1 U	0.1 U

MW-203

Date	9/25/18	12/3/18	2/19/19	5/20/19	8/27/19	10/28/19
Total VOC (ppb)	Dry	Dry	200 U	200 U	Dry	Dry
Total SVOC (ppb)	Dry	Dry	0.11 U	0.1 U	Dry	Dry

BMW13

Date	9/25/18	12/5/18	2/18/19	5/20/19	8/27/19	10/28/19
Total VOC (ppb)	NP	38,276.9	NP	NP	NP	NP
Total SVOC (ppb)	NP	2.05	NP	NP	NP	NP

MW-209

Date	9/24/18	12/3/18	2/18/19	5/22/19	8/27/19	10/29/19
Total VOC (ppb)	1.1 [1]	200 U	Frozen	200 U	200 U	200 U
Total SVOC (ppb)	0.099 U [0.099 U]	0.091 U	Frozen	0.1 U	0.1 UR1	1.63

MW-208

Date	9/24/18	12/3/18	2/18/19	5/21/19	8/27/19	10/29/19
Total VOC (ppb)	202.1	58.6	94.6	86.8	371.5	11.7
Total SVOC (ppb)	0.099 U	0.091 U	0.1 U	0.1 U	0.1 U	1.07

BMW2

Date	9/25/18	12/4/18	2/20/19	5/22/19	8/29/19	10/30/19
Total VOC (ppb)	200 U	200 U	200 U	200 U	200 U	200 U
Total SVOC (ppb)	0.1 U	0.098 U	0.1 U	0.14 U	0.1 U	0.1 U

MW-210

Date	9/26/18	12/4/18	12/4/18	2/20/19	8/28/19	10/30/19
Total VOC (ppb)	200 U	200 U	200 U	20.3	200 U	200 U
Total SVOC (ppb)	0.13	0.098 U	0.098 U	0.1 U	0.1 U	0.12

MW-211

Date	9/25/18	12/4/18	2/18/19	5/21/19	8/29/19	10/30/19
Total VOC (ppb)	200 U	200 U	200 U	200 U	200 U	200 U
Total SVOC (ppb)	0.29 U	0.098 U	0.1 U	0.1 U	0.1 U	2.68

BMW9

Date	9/25/18	12/4/18	2/18/19	5/21/19	8/28/19	10/30/19
Total VOC (ppb)	Dry	200 U	200 U	200 U	200 U	200 U
Total SVOC (ppb)	Dry	0.098 U	0.1 U	0.1 U	0.1 U	0.58

PZ106S

Date	9/26/18	12/4/18	2/20/19	5/21/19	8/29/19	10/30/19
Total VOC (ppb)	200 U	200 U	200 U	200 U	200 U	200 U
Total SVOC (ppb)	0.1 U	0.098 U	0.1 U	0.1 U	0.1 U	0.11 U

BMW14R

Date	9/25/18	12/5/18	2/20/19	5/20/19	8/28/19	10/30/19
Total VOC (ppb)	4,757.60	4,345.80	4,156.00	NP	3,422.80	3,499.20
Total SVOC (ppb)	6.82	0.93	1.92	NP	1.24	0.84

LEGEND:

- MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- PIEZOMETER
- FORMER SITE FEATURE
- FENCE
- RETAINING WALL
- EDGE OF WATER
- EDGE OF BANK

NOTES:

1. ALL CONCENTRATIONS ARE SHOWN IN PARTS PER BILLION (ppb), WHICH IS EQUIVALENT TO MICROGRAMS PER LITER (µg/L).
2. BASE MAP REFERENCE: "SITE MAP MONITORING WELLS" BY GROUNDWATER & ENVIRONMENTAL SERVICES, INC. (GES), DATED SEPTEMBER 30, 2015.
3. LOCATION OF PIEZOMETER (PZ106S) WAS SURVEYED ON APRIL 26, 2016 BY C.T. MALE. LOCATION OF MONITORING WELLS MW-201 - MW-210 WERE SURVEYED ON JUNE 7, 2018.
4. U = INDICATES THE COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.
5. AST = ABOVE GROUND STORAGE TANK
   NP = NAPL PRESENT
   SVOC = SEMIVOLATILE ORGANIC COMPOUNDS
   VOC = VOLATILE ORGANIC COMPOUNDS
6. Dry/Frozen = INSUFFICIENT WATER TO COLLECT A SAMPLE.
7. FIELD DUPLICATE SAMPLE RESULTS ARE PRESENTED IN BRACKETS.

0 100' 200'

GRAPHIC SCALE

NORTHERN COLD SPRINGS TERMINAL
LYSANDER, NEW YORK

GROUNDWATER SAMPLING SUMMARY 2019 - FOURTH QUARTER

TOTAL VOC AND SVOC CONCENTRATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 4

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER PIC: PM: V. MARESCO TM: R. HENSEL TR: N. GRIFFITH LYR:(Opt)ON=*;OFF=*REF*
C:\Users\EKrahmer\BIM 360\Arcadis\ANA - BP AMOCO CORPORATION\Project Files\Buckeye Pipeline Company\2020\30036080\1-DWG\2019Q4_Fig4_Databoxes.dwg LAYOUT: 4 SAVED: 2/10/2020 12:14 PM ACADVER: 23.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 3/4/2020 8:21 AM BY: KRAHMER, ERIC
XREFS: IMAGES: PROJECTNAME: ----
2019Q4-Title Block
X-Base Map

ATTACHMENT A

Laboratory Reports

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

November 12, 2019

Vin Maresco
Arcadis
6723 Towpath Road
Syracuse, NY 13214

RE: Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

Dear Vin Maresco:
Enclosed are the analytical results for sample(s) received by the laboratory on October 29, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Some analyses have been subcontracted outside of the Pace Network. The subcontracted laboratory report has been attached.

The samples were subcontracted to Pace Analytical Energy Services, 220 William Pitt Way, Pittsburgh, PA 15238 for Carbon Dioxide analysis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rachel D Christner

Rachel Christner
rachel.christner@pacelabs.com
724-850-5611
Project Manager

Enclosures

cc: Mr. P.J. Hart, Arcadis
Mr. Edward Mason, Arcadis
Mr. Mike Teeling, Woodard & Curran
Mr. Andrew Zoanetti, Arcadis

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30332332001	**TRIP BLANK_102819**	Water	10/28/19 07:30	10/29/19 09:20
30332332002	**MW-205**	Water	10/28/19 14:00	10/29/19 09:20
30332332003	**MW-206**	Water	10/28/19 13:55	10/29/19 09:20
30332332004	**MW-207**	Water	10/28/19 15:25	10/29/19 09:20
30332332005	**DUP_102819**	Water	10/28/19 00:01	10/29/19 09:20

Pace Analytical Services, LLC
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SAMPLE ANALYTE COUNT

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30332332001	**TRIP BLANK_102819**	EPA 8260C	JAS	20	PASI-PA
30332332002	**MW-205**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	CTS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA
		SM 3500-FeB-2011	PAS	1	PASI-PA
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-11	RTB	1	PASI-PA
30332332003	**MW-206**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	CTS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA
		SM 3500-FeB-2011	PAS	1	PASI-PA
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-11	RTB	1	PASI-PA
30332332004	**MW-207**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	CTS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA
		SM 3500-FeB-2011	PAS	1	PASI-PA
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-11	RTB	1	PASI-PA
30332332005	**DUP_102819**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	CTS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA
		SM 3500-FeB-2011	PAS	1	PASI-PA
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-11	RTB	1	PASI-PA

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

Sample: TRIP BLANK_102819 **Lab ID: 30332332001** Collected: 10/28/19 07:30 Received: 10/29/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.34	1		11/02/19 01:31	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.84	1		11/02/19 01:31	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.57	1		11/02/19 01:31	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.60	1		11/02/19 01:31	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/02/19 01:31	64-17-5	2c,CH, L1
Ethylbenzene	ND	ug/L	1.0	0.40	1		11/02/19 01:31	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.47	1		11/02/19 01:31	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.66	1		11/02/19 01:31	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.25	1		11/02/19 01:31	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		11/02/19 01:31	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.51	1		11/02/19 01:31	103-65-1	
Toluene	ND	ug/L	1.0	0.32	1		11/02/19 01:31	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.63	1		11/02/19 01:31	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.45	1		11/02/19 01:31	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.94	1		11/02/19 01:31	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.41	1		11/02/19 01:31	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	93	%.	78-122		1		11/02/19 01:31	460-00-4	
1,2-Dichloroethane-d4 (S)	108	%.	80-120		1		11/02/19 01:31	17060-07-0	
Toluene-d8 (S)	95	%.	80-120		1		11/02/19 01:31	2037-26-5	
Dibromofluoromethane (S)	96	%.	80-120		1		11/02/19 01:31	1868-53-7	

Sample: MW-205 **Lab ID: 30332332002** Collected: 10/28/19 14:00 Received: 10/29/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**73.7**	ug/L	5.0	1.2	1	10/30/19 06:33	11/05/19 08:59	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**35.1**	ug/L	5.0	1.2	1	10/31/19 14:35	11/01/19 12:33	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	ND	ug/L	0.099	0.028	1	10/30/19 14:34	10/31/19 15:17	83-32-9	1c
Acenaphthylene	ND	ug/L	0.099	0.033	1	10/30/19 14:34	10/31/19 15:17	208-96-8	1c
Anthracene	ND	ug/L	0.099	0.027	1	10/30/19 14:34	10/31/19 15:17	120-12-7	1c
Benzo(a)anthracene	ND	ug/L	0.099	0.038	1	10/30/19 14:34	10/31/19 15:17	56-55-3	1c
Benzo(a)pyrene	ND	ug/L	0.099	0.012	1	10/30/19 14:34	10/31/19 15:17	50-32-8	1c
Benzo(b)fluoranthene	ND	ug/L	0.099	0.027	1	10/30/19 14:34	10/31/19 15:17	205-99-2	1c
Benzo(g,h,i)perylene	ND	ug/L	0.099	0.035	1	10/30/19 14:34	10/31/19 15:17	191-24-2	1c
Benzo(k)fluoranthene	ND	ug/L	0.099	0.023	1	10/30/19 14:34	10/31/19 15:17	207-08-9	1c
Chrysene	ND	ug/L	0.099	0.039	1	10/30/19 14:34	10/31/19 15:17	218-01-9	1c
Dibenz(a,h)anthracene	ND	ug/L	0.099	0.027	1	10/30/19 14:34	10/31/19 15:17	53-70-3	1c

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

Sample: MW-205 **Lab ID: 30332332002** Collected: 10/28/19 14:00 Received: 10/29/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Fluoranthene	ND	ug/L	0.099	0.032	1	10/30/19 14:34	10/31/19 15:17	206-44-0	1c
Fluorene	ND	ug/L	0.099	0.030	1	10/30/19 14:34	10/31/19 15:17	86-73-7	1c
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.099	0.030	1	10/30/19 14:34	10/31/19 15:17	193-39-5	1c
Phenanthrene	ND	ug/L	0.099	0.043	1	10/30/19 14:34	10/31/19 15:17	85-01-8	1c
Pyrene	ND	ug/L	0.099	0.035	1	10/30/19 14:34	10/31/19 15:17	129-00-0	1c
Surrogates									
2-Fluorobiphenyl (S)	59	%.	19-97		1	10/30/19 14:34	10/31/19 15:17	321-60-8	
Terphenyl-d14 (S)	75	%.	47-105		1	10/30/19 14:34	10/31/19 15:17	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.34	1		11/02/19 03:16	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.84	1		11/02/19 03:16	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.57	1		11/02/19 03:16	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.60	1		11/02/19 03:16	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/02/19 03:16	64-17-5	2c,CH, L1,MH
Ethylbenzene	ND	ug/L	1.0	0.40	1		11/02/19 03:16	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.47	1		11/02/19 03:16	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.66	1		11/02/19 03:16	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.25	1		11/02/19 03:16	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		11/02/19 03:16	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.51	1		11/02/19 03:16	103-65-1	
Toluene	ND	ug/L	1.0	0.32	1		11/02/19 03:16	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.63	1		11/02/19 03:16	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.45	1		11/02/19 03:16	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.94	1		11/02/19 03:16	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.41	1		11/02/19 03:16	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	94	%.	78-122		1		11/02/19 03:16	460-00-4	
1,2-Dichloroethane-d4 (S)	107	%.	80-120		1		11/02/19 03:16	17060-07-0	
Toluene-d8 (S)	97	%.	80-120		1		11/02/19 03:16	2037-26-5	
Dibromofluoromethane (S)	93	%.	80-120		1		11/02/19 03:16	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**380**	mg/L	10.0	10.0	1		11/04/19 19:05		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		11/04/19 19:05		
Alkalinity,Total (CaCO3 pH4.5)	**380**	mg/L	10.0	1.0	1		11/04/19 19:05		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	**0.13**	mg/L	0.10	0.020	1		10/29/19 16:29		H1,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.024	1		10/31/19 12:32		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-11								
Sulfate	**449**	mg/L	200	93.4	20		10/29/19 18:48	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

Sample: MW-206 **Lab ID: 30332332003** Collected: 10/28/19 13:55 Received: 10/29/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**19.2**	ug/L	5.0	1.2	1	10/30/19 06:33	11/05/19 09:07	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	ND	ug/L	5.0	1.2	1	10/31/19 14:35	11/01/19 12:42	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	**0.29**	ug/L	0.10	0.029	1	10/30/19 14:34	10/31/19 15:34	83-32-9	1c
Acenaphthylene	**0.20**	ug/L	0.10	0.034	1	10/30/19 14:34	10/31/19 15:34	208-96-8	1c
Anthracene	**0.23**	ug/L	0.10	0.027	1	10/30/19 14:34	10/31/19 15:34	120-12-7	1c
Benzo(a)anthracene	**0.41**	ug/L	0.10	0.039	1	10/30/19 14:34	10/31/19 15:34	56-55-3	1c
Benzo(a)pyrene	**0.29**	ug/L	0.10	0.012	1	10/30/19 14:34	10/31/19 15:34	50-32-8	1c
Benzo(b)fluoranthene	**0.36**	ug/L	0.10	0.027	1	10/30/19 14:34	10/31/19 15:34	205-99-2	1c,ip
Benzo(g,h,i)perylene	**0.16**	ug/L	0.10	0.035	1	10/30/19 14:34	10/31/19 15:34	191-24-2	1c
Benzo(k)fluoranthene	**0.33**	ug/L	0.10	0.023	1	10/30/19 14:34	10/31/19 15:34	207-08-9	1c,ip
Chrysene	**0.30**	ug/L	0.10	0.040	1	10/30/19 14:34	10/31/19 15:34	218-01-9	1c
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.027	1	10/30/19 14:34	10/31/19 15:34	53-70-3	1c
Fluoranthene	**1.2**	ug/L	0.10	0.032	1	10/30/19 14:34	10/31/19 15:34	206-44-0	1c
Fluorene	**0.34**	ug/L	0.10	0.031	1	10/30/19 14:34	10/31/19 15:34	86-73-7	1c
Indeno(1,2,3-cd)pyrene	**0.11**	ug/L	0.10	0.030	1	10/30/19 14:34	10/31/19 15:34	193-39-5	1c
Phenanthrene	**2.0**	ug/L	0.10	0.044	1	10/30/19 14:34	10/31/19 15:34	85-01-8	1c
Pyrene	**1.5**	ug/L	0.10	0.036	1	10/30/19 14:34	10/31/19 15:34	129-00-0	1c
Surrogates									
2-Fluorobiphenyl (S)	49	%.	19-97		1	10/30/19 14:34	10/31/19 15:34	321-60-8	
Terphenyl-d14 (S)	72	%.	47-105		1	10/30/19 14:34	10/31/19 15:34	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.34	1		11/02/19 03:42	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.84	1		11/02/19 03:42	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.57	1		11/02/19 03:42	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.60	1		11/02/19 03:42	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/02/19 03:42	64-17-5	2c,CH,L1
Ethylbenzene	ND	ug/L	1.0	0.40	1		11/02/19 03:42	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.47	1		11/02/19 03:42	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.66	1		11/02/19 03:42	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.25	1		11/02/19 03:42	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		11/02/19 03:42	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.51	1		11/02/19 03:42	103-65-1	
Toluene	ND	ug/L	1.0	0.32	1		11/02/19 03:42	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.63	1		11/02/19 03:42	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.45	1		11/02/19 03:42	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.94	1		11/02/19 03:42	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.41	1		11/02/19 03:42	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	92	%.	78-122		1		11/02/19 03:42	460-00-4	
1,2-Dichloroethane-d4 (S)	109	%.	80-120		1		11/02/19 03:42	17060-07-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

Sample: MW-206 **Lab ID: 30332332003** Collected: 10/28/19 13:55 Received: 10/29/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
Toluene-d8 (S)	97	%.	80-120		1		11/02/19 03:42	2037-26-5	
Dibromofluoromethane (S)	100	%.	80-120		1		11/02/19 03:42	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**280**	mg/L	10.0	10.0	1		11/04/19 19:07		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		11/04/19 19:07		
Alkalinity,Total (CaCO3 pH4.5)	**280**	mg/L	10.0	1.0	1		11/04/19 19:07		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		10/29/19 16:34		H1,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	**0.48**	mg/L	0.10	0.024	1		10/31/19 12:33		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-11								
Sulfate	**32.0**	mg/L	20.0	9.3	2		10/29/19 18:50	14808-79-8	

Sample: MW-207 **Lab ID: 30332332004** Collected: 10/28/19 15:25 Received: 10/29/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**19.8**	ug/L	5.0	1.2	1	10/30/19 06:33	11/05/19 09:10	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	ND	ug/L	5.0	1.2	1	10/31/19 14:35	11/01/19 12:44	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	ND	ug/L	0.10	0.029	1	10/30/19 14:34	10/31/19 15:52	83-32-9	1c
Acenaphthylene	ND	ug/L	0.10	0.034	1	10/30/19 14:34	10/31/19 15:52	208-96-8	1c
Anthracene	ND	ug/L	0.10	0.028	1	10/30/19 14:34	10/31/19 15:52	120-12-7	1c
Benzo(a)anthracene	ND	ug/L	0.10	0.039	1	10/30/19 14:34	10/31/19 15:52	56-55-3	1c
Benzo(a)pyrene	ND	ug/L	0.10	0.012	1	10/30/19 14:34	10/31/19 15:52	50-32-8	1c
Benzo(b)fluoranthene	ND	ug/L	0.10	0.027	1	10/30/19 14:34	10/31/19 15:52	205-99-2	1c
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.035	1	10/30/19 14:34	10/31/19 15:52	191-24-2	1c
Benzo(k)fluoranthene	ND	ug/L	0.10	0.023	1	10/30/19 14:34	10/31/19 15:52	207-08-9	1c
Chrysene	ND	ug/L	0.10	0.040	1	10/30/19 14:34	10/31/19 15:52	218-01-9	1c
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.028	1	10/30/19 14:34	10/31/19 15:52	53-70-3	1c
Fluoranthene	ND	ug/L	0.10	0.032	1	10/30/19 14:34	10/31/19 15:52	206-44-0	1c
Fluorene	ND	ug/L	0.10	0.031	1	10/30/19 14:34	10/31/19 15:52	86-73-7	1c
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.030	1	10/30/19 14:34	10/31/19 15:52	193-39-5	1c
Phenanthrene	ND	ug/L	0.10	0.044	1	10/30/19 14:34	10/31/19 15:52	85-01-8	1c

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

Sample: MW-207 **Lab ID: 30332332004** Collected: 10/28/19 15:25 Received: 10/29/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pyrene	ND	ug/L	0.10	0.036	1	10/30/19 14:34	10/31/19 15:52	129-00-0	1c
Surrogates									
2-Fluorobiphenyl (S)	54	%.	19-97		1	10/30/19 14:34	10/31/19 15:52	321-60-8	
Terphenyl-d14 (S)	78	%.	47-105		1	10/30/19 14:34	10/31/19 15:52	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.34	1		11/04/19 11:55	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.84	1		11/04/19 11:55	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.57	1		11/04/19 11:55	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.60	1		11/04/19 11:55	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/04/19 11:55	64-17-5	2c,CH, L1
Ethylbenzene	ND	ug/L	1.0	0.40	1		11/04/19 11:55	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.47	1		11/04/19 11:55	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.66	1		11/04/19 11:55	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.25	1		11/04/19 11:55	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		11/04/19 11:55	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.51	1		11/04/19 11:55	103-65-1	
Toluene	ND	ug/L	1.0	0.32	1		11/04/19 11:55	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.63	1		11/04/19 11:55	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.45	1		11/04/19 11:55	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.94	1		11/04/19 11:55	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.41	1		11/04/19 11:55	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	92	%.	78-122		1		11/04/19 11:55	460-00-4	
1,2-Dichloroethane-d4 (S)	110	%.	80-120		1		11/04/19 11:55	17060-07-0	
Toluene-d8 (S)	96	%.	80-120		1		11/04/19 11:55	2037-26-5	
Dibromofluoromethane (S)	98	%.	80-120		1		11/04/19 11:55	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**290**	mg/L	10.0	10.0	1		11/04/19 19:08		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		11/04/19 19:08		
Alkalinity,Total (CaCO3 pH4.5)	**290**	mg/L	10.0	1.0	1		11/04/19 19:08		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		10/29/19 16:34		H1,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	**0.70**	mg/L	0.10	0.024	1		10/31/19 12:35		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-11								
Sulfate	**23.3**	mg/L	10.0	4.7	1		10/30/19 20:18	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

Sample: DUP_102819 **Lab ID: 30332332005** Collected: 10/28/19 00:01 Received: 10/29/19 09:20 Matrix: Water
Comments: • Sample collection time on containers does not match COC

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**64.4**	ug/L	5.0	1.2	1	10/30/19 06:33	11/05/19 09:12	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	ND	ug/L	5.0	1.2	1	10/31/19 14:35	11/01/19 12:46	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	ND	ug/L	0.10	0.030	1	10/30/19 14:34	10/31/19 16:10	83-32-9	1c
Acenaphthylene	ND	ug/L	0.10	0.035	1	10/30/19 14:34	10/31/19 16:10	208-96-8	1c
Anthracene	ND	ug/L	0.10	0.028	1	10/30/19 14:34	10/31/19 16:10	120-12-7	1c
Benzo(a)anthracene	ND	ug/L	0.10	0.040	1	10/30/19 14:34	10/31/19 16:10	56-55-3	1c
Benzo(a)pyrene	ND	ug/L	0.10	0.013	1	10/30/19 14:34	10/31/19 16:10	50-32-8	1c
Benzo(b)fluoranthene	ND	ug/L	0.10	0.028	1	10/30/19 14:34	10/31/19 16:10	205-99-2	1c
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.036	1	10/30/19 14:34	10/31/19 16:10	191-24-2	1c
Benzo(k)fluoranthene	ND	ug/L	0.10	0.024	1	10/30/19 14:34	10/31/19 16:10	207-08-9	1c
Chrysene	ND	ug/L	0.10	0.041	1	10/30/19 14:34	10/31/19 16:10	218-01-9	1c
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.028	1	10/30/19 14:34	10/31/19 16:10	53-70-3	1c
Fluoranthene	**0.17**	ug/L	0.10	0.033	1	10/30/19 14:34	10/31/19 16:10	206-44-0	1c
Fluorene	ND	ug/L	0.10	0.032	1	10/30/19 14:34	10/31/19 16:10	86-73-7	1c
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.031	1	10/30/19 14:34	10/31/19 16:10	193-39-5	1c
Phenanthrene	**0.41**	ug/L	0.10	0.045	1	10/30/19 14:34	10/31/19 16:10	85-01-8	1c
Pyrene	**0.18**	ug/L	0.10	0.037	1	10/30/19 14:34	10/31/19 16:10	129-00-0	1c
Surrogates									
2-Fluorobiphenyl (S)	55	%.	19-97		1	10/30/19 14:34	10/31/19 16:10	321-60-8	
Terphenyl-d14 (S)	65	%.	47-105		1	10/30/19 14:34	10/31/19 16:10	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.34	1		11/04/19 12:22	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.84	1		11/04/19 12:22	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.57	1		11/04/19 12:22	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.60	1		11/04/19 12:22	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/04/19 12:22	64-17-5	2c,CH, L1
Ethylbenzene	ND	ug/L	1.0	0.40	1		11/04/19 12:22	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.47	1		11/04/19 12:22	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.66	1		11/04/19 12:22	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.25	1		11/04/19 12:22	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		11/04/19 12:22	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.51	1		11/04/19 12:22	103-65-1	
Toluene	ND	ug/L	1.0	0.32	1		11/04/19 12:22	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.63	1		11/04/19 12:22	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.45	1		11/04/19 12:22	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.94	1		11/04/19 12:22	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.41	1		11/04/19 12:22	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	94	%.	78-122		1		11/04/19 12:22	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
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ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

Sample: DUP_102819 **Lab ID: 30332332005** Collected: 10/28/19 00:01 Received: 10/29/19 09:20 Matrix: Water

Comments: • Sample collection time on containers does not match COC

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
1,2-Dichloroethane-d4 (S)	110	%.	80-120		1		11/04/19 12:22	17060-07-0	
Toluene-d8 (S)	96	%.	80-120		1		11/04/19 12:22	2037-26-5	
Dibromofluoromethane (S)	99	%.	80-120		1		11/04/19 12:22	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**300**	mg/L	10.0	10.0	1		11/04/19 19:09		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		11/04/19 19:09		
Alkalinity,Total (CaCO3 pH4.5)	**300**	mg/L	10.0	1.0	1		11/04/19 19:09		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		10/29/19 16:36		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	**0.53**	mg/L	0.10	0.024	1		10/31/19 12:36		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-11								
Sulfate	**29.8**	mg/L	20.0	9.3	2		10/29/19 18:51	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
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QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

QC Batch: 368458 Analysis Method: EPA 6010C
QC Batch Method: EPA 3005A Analysis Description: 6010C MET
Associated Lab Samples: 30332332002, 30332332003, 30332332004, 30332332005

METHOD BLANK: 1787777 Matrix: Water
Associated Lab Samples: 30332332002, 30332332003, 30332332004, 30332332005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Manganese	ug/L	ND	5.0	1.2	11/05/19 08:54	

LABORATORY CONTROL SAMPLE: 1787778

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Manganese	ug/L	500	541	108	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1787780 1787781

Parameter	Units	30332332002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Manganese	ug/L	73.7	500	500	612	599	108	105	75-125	2	20	

SAMPLE DUPLICATE: 1787779

Parameter	Units	30332332002 Result	Dup Result	RPD	Max RPD	Qualifiers
Manganese	ug/L	73.7	71.4	3	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

QC Batch: 368812 Analysis Method: EPA 6010C
QC Batch Method: EPA 3005A Analysis Description: 6010C MET Dissolved
Associated Lab Samples: 30332332002, 30332332003, 30332332004, 30332332005

METHOD BLANK: 1789478 Matrix: Water
Associated Lab Samples: 30332332002, 30332332003, 30332332004, 30332332005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Manganese, Dissolved	ug/L	ND	5.0	1.2	11/01/19 12:29	

LABORATORY CONTROL SAMPLE: 1789479

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Manganese, Dissolved	ug/L	500	499	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1789481 1789482

Parameter	Units	30332332002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Manganese, Dissolved	ug/L	35.1	500	500	548	547	103	102	75-125	0	20	

SAMPLE DUPLICATE: 1789480

Parameter	Units	30332332002 Result	Dup Result	RPD	Max RPD	Qualifiers
Manganese, Dissolved	ug/L	35.1	36.6	4	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

QC Batch: 368971 Analysis Method: EPA 8260C
QC Batch Method: EPA 8260C Analysis Description: 8260C MSV
Associated Lab Samples: 30332332001, 30332332002, 30332332003

METHOD BLANK: 1790195 Matrix: Water
Associated Lab Samples: 30332332001, 30332332002, 30332332003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	ND	1.0	0.63	11/02/19 00:37	
1,3,5-Trimethylbenzene	ug/L	ND	1.0	0.45	11/02/19 00:37	
Benzene	ug/L	ND	1.0	0.34	11/02/19 00:37	
Ethanol	ug/L	ND	200	73.5	11/02/19 00:37	2c,CH
Ethylbenzene	ug/L	ND	1.0	0.40	11/02/19 00:37	
Isopropylbenzene (Cumene)	ug/L	ND	1.0	0.47	11/02/19 00:37	
m&p-Xylene	ug/L	ND	2.0	0.94	11/02/19 00:37	
Methyl-tert-butyl ether	ug/L	ND	1.0	0.25	11/02/19 00:37	
n-Butylbenzene	ug/L	ND	1.0	0.84	11/02/19 00:37	
n-Propylbenzene	ug/L	ND	1.0	0.51	11/02/19 00:37	
Naphthalene	ug/L	ND	2.0	0.82	11/02/19 00:37	
o-Xylene	ug/L	ND	1.0	0.41	11/02/19 00:37	
p-Isopropyltoluene	ug/L	ND	1.0	0.66	11/02/19 00:37	
sec-Butylbenzene	ug/L	ND	1.0	0.57	11/02/19 00:37	
tert-Butylbenzene	ug/L	ND	1.0	0.60	11/02/19 00:37	
Toluene	ug/L	ND	1.0	0.32	11/02/19 00:37	
1,2-Dichloroethane-d4 (S)	%.	107	80-120		11/02/19 00:37	
4-Bromofluorobenzene (S)	%.	93	78-122		11/02/19 00:37	
Dibromofluoromethane (S)	%.	95	80-120		11/02/19 00:37	
Toluene-d8 (S)	%.	96	80-120		11/02/19 00:37	

LABORATORY CONTROL SAMPLE: 1790196

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	21.7	108	70-130	
1,3,5-Trimethylbenzene	ug/L	20	20.7	103	70-130	
Benzene	ug/L	20	21.3	107	70-130	
Ethanol	ug/L	200	431	215	10-175	2c,CH,L1
Ethylbenzene	ug/L	20	22.3	111	70-130	
Isopropylbenzene (Cumene)	ug/L	20	22.7	114	70-130	
m&p-Xylene	ug/L	40	42.6	106	70-130	
Methyl-tert-butyl ether	ug/L	20	19.3	96	70-130	
n-Butylbenzene	ug/L	20	19.8	99	71-138	
n-Propylbenzene	ug/L	20	21.2	106	70-130	
Naphthalene	ug/L	20	22.0	110	69-135	
o-Xylene	ug/L	20	21.6	108	70-130	
p-Isopropyltoluene	ug/L	20	20.3	101	70-130	
sec-Butylbenzene	ug/L	20	21.0	105	70-130	
tert-Butylbenzene	ug/L	20	21.2	106	70-130	
Toluene	ug/L	20	21.7	109	70-130	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

LABORATORY CONTROL SAMPLE: 1790196

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2-Dichloroethane-d4 (S)	%.			103	80-120	
4-Bromofluorobenzene (S)	%.			95	78-122	
Dibromofluoromethane (S)	%.			97	80-120	
Toluene-d8 (S)	%.			98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1790796 1790797

Parameter	Units	30332332002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,2,4-Trimethylbenzene	ug/L	ND	20	20	20.4	20.8	102	104	70-130	2	30	
1,3,5-Trimethylbenzene	ug/L	ND	20	20	20.2	21.1	101	106	70-130	4	30	
Benzene	ug/L	ND	20	20	21.8	21.9	109	110	67-119	0	30	
Ethanol	ug/L	ND	200	200	353	363	176	182	10-175	3	30	2c,CH, MH
Ethylbenzene	ug/L	ND	20	20	22.3	21.8	111	109	69-127	2	30	
Isopropylbenzene (Cumene)	ug/L	ND	20	20	22.3	22.9	112	115	70-130	3	30	
m&p-Xylene	ug/L	ND	40	40	43.1	42.7	108	107	70-129	1	30	
Methyl-tert-butyl ether	ug/L	ND	20	20	18.3	17.6	91	88	70-130	4	30	
n-Butylbenzene	ug/L	ND	20	20	17.6	18.0	88	90	54-128	3	30	
n-Propylbenzene	ug/L	ND	20	20	20.8	21.3	104	106	62-127	2	30	
Naphthalene	ug/L	ND	20	20	20.1	21.0	101	105	60-136	4	30	
o-Xylene	ug/L	ND	20	20	21.3	21.1	107	106	68-126	1	30	
p-Isopropyltoluene	ug/L	ND	20	20	19.6	19.8	98	99	60-125	1	30	
sec-Butylbenzene	ug/L	ND	20	20	19.9	20.6	100	103	63-125	3	30	
tert-Butylbenzene	ug/L	ND	20	20	20.6	21.6	103	108	64-124	5	30	
Toluene	ug/L	ND	20	20	21.0	21.4	105	107	70-130	2	30	
1,2-Dichloroethane-d4 (S)	%.						105	105	80-120			
4-Bromofluorobenzene (S)	%.						95	95	78-122			
Dibromofluoromethane (S)	%.						99	101	80-120			
Toluene-d8 (S)	%.						99	98	80-120			

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REPORT OF LABORATORY ANALYSIS

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(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

QC Batch: 369157 Analysis Method: EPA 8260C
QC Batch Method: EPA 8260C Analysis Description: 8260C MSV
Associated Lab Samples: 30332332004, 30332332005

METHOD BLANK: 1791271 Matrix: Water
Associated Lab Samples: 30332332004, 30332332005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	ND	1.0	0.63	11/04/19 10:36	
1,3,5-Trimethylbenzene	ug/L	ND	1.0	0.45	11/04/19 10:36	
Benzene	ug/L	ND	1.0	0.34	11/04/19 10:36	
Ethanol	ug/L	ND	200	73.5	11/04/19 10:36	2c,CH
Ethylbenzene	ug/L	ND	1.0	0.40	11/04/19 10:36	
Isopropylbenzene (Cumene)	ug/L	ND	1.0	0.47	11/04/19 10:36	
m&p-Xylene	ug/L	ND	2.0	0.94	11/04/19 10:36	
Methyl-tert-butyl ether	ug/L	ND	1.0	0.25	11/04/19 10:36	
n-Butylbenzene	ug/L	ND	1.0	0.84	11/04/19 10:36	
n-Propylbenzene	ug/L	ND	1.0	0.51	11/04/19 10:36	
Naphthalene	ug/L	ND	2.0	0.82	11/04/19 10:36	
o-Xylene	ug/L	ND	1.0	0.41	11/04/19 10:36	
p-Isopropyltoluene	ug/L	ND	1.0	0.66	11/04/19 10:36	
sec-Butylbenzene	ug/L	ND	1.0	0.57	11/04/19 10:36	
tert-Butylbenzene	ug/L	ND	1.0	0.60	11/04/19 10:36	
Toluene	ug/L	ND	1.0	0.32	11/04/19 10:36	
1,2-Dichloroethane-d4 (S)	%.	110	80-120		11/04/19 10:36	
4-Bromofluorobenzene (S)	%.	93	78-122		11/04/19 10:36	
Dibromofluoromethane (S)	%.	100	80-120		11/04/19 10:36	
Toluene-d8 (S)	%.	94	80-120		11/04/19 10:36	

LABORATORY CONTROL SAMPLE: 1791272

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	21.9	109	70-130	
1,3,5-Trimethylbenzene	ug/L	20	21.1	106	70-130	
Benzene	ug/L	20	21.5	108	70-130	
Ethanol	ug/L	200	409	204	10-175	2c,CH,L1
Ethylbenzene	ug/L	20	22.4	112	70-130	
Isopropylbenzene (Cumene)	ug/L	20	23.0	115	70-130	
m&p-Xylene	ug/L	40	44.6	111	70-130	
Methyl-tert-butyl ether	ug/L	20	18.8	94	70-130	
n-Butylbenzene	ug/L	20	20.8	104	71-138	
n-Propylbenzene	ug/L	20	21.7	108	70-130	
Naphthalene	ug/L	20	22.4	112	69-135	
o-Xylene	ug/L	20	21.6	108	70-130	
p-Isopropyltoluene	ug/L	20	21.5	108	70-130	
sec-Butylbenzene	ug/L	20	21.7	109	70-130	
tert-Butylbenzene	ug/L	20	21.4	107	70-130	
Toluene	ug/L	20	21.6	108	70-130	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

LABORATORY CONTROL SAMPLE: 1791272

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2-Dichloroethane-d4 (S)	%.			104	80-120	
4-Bromofluorobenzene (S)	%.			95	78-122	
Dibromofluoromethane (S)	%.			97	80-120	
Toluene-d8 (S)	%.			96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1791711 1791712

Parameter	Units	30331874004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,2,4-Trimethylbenzene	ug/L	ND	20	20	20.9	21.0	104	105	70-130	1	30	
1,3,5-Trimethylbenzene	ug/L	ND	20	20	20.7	20.6	104	103	70-130	1	30	
Benzene	ug/L	ND	20	20	21.9	21.5	109	108	67-119	2	30	
Ethanol	ug/L	ND	200	200	195J	284	98	142	10-175		30	2c,CH
Ethylbenzene	ug/L	ND	20	20	22.4	22.5	112	112	69-127	0	30	
Isopropylbenzene (Cumene)	ug/L	ND	20	20	22.7	22.6	114	113	70-130	0	30	
m&p-Xylene	ug/L	ND	40	40	43.8	43.9	109	110	70-129	0	30	
Methyl-tert-butyl ether	ug/L	ND	20	20	18.0	18.4	90	92	70-130	2	30	
n-Butylbenzene	ug/L	ND	20	20	18.9	18.8	94	94	54-128	0	30	
n-Propylbenzene	ug/L	ND	20	20	21.1	21.3	105	106	62-127	1	30	
Naphthalene	ug/L	ND	20	20	20.5	20.5	102	102	60-136	0	30	
o-Xylene	ug/L	ND	20	20	21.3	21.3	106	107	68-126	0	30	
p-Isopropyltoluene	ug/L	ND	20	20	20.2	20.2	101	101	60-125	0	30	
sec-Butylbenzene	ug/L	ND	20	20	20.3	20.4	102	102	63-125	0	30	
tert-Butylbenzene	ug/L	ND	20	20	20.6	20.7	103	104	64-124	1	30	
Toluene	ug/L	ND	20	20	21.3	21.6	106	108	70-130	2	30	
1,2-Dichloroethane-d4 (S)	%.						108	105	80-120			
4-Bromofluorobenzene (S)	%.						96	94	78-122			
Dibromofluoromethane (S)	%.						103	98	80-120			
Toluene-d8 (S)	%.						98	98	80-120			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

QC Batch: 368483 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3510C Analysis Description: 8270D Water PAH by SIM MSSV
Associated Lab Samples: 30332332002, 30332332003, 30332332004, 30332332005

METHOD BLANK: 1787877 Matrix: Water
Associated Lab Samples: 30332332002, 30332332003, 30332332004, 30332332005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Acenaphthene	ug/L	ND	0.10	0.029	10/31/19 13:48	
Acenaphthylene	ug/L	ND	0.10	0.034	10/31/19 13:48	
Anthracene	ug/L	ND	0.10	0.028	10/31/19 13:48	
Benzo(a)anthracene	ug/L	ND	0.10	0.039	10/31/19 13:48	
Benzo(a)pyrene	ug/L	ND	0.10	0.012	10/31/19 13:48	
Benzo(b)fluoranthene	ug/L	ND	0.10	0.027	10/31/19 13:48	
Benzo(g,h,i)perylene	ug/L	ND	0.10	0.035	10/31/19 13:48	
Benzo(k)fluoranthene	ug/L	ND	0.10	0.023	10/31/19 13:48	
Chrysene	ug/L	ND	0.10	0.040	10/31/19 13:48	
Dibenz(a,h)anthracene	ug/L	ND	0.10	0.028	10/31/19 13:48	
Fluoranthene	ug/L	ND	0.10	0.032	10/31/19 13:48	
Fluorene	ug/L	ND	0.10	0.031	10/31/19 13:48	
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.10	0.030	10/31/19 13:48	
Phenanthrene	ug/L	ND	0.10	0.044	10/31/19 13:48	
Pyrene	ug/L	ND	0.10	0.036	10/31/19 13:48	
2-Fluorobiphenyl (S)	%.	77	19-97		10/31/19 13:48	
Terphenyl-d14 (S)	%.	87	47-105		10/31/19 13:48	

LABORATORY CONTROL SAMPLE: 1787878

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Acenaphthene	ug/L	2	1.5	77	34-105	
Acenaphthylene	ug/L	2	1.5	76	30-121	
Anthracene	ug/L	2	1.7	83	39-113	
Benzo(a)anthracene	ug/L	2	1.8	89	51-115	
Benzo(a)pyrene	ug/L	2	1.9	94	46-117	
Benzo(b)fluoranthene	ug/L	2	1.7	83	50-126	
Benzo(g,h,i)perylene	ug/L	2	1.9	93	48-117	
Benzo(k)fluoranthene	ug/L	2	1.6	81	52-118	
Chrysene	ug/L	2	1.7	84	55-107	
Dibenz(a,h)anthracene	ug/L	2	1.9	94	53-118	
Fluoranthene	ug/L	2	1.8	88	45-122	
Fluorene	ug/L	2	1.6	81	36-113	
Indeno(1,2,3-cd)pyrene	ug/L	2	1.9	96	52-117	
Phenanthrene	ug/L	2	1.6	82	40-109	
Pyrene	ug/L	2	1.7	87	45-122	
2-Fluorobiphenyl (S)	%.			76	19-97	
Terphenyl-d14 (S)	%.			85	47-105	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

QC Batch: 368887 Analysis Method: SM 2320B-2011
QC Batch Method: SM 2320B-2011 Analysis Description: 2320B Alkalinity
Associated Lab Samples: 30332332002, 30332332003, 30332332004, 30332332005

METHOD BLANK: 1789846 Matrix: Water
Associated Lab Samples: 30332332002, 30332332003, 30332332004, 30332332005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Carbonate (pH4.5)	mg/L	ND	10.0	10.0	11/04/19 18:53	
Alkalinity,Bicarbonate (pH4.5)	mg/L	ND	10.0	10.0	11/04/19 18:53	
Alkalinity,Total (CaCO3 pH4.5)	mg/L	ND	10.0	1.0	11/04/19 18:53	

LABORATORY CONTROL SAMPLE: 1789847

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity,Total (CaCO3 pH4.5)	mg/L	20	20.0	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1789848 1789849

Parameter	Units	30331102001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity,Total (CaCO3 pH4.5)	mg/L	3170	50	50	3220	3220	100	100	85-115	0	20	

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REPORT OF LABORATORY ANALYSIS

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(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

QC Batch: 368393 Analysis Method: SM 3500-FeB-2011
QC Batch Method: SM 3500-FeB-2011 Analysis Description: Iron, Ferrous
Associated Lab Samples: 30332332002, 30332332003, 30332332004, 30332332005

METHOD BLANK: 1787329 Matrix: Water
Associated Lab Samples: 30332332002, 30332332003, 30332332004, 30332332005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	ND	0.10	0.020	10/29/19 16:27	H6

LABORATORY CONTROL SAMPLE: 1787330

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	1	0.96	96	90-110	H6

MATRIX SPIKE SAMPLE: 1787332

Parameter	Units	30332332002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	0.13	1	1.1	96	85-115	H1,H6

SAMPLE DUPLICATE: 1787331

Parameter	Units	30332332002 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	0.13	.093J		20	H1,H6

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REPORT OF LABORATORY ANALYSIS

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(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

QC Batch: 368745 Analysis Method: SM 4500NO3F-2011
QC Batch Method: SM 4500NO3F-2011 Analysis Description: SM4500NO3-F, Nitrate, Preserved
Associated Lab Samples: 30332332002, 30332332003, 30332332004, 30332332005

METHOD BLANK: 1789224 Matrix: Water
Associated Lab Samples: 30332332002, 30332332003, 30332332004, 30332332005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	0.024	10/31/19 12:24	

LABORATORY CONTROL SAMPLE: 1789225

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	4	4.0	99	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1789226 1789227

Parameter	Units	30332292002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	10.8	5	5	15.4	15.4	91	93	85-115	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

QC Batch: 368416 Analysis Method: ASTM D516-11
QC Batch Method: ASTM D516-11 Analysis Description: ASTM D516-11, Sulfate Water
Associated Lab Samples: 30332332002, 30332332003, 30332332005

METHOD BLANK: 1787368 Matrix: Water
Associated Lab Samples: 30332332002, 30332332003, 30332332005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	10.0	4.7	10/29/19 18:46	

LABORATORY CONTROL SAMPLE: 1787369

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	30	30.2	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1787370 1787371

Parameter	Units	30332378001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	210	400	400	619	616	102	102	85-115	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

QC Batch: 368620 Analysis Method: ASTM D516-11
QC Batch Method: ASTM D516-11 Analysis Description: ASTM D516-11, Sulfate Water
Associated Lab Samples: 30332332004

METHOD BLANK: 1788382 Matrix: Water
Associated Lab Samples: 30332332004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	10.0	4.7	10/30/19 20:12	

METHOD BLANK: 1788384 Matrix: Water
Associated Lab Samples: 30332332004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	10.0	4.7	10/30/19 20:14	

LABORATORY CONTROL SAMPLE: 1788383

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	30	28.8	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1788385 1788386

Parameter	Units	30332422001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	219	100	100	260	258	42	39	85-115	1	20	ML

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1788387 1788388

Parameter	Units	30332426001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	475	200	200	660	647	92	86	85-115	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA	Pace Analytical Services - Greensburg

BATCH QUALIFIERS

Batch: 368483

[M5]	A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

ANALYTE QUALIFIERS

1c	A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.
2c	The analyte did not meet the method recommended minimum RF.
CH	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.
H1	Analysis conducted outside the EPA method holding time.
H3	Sample was received or analysis requested beyond the recognized method holding time.
H6	Analysis initiated outside of the 15 minute EPA required holding time.
L1	Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be biased high.
MH	Matrix spike recovery and/or matrix spike duplicate recovery was above laboratory control limits. Result may be biased high.
ML	Matrix spike recovery and/or matrix spike duplicate recovery was below laboratory control limits. Result may be biased low.

Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

ANALYTE QUALIFIERS

ip	Benzo(b)fluoranthene and benzo(k)fluoranthene were separated in the check standard but did not meet the resolution criteria in SW846 Method 8270D. Whereas sample results included are reported as individual isomers, the lab and the customer must recognize them as an isomeric pair.

Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332332

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
30332332002	**MW-205**	EPA 3005A	368458	EPA 6010C	368539
30332332003	**MW-206**	EPA 3005A	368458	EPA 6010C	368539
30332332004	**MW-207**	EPA 3005A	368458	EPA 6010C	368539
30332332005	**DUP_102819**	EPA 3005A	368458	EPA 6010C	368539
30332332002	**MW-205**	EPA 3005A	368812	EPA 6010C	368885
30332332003	**MW-206**	EPA 3005A	368812	EPA 6010C	368885
30332332004	**MW-207**	EPA 3005A	368812	EPA 6010C	368885
30332332005	**DUP_102819**	EPA 3005A	368812	EPA 6010C	368885
30332332002	**MW-205**	EPA 3510C	368483	EPA 8270D by SIM	368633
30332332003	**MW-206**	EPA 3510C	368483	EPA 8270D by SIM	368633
30332332004	**MW-207**	EPA 3510C	368483	EPA 8270D by SIM	368633
30332332005	**DUP_102819**	EPA 3510C	368483	EPA 8270D by SIM	368633
30332332001	**TRIP BLANK_102819**	EPA 8260C	368971		
30332332002	**MW-205**	EPA 8260C	368971		
30332332003	**MW-206**	EPA 8260C	368971		
30332332004	**MW-207**	EPA 8260C	369157		
30332332005	**DUP_102819**	EPA 8260C	369157		
30332332002	**MW-205**	SM 2320B-2011	368887		
30332332003	**MW-206**	SM 2320B-2011	368887		
30332332004	**MW-207**	SM 2320B-2011	368887		
30332332005	**DUP_102819**	SM 2320B-2011	368887		
30332332002	**MW-205**	SM 3500-FeB-2011	368393		
30332332003	**MW-206**	SM 3500-FeB-2011	368393		
30332332004	**MW-207**	SM 3500-FeB-2011	368393		
30332332005	**DUP_102819**	SM 3500-FeB-2011	368393		
30332332002	**MW-205**	SM 4500NO3F-2011	368745		
30332332003	**MW-206**	SM 4500NO3F-2011	368745		
30332332004	**MW-207**	SM 4500NO3F-2011	368745		
30332332005	**DUP_102819**	SM 4500NO3F-2011	368745		
30332332002	**MW-205**	ASTM D516-11	368416		
30332332003	**MW-206**	ASTM D516-11	368416		
30332332004	**MW-207**	ASTM D516-11	368620		
30332332005	**DUP_102819**	ASTM D516-11	368416		

Pace Analytical®

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONL[Y] WO# : 30332332

30332332

Company: Arcadis	Billing Information:
Address: 110 W Fayette St	
Report To: PJ Hart	Email To: Vin.Maresco@Arcadis.com
Copy To: Vin Maresco	Site Collection Info/Address: Lysander
Customer Project Name/Number: Cold Springs Terminal	State: NY County/City: Onondaga Time Zone Collected: [ ] PT [ ] MT [ ] CT [X] ET

Phone: Email:	Site/Facility ID #:	Compliance Monitoring? [ ] Yes [ ] No
Collected By (print): Sarah Tuttle	Purchase Order #: Quote #:	DW PWS ID #: DW Location Code:
Collected By (signature): Sarah Tuttle	Turnaround Date Required:	Immediately Packed on Ice: [ ] Yes [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)	Field Filtered (if applicable): [ ] Yes [ ] No Analysis:

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Container Preservative Type **: 4 | 3 | 5 | | 2 | 1 | U

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

Lab Project Manager:

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Time	Composite End Date	Time	Res Cl	# of Ctns	SVOC 8270	VOC 8260	Fe, Sulfate, Alkalinity	CO2	Nitrate / Nitrite	Manganese	Manganese, Lab Filtered	Lab Sample # / Comments
TRIP BLANK_102819	TB		10/28/19	07:30						2						001
MW-205	GW	G	10/28/19	14:00					2	3	1	2	1	1	1	002
MW-206	GW	G	10/28/19	1:55(PM)					2	3	1	2	1	1	1	003
MW-207	GW	G	10/28/19	15:25					2	3	1	2	1	1	1	004
DUP_102819	GW	G	10/28/19	—					2	3	1	2	1	1	1	005

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	(Y) N NA
Custody Signatures Present	(Y) N NA
Collector Signature Present	(Y) N NA
Bottles Intact	(Y) N NA
Correct Bottles	(Y) N NA
Sufficient Volume	(Y) N NA
Samples Received on Ice	(Y) N NA
VOA - Headspace Acceptable	(Y) N NA
USDA Regulated Soils	Y N (NA)
Samples in Holding Time	(Y) N NA
Residual Chlorine Present	Y (N) NA
Cl Strips:	
Sample pH Acceptable	(Y) N NA
pH Strips:	1UD0391
Sulfide Present	Y N (NA)
Lead Acetate Strips:	

LAB USE ONLY:
Lab Sample # / Comments: JLB 103

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: (Wet) Blue Dry None

Packing Material Used: bubble bags

Radchem sample(s) screened (<500 cpm): Y N (NA)

SHORT HOLDS PRESENT (<72 hours): (Y) N N/A

Lab Tracking #: 2448835

Samples received via: (FEDEX) UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: 11
Cooler 1 Temp Upon Receipt: 3.6/4.8
Cooler 1 Therm Corr. Factor: 0 oC
Cooler 1 Corrected Temp: 3.6/4.8 oC
Comments: JLB 10/29/19

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Sarah Tuttle	10/28/19 16:25	Alec S.	10/28/19 16:25
Alec S.	10/28/19 1700	[signature] PACE	10/29/19 0920

MTJL LAB USE ONLY
Table #:
Acctnum:
Template:
Prelogin:
PM:
PB:

Trip Blank Received: (Y) N NA
(HCL) MeOH TSP Other

Non Conformance(s): YES / NO

Page: of:

Pace Analytical
www.pacelabs.com

Sample Receiving Non-Conformance Form (NCF)

Date: 10/29/19	Evaluated by: JJB
Client: Buckeye Arcadis	

WO# : 30332332

PM: RDC **Due Date: 11/05/19**

CLIENT: BUCKARCNY

1. If Chain-of-Custody (COC) is not received: contact client and if necessary, fill out a COC and indicate that it was filled out by lab personnel. Note issues on this NCF.

2. If COC is incomplete, check applicable issues below and add details where appropriate:

✓	Collection date/time missing or incorrect		Analyses or analytes: missing or clarification needed		Samples listed on COC do not match samples received (missing, additional, etc.)
	Sample IDs on COC do not match sample labels		Required trip blanks were not received		Required signatures are missing

Comments/Details/Other Issues not listed above:

time on dup sample is 1:55

3. Sample integrity issues: check applicable issues below and add details where appropriate:

	Samples: Past holding time		Samples: Condition needs to be brought to lab personnel's attention (details below)		Preservation: Improper
	Samples: Not field filtered		Containers: Broken or compromised		Temperature: not within acceptance criteria (typically 0-6C)
	Samples: Insufficient volume received		Containers: Incorrect		Temperature: Samples arrived frozen
	Samples: Cooler damaged or compromised		Custody Seals: Missing or compromised on samples, trip blanks or coolers		Vials received with improper headspace
	Samples: contain chlorine or sulfides		Packing Material: Insufficient/Improper		Other:

Comments/Details:

4. If Samples not preserved properly and Sample Receiving adjusts pH, add details below:

Sample ID:	Date/Time:	Amount/type pres added:
Preserved by:	Initial and Final pH:	Lot # of pres added:
Sample ID:	Date/Time:	Amount/type pres added:
Preserved by:	Initial and Final pH:	Lot # of pres added:
Sample ID:	Date/Time:	Amount/type pres added:
Preserved by:	Initial and Final pH:	Lot # of pres added:

5. Client Contact: If client is contacted for any issue listed above, fill in details below:

Client:	Contacted per:	
PM Initials:	Date/Time:	

Client Comments/Instructions:

Pace Analytical Energy Services LLC
220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

November 12, 2019

Rachel Christner
Pace Analytical Services, Inc.
1638 Roseytown Road
Suites 2,3,4
Greensburg, PA 15601
USA

RE: **30332332**

Pace Workorder: 31970

Dear Rachel Christner:

Enclosed are the analytical results for sample(s) received by the laboratory on Wednesday, October 30, 2019. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Ruth Welsh 11/12/2019
Ruth.Welsh@pacelabs.com

Customer Service Representative

Enclosures

As a valued client we would appreciate your comments on our service.
Please email PAESfeedback@pacelabs.com.

Total Number of Pages 16

CERTIFICATE OF ANALYSIS

Pace Analytical Energy Services LLC
220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

LABORATORY ACCREDITATIONS & CERTIFICATIONS

Accreditor:	Pennsylvania Department of Environmental Protection, Bureau of Laboratories
Accreditation ID:	02-00538
Scope:	NELAP Non-Potable Water
Accreditor:	West Virginia Department of Environmental Protection, Division of Water and Waste Management
Accreditation ID:	395
Scope:	Non-Potable Water
Accreditor:	South Carolina Department of Health and Environmental Control, Office of Environmental Laboratory Certification
Accreditation ID:	89009003
Scope:	Clean Water Act (CWA); Resource Conservation and Recovery Act (RCRA)
Accreditor:	State of Virginia
Accreditation ID:	460201
Scope:	Non-Potable Water
Accreditor:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water
Accreditor:	State of Connecticut, Department of Public Health, Division of Environmental Health
Accreditation ID:	PH-0263
Scope:	Clean Water Act (CWA) Resource Conservation and Recovery Act (RCRA)
Accreditor:	NELAP: Texas, Commission on Environmental Quality
Accreditation ID:	T104704453-09-TX
Scope:	Non-Potable Water
Accreditor:	State of New Hampshire
Accreditation ID:	299409
Scope:	Non-potable water
Accreditor:	State of Georgia
Accreditation ID:	Chapter 391-3-26
Scope:	As per the Georgia EPD Rules and Regulations for Commercial Laboratories, PAES is accredited by the Pennsylvania Department of Environmental Protection Bureau of Laboratories under the National Environmental Laboratory Approval Program (NELAC).

Pace Analytical Energy Services LLC
220 William Pitt Way
Pittsburgh, PA 15238
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SAMPLE SUMMARY

Workorder: 31970 30332332

Lab ID	Sample ID	Matrix	Date Collected	Date Received
319700001	30332332 002	Water	10/28/2019 14:00	10/30/2019 15:00
319700002	30332332 003	Water	10/28/2019 13:55	10/30/2019 15:00
319700003	30332332 004	Water	10/28/2019 15:25	10/30/2019 15:00
319700004	30332332 005	Water	10/28/2019 00:01	10/30/2019 15:00

Pace Analytical Energy Services LLC
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Phone: (412) 826-5245
Fax: (412) 826-3433

PROJECT SUMMARY

Workorder: 31970 30332332

Batch Comments

Batch: DISG/7901 - AM20GAX Water QC

The matrix spike and/or spike duplicate, recovery or relative percent difference; accuracy influenced by the reference sample 320060004. Analyte Methane. Batch acceptance based on laboratory control sample recovery.

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ANALYTICAL RESULTS

Workorder: 31970 30332332

Lab ID: **319700001** Date Received: 10/30/2019 15:00 Matrix: Water

Sample ID: **30332332 002** Date Collected: 10/28/2019 14:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**51**	mg/l	5.0	0.45	1	11/8/2019 08:41	BW	n

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ANALYTICAL RESULTS

Workorder: 31970 30332332

Lab ID: **319700002** Date Received: 10/30/2019 15:00 Matrix: Water

Sample ID: **30332332 003** Date Collected: 10/28/2019 13:55

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**19**	mg/l	5.0	0.45	1	11/8/2019 08:53	BW	n

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ANALYTICAL RESULTS

Workorder: 31970 30332332

Lab ID: **319700003** Date Received: 10/30/2019 15:00 Matrix: Water

Sample ID: **30332332 004** Date Collected: 10/28/2019 15:25

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**20**	mg/l	5.0	0.45	1	11/8/2019 09:08	BW	n

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ANALYTICAL RESULTS

Workorder: 31970 30332332

Lab ID: **319700004** Date Received: 10/30/2019 15:00 Matrix: Water

Sample ID: **30332332 005** Date Collected: 10/28/2019 00:01

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**18**	mg/l	5.0	0.45	1	11/8/2019 09:21	BW	n

Pace Analytical Energy Services LLC
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Phone: (412) 826-5245
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ANALYTICAL RESULTS QUALIFIERS

Workorder: 31970 30332332

DEFINITIONS/QUALIFIERS

MDL	Method Detection Limit. Can be used synonymously with LOD; Limit Of Detection.
PQL	Practical Quanitation Limit. Can be used synonymously with LOQ; Limit Of Quantitation.
ND	Not detected at or above reporting limit.
DF	Dilution Factor.
S	Surrogate.
RPD	Relative Percent Difference.
% Rec	Percent Recovery.
U	Indicates the compound was analyzed for, but not detected at or above the noted concentration.
J	Estimated concentration greater than the set method detection limit (MDL) and less than the set reporting limit (PQL).
n	The laboratory does not hold NELAP/TNI accreditation for this method or analyte.

Pace Analytical Energy Services LLC
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QUALITY CONTROL DATA

Workorder: 31970 30332332

QC Batch: DISG/7901 Analysis Method: AM20GAX

QC Batch Method: AM20GAX

Associated Lab Samples: 319700001, 319700002, 319700003, 319700004

METHOD BLANK: 64222

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Carbon Dioxide	mg/l	0.45U	0.45	n

LABORATORY CONTROL SAMPLE & LCSD: 64224 64226

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Carbon Dioxide	mg/l	120	120	110	101	92	80-120	9.4	20	n

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QUALITY CONTROL DATA QUALIFIERS

Workorder: 31970 30332332

QUALITY CONTROL PARAMETER QUALIFIERS

n	The laboratory does not hold NELAP/TNI accreditation for this method or analyte.

Pace Analytical Energy Services LLC
220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 31970 30332332

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
319700001	30332332 002			AM20GAX	DISG/7901
319700002	30332332 003			AM20GAX	DISG/7901
319700003	30332332 004			AM20GAX	DISG/7901
319700004	30332332 005			AM20GAX	DISG/7901

Chain of Custody

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
1638 Roseytown Road
Suites 2,3, & 4
Greensburg, PA 15601
Phone: (724) 850-5600
FAX: (724) 850-5601

Sample Condition upon Receipt: (Please record the following information)		
Temp in C	0.4	
Received on Ice	Yes (circled)	No
Sealed Cooler	Yes	No
Samples Intact	Yes	No

Page 1 of 1

Subcontractor Project No.: 31970
P.O. No: ASR- 30332332

Request Date: 10/29/19
Analysis Due Date: 11/5/2019
Shipped By: FedEx
Certification Required: NY
Pace Project No.: 30332332
Report/Invoice to: Rachel Christner

	Pace Sample ID:	Matrix:	Collection Date:	Time:	Analysis Requested:	Analytical Method:	Preservative Type:
1	30332332 002	WT	10/28/14	14:00	Carbon Dioxide	AM20GAX	BAK
2	30332332 003	WT	10/28/19	13:55	Carbon Dioxide	AM20GAX	BAK
3	30332332 004	WT	10/28/19	15:25	Carbon Dioxide	AM20GAX	BAK
4	30332332 005	WT	10/28/19	00:01	Carbon Dioxide	AM20GAX	BAK
5							
6							
7							
8							
9							
10							
11							
12							

Special Requirements: ****Please supply a method blank and LCS QC information on the final report****

Subcontract Lab: Pace Analytical Energy Services PA (Microseep
Address: 220 William Pitt Way
Pittsburgh, PA 15238
Phone: 412-826-5245

Analysis Authorized By: Megan Sutanlee — Project Manager
Pace Agent Name — Title

Acceptance of Terms By: ____
Subcontract Lab Agent — Title

Relinquished By: [signature] PACE 10/29/19 1600
(Signature & Affiliation) (Date) (Time)

Received By: [signature] 10-30-19 900
(Signature & Affiliation) (Date) (Time)

Relinquished By: [signature] 10-30-19 1500
(Signature & Affiliation) (Date) (Time)

Received By: [signature] PAES 10.30.19 1520
(Signature & Affiliation) (Date) (Time)

Comments:

In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.

C:\Users\ksmetanka\Desktop\SUBCON\30332332 asr paes]

Cooler Receipt Form

Client Name: Pace **Project:** 30332332 **Lab Work Order:** 31970

A. **Shipping/Container Information** (circle appropriate response)

Courier: FedEx UPS USPS (Client) Other:_____ **Air bill Present:** Yes No

Tracking Number:_____

Custody Seal on Cooler/Box Present: Yes (No) **Seals Intact:** Yes No

Cooler/Box Packing Material: Bubble Wrap Absorbent Foam (Other):_____

Type of Ice: (Wet) Blue None **Ice Intact:** (Yes) Melted

Cooler Temperature: 0.4°C **Radiation Screened:** Yes (No) **Chain of Custody Present:** (Yes) No

Comments:_____

B. **Laboratory Assignment/Log-in** (check appropriate response)

	YES	NO	N/A	Comment Reference non-Conformance
Chain of Custody properly filled out	✓			
Chain of Custody relinquished	✓			
Sampler Name & Signature on COC			✓	
Containers intact	✓			
Were samples in separate bags	✓			
Sample container labels match COC Sample name/date and time collected		✓		
Sufficient volume provided	✓			
PAES containers used	✓			
Are containers properly preserved for the requested testing? (as labeled)	✓			
If an unknown preservation state, were containers checked? Exception: VOA's coliform			✓	If yes, see pH form.
Was volume for dissolved testing field filtered, as noted on the COC? Was volume received in a preserved container?			✓	
Headspace present?	✓			

Comments:_____

_____

Cooler contents examined/received by : LG **Date:** 10.30.19

Project Manager Review : ERG **Date:** 10/30/19

NON-CONFORMANCE FORM

PAES Work Order #: 31970

Date: 10.30.19 Time of Receipt: 1500 Receiver: LY

Client: Pace

REASON FOR NON-CONFORMANCE:

1. 30332332 002: Vials date was 10/28/19.

2. Headspace in 1 vial of 30332332 003.

ACTION TAKEN:

Client name: Pace Date: 10/30/19 Time: 16:44

Emailed client to notify & confirm correct date of collection.

Customer Service Initials: DRJ Date: 10/30/19

F-PAE-Q-014-rev.00, 20 Nov2014

Emma Louis - 30332332 Samples

From: Emma Louis
To: Rachel Christner
Subject: 30332332 Samples

Hi Rachel,

For sample 30332332 002, the vials date of collection was 10-28-19 while the COC states 10/28/14. Please confirm this was a typo. There was also head space larger than 6mm found present in 1 vial of 30332332 003. We will use the remaining vial and qualify as needed.

Thank you

Emma Louis
Project Coordinator
Pace Analytical Energy Services, LLC
220 William Pitt Way
Pittsburgh, PA 15238
Emma.Louis@pacelabs.com
412-826-2378 (Direct) | 412-826-5245 (Main)
www.pacelabs.com

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

November 18, 2019

Vin Maresco
Arcadis
6723 Towpath Road
Syracuse, NY 13214

RE: Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Dear Vin Maresco:
Enclosed are the analytical results for sample(s) received by the laboratory on October 31, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Some analyses have been subcontracted outside of the Pace Network. The subcontracted laboratory report has been attached.

The samples were subcontracted to Pace Analytical Energy Services, 220 William Pitt Way, Pittsburgh, PA 15238 for RSK-175 Carbon Dioxide analysis.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rachel D Christner

Rachel Christner
rachel.christner@pacelabs.com
724-850-5611
Project Manager

Enclosures

cc: Mr. P.J. Hart, Arcadis
Mr. Edward Mason, Arcadis
Mr. Mike Teeling, Woodard & Curran
Mr. Andrew Zoanetti, Arcadis

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

CERTIFICATIONS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Pace Analytical Services Pennsylvania
1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991
Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30332977001	**MW-209**	Water	10/29/19 10:20	10/31/19 09:20
30332977002	**MW-208**	Water	10/29/19 11:20	10/31/19 09:20
30332977003	**BMW3**	Water	10/29/19 12:30	10/31/19 09:20
30332977004	**BMW8**	Water	10/29/19 10:50	10/31/19 09:20
30332977005	**MW-204**	Water	10/29/19 16:00	10/31/19 09:20
30332977006	**BMW14R**	Water	10/30/19 11:15	10/31/19 09:20
30332977007	**MW-210**	Water	10/30/19 09:00	10/31/19 09:20
30332977008	**BMW2**	Water	10/30/19 08:30	10/31/19 09:20
30332977009	**PZ106S**	Water	10/30/19 12:20	10/31/19 09:20
30332977010	**BMW9**	Water	10/30/19 11:47	10/31/19 09:20
30332977011	**MW-211**	Water	10/30/19 12:20	10/31/19 09:20
30332977012	**WM-210 MS**	Water	10/30/19 09:00	10/31/19 09:20
30332977013	**WM-210 MSD**	Water	10/30/19 09:00	10/31/19 09:20
30332977014	**TRIP BLANK**	Water	10/30/19 00:01	10/31/19 09:20

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30332977001	**MW-209**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	CTS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA
		SM 3500-FeB-2011	PAS	1	PASI-PA
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-11	RTB	1	PASI-PA
30332977002	**MW-208**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	CTS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA
		SM 3500-FeB-2011	PAS	1	PASI-PA
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-11	RTB	1	PASI-PA
30332977003	**BMW3**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	CTS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA
		SM 3500-FeB-2011	PAS	1	PASI-PA
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-11	RTB	1	PASI-PA
30332977004	**BMW8**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	CTS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA
		SM 3500-FeB-2011	PAS	1	PASI-PA
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-11	RTB	1	PASI-PA
30332977005	**MW-204**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	CTS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 3500-FeB-2011	PAS	1	PASI-PA
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-11	RTB	1	PASI-PA
30332977006	**BMW14R**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	CTS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA
		SM 3500-FeB-2011	PAS	1	PASI-PA
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-11	RTB	1	PASI-PA
30332977007	**MW-210**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	CTS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA
		SM 3500-FeB-2011	PAS	1	PASI-PA
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-11	RTB	1	PASI-PA
30332977008	**BMW2**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	CTS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA
		SM 3500-FeB-2011	PAS	1	PASI-PA
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-11	RTB	1	PASI-PA
30332977009	**PZ106S**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	CTS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA
		SM 3500-FeB-2011	PAS	1	PASI-PA
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-11	RTB	1	PASI-PA
30332977010	**BMW9**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	CTS	1	PASI-PA

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

SAMPLE ANALYTE COUNT

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA
		SM 3500-FeB-2011	PAS	1	PASI-PA
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-11	RTB	1	PASI-PA
30332977011	**MW-211**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	CTS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA
		SM 3500-FeB-2011	PAS	1	PASI-PA
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-11	RTB	1	PASI-PA
30332977012	**WM-210 MS**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	CTS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA
		SM 3500-FeB-2011	PAS	1	PASI-PA
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-11	RTB	1	PASI-PA
30332977013	**WM-210 MSD**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	CTS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA
		SM 3500-FeB-2011	PAS	1	PASI-PA
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-11	RTB	1	PASI-PA
30332977014	**TRIP BLANK**	EPA 8260C	JAS	20	PASI-PA

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: MW-209 **Lab ID: 30332977001** Collected: 10/29/19 10:20 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**19.8**	ug/L	5.0	1.2	1	11/01/19 14:55	11/04/19 13:08	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	ND	ug/L	5.0	1.2	1	11/01/19 14:51	11/04/19 12:17	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	ND	ug/L	0.10	0.029	1	11/03/19 10:07	11/05/19 13:15	83-32-9	
Acenaphthylene	ND	ug/L	0.10	0.034	1	11/03/19 10:07	11/05/19 13:15	208-96-8	
Anthracene	ND	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 13:15	120-12-7	
Benzo(a)anthracene	**0.12**	ug/L	0.10	0.039	1	11/03/19 10:07	11/05/19 13:15	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.10	0.013	1	11/03/19 10:07	11/05/19 13:15	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.10	0.027	1	11/03/19 10:07	11/05/19 13:15	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.036	1	11/03/19 10:07	11/05/19 13:15	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.10	0.023	1	11/03/19 10:07	11/05/19 13:15	207-08-9	
Chrysene	ND	ug/L	0.10	0.041	1	11/03/19 10:07	11/05/19 13:15	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 13:15	53-70-3	
Fluoranthene	**0.41**	ug/L	0.10	0.033	1	11/03/19 10:07	11/05/19 13:15	206-44-0	
Fluorene	**0.11**	ug/L	0.10	0.032	1	11/03/19 10:07	11/05/19 13:15	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.031	1	11/03/19 10:07	11/05/19 13:15	193-39-5	
Phenanthrene	**0.55**	ug/L	0.10	0.045	1	11/03/19 10:07	11/05/19 13:15	85-01-8	
Pyrene	**0.44**	ug/L	0.10	0.037	1	11/03/19 10:07	11/05/19 13:15	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	47	%.	19-97		1	11/03/19 10:07	11/05/19 13:15	321-60-8	
Terphenyl-d14 (S)	73	%.	47-105		1	11/03/19 10:07	11/05/19 13:15	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.34	1		11/05/19 01:38	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.84	1		11/05/19 01:38	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.57	1		11/05/19 01:38	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.60	1		11/05/19 01:38	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/05/19 01:38	64-17-5	1c,CH, L1
Ethylbenzene	ND	ug/L	1.0	0.40	1		11/05/19 01:38	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.47	1		11/05/19 01:38	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.66	1		11/05/19 01:38	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.25	1		11/05/19 01:38	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		11/05/19 01:38	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.51	1		11/05/19 01:38	103-65-1	
Toluene	ND	ug/L	1.0	0.32	1		11/05/19 01:38	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.63	1		11/05/19 01:38	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.45	1		11/05/19 01:38	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.94	1		11/05/19 01:38	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.41	1		11/05/19 01:38	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	94	%.	78-122		1		11/05/19 01:38	460-00-4	
1,2-Dichloroethane-d4 (S)	106	%.	80-120		1		11/05/19 01:38	17060-07-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: MW-209 **Lab ID: 30332977001** Collected: 10/29/19 10:20 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
Toluene-d8 (S)	96	%.	80-120		1		11/05/19 01:38	2037-26-5	
Dibromofluoromethane (S)	96	%.	80-120		1		11/05/19 01:38	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**320**	mg/L	10.0	10.0	1		11/05/19 16:27		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		11/05/19 16:27		
Alkalinity,Total (CaCO3 pH4.5)	**320**	mg/L	10.0	1.0	1		11/05/19 16:27		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		10/31/19 21:30		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	**0.95**	mg/L	0.10	0.024	1		11/04/19 13:51		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-11								
Sulfate	**20.8**	mg/L	10.0	4.7	1		11/04/19 18:39	14808-79-8	

Sample: MW-208 **Lab ID: 30332977002** Collected: 10/29/19 11:20 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**832**	ug/L	5.0	1.2	1	11/01/19 14:55	11/04/19 13:11	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**656**	ug/L	5.0	1.2	1	11/01/19 14:51	11/04/19 12:19	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	ND	ug/L	0.10	0.029	1	11/03/19 10:07	11/05/19 13:32	83-32-9	
Acenaphthylene	ND	ug/L	0.10	0.034	1	11/03/19 10:07	11/05/19 13:32	208-96-8	
Anthracene	ND	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 13:32	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.10	0.039	1	11/03/19 10:07	11/05/19 13:32	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.10	0.012	1	11/03/19 10:07	11/05/19 13:32	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.10	0.027	1	11/03/19 10:07	11/05/19 13:32	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.036	1	11/03/19 10:07	11/05/19 13:32	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.10	0.023	1	11/03/19 10:07	11/05/19 13:32	207-08-9	
Chrysene	ND	ug/L	0.10	0.040	1	11/03/19 10:07	11/05/19 13:32	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 13:32	53-70-3	
Fluoranthene	**0.29**	ug/L	0.10	0.032	1	11/03/19 10:07	11/05/19 13:32	206-44-0	
Fluorene	ND	ug/L	0.10	0.031	1	11/03/19 10:07	11/05/19 13:32	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.030	1	11/03/19 10:07	11/05/19 13:32	193-39-5	
Phenanthrene	**0.37**	ug/L	0.10	0.044	1	11/03/19 10:07	11/05/19 13:32	85-01-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: MW-208 **Lab ID: 30332977002** Collected: 10/29/19 11:20 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pyrene	**0.41**	ug/L	0.10	0.036	1	11/03/19 10:07	11/05/19 13:32	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	46	%.	19-97		1	11/03/19 10:07	11/05/19 13:32	321-60-8	
Terphenyl-d14 (S)	75	%.	47-105		1	11/03/19 10:07	11/05/19 13:32	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.34	1		11/05/19 01:12	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.84	1		11/05/19 01:12	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.57	1		11/05/19 01:12	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.60	1		11/05/19 01:12	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/05/19 01:12	64-17-5	1c,CH, L1
Ethylbenzene	ND	ug/L	1.0	0.40	1		11/05/19 01:12	100-41-4	
Isopropylbenzene (Cumene)	**4.1**	ug/L	1.0	0.47	1		11/05/19 01:12	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.66	1		11/05/19 01:12	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.25	1		11/05/19 01:12	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		11/05/19 01:12	91-20-3	
n-Propylbenzene	**1.4**	ug/L	1.0	0.51	1		11/05/19 01:12	103-65-1	
Toluene	ND	ug/L	1.0	0.32	1		11/05/19 01:12	108-88-3	
1,2,4-Trimethylbenzene	**3.2**	ug/L	1.0	0.63	1		11/05/19 01:12	95-63-6	
1,3,5-Trimethylbenzene	**1.7**	ug/L	1.0	0.45	1		11/05/19 01:12	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.94	1		11/05/19 01:12	179601-23-1	
o-Xylene	**1.3**	ug/L	1.0	0.41	1		11/05/19 01:12	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	93	%.	78-122		1		11/05/19 01:12	460-00-4	
1,2-Dichloroethane-d4 (S)	106	%.	80-120		1		11/05/19 01:12	17060-07-0	
Toluene-d8 (S)	97	%.	80-120		1		11/05/19 01:12	2037-26-5	
Dibromofluoromethane (S)	97	%.	80-120		1		11/05/19 01:12	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**550**	mg/L	10.0	10.0	1		11/05/19 16:29		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		11/05/19 16:29		
Alkalinity,Total (CaCO3 pH4.5)	**550**	mg/L	10.0	1.0	1		11/05/19 16:29		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	**0.11**	mg/L	0.10	0.020	1		10/31/19 21:32		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.024	1		11/04/19 13:52		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-11								
Sulfate	**38.5**	mg/L	10.0	4.7	1		11/04/19 18:41	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: BMW3 **Lab ID: 30332977003** Collected: 10/29/19 12:30 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**312**	ug/L	5.0	1.2	1	11/01/19 14:55	11/04/19 13:13	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**18.7**	ug/L	5.0	1.2	1	11/01/19 14:51	11/04/19 12:21	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	ND	ug/L	0.10	0.030	1	11/03/19 10:07	11/05/19 13:50	83-32-9	
Acenaphthylene	ND	ug/L	0.10	0.035	1	11/03/19 10:07	11/05/19 13:50	208-96-8	
Anthracene	ND	ug/L	0.10	0.029	1	11/03/19 10:07	11/05/19 13:50	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.10	0.040	1	11/03/19 10:07	11/05/19 13:50	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.10	0.013	1	11/03/19 10:07	11/05/19 13:50	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 13:50	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.037	1	11/03/19 10:07	11/05/19 13:50	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.10	0.024	1	11/03/19 10:07	11/05/19 13:50	207-08-9	
Chrysene	ND	ug/L	0.10	0.042	1	11/03/19 10:07	11/05/19 13:50	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.029	1	11/03/19 10:07	11/05/19 13:50	53-70-3	
Fluoranthene	ND	ug/L	0.10	0.033	1	11/03/19 10:07	11/05/19 13:50	206-44-0	
Fluorene	ND	ug/L	0.10	0.032	1	11/03/19 10:07	11/05/19 13:50	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.031	1	11/03/19 10:07	11/05/19 13:50	193-39-5	
Phenanthrene	ND	ug/L	0.10	0.046	1	11/03/19 10:07	11/05/19 13:50	85-01-8	
Pyrene	ND	ug/L	0.10	0.038	1	11/03/19 10:07	11/05/19 13:50	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	54	%.	19-97		1	11/03/19 10:07	11/05/19 13:50	321-60-8	
Terphenyl-d14 (S)	77	%.	47-105		1	11/03/19 10:07	11/05/19 13:50	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.34	1		11/05/19 02:05	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.84	1		11/05/19 02:05	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.57	1		11/05/19 02:05	135-98-8	
tert-Butylbenzene	**1.9**	ug/L	1.0	0.60	1		11/05/19 02:05	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/05/19 02:05	64-17-5	1c,CH, L1
Ethylbenzene	**1.4**	ug/L	1.0	0.40	1		11/05/19 02:05	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.47	1		11/05/19 02:05	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.66	1		11/05/19 02:05	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.25	1		11/05/19 02:05	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		11/05/19 02:05	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.51	1		11/05/19 02:05	103-65-1	
Toluene	ND	ug/L	1.0	0.32	1		11/05/19 02:05	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.63	1		11/05/19 02:05	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.45	1		11/05/19 02:05	108-67-8	
m&p-Xylene	**4.4**	ug/L	2.0	0.94	1		11/05/19 02:05	179601-23-1	
o-Xylene	**1.7**	ug/L	1.0	0.41	1		11/05/19 02:05	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	92	%.	78-122		1		11/05/19 02:05	460-00-4	
1,2-Dichloroethane-d4 (S)	113	%.	80-120		1		11/05/19 02:05	17060-07-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
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ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: BMW3 **Lab ID: 30332977003** Collected: 10/29/19 12:30 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
Toluene-d8 (S)	95	%.	80-120		1		11/05/19 02:05	2037-26-5	
Dibromofluoromethane (S)	96	%.	80-120		1		11/05/19 02:05	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**590**	mg/L	10.0	10.0	1		11/05/19 16:30		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		11/05/19 16:30		
Alkalinity,Total (CaCO3 pH4.5)	**590**	mg/L	10.0	1.0	1		11/05/19 16:30		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		10/31/19 21:32		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.024	1		11/04/19 13:54		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-11								
Sulfate	**48.0**	mg/L	10.0	4.7	1		11/04/19 18:41	14808-79-8	

Sample: BMW8 **Lab ID: 30332977004** Collected: 10/29/19 10:50 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**1620**	ug/L	5.0	1.2	1	11/01/19 14:55	11/04/19 13:15	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**1820**	ug/L	5.0	1.2	1	11/01/19 14:51	11/04/19 12:23	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	ND	ug/L	0.10	0.029	1	11/03/19 10:07	11/05/19 14:08	83-32-9	
Acenaphthylene	ND	ug/L	0.10	0.034	1	11/03/19 10:07	11/05/19 14:08	208-96-8	
Anthracene	ND	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 14:08	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.10	0.039	1	11/03/19 10:07	11/05/19 14:08	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.10	0.012	1	11/03/19 10:07	11/05/19 14:08	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.10	0.027	1	11/03/19 10:07	11/05/19 14:08	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.035	1	11/03/19 10:07	11/05/19 14:08	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.10	0.023	1	11/03/19 10:07	11/05/19 14:08	207-08-9	
Chrysene	ND	ug/L	0.10	0.040	1	11/03/19 10:07	11/05/19 14:08	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 14:08	53-70-3	
Fluoranthene	ND	ug/L	0.10	0.032	1	11/03/19 10:07	11/05/19 14:08	206-44-0	
Fluorene	ND	ug/L	0.10	0.031	1	11/03/19 10:07	11/05/19 14:08	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.030	1	11/03/19 10:07	11/05/19 14:08	193-39-5	
Phenanthrene	ND	ug/L	0.10	0.044	1	11/03/19 10:07	11/05/19 14:08	85-01-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
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(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: BMW8 **Lab ID: 30332977004** Collected: 10/29/19 10:50 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pyrene	ND	ug/L	0.10	0.036	1	11/03/19 10:07	11/05/19 14:08	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	46	%.	19-97		1	11/03/19 10:07	11/05/19 14:08	321-60-8	
Terphenyl-d14 (S)	78	%.	47-105		1	11/03/19 10:07	11/05/19 14:08	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.34	1		11/05/19 02:31	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.84	1		11/05/19 02:31	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.57	1		11/05/19 02:31	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.60	1		11/05/19 02:31	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/05/19 02:31	64-17-5	1c,CH, L1
Ethylbenzene	ND	ug/L	1.0	0.40	1		11/05/19 02:31	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.47	1		11/05/19 02:31	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.66	1		11/05/19 02:31	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.25	1		11/05/19 02:31	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		11/05/19 02:31	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.51	1		11/05/19 02:31	103-65-1	
Toluene	ND	ug/L	1.0	0.32	1		11/05/19 02:31	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.63	1		11/05/19 02:31	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.45	1		11/05/19 02:31	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.94	1		11/05/19 02:31	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.41	1		11/05/19 02:31	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	92	%.	78-122		1		11/05/19 02:31	460-00-4	
1,2-Dichloroethane-d4 (S)	110	%.	80-120		1		11/05/19 02:31	17060-07-0	
Toluene-d8 (S)	96	%.	80-120		1		11/05/19 02:31	2037-26-5	
Dibromofluoromethane (S)	95	%.	80-120		1		11/05/19 02:31	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**430**	mg/L	10.0	10.0	1		11/05/19 16:32		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		11/05/19 16:32		
Alkalinity,Total (CaCO3 pH4.5)	**430**	mg/L	10.0	1.0	1		11/05/19 16:32		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	**1.0**	mg/L	0.10	0.020	1		10/31/19 21:34		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	**0.11**	mg/L	0.10	0.024	1		11/04/19 13:55		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-11								
Sulfate	**70.2**	mg/L	10.0	4.7	1		11/04/19 18:42	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: MW-204 **Lab ID: 30332977005** Collected: 10/29/19 16:00 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**572**	ug/L	5.0	1.2	1	11/01/19 14:55	11/04/19 13:21	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**789**	ug/L	5.0	1.2	1	11/01/19 14:51	11/04/19 12:30	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	ND	ug/L	0.10	0.029	1	11/03/19 10:07	11/05/19 14:25	83-32-9	
Acenaphthylene	ND	ug/L	0.10	0.034	1	11/03/19 10:07	11/05/19 14:25	208-96-8	
Anthracene	ND	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 14:25	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.10	0.039	1	11/03/19 10:07	11/05/19 14:25	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.10	0.012	1	11/03/19 10:07	11/05/19 14:25	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.10	0.027	1	11/03/19 10:07	11/05/19 14:25	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.035	1	11/03/19 10:07	11/05/19 14:25	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.10	0.023	1	11/03/19 10:07	11/05/19 14:25	207-08-9	
Chrysene	ND	ug/L	0.10	0.040	1	11/03/19 10:07	11/05/19 14:25	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 14:25	53-70-3	
Fluoranthene	ND	ug/L	0.10	0.032	1	11/03/19 10:07	11/05/19 14:25	206-44-0	
Fluorene	ND	ug/L	0.10	0.031	1	11/03/19 10:07	11/05/19 14:25	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.030	1	11/03/19 10:07	11/05/19 14:25	193-39-5	
Phenanthrene	ND	ug/L	0.10	0.044	1	11/03/19 10:07	11/05/19 14:25	85-01-8	
Pyrene	ND	ug/L	0.10	0.036	1	11/03/19 10:07	11/05/19 14:25	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	56	%.	19-97		1	11/03/19 10:07	11/05/19 14:25	321-60-8	
Terphenyl-d14 (S)	81	%.	47-105		1	11/03/19 10:07	11/05/19 14:25	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	**2.9**	ug/L	1.0	0.34	1		11/05/19 02:57	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.84	1		11/05/19 02:57	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.57	1		11/05/19 02:57	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.60	1		11/05/19 02:57	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/05/19 02:57	64-17-5	1c,CH, L1
Ethylbenzene	**16.3**	ug/L	1.0	0.40	1		11/05/19 02:57	100-41-4	
Isopropylbenzene (Cumene)	**3.2**	ug/L	1.0	0.47	1		11/05/19 02:57	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.66	1		11/05/19 02:57	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.25	1		11/05/19 02:57	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		11/05/19 02:57	91-20-3	
n-Propylbenzene	**9.4**	ug/L	1.0	0.51	1		11/05/19 02:57	103-65-1	
Toluene	**7.1**	ug/L	1.0	0.32	1		11/05/19 02:57	108-88-3	
1,2,4-Trimethylbenzene	**41.2**	ug/L	1.0	0.63	1		11/05/19 02:57	95-63-6	
1,3,5-Trimethylbenzene	**12.2**	ug/L	1.0	0.45	1		11/05/19 02:57	108-67-8	
m&p-Xylene	**30.6**	ug/L	2.0	0.94	1		11/05/19 02:57	179601-23-1	
o-Xylene	**3.1**	ug/L	1.0	0.41	1		11/05/19 02:57	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	94	%.	78-122		1		11/05/19 02:57	460-00-4	
1,2-Dichloroethane-d4 (S)	105	%.	80-120		1		11/05/19 02:57	17060-07-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: MW-204 **Lab ID: 30332977005** Collected: 10/29/19 16:00 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
Toluene-d8 (S)	98	%.	80-120		1		11/05/19 02:57	2037-26-5	
Dibromofluoromethane (S)	95	%.	80-120		1		11/05/19 02:57	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**580**	mg/L	10.0	10.0	1		11/05/19 16:33		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		11/05/19 16:33		
Alkalinity,Total (CaCO3 pH4.5)	**580**	mg/L	10.0	1.0	1		11/05/19 16:33		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	**0.78**	mg/L	0.10	0.020	1		10/31/19 21:34		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	1.0	0.24	10		11/04/19 13:56		D3
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-11								
Sulfate	**22.5**	mg/L	10.0	4.7	1		11/04/19 18:43	14808-79-8	

Sample: BMW14R **Lab ID: 30332977006** Collected: 10/30/19 11:15 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**650**	ug/L	5.0	1.2	1	11/01/19 14:55	11/04/19 13:24	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**400**	ug/L	5.0	1.2	1	11/01/19 14:51	11/04/19 12:32	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	**0.40**	ug/L	0.10	0.030	1	11/03/19 10:07	11/05/19 14:43	83-32-9	
Acenaphthylene	ND	ug/L	0.10	0.035	1	11/03/19 10:07	11/05/19 14:43	208-96-8	
Anthracene	ND	ug/L	0.10	0.029	1	11/03/19 10:07	11/05/19 14:43	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.10	0.040	1	11/03/19 10:07	11/05/19 14:43	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.10	0.013	1	11/03/19 10:07	11/05/19 14:43	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 14:43	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.037	1	11/03/19 10:07	11/05/19 14:43	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.10	0.024	1	11/03/19 10:07	11/05/19 14:43	207-08-9	
Chrysene	ND	ug/L	0.10	0.042	1	11/03/19 10:07	11/05/19 14:43	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.029	1	11/03/19 10:07	11/05/19 14:43	53-70-3	
Fluoranthene	ND	ug/L	0.10	0.033	1	11/03/19 10:07	11/05/19 14:43	206-44-0	
Fluorene	**0.44**	ug/L	0.10	0.032	1	11/03/19 10:07	11/05/19 14:43	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.031	1	11/03/19 10:07	11/05/19 14:43	193-39-5	
Phenanthrene	ND	ug/L	0.10	0.046	1	11/03/19 10:07	11/05/19 14:43	85-01-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
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ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: BMW14R **Lab ID: 30332977006** Collected: 10/30/19 11:15 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pyrene	ND	ug/L	0.10	0.038	1	11/03/19 10:07	11/05/19 14:43	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	45	%.	19-97		1	11/03/19 10:07	11/05/19 14:43	321-60-8	
Terphenyl-d14 (S)	73	%.	47-105		1	11/03/19 10:07	11/05/19 14:43	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.34	1		11/05/19 06:02	71-43-2	
n-Butylbenzene	**17.5**	ug/L	1.0	0.84	1		11/05/19 06:02	104-51-8	
sec-Butylbenzene	**10.9**	ug/L	1.0	0.57	1		11/05/19 06:02	135-98-8	
tert-Butylbenzene	**1.5**	ug/L	1.0	0.60	1		11/05/19 06:02	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/05/19 06:02	64-17-5	1c,CH, L1
Ethylbenzene	**64.9**	ug/L	1.0	0.40	1		11/05/19 06:02	100-41-4	
Isopropylbenzene (Cumene)	**77.4**	ug/L	1.0	0.47	1		11/05/19 06:02	98-82-8	
p-Isopropyltoluene	**32.0**	ug/L	1.0	0.66	1		11/05/19 06:02	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.25	1		11/05/19 06:02	1634-04-4	
Naphthalene	**623**	ug/L	20.0	8.2	10		11/05/19 06:39	91-20-3	
n-Propylbenzene	**170**	ug/L	1.0	0.51	1		11/05/19 06:02	103-65-1	
Toluene	**1.9**	ug/L	1.0	0.32	1		11/05/19 06:02	108-88-3	
1,2,4-Trimethylbenzene	**1770**	ug/L	10.0	6.3	10		11/05/19 06:39	95-63-6	
1,3,5-Trimethylbenzene	**356**	ug/L	1.0	0.45	1		11/05/19 06:02	108-67-8	
m&p-Xylene	**372**	ug/L	2.0	0.94	1		11/05/19 06:02	179601-23-1	
o-Xylene	**2.1**	ug/L	1.0	0.41	1		11/05/19 06:02	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	92	%.	78-122		1		11/05/19 06:02	460-00-4	
1,2-Dichloroethane-d4 (S)	104	%.	80-120		1		11/05/19 06:02	17060-07-0	
Toluene-d8 (S)	98	%.	80-120		1		11/05/19 06:02	2037-26-5	
Dibromofluoromethane (S)	88	%.	80-120		1		11/05/19 06:02	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**570**	mg/L	10.0	10.0	1		11/05/19 16:35		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		11/05/19 16:35		
Alkalinity,Total (CaCO3 pH4.5)	**570**	mg/L	10.0	1.0	1		11/05/19 16:35		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	**1.7**	mg/L	0.10	0.020	1		10/31/19 21:37		H1,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	1.0	0.24	10		11/04/19 13:58		D3
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-11								
Sulfate	ND	mg/L	10.0	4.7	1		11/04/19 18:44	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: MW-210 **Lab ID: 30332977007** Collected: 10/30/19 09:00 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**1290**	ug/L	5.0	1.2	1	11/01/19 14:55	11/04/19 13:00	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**333**	ug/L	5.0	1.2	1	11/01/19 14:51	11/04/19 12:48	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	ND	ug/L	0.10	0.030	1	11/03/19 10:07	11/05/19 15:00	83-32-9	
Acenaphthylene	ND	ug/L	0.10	0.035	1	11/03/19 10:07	11/05/19 15:00	208-96-8	
Anthracene	ND	ug/L	0.10	0.029	1	11/03/19 10:07	11/05/19 15:00	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.10	0.041	1	11/03/19 10:07	11/05/19 15:00	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.10	0.013	1	11/03/19 10:07	11/05/19 15:00	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 15:00	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.037	1	11/03/19 10:07	11/05/19 15:00	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.10	0.024	1	11/03/19 10:07	11/05/19 15:00	207-08-9	
Chrysene	ND	ug/L	0.10	0.042	1	11/03/19 10:07	11/05/19 15:00	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.029	1	11/03/19 10:07	11/05/19 15:00	53-70-3	
Fluoranthene	ND	ug/L	0.10	0.034	1	11/03/19 10:07	11/05/19 15:00	206-44-0	
Fluorene	ND	ug/L	0.10	0.032	1	11/03/19 10:07	11/05/19 15:00	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.031	1	11/03/19 10:07	11/05/19 15:00	193-39-5	
Phenanthrene	ND	ug/L	0.10	0.046	1	11/03/19 10:07	11/05/19 15:00	85-01-8	
Pyrene	**0.12**	ug/L	0.10	0.038	1	11/03/19 10:07	11/05/19 15:00	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	44	%.	19-97		1	11/03/19 10:07	11/05/19 15:00	321-60-8	
Terphenyl-d14 (S)	69	%.	47-105		1	11/03/19 10:07	11/05/19 15:00	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.34	1		11/04/19 23:52	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.84	1		11/04/19 23:52	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.57	1		11/04/19 23:52	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.60	1		11/04/19 23:52	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/04/19 23:52	64-17-5	1c,CH, L1
Ethylbenzene	ND	ug/L	1.0	0.40	1		11/04/19 23:52	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.47	1		11/04/19 23:52	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.66	1		11/04/19 23:52	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.25	1		11/04/19 23:52	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		11/04/19 23:52	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.51	1		11/04/19 23:52	103-65-1	
Toluene	ND	ug/L	1.0	0.32	1		11/04/19 23:52	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.63	1		11/04/19 23:52	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.45	1		11/04/19 23:52	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.94	1		11/04/19 23:52	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.41	1		11/04/19 23:52	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	93	%.	78-122		1		11/04/19 23:52	460-00-4	
1,2-Dichloroethane-d4 (S)	106	%.	80-120		1		11/04/19 23:52	17060-07-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
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ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: MW-210 **Lab ID: 30332977007** Collected: 10/30/19 09:00 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
Toluene-d8 (S)	95	%.	80-120		1		11/04/19 23:52	2037-26-5	
Dibromofluoromethane (S)	97	%.	80-120		1		11/04/19 23:52	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**500**	mg/L	10.0	10.0	1		11/05/19 16:36		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		11/05/19 16:36		
Alkalinity,Total (CaCO3 pH4.5)	**500**	mg/L	10.0	1.0	1		11/05/19 16:36		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		10/31/19 21:37		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.024	1		11/04/19 13:59		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-11								
Sulfate	**57.8**	mg/L	10.0	4.7	1		11/04/19 18:44	14808-79-8	

Sample: BMW2 **Lab ID: 30332977008** Collected: 10/30/19 08:30 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**104**	ug/L	5.0	1.2	1	11/01/19 14:55	11/04/19 13:26	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**43.9**	ug/L	5.0	1.2	1	11/01/19 14:51	11/04/19 12:34	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	ND	ug/L	0.10	0.030	1	11/03/19 10:07	11/05/19 15:18	83-32-9	
Acenaphthylene	ND	ug/L	0.10	0.035	1	11/03/19 10:07	11/05/19 15:18	208-96-8	
Anthracene	ND	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 15:18	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.10	0.040	1	11/03/19 10:07	11/05/19 15:18	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.10	0.013	1	11/03/19 10:07	11/05/19 15:18	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 15:18	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.036	1	11/03/19 10:07	11/05/19 15:18	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.10	0.024	1	11/03/19 10:07	11/05/19 15:18	207-08-9	
Chrysene	ND	ug/L	0.10	0.041	1	11/03/19 10:07	11/05/19 15:18	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 15:18	53-70-3	
Fluoranthene	ND	ug/L	0.10	0.033	1	11/03/19 10:07	11/05/19 15:18	206-44-0	
Fluorene	ND	ug/L	0.10	0.032	1	11/03/19 10:07	11/05/19 15:18	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.031	1	11/03/19 10:07	11/05/19 15:18	193-39-5	
Phenanthrene	ND	ug/L	0.10	0.045	1	11/03/19 10:07	11/05/19 15:18	85-01-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: BMW2 **Lab ID: 30332977008** Collected: 10/30/19 08:30 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pyrene	ND	ug/L	0.10	0.037	1	11/03/19 10:07	11/05/19 15:18	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	40	%.	19-97		1	11/03/19 10:07	11/05/19 15:18	321-60-8	
Terphenyl-d14 (S)	73	%.	47-105		1	11/03/19 10:07	11/05/19 15:18	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.34	1		11/05/19 03:50	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.84	1		11/05/19 03:50	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.57	1		11/05/19 03:50	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.60	1		11/05/19 03:50	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/05/19 03:50	64-17-5	1c,CH, L1
Ethylbenzene	ND	ug/L	1.0	0.40	1		11/05/19 03:50	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.47	1		11/05/19 03:50	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.66	1		11/05/19 03:50	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.25	1		11/05/19 03:50	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		11/05/19 03:50	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.51	1		11/05/19 03:50	103-65-1	
Toluene	ND	ug/L	1.0	0.32	1		11/05/19 03:50	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.63	1		11/05/19 03:50	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.45	1		11/05/19 03:50	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.94	1		11/05/19 03:50	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.41	1		11/05/19 03:50	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	94	%.	78-122		1		11/05/19 03:50	460-00-4	
1,2-Dichloroethane-d4 (S)	108	%.	80-120		1		11/05/19 03:50	17060-07-0	
Toluene-d8 (S)	93	%.	80-120		1		11/05/19 03:50	2037-26-5	
Dibromofluoromethane (S)	96	%.	80-120		1		11/05/19 03:50	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**250**	mg/L	10.0	10.0	1		11/05/19 16:40		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		11/05/19 16:40		
Alkalinity,Total (CaCO3 pH4.5)	**250**	mg/L	10.0	1.0	1		11/05/19 16:40		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		10/31/19 21:44		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	**0.11**	mg/L	0.10	0.024	1		11/04/19 14:06		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-11								
Sulfate	**44.9**	mg/L	10.0	4.7	1		11/04/19 18:48	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: PZ106S **Lab ID: 30332977009** Collected: 10/30/19 12:20 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**3520**	ug/L	5.0	1.2	1	11/01/19 14:55	11/04/19 13:28	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**909**	ug/L	5.0	1.2	1	11/01/19 14:51	11/04/19 12:36	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	ND	ug/L	0.11	0.030	1	11/03/19 10:07	11/05/19 15:35	83-32-9	
Acenaphthylene	ND	ug/L	0.11	0.036	1	11/03/19 10:07	11/05/19 15:35	208-96-8	
Anthracene	ND	ug/L	0.11	0.029	1	11/03/19 10:07	11/05/19 15:35	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.11	0.041	1	11/03/19 10:07	11/05/19 15:35	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.11	0.013	1	11/03/19 10:07	11/05/19 15:35	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.11	0.028	1	11/03/19 10:07	11/05/19 15:35	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.11	0.037	1	11/03/19 10:07	11/05/19 15:35	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.11	0.024	1	11/03/19 10:07	11/05/19 15:35	207-08-9	
Chrysene	ND	ug/L	0.11	0.042	1	11/03/19 10:07	11/05/19 15:35	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.11	0.029	1	11/03/19 10:07	11/05/19 15:35	53-70-3	
Fluoranthene	ND	ug/L	0.11	0.034	1	11/03/19 10:07	11/05/19 15:35	206-44-0	
Fluorene	ND	ug/L	0.11	0.033	1	11/03/19 10:07	11/05/19 15:35	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.11	0.032	1	11/03/19 10:07	11/05/19 15:35	193-39-5	
Phenanthrene	ND	ug/L	0.11	0.046	1	11/03/19 10:07	11/05/19 15:35	85-01-8	
Pyrene	ND	ug/L	0.11	0.038	1	11/03/19 10:07	11/05/19 15:35	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	45	%.	19-97		1	11/03/19 10:07	11/05/19 15:35	321-60-8	
Terphenyl-d14 (S)	69	%.	47-105		1	11/03/19 10:07	11/05/19 15:35	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.34	1		11/05/19 03:24	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.84	1		11/05/19 03:24	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.57	1		11/05/19 03:24	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.60	1		11/05/19 03:24	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/05/19 03:24	64-17-5	1c,CH, L1
Ethylbenzene	ND	ug/L	1.0	0.40	1		11/05/19 03:24	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.47	1		11/05/19 03:24	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.66	1		11/05/19 03:24	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.25	1		11/05/19 03:24	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		11/05/19 03:24	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.51	1		11/05/19 03:24	103-65-1	
Toluene	ND	ug/L	1.0	0.32	1		11/05/19 03:24	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.63	1		11/05/19 03:24	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.45	1		11/05/19 03:24	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.94	1		11/05/19 03:24	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.41	1		11/05/19 03:24	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	94	%.	78-122		1		11/05/19 03:24	460-00-4	
1,2-Dichloroethane-d4 (S)	107	%.	80-120		1		11/05/19 03:24	17060-07-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
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ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: PZ106S **Lab ID: 30332977009** Collected: 10/30/19 12:20 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
Toluene-d8 (S)	95	%.	80-120		1		11/05/19 03:24	2037-26-5	
Dibromofluoromethane (S)	97	%.	80-120		1		11/05/19 03:24	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**500**	mg/L	10.0	10.0	1		11/05/19 16:43		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		11/05/19 16:43		
Alkalinity,Total (CaCO3 pH4.5)	**500**	mg/L	10.0	1.0	1		11/05/19 16:43		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		10/31/19 21:44		H1,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.024	1		11/04/19 14:07		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-11								
Sulfate	**65.8**	mg/L	10.0	4.7	1		11/04/19 18:50	14808-79-8	

Sample: BMW9 **Lab ID: 30332977010** Collected: 10/30/19 11:47 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**320**	ug/L	5.0	1.2	1	11/01/19 14:55	11/04/19 13:30	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**298**	ug/L	5.0	1.2	1	11/01/19 14:51	11/04/19 12:39	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	ND	ug/L	0.10	0.029	1	11/03/19 10:07	11/05/19 15:53	83-32-9	
Acenaphthylene	ND	ug/L	0.10	0.034	1	11/03/19 10:07	11/05/19 15:53	208-96-8	
Anthracene	ND	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 15:53	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.10	0.039	1	11/03/19 10:07	11/05/19 15:53	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.10	0.012	1	11/03/19 10:07	11/05/19 15:53	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.10	0.027	1	11/03/19 10:07	11/05/19 15:53	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.036	1	11/03/19 10:07	11/05/19 15:53	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.10	0.023	1	11/03/19 10:07	11/05/19 15:53	207-08-9	
Chrysene	ND	ug/L	0.10	0.040	1	11/03/19 10:07	11/05/19 15:53	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 15:53	53-70-3	
Fluoranthene	**0.16**	ug/L	0.10	0.032	1	11/03/19 10:07	11/05/19 15:53	206-44-0	
Fluorene	ND	ug/L	0.10	0.031	1	11/03/19 10:07	11/05/19 15:53	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.030	1	11/03/19 10:07	11/05/19 15:53	193-39-5	
Phenanthrene	**0.23**	ug/L	0.10	0.044	1	11/03/19 10:07	11/05/19 15:53	85-01-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: BMW9 **Lab ID: 30332977010** Collected: 10/30/19 11:47 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pyrene	**0.19**	ug/L	0.10	0.036	1	11/03/19 10:07	11/05/19 15:53	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	38	%.	19-97		1	11/03/19 10:07	11/05/19 15:53	321-60-8	
Terphenyl-d14 (S)	66	%.	47-105		1	11/03/19 10:07	11/05/19 15:53	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.34	1		11/05/19 00:19	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.84	1		11/05/19 00:19	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.57	1		11/05/19 00:19	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.60	1		11/05/19 00:19	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/05/19 00:19	64-17-5	1c,CH, L1
Ethylbenzene	ND	ug/L	1.0	0.40	1		11/05/19 00:19	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.47	1		11/05/19 00:19	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.66	1		11/05/19 00:19	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.25	1		11/05/19 00:19	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		11/05/19 00:19	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.51	1		11/05/19 00:19	103-65-1	
Toluene	ND	ug/L	1.0	0.32	1		11/05/19 00:19	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.63	1		11/05/19 00:19	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.45	1		11/05/19 00:19	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.94	1		11/05/19 00:19	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.41	1		11/05/19 00:19	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	92	%.	78-122		1		11/05/19 00:19	460-00-4	
1,2-Dichloroethane-d4 (S)	107	%.	80-120		1		11/05/19 00:19	17060-07-0	
Toluene-d8 (S)	95	%.	80-120		1		11/05/19 00:19	2037-26-5	
Dibromofluoromethane (S)	97	%.	80-120		1		11/05/19 00:19	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**520**	mg/L	10.0	10.0	1		11/05/19 16:45		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		11/05/19 16:45		
Alkalinity,Total (CaCO3 pH4.5)	**520**	mg/L	10.0	1.0	1		11/05/19 16:45		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	**0.31**	mg/L	0.10	0.020	1		10/31/19 21:46		H1,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.024	1		11/04/19 14:09		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-11								
Sulfate	**158**	mg/L	30.0	14.0	3		11/04/19 22:10	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: MW-211 **Lab ID: 30332977011** Collected: 10/30/19 12:20 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**128**	ug/L	5.0	1.2	1	11/01/19 14:55	11/04/19 13:32	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	ND	ug/L	5.0	1.2	1	11/01/19 14:51	11/04/19 12:41	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	**0.24**	ug/L	0.10	0.030	1	11/03/19 10:07	11/05/19 16:11	83-32-9	
Acenaphthylene	ND	ug/L	0.10	0.035	1	11/03/19 10:07	11/05/19 16:11	208-96-8	
Anthracene	**0.12**	ug/L	0.10	0.029	1	11/03/19 10:07	11/05/19 16:11	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.10	0.040	1	11/03/19 10:07	11/05/19 16:11	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.10	0.013	1	11/03/19 10:07	11/05/19 16:11	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 16:11	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.037	1	11/03/19 10:07	11/05/19 16:11	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.10	0.024	1	11/03/19 10:07	11/05/19 16:11	207-08-9	
Chrysene	ND	ug/L	0.10	0.041	1	11/03/19 10:07	11/05/19 16:11	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.029	1	11/03/19 10:07	11/05/19 16:11	53-70-3	
Fluoranthene	**0.40**	ug/L	0.10	0.033	1	11/03/19 10:07	11/05/19 16:11	206-44-0	
Fluorene	**0.27**	ug/L	0.10	0.032	1	11/03/19 10:07	11/05/19 16:11	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.031	1	11/03/19 10:07	11/05/19 16:11	193-39-5	
Phenanthrene	**1.2**	ug/L	0.10	0.045	1	11/03/19 10:07	11/05/19 16:11	85-01-8	ML
Pyrene	**0.45**	ug/L	0.10	0.037	1	11/03/19 10:07	11/05/19 16:11	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	55	%.	19-97		1	11/03/19 10:07	11/05/19 16:11	321-60-8	
Terphenyl-d14 (S)	78	%.	47-105		1	11/03/19 10:07	11/05/19 16:11	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.34	1		11/05/19 00:45	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.84	1		11/05/19 00:45	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.57	1		11/05/19 00:45	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.60	1		11/05/19 00:45	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/05/19 00:45	64-17-5	1c,CH, L1
Ethylbenzene	ND	ug/L	1.0	0.40	1		11/05/19 00:45	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.47	1		11/05/19 00:45	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.66	1		11/05/19 00:45	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.25	1		11/05/19 00:45	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		11/05/19 00:45	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.51	1		11/05/19 00:45	103-65-1	
Toluene	ND	ug/L	1.0	0.32	1		11/05/19 00:45	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.63	1		11/05/19 00:45	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.45	1		11/05/19 00:45	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.94	1		11/05/19 00:45	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.41	1		11/05/19 00:45	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	94	%.	78-122		1		11/05/19 00:45	460-00-4	
1,2-Dichloroethane-d4 (S)	106	%.	80-120		1		11/05/19 00:45	17060-07-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: MW-211 **Lab ID: 30332977011** Collected: 10/30/19 12:20 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
Toluene-d8 (S)	95	%.	80-120		1		11/05/19 00:45	2037-26-5	
Dibromofluoromethane (S)	97	%.	80-120		1		11/05/19 00:45	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**450**	mg/L	10.0	10.0	1		11/05/19 16:46		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		11/05/19 16:46		
Alkalinity,Total (CaCO3 pH4.5)	**450**	mg/L	10.0	1.0	1		11/05/19 16:46		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		10/31/19 21:46		H1,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.024	1		11/04/19 14:10		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-11								
Sulfate	**92.8**	mg/L	30.0	14.0	3		11/04/19 22:11	14808-79-8	

Sample: WM-210 MS **Lab ID: 30332977012** Collected: 10/30/19 09:00 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**1770**	ug/L	5.0	1.2	1	11/01/19 14:55	11/04/19 13:04	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**801**	ug/L	5.0	1.2	1	11/01/19 14:51	11/04/19 12:13	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	**1.3**	ug/L	0.10	0.029	1	11/03/19 10:07	11/05/19 16:28	83-32-9	
Acenaphthylene	**1.4**	ug/L	0.10	0.034	1	11/03/19 10:07	11/05/19 16:28	208-96-8	
Anthracene	**1.5**	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 16:28	120-12-7	
Benzo(a)anthracene	**1.6**	ug/L	0.10	0.039	1	11/03/19 10:07	11/05/19 16:28	56-55-3	
Benzo(a)pyrene	**1.4**	ug/L	0.10	0.012	1	11/03/19 10:07	11/05/19 16:28	50-32-8	
Benzo(b)fluoranthene	**1.5**	ug/L	0.10	0.027	1	11/03/19 10:07	11/05/19 16:28	205-99-2	
Benzo(g,h,i)perylene	**1.1**	ug/L	0.10	0.035	1	11/03/19 10:07	11/05/19 16:28	191-24-2	
Benzo(k)fluoranthene	**1.3**	ug/L	0.10	0.023	1	11/03/19 10:07	11/05/19 16:28	207-08-9	
Chrysene	**1.6**	ug/L	0.10	0.040	1	11/03/19 10:07	11/05/19 16:28	218-01-9	
Dibenz(a,h)anthracene	**1.2**	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 16:28	53-70-3	
Fluoranthene	**1.7**	ug/L	0.10	0.032	1	11/03/19 10:07	11/05/19 16:28	206-44-0	
Fluorene	**1.4**	ug/L	0.10	0.031	1	11/03/19 10:07	11/05/19 16:28	86-73-7	
Indeno(1,2,3-cd)pyrene	**1.2**	ug/L	0.10	0.030	1	11/03/19 10:07	11/05/19 16:28	193-39-5	
Phenanthrene	**1.5**	ug/L	0.10	0.044	1	11/03/19 10:07	11/05/19 16:28	85-01-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: WM-210 MS **Lab ID: 30332977012** Collected: 10/30/19 09:00 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Pyrene	**1.7**	ug/L	0.10	0.036	1	11/03/19 10:07	11/05/19 16:28	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	58	%.	19-97		1	11/03/19 10:07	11/05/19 16:28	321-60-8	
Terphenyl-d14 (S)	79	%.	47-105		1	11/03/19 10:07	11/05/19 16:28	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	**21.9**	ug/L	1.0	0.34	1		11/05/19 07:06	71-43-2	
n-Butylbenzene	**18.2**	ug/L	1.0	0.84	1		11/05/19 07:06	104-51-8	
sec-Butylbenzene	**20.3**	ug/L	1.0	0.57	1		11/05/19 07:06	135-98-8	
tert-Butylbenzene	**20.5**	ug/L	1.0	0.60	1		11/05/19 07:06	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/05/19 07:06	64-17-5	1c,CH, L1
Ethylbenzene	**22.6**	ug/L	1.0	0.40	1		11/05/19 07:06	100-41-4	
Isopropylbenzene (Cumene)	**22.6**	ug/L	1.0	0.47	1		11/05/19 07:06	98-82-8	
p-Isopropyltoluene	**19.5**	ug/L	1.0	0.66	1		11/05/19 07:06	99-87-6	
Methyl-tert-butyl ether	**17.7**	ug/L	1.0	0.25	1		11/05/19 07:06	1634-04-4	
Naphthalene	**22.5**	ug/L	2.0	0.82	1		11/05/19 07:06	91-20-3	
n-Propylbenzene	**21.0**	ug/L	1.0	0.51	1		11/05/19 07:06	103-65-1	
Toluene	**21.4**	ug/L	1.0	0.32	1		11/05/19 07:06	108-88-3	
1,2,4-Trimethylbenzene	**21.6**	ug/L	1.0	0.63	1		11/05/19 07:06	95-63-6	
1,3,5-Trimethylbenzene	**19.5**	ug/L	1.0	0.45	1		11/05/19 07:06	108-67-8	
m&p-Xylene	**43.3**	ug/L	2.0	0.94	1		11/05/19 07:06	179601-23-1	
o-Xylene	**21.2**	ug/L	1.0	0.41	1		11/05/19 07:06	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	92	%.	78-122		1		11/05/19 07:06	460-00-4	
1,2-Dichloroethane-d4 (S)	107	%.	80-120		1		11/05/19 07:06	17060-07-0	
Toluene-d8 (S)	97	%.	80-120		1		11/05/19 07:06	2037-26-5	
Dibromofluoromethane (S)	97	%.	80-120		1		11/05/19 07:06	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**530**	mg/L	10.0	10.0	1		11/05/19 16:47		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		11/05/19 16:47		
Alkalinity,Total (CaCO3 pH4.5)	**530**	mg/L	10.0	1.0	1		11/05/19 16:47		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	**0.92**	mg/L	0.10	0.020	1		10/31/19 21:49		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	**4.5**	mg/L	0.10	0.024	1		11/04/19 14:01		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-11								
Sulfate	**77.1**	mg/L	10.0	4.7	1		11/04/19 18:53	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: WM-210 MSD **Lab ID: 30332977013** Collected: 10/30/19 09:00 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**1720**	ug/L	5.0	1.2	1	11/01/19 14:55	11/04/19 13:06	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**794**	ug/L	5.0	1.2	1	11/01/19 14:51	11/04/19 12:15	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	**1.3**	ug/L	0.10	0.030	1	11/03/19 10:07	11/05/19 16:46	83-32-9	
Acenaphthylene	**1.4**	ug/L	0.10	0.035	1	11/03/19 10:07	11/05/19 16:46	208-96-8	
Anthracene	**1.6**	ug/L	0.10	0.029	1	11/03/19 10:07	11/05/19 16:46	120-12-7	
Benzo(a)anthracene	**1.8**	ug/L	0.10	0.040	1	11/03/19 10:07	11/05/19 16:46	56-55-3	
Benzo(a)pyrene	**1.5**	ug/L	0.10	0.013	1	11/03/19 10:07	11/05/19 16:46	50-32-8	
Benzo(b)fluoranthene	**1.4**	ug/L	0.10	0.028	1	11/03/19 10:07	11/05/19 16:46	205-99-2	
Benzo(g,h,i)perylene	**1.2**	ug/L	0.10	0.037	1	11/03/19 10:07	11/05/19 16:46	191-24-2	
Benzo(k)fluoranthene	**1.5**	ug/L	0.10	0.024	1	11/03/19 10:07	11/05/19 16:46	207-08-9	
Chrysene	**1.8**	ug/L	0.10	0.042	1	11/03/19 10:07	11/05/19 16:46	218-01-9	
Dibenz(a,h)anthracene	**1.3**	ug/L	0.10	0.029	1	11/03/19 10:07	11/05/19 16:46	53-70-3	
Fluoranthene	**2.0**	ug/L	0.10	0.033	1	11/03/19 10:07	11/05/19 16:46	206-44-0	
Fluorene	**1.5**	ug/L	0.10	0.032	1	11/03/19 10:07	11/05/19 16:46	86-73-7	
Indeno(1,2,3-cd)pyrene	**1.2**	ug/L	0.10	0.031	1	11/03/19 10:07	11/05/19 16:46	193-39-5	
Phenanthrene	**1.6**	ug/L	0.10	0.046	1	11/03/19 10:07	11/05/19 16:46	85-01-8	
Pyrene	**2.0**	ug/L	0.10	0.038	1	11/03/19 10:07	11/05/19 16:46	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	54	%.	19-97		1	11/03/19 10:07	11/05/19 16:46	321-60-8	
Terphenyl-d14 (S)	79	%.	47-105		1	11/03/19 10:07	11/05/19 16:46	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	**20.8**	ug/L	1.0	0.34	1		11/05/19 07:32	71-43-2	
n-Butylbenzene	**17.6**	ug/L	1.0	0.84	1		11/05/19 07:32	104-51-8	
sec-Butylbenzene	**20.3**	ug/L	1.0	0.57	1		11/05/19 07:32	135-98-8	
tert-Butylbenzene	**20.6**	ug/L	1.0	0.60	1		11/05/19 07:32	98-06-6	
Ethanol	**269**	ug/L	200	73.5	1		11/05/19 07:32	64-17-5	1c,CH, L1
Ethylbenzene	**22.0**	ug/L	1.0	0.40	1		11/05/19 07:32	100-41-4	
Isopropylbenzene (Cumene)	**22.1**	ug/L	1.0	0.47	1		11/05/19 07:32	98-82-8	
p-Isopropyltoluene	**19.5**	ug/L	1.0	0.66	1		11/05/19 07:32	99-87-6	
Methyl-tert-butyl ether	**19.4**	ug/L	1.0	0.25	1		11/05/19 07:32	1634-04-4	
Naphthalene	**20.3**	ug/L	2.0	0.82	1		11/05/19 07:32	91-20-3	
n-Propylbenzene	**20.4**	ug/L	1.0	0.51	1		11/05/19 07:32	103-65-1	
Toluene	**21.7**	ug/L	1.0	0.32	1		11/05/19 07:32	108-88-3	
1,2,4-Trimethylbenzene	**20.2**	ug/L	1.0	0.63	1		11/05/19 07:32	95-63-6	
1,3,5-Trimethylbenzene	**19.0**	ug/L	1.0	0.45	1		11/05/19 07:32	108-67-8	
m&p-Xylene	**42.6**	ug/L	2.0	0.94	1		11/05/19 07:32	179601-23-1	
o-Xylene	**21.4**	ug/L	1.0	0.41	1		11/05/19 07:32	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	92	%.	78-122		1		11/05/19 07:32	460-00-4	
1,2-Dichloroethane-d4 (S)	106	%.	80-120		1		11/05/19 07:32	17060-07-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: WM-210 MSD **Lab ID: 30332977013** Collected: 10/30/19 09:00 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
Toluene-d8 (S)	98	%.	80-120		1		11/05/19 07:32	2037-26-5	
Dibromofluoromethane (S)	97	%.	80-120		1		11/05/19 07:32	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**520**	mg/L	10.0	10.0	1		11/06/19 20:45		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		11/06/19 20:45		
Alkalinity,Total (CaCO3 pH4.5)	**520**	mg/L	10.0	1.0	1		11/06/19 20:45		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	**1.8**	mg/L	0.10	0.020	1		10/31/19 21:49		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	**4.6**	mg/L	0.10	0.024	1		11/04/19 14:02		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-11								
Sulfate	**78.4**	mg/L	10.0	4.7	1		11/04/19 18:53	14808-79-8	

Sample: TRIP BLANK **Lab ID: 30332977014** Collected: 10/30/19 00:01 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.34	1		11/04/19 23:26	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.84	1		11/04/19 23:26	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.57	1		11/04/19 23:26	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.60	1		11/04/19 23:26	98-06-6	
Ethanol	ND	ug/L	200	73.5	1		11/04/19 23:26	64-17-5	1c,CH, L1
Ethylbenzene	ND	ug/L	1.0	0.40	1		11/04/19 23:26	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.47	1		11/04/19 23:26	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.66	1		11/04/19 23:26	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.25	1		11/04/19 23:26	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		11/04/19 23:26	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.51	1		11/04/19 23:26	103-65-1	
Toluene	ND	ug/L	1.0	0.32	1		11/04/19 23:26	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.63	1		11/04/19 23:26	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.45	1		11/04/19 23:26	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.94	1		11/04/19 23:26	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.41	1		11/04/19 23:26	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	94	%.	78-122		1		11/04/19 23:26	460-00-4	
1,2-Dichloroethane-d4 (S)	108	%.	80-120		1		11/04/19 23:26	17060-07-0	
Toluene-d8 (S)	97	%.	80-120		1		11/04/19 23:26	2037-26-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Sample: TRIP BLANK **Lab ID: 30332977014** Collected: 10/30/19 00:01 Received: 10/31/19 09:20 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
Dibromofluoromethane (S)	96	%.	80-120		1		11/04/19 23:26	1868-53-7	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
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QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

QC Batch: 369013 Analysis Method: EPA 6010C
QC Batch Method: EPA 3005A Analysis Description: 6010C MET
Associated Lab Samples: 30332977001, 30332977002, 30332977003, 30332977004, 30332977005, 30332977006, 30332977007, 30332977008, 30332977009, 30332977010, 30332977011, 30332977012, 30332977013

METHOD BLANK: 1790363 Matrix: Water
Associated Lab Samples: 30332977001, 30332977002, 30332977003, 30332977004, 30332977005, 30332977006, 30332977007, 30332977008, 30332977009, 30332977010, 30332977011, 30332977012, 30332977013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Manganese	ug/L	ND	5.0	1.2	11/04/19 12:56	

LABORATORY CONTROL SAMPLE: 1790364

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Manganese	ug/L	500	510	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1790552 1790553

Parameter	Units	30332977007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Manganese	ug/L	1290	500	500	1770	1720	96	88	75-125	2	20	

MATRIX SPIKE SAMPLE: 1790555

Parameter	Units	30332977011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Manganese	ug/L	128	500	632	101	75-125	

SAMPLE DUPLICATE: 1790551

Parameter	Units	30332977007 Result	Dup Result	RPD	Max RPD	Qualifiers
Manganese	ug/L	1290	1260	2	20	

SAMPLE DUPLICATE: 1790554

Parameter	Units	30332977011 Result	Dup Result	RPD	Max RPD	Qualifiers
Manganese	ug/L	128	133	4	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

QC Batch: 369011 Analysis Method: EPA 6010C
QC Batch Method: EPA 3005A Analysis Description: 6010C MET Dissolved
Associated Lab Samples: 30332977001, 30332977002, 30332977003, 30332977004, 30332977005, 30332977006, 30332977007, 30332977008, 30332977009, 30332977010, 30332977011, 30332977012, 30332977013

METHOD BLANK: 1790350 Matrix: Water
Associated Lab Samples: 30332977001, 30332977002, 30332977003, 30332977004, 30332977005, 30332977006, 30332977007, 30332977008, 30332977009, 30332977010, 30332977011, 30332977012, 30332977013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Manganese, Dissolved	ug/L	ND	5.0	1.2	11/04/19 12:04	

LABORATORY CONTROL SAMPLE: 1790351

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Manganese, Dissolved	ug/L	500	451	90	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1790545 1790546

Parameter	Units	30332977007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Manganese, Dissolved	ug/L	333	500	500	801	794	94	92	75-125	1	20	

MATRIX SPIKE SAMPLE: 1790548

Parameter	Units	30332977011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Manganese, Dissolved	ug/L	ND	500	501	100	75-125	

SAMPLE DUPLICATE: 1790544

Parameter	Units	30332977007 Result	Dup Result	RPD	Max RPD	Qualifiers
Manganese, Dissolved	ug/L	333	336	1	20	

SAMPLE DUPLICATE: 1790547

Parameter	Units	30332977011 Result	Dup Result	RPD	Max RPD	Qualifiers
Manganese, Dissolved	ug/L	ND	1.9J		20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

QC Batch: 369193 Analysis Method: EPA 8260C
QC Batch Method: EPA 8260C Analysis Description: 8260C MSV
Associated Lab Samples: 30332977001, 30332977002, 30332977003, 30332977004, 30332977005, 30332977006, 30332977007, 30332977008, 30332977009, 30332977010, 30332977011, 30332977012, 30332977013, 30332977014

METHOD BLANK: 1791356 Matrix: Water
Associated Lab Samples: 30332977001, 30332977002, 30332977003, 30332977004, 30332977005, 30332977006, 30332977007, 30332977008, 30332977009, 30332977010, 30332977011, 30332977012, 30332977013, 30332977014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	ND	1.0	0.63	11/04/19 23:00	
1,3,5-Trimethylbenzene	ug/L	ND	1.0	0.45	11/04/19 23:00	
Benzene	ug/L	ND	1.0	0.34	11/04/19 23:00	
Ethanol	ug/L	ND	200	73.5	11/04/19 23:00	1c,CH
Ethylbenzene	ug/L	ND	1.0	0.40	11/04/19 23:00	
Isopropylbenzene (Cumene)	ug/L	ND	1.0	0.47	11/04/19 23:00	
m&p-Xylene	ug/L	ND	2.0	0.94	11/04/19 23:00	
Methyl-tert-butyl ether	ug/L	ND	1.0	0.25	11/04/19 23:00	
n-Butylbenzene	ug/L	ND	1.0	0.84	11/04/19 23:00	
n-Propylbenzene	ug/L	ND	1.0	0.51	11/04/19 23:00	
Naphthalene	ug/L	ND	2.0	0.82	11/04/19 23:00	
o-Xylene	ug/L	ND	1.0	0.41	11/04/19 23:00	
p-Isopropyltoluene	ug/L	ND	1.0	0.66	11/04/19 23:00	
sec-Butylbenzene	ug/L	ND	1.0	0.57	11/04/19 23:00	
tert-Butylbenzene	ug/L	ND	1.0	0.60	11/04/19 23:00	
Toluene	ug/L	ND	1.0	0.32	11/04/19 23:00	
1,2-Dichloroethane-d4 (S)	%.	107	80-120		11/04/19 23:00	
4-Bromofluorobenzene (S)	%.	92	78-122		11/04/19 23:00	
Dibromofluoromethane (S)	%.	97	80-120		11/04/19 23:00	
Toluene-d8 (S)	%.	96	80-120		11/04/19 23:00	

LABORATORY CONTROL SAMPLE: 1791357

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	21.1	105	70-130	
1,3,5-Trimethylbenzene	ug/L	20	20.5	102	70-130	
Benzene	ug/L	20	20.3	101	70-130	
Ethanol	ug/L	200	445	222	10-175	1c,CH,L1
Ethylbenzene	ug/L	20	21.6	108	70-130	
Isopropylbenzene (Cumene)	ug/L	20	22.2	111	70-130	
m&p-Xylene	ug/L	40	41.6	104	70-130	
Methyl-tert-butyl ether	ug/L	20	19.0	95	70-130	
n-Butylbenzene	ug/L	20	19.4	97	71-138	
n-Propylbenzene	ug/L	20	20.8	104	70-130	
Naphthalene	ug/L	20	22.8	114	69-135	
o-Xylene	ug/L	20	21.1	105	70-130	
p-Isopropyltoluene	ug/L	20	20.1	100	70-130	
sec-Butylbenzene	ug/L	20	20.4	102	70-130	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

LABORATORY CONTROL SAMPLE: 1791357

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
tert-Butylbenzene	ug/L	20	20.7	103	70-130	
Toluene	ug/L	20	20.6	103	70-130	
1,2-Dichloroethane-d4 (S)	%.			103	80-120	
4-Bromofluorobenzene (S)	%.			97	78-122	
Dibromofluoromethane (S)	%.			97	80-120	
Toluene-d8 (S)	%.			97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1791358 1791359

Parameter	Units	30332977007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,2,4-Trimethylbenzene	ug/L	ND	20	20	21.6	20.2	108	101	70-130	7	30	
1,3,5-Trimethylbenzene	ug/L	ND	20	20	19.5	19.0	97	95	70-130	2	30	
Benzene	ug/L	ND	20	20	21.9	20.8	109	104	67-119	5	30	
Ethanol	ug/L	ND	200	200	187J	269	94	135	10-175		30	1c,CH
Ethylbenzene	ug/L	ND	20	20	22.6	22.0	113	110	69-127	3	30	
Isopropylbenzene (Cumene)	ug/L	ND	20	20	22.6	22.1	113	111	70-130	2	30	
m&p-Xylene	ug/L	ND	40	40	43.3	42.6	108	106	70-129	2	30	
Methyl-tert-butyl ether	ug/L	ND	20	20	17.7	19.4	88	97	70-130	9	30	
n-Butylbenzene	ug/L	ND	20	20	18.2	17.6	91	88	54-128	3	30	
n-Propylbenzene	ug/L	ND	20	20	21.0	20.4	105	102	62-127	3	30	
Naphthalene	ug/L	ND	20	20	22.5	20.3	113	101	60-136	11	30	
o-Xylene	ug/L	ND	20	20	21.2	21.4	106	107	68-126	1	30	
p-Isopropyltoluene	ug/L	ND	20	20	19.5	19.5	98	97	60-125	0	30	
sec-Butylbenzene	ug/L	ND	20	20	20.3	20.3	101	101	63-125	0	30	
tert-Butylbenzene	ug/L	ND	20	20	20.5	20.6	102	103	64-124	1	30	
Toluene	ug/L	ND	20	20	21.4	21.7	107	108	70-130	1	30	
1,2-Dichloroethane-d4 (S)	%.						107	106	80-120			
4-Bromofluorobenzene (S)	%.						92	92	78-122			
Dibromofluoromethane (S)	%.						97	97	80-120			
Toluene-d8 (S)	%.						97	98	80-120			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

QC Batch: 369012 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3510C Analysis Description: 8270D Water PAH by SIM MSSV
Associated Lab Samples: 30332977001, 30332977002, 30332977003, 30332977004, 30332977005, 30332977006, 30332977007, 30332977008, 30332977009, 30332977010, 30332977011, 30332977012, 30332977013

METHOD BLANK: 1790358 Matrix: Water
Associated Lab Samples: 30332977001, 30332977002, 30332977003, 30332977004, 30332977005, 30332977006, 30332977007, 30332977008, 30332977009, 30332977010, 30332977011, 30332977012, 30332977013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Acenaphthene	ug/L	ND	0.10	0.029	11/05/19 12:05	
Acenaphthylene	ug/L	ND	0.10	0.034	11/05/19 12:05	
Anthracene	ug/L	ND	0.10	0.028	11/05/19 12:05	
Benzo(a)anthracene	ug/L	ND	0.10	0.039	11/05/19 12:05	
Benzo(a)pyrene	ug/L	ND	0.10	0.012	11/05/19 12:05	
Benzo(b)fluoranthene	ug/L	ND	0.10	0.027	11/05/19 12:05	
Benzo(g,h,i)perylene	ug/L	ND	0.10	0.035	11/05/19 12:05	
Benzo(k)fluoranthene	ug/L	ND	0.10	0.023	11/05/19 12:05	
Chrysene	ug/L	ND	0.10	0.040	11/05/19 12:05	
Dibenz(a,h)anthracene	ug/L	ND	0.10	0.028	11/05/19 12:05	
Fluoranthene	ug/L	ND	0.10	0.032	11/05/19 12:05	
Fluorene	ug/L	ND	0.10	0.031	11/05/19 12:05	
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.10	0.030	11/05/19 12:05	
Phenanthrene	ug/L	ND	0.10	0.044	11/05/19 12:05	
Pyrene	ug/L	ND	0.10	0.036	11/05/19 12:05	
2-Fluorobiphenyl (S)	%.	51	19-97		11/05/19 12:05	
Terphenyl-d14 (S)	%.	78	47-105		11/05/19 12:05	

LABORATORY CONTROL SAMPLE: 1790359

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Acenaphthene	ug/L	2	1.4	71	34-105	
Acenaphthylene	ug/L	2	1.5	75	30-121	
Anthracene	ug/L	2	1.5	76	39-113	
Benzo(a)anthracene	ug/L	2	1.6	81	51-115	
Benzo(a)pyrene	ug/L	2	1.7	85	46-117	
Benzo(b)fluoranthene	ug/L	2	1.6	81	50-126	
Benzo(g,h,i)perylene	ug/L	2	1.7	85	48-117	
Benzo(k)fluoranthene	ug/L	2	1.8	90	52-118	
Chrysene	ug/L	2	1.7	83	55-107	
Dibenz(a,h)anthracene	ug/L	2	1.7	87	53-118	
Fluoranthene	ug/L	2	1.7	84	45-122	
Fluorene	ug/L	2	1.5	76	36-113	
Indeno(1,2,3-cd)pyrene	ug/L	2	1.7	86	52-117	
Phenanthrene	ug/L	2	1.5	76	40-109	
Pyrene	ug/L	2	1.6	81	45-122	
2-Fluorobiphenyl (S)	%.			63	19-97	
Terphenyl-d14 (S)	%.			84	47-105	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1790373 1790374

Parameter	Units	30332977011 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Acenaphthene	ug/L	0.24	2	2	1.3	1.3	54	52	10-111	3	20	
Acenaphthylene	ug/L	ND	2	2	1.4	1.4	66	63	14-121	4	20	
Anthracene	ug/L	0.12	2	2	1.5	1.5	69	70	23-108	2	20	
Benzo(a)anthracene	ug/L	ND	2	2	1.6	1.7	77	82	30-118	6	20	
Benzo(a)pyrene	ug/L	ND	2	2	1.4	1.5	69	71	10-126	3	20	
Benzo(b)fluoranthene	ug/L	ND	2	2	1.5	1.4	73	67	17-127	7	20	
Benzo(g,h,i)perylene	ug/L	ND	2	2	1.1	1.1	56	55	10-122	1	20	
Benzo(k)fluoranthene	ug/L	ND	2	2	1.3	1.5	64	71	22-118	11	20	
Chrysene	ug/L	ND	2	2	1.6	1.7	77	80	29-110	5	20	
Dibenz(a,h)anthracene	ug/L	ND	2	2	1.2	1.2	61	61	10-124	1	20	
Fluoranthene	ug/L	0.40	2	2	1.7	1.9	67	74	15-134	7	20	
Fluorene	ug/L	0.27	2	2	1.4	1.4	58	57	16-113	2	20	
Indeno(1,2,3-cd)pyrene	ug/L	ND	2	2	1.2	1.2	58	59	10-125	1	20	
Phenanthrene	ug/L	1.2	2	2	1.5	1.6	17	21	20-112	5	20	ML
Pyrene	ug/L	0.45	2	2	1.7	1.9	63	72	25-125	10	20	
2-Fluorobiphenyl (S)	%.						58	54	19-97		20	
Terphenyl-d14 (S)	%.						79	79	47-105		20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

QC Batch: 369355 Analysis Method: SM 2320B-2011
QC Batch Method: SM 2320B-2011 Analysis Description: 2320B Alkalinity
Associated Lab Samples: 30332977001, 30332977002, 30332977003, 30332977004, 30332977005, 30332977006, 30332977007, 30332977008, 30332977009, 30332977010, 30332977011, 30332977012

METHOD BLANK: 1791920 Matrix: Water
Associated Lab Samples: 30332977001, 30332977002, 30332977003, 30332977004, 30332977005, 30332977006, 30332977007, 30332977008, 30332977009, 30332977010, 30332977011, 30332977012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Carbonate (pH4.5)	mg/L	ND	10.0	10.0	11/05/19 16:14	
Alkalinity,Bicarbonate (pH4.5)	mg/L	ND	10.0	10.0	11/05/19 16:14	
Alkalinity,Total (CaCO3 pH4.5)	mg/L	ND	10.0	1.0	11/05/19 16:14	

LABORATORY CONTROL SAMPLE: 1791921

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity,Total (CaCO3 pH4.5)	mg/L	20	20.0	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1791922 1791923

Parameter	Units	30332977007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity,Total (CaCO3 pH4.5)	mg/L	500	50	50	550	550	100	100	85-115	0	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
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(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

QC Batch: 369356 Analysis Method: SM 2320B-2011
QC Batch Method: SM 2320B-2011 Analysis Description: 2320B Alkalinity
Associated Lab Samples: 30332977013

METHOD BLANK: 1791927 Matrix: Water
Associated Lab Samples: 30332977013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Carbonate (pH4.5)	mg/L	ND	10.0	10.0	11/06/19 20:42	
Alkalinity,Bicarbonate (pH4.5)	mg/L	ND	10.0	10.0	11/06/19 20:42	
Alkalinity,Total (CaCO3 pH4.5)	mg/L	ND	10.0	1.0	11/06/19 20:42	

LABORATORY CONTROL SAMPLE: 1791928

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity,Total (CaCO3 pH4.5)	mg/L	20	20.0	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1791929 1791930

Parameter	Units	30332977013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Alkalinity,Total (CaCO3 pH4.5)	mg/L	520	50	50	570	570	100	100	85-115	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

QC Batch: 368876 Analysis Method: SM 3500-FeB-2011
QC Batch Method: SM 3500-FeB-2011 Analysis Description: Iron, Ferrous
Associated Lab Samples: 30332977001, 30332977002, 30332977003, 30332977004, 30332977005, 30332977006, 30332977007, 30332977008, 30332977009, 30332977010, 30332977011, 30332977012, 30332977013

METHOD BLANK: 1789785 Matrix: Water
Associated Lab Samples: 30332977001, 30332977002, 30332977003, 30332977004, 30332977005, 30332977006, 30332977007, 30332977008, 30332977009, 30332977010, 30332977011, 30332977012, 30332977013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	ND	0.10	0.020	10/31/19 21:27	H6

LABORATORY CONTROL SAMPLE: 1789786

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	1	1.0	101	90-110	H6

MATRIX SPIKE SAMPLE: 1789787

Parameter	Units	30332977007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	ND	1	0.95	87	85-115	H3,H6

MATRIX SPIKE SAMPLE: 1789788

Parameter	Units	30332977007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	ND	1	0.98	90	85-115	H3,H6

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REPORT OF LABORATORY ANALYSIS

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(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

QC Batch: 369182 Analysis Method: SM 4500NO3F-2011
QC Batch Method: SM 4500NO3F-2011 Analysis Description: SM4500NO3-F, Nitrate, Preserved
Associated Lab Samples: 30332977001, 30332977002, 30332977003, 30332977004, 30332977005, 30332977006, 30332977007, 30332977008, 30332977009, 30332977010, 30332977011, 30332977012, 30332977013

METHOD BLANK: 1791329 Matrix: Water
Associated Lab Samples: 30332977001, 30332977002, 30332977003, 30332977004, 30332977005, 30332977006, 30332977007, 30332977008, 30332977009, 30332977010, 30332977011, 30332977012, 30332977013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	0.024	11/04/19 13:43	

METHOD BLANK: 1791331 Matrix: Water
Associated Lab Samples: 30332977001, 30332977002, 30332977003, 30332977004, 30332977005, 30332977006, 30332977007, 30332977008, 30332977009, 30332977010, 30332977011, 30332977012, 30332977013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	0.024	11/04/19 13:45	

LABORATORY CONTROL SAMPLE: 1791330

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	4	3.8	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1791332 1791333

Parameter	Units	30332977007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	ND	5	5	4.5	4.6	90	92	85-115	2	20	

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REPORT OF LABORATORY ANALYSIS

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1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

QC Batch: 369330 Analysis Method: ASTM D516-11
QC Batch Method: ASTM D516-11 Analysis Description: ASTM D516-11, Sulfate Water
Associated Lab Samples: 30332977001, 30332977002, 30332977003, 30332977004, 30332977005, 30332977006, 30332977007, 30332977008, 30332977009, 30332977010, 30332977011, 30332977012, 30332977013

METHOD BLANK: 1791759 Matrix: Water
Associated Lab Samples: 30332977001, 30332977002, 30332977003, 30332977004, 30332977005, 30332977006, 30332977007, 30332977008, 30332977009, 30332977010, 30332977011, 30332977012, 30332977013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	10.0	4.7	11/04/19 18:35	

LABORATORY CONTROL SAMPLE: 1791760

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	30	28.7	95	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1791761 1791762

Parameter	Units	30332977007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	57.8	20	20	75.9	77.5	90	99	85-115	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1791763 1791764

Parameter	Units	30332718001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	ND	20	20	22.4	22.8	95	97	85-115	2	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALIFIERS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA	Pace Analytical Services - Greensburg

ANALYTE QUALIFIERS

1c	The minimum RF for this compound was not met.
CH	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
H1	Analysis conducted outside the EPA method holding time.
H3	Sample was received or analysis requested beyond the recognized method holding time.
H6	Analysis initiated outside of the 15 minute EPA required holding time.
L1	Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be biased high.
ML	Matrix spike recovery and/or matrix spike duplicate recovery was below laboratory control limits. Result may be biased low.

Pace Analytical Services, LLC
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
30332977001	**MW-209**	EPA 3005A	369013	EPA 6010C	369078
30332977002	**MW-208**	EPA 3005A	369013	EPA 6010C	369078
30332977003	**BMW3**	EPA 3005A	369013	EPA 6010C	369078
30332977004	**BMW8**	EPA 3005A	369013	EPA 6010C	369078
30332977005	**MW-204**	EPA 3005A	369013	EPA 6010C	369078
30332977006	**BMW14R**	EPA 3005A	369013	EPA 6010C	369078
30332977007	**MW-210**	EPA 3005A	369013	EPA 6010C	369078
30332977008	**BMW2**	EPA 3005A	369013	EPA 6010C	369078
30332977009	**PZ106S**	EPA 3005A	369013	EPA 6010C	369078
30332977010	**BMW9**	EPA 3005A	369013	EPA 6010C	369078
30332977011	**MW-211**	EPA 3005A	369013	EPA 6010C	369078
30332977012	**WM-210 MS**	EPA 3005A	369013	EPA 6010C	369078
30332977013	**WM-210 MSD**	EPA 3005A	369013	EPA 6010C	369078
30332977001	**MW-209**	EPA 3005A	369011	EPA 6010C	369074
30332977002	**MW-208**	EPA 3005A	369011	EPA 6010C	369074
30332977003	**BMW3**	EPA 3005A	369011	EPA 6010C	369074
30332977004	**BMW8**	EPA 3005A	369011	EPA 6010C	369074
30332977005	**MW-204**	EPA 3005A	369011	EPA 6010C	369074
30332977006	**BMW14R**	EPA 3005A	369011	EPA 6010C	369074
30332977007	**MW-210**	EPA 3005A	369011	EPA 6010C	369074
30332977008	**BMW2**	EPA 3005A	369011	EPA 6010C	369074
30332977009	**PZ106S**	EPA 3005A	369011	EPA 6010C	369074
30332977010	**BMW9**	EPA 3005A	369011	EPA 6010C	369074
30332977011	**MW-211**	EPA 3005A	369011	EPA 6010C	369074
30332977012	**WM-210 MS**	EPA 3005A	369011	EPA 6010C	369074
30332977013	**WM-210 MSD**	EPA 3005A	369011	EPA 6010C	369074
30332977001	**MW-209**	EPA 3510C	369012	EPA 8270D by SIM	369107
30332977002	**MW-208**	EPA 3510C	369012	EPA 8270D by SIM	369107
30332977003	**BMW3**	EPA 3510C	369012	EPA 8270D by SIM	369107
30332977004	**BMW8**	EPA 3510C	369012	EPA 8270D by SIM	369107
30332977005	**MW-204**	EPA 3510C	369012	EPA 8270D by SIM	369107
30332977006	**BMW14R**	EPA 3510C	369012	EPA 8270D by SIM	369107
30332977007	**MW-210**	EPA 3510C	369012	EPA 8270D by SIM	369107
30332977008	**BMW2**	EPA 3510C	369012	EPA 8270D by SIM	369107
30332977009	**PZ106S**	EPA 3510C	369012	EPA 8270D by SIM	369107
30332977010	**BMW9**	EPA 3510C	369012	EPA 8270D by SIM	369107
30332977011	**MW-211**	EPA 3510C	369012	EPA 8270D by SIM	369107
30332977012	**WM-210 MS**	EPA 3510C	369012	EPA 8270D by SIM	369107
30332977013	**WM-210 MSD**	EPA 3510C	369012	EPA 8270D by SIM	369107
30332977001	**MW-209**	EPA 8260C	369193		
30332977002	**MW-208**	EPA 8260C	369193		
30332977003	**BMW3**	EPA 8260C	369193		
30332977004	**BMW8**	EPA 8260C	369193		
30332977005	**MW-204**	EPA 8260C	369193		
30332977006	**BMW14R**	EPA 8260C	369193		
30332977007	**MW-210**	EPA 8260C	369193		
30332977008	**BMW2**	EPA 8260C	369193		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
30332977009	**PZ106S**	EPA 8260C	369193		
30332977010	**BMW9**	EPA 8260C	369193		
30332977011	**MW-211**	EPA 8260C	369193		
30332977012	**WM-210 MS**	EPA 8260C	369193		
30332977013	**WM-210 MSD**	EPA 8260C	369193		
30332977014	**TRIP BLANK**	EPA 8260C	369193		
30332977001	**MW-209**	SM 2320B-2011	369355		
30332977002	**MW-208**	SM 2320B-2011	369355		
30332977003	**BMW3**	SM 2320B-2011	369355		
30332977004	**BMW8**	SM 2320B-2011	369355		
30332977005	**MW-204**	SM 2320B-2011	369355		
30332977006	**BMW14R**	SM 2320B-2011	369355		
30332977007	**MW-210**	SM 2320B-2011	369355		
30332977008	**BMW2**	SM 2320B-2011	369355		
30332977009	**PZ106S**	SM 2320B-2011	369355		
30332977010	**BMW9**	SM 2320B-2011	369355		
30332977011	**MW-211**	SM 2320B-2011	369355		
30332977012	**WM-210 MS**	SM 2320B-2011	369355		
30332977013	**WM-210 MSD**	SM 2320B-2011	369356		
30332977001	**MW-209**	SM 3500-FeB-2011	368876		
30332977002	**MW-208**	SM 3500-FeB-2011	368876		
30332977003	**BMW3**	SM 3500-FeB-2011	368876		
30332977004	**BMW8**	SM 3500-FeB-2011	368876		
30332977005	**MW-204**	SM 3500-FeB-2011	368876		
30332977006	**BMW14R**	SM 3500-FeB-2011	368876		
30332977007	**MW-210**	SM 3500-FeB-2011	368876		
30332977008	**BMW2**	SM 3500-FeB-2011	368876		
30332977009	**PZ106S**	SM 3500-FeB-2011	368876		
30332977010	**BMW9**	SM 3500-FeB-2011	368876		
30332977011	**MW-211**	SM 3500-FeB-2011	368876		
30332977012	**WM-210 MS**	SM 3500-FeB-2011	368876		
30332977013	**WM-210 MSD**	SM 3500-FeB-2011	368876		
30332977001	**MW-209**	SM 4500NO3F-2011	369182		
30332977002	**MW-208**	SM 4500NO3F-2011	369182		
30332977003	**BMW3**	SM 4500NO3F-2011	369182		
30332977004	**BMW8**	SM 4500NO3F-2011	369182		
30332977005	**MW-204**	SM 4500NO3F-2011	369182		
30332977006	**BMW14R**	SM 4500NO3F-2011	369182		
30332977007	**MW-210**	SM 4500NO3F-2011	369182		
30332977008	**BMW2**	SM 4500NO3F-2011	369182		
30332977009	**PZ106S**	SM 4500NO3F-2011	369182		
30332977010	**BMW9**	SM 4500NO3F-2011	369182		
30332977011	**MW-211**	SM 4500NO3F-2011	369182		
30332977012	**WM-210 MS**	SM 4500NO3F-2011	369182		
30332977013	**WM-210 MSD**	SM 4500NO3F-2011	369182		
30332977001	**MW-209**	ASTM D516-11	369330		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30332977

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
30332977002	**MW-208**	ASTM D516-11	369330		
30332977003	**BMW3**	ASTM D516-11	369330		
30332977004	**BMW8**	ASTM D516-11	369330		
30332977005	**MW-204**	ASTM D516-11	369330		
30332977006	**BMW14R**	ASTM D516-11	369330		
30332977007	**MW-210**	ASTM D516-11	369330		
30332977008	**BMW2**	ASTM D516-11	369330		
30332977009	**PZ106S**	ASTM D516-11	369330		
30332977010	**BMW9**	ASTM D516-11	369330		
30332977011	**MW-211**	ASTM D516-11	369330		
30332977012	**WM-210 MS**	ASTM D516-11	369330		
30332977013	**WM-210 MSD**	ASTM D516-11	369330		

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

WO# : 30332977

30332977

ALL SHADE

Company: Arcadis	Billing Information:
Address: 110 w Fayette St	
Report To: PJ Hart	Email To: Vin.Maresco@Arcadis.com
Copy To: Vin Maresco	Site Collection Info/Address: Lysander, NY
Customer Project Name/Number: Cold Springs Terminal	State: / County/City: Time Zone Collected: [ ]PT [ ]MT [ ]CT [X]ET
Phone: Email:	Site/Facility ID #: Compliance Monitoring? [ ] Yes [ ] No
Collected By (print):	Purchase Order #: Quote #: DW PWS ID #: DW Location Code:
Collected By (signature):	Turnaround Date Required: Immediately Packed on Ice: [ ] Yes [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: _____ [ ] Hold: _____	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) Field Filtered (if applicable): [ ] Yes [ ] No Analysis: _____

Container Preservative Type: U 3 U 2 1 U

** Preservative Types: (1) nitric acid, (2) sulfuric (6) methanol, (7) sodium bisulfate, (8) sodium th (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	SVOC 8270	VOC 8260	Fe, Sulfate, Alkalinity	CO2	Nitrate / Nitrite	Manganese	Manganese, Lab Filtered			Lab Sample # / Comments:
																		PM/PM
MW-209	GW	G	10/29/19	10:20					2	3	1	2	1	1	1			001
MW-208	GW	G	10/29/19	11:20					2	3	1	2	1	1	1			002
BMW3	GW	G	10/29/19	12:30					2	3	1	2	1	1	1			003
BMW8	GW	G	10/29/19	10:50					2	3	1	2	1	1	1			004
MW-204	GW	G	10/29/19	16:00					2	3	1	2	1	1	1			005
BMW14R	GW	G	10/30/19	11:15					2	3	1	2	1	1	1			006
MW-210	GW	G	10/29/19	09:00					2	3	1	2	1	1	1			007
BMW2	GW	G	10/30/19	08:30					2	3	1	2	1	1	1			008
PZ1065	GW	G	10/30/19	12:20					2	3	1	2	1	1	1			009
BMW9	GW	G	10/30/19	11:47					2	3	1	2	1	1	1			010

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	(Y) N	NA
Custody Signatures Present	(Y) N	NA
Collector Signature Present	(Y) N	NA
Bottles Intact	(Y) N	NA
Correct Bottles	(Y) N	NA
Sufficient Volume	(Y) N	NA
Samples Received on Ice	(Y) N	NA
VOA - Headspace Acceptable	(Y) N	NA
USDA Regulated Soils	Y N	(NA)
Samples in Holding Time	(Y) N	NA
Residual Chlorine Present	Y N	NA
Cl Strips:		
Sample pH Acceptable	Y (N)	NA
pH Strips: 100391		
Sulfide Present	Y N	(NA)
Lead Acetate Strips:		

LAB USE ONLY:

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: (Wet) Blue Dry None

Packing Material Used: Ice, Bubble wrap

Radchem sample(s) screened (<500 cpm): Y N (NA)

SHORT HOLDS PRESENT (<72 hours): (Y) N N/A

Lab Tracking #: 7718 5288 8882431059

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:

Temp Blank Received: Y (N) NA

Therm ID#: 9

Cooler 1 Temp Upon Receipt: 3.6, 3.3 oC 4.7, 5.8, 5.5, 5.5

Cooler 1 Therm Corr. Factor: 0 oC

Cooler 1 Corrected Temp: 3.6, 3.3, 4.7, 5.8, 5.5, 5.5 oC

Comments:

PM 10-31-19

Relinquished by/Company: (Signature) Sarah Tuttle	Date/Time: 10/30/19 13:30	Received by/Company: (Signature)	Date/Time: 10/30/19 1300	MTJL LAB USE ONLY Table #: Acctnum: Template: Prelogin: PM: PB:
Relinquished by/Company: (Signature)	Date/Time: 10/30/19 1700	Received by/Company: (Signature)	Date/Time: 10-31-19 9:20	Trip Blank Received: (Y) N NA HCl MeOH TSP Other
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Non Conformance(s): (YES) / NO Page: _____ of: _____

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

ALL SHADED AREAS are for LAB USE ONLY

Company: Arcadis	Billing Information:
Address: 110 W Fayette St	
Report To: PJ Hart	Email To: Vin.Maresco@Arcadis.com
Copy To: Vin Maresco	Site Collection Info/Address: Lyssander, NV
Customer Project Name/Number: Cold Springs Terminal	State: / County/City: Time Zone Collected: [ ]PT [ ]MT [ ]CT [X]ET
Phone: Email:	Site/Facility ID #: Compliance Monitoring? [ ] Yes [ ] No
Collected By (print):	Purchase Order #: Quote #: DW PWS ID #: DW Location Code:
Collected By (signature):	Turnaround Date Required: Immediately Packed on Ice: [ ] Yes [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)
	Field Filtered (if applicable): [ ] Yes [ ] No Analysis:

Container Preservative Type **: U | 3 | U | | 2 | 1 | U

Lab Project Manager:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	SVOC 8270	VOC 8260	Fe, Sulfate, Alkalinity	CO2	Nitrate / Nitrite	Manganese	Manganese, Lab Filtered			Lab Sample # / Comments
MW-211	GW	G	10/30/19	12:20					2	3	1	2	1	1	1			C11
TRIP BLANK	TB		10/30/19	—						2								C14
MW-210 MS	GW	G	10/30/19	09:00					2	3	1	2	1	1	1			C12
MW-210 MSD	GW	G	10/30/19	09:00					2	3	1	2	1	1	1			C13

#_30332977

Lab Profile/Line:

Lab Sample Receipt Checklist:

Custody Seals Present/Intact	Y N NA
Custody Signatures Present	Y N NA
Collector Signature Present	Y N NA
Bottles Intact	Y N NA
Correct Bottles	Y N NA
Sufficient Volume	Y N NA
Samples Received on Ice	Y N NA
VOA – Headspace Acceptable	Y N NA
USDA Regulated Soils	Y N NA
Samples in Holding Time	Y N NA
Residual Chlorine Present	Y N NA
Cl Strips:	
Sample pH Acceptable	Y N NA
pH Strips:	
Sulfide Present	Y N NA
Lead Acetate Strips:	

LAB USE ONLY:

Lab Sample # / Comments: see page 1

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: (Wet) Blue Dry None

Packing Material Used: Ice, Bubble wrap

Radchem sample(s) screened (<500 cpm): Y N (NA)

SHORT HOLDS PRESENT (<72 hours): (Y) N N/A

Lab Tracking #: 7768 5258 9896 2448836

Samples received via: (FEDEX) UPS Client Courier Pace Courier

Lab Sample Temperature Info:

Temp Blank Received: Y N NA

Therm ID#:

Cooler 1 Temp Upon Receipt: ____oC

Cooler 1 Therm Corr. Factor: ____oC

Cooler 1 Corrected Temp: ____oC

Comments: see page 1

Relinquished by/Company: (Signature) Sarah Jutter	Date/Time: 10/30/19 13:30	Received by/Company: (Signature)	Date/Time: 10/30/19 1300
Relinquished by/Company: (Signature)	Date/Time: 10/30/19 1700	Received by/Company: (Signature)	Date/Time: 10-31-19 9:25
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY

Table #:

Acctnum:

Template:

Prelogin:

PM:

PB:

Trip Blank Received: (Y) N NA

HCL MeOH TSP Other

Non Conformance(s): (YES) / NO

Page: ____ of: ____

Pace Analytical
www.pacelabs.com

#_30332977

Sample Receiving Non-Conformance Form (NCF)

Date: 10/31/19	Evaluated by: DL
Client: Arcadis	

Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

1. If Chain-of-Custody (COC) is not received: contact client and if necessary, fill out a COC and indicate that it was filled out by lab personnel. Note issues on this NCF.

2. If COC is incomplete, check applicable issues below and add details where appropriate:

/	Collection date/time missing or incorrect		Analyses or analytes: missing or clarification needed		Samples listed on COC do not match samples received (missing, additional, etc.)
	Sample IDs on COC do not match sample labels		Required trip blanks were not received		Required signatures are missing

Comments/Details/Other Issues not listed above:
BMW9 has time of 10:10 on samples, MW-211 has time of 8:45 on samples

3. Sample integrity issues: check applicable issues below and add details where appropriate:

	Samples: Past holding time		Samples: Condition needs to be brought to lab personnel's attention (details below)	/	Preservation: Improper
	Samples: Not field filtered		Containers: Broken or compromised		Temperature: not within acceptance criteria (typically 0-6C)
	Samples: Insufficient volume received		Containers: Incorrect		Temperature: Samples arrived frozen
	Samples: Cooler damaged or compromised		Custody Seals: Missing or compromised on samples, trip blanks or coolers		Vials received with improper headspace
	Samples: contain chlorine or sulfides		Packing Material: Insufficient/Improper		Other:

Comments/Details:
metals bottles for samples BMW3 and PZ1065 received neutral pH

DL 10/31/19

4. If Samples not preserved properly and Sample Receiving adjusts pH, add details below: ✓ DL 10/31/19

Sample ID: BMW3	Date/Time: 10/31/19 1830	Amount/type pres added: 2.5 mL HNO3
Preserved by: DLP	Initial and Final pH: 7 ≥1 pH<2	Lot # of pres added: DL19-1142
Sample ID: PZ1065	Date/Time: 10/31/19 1830	Amount/type pres added: 2.5 mL HNO3
Preserved by: DLP	Initial and Final pH: 7 1 pH<2	Lot # of pres added: DL19-1142
Sample ID:	Date/Time:	Amount/type pres added:
Preserved by:	Initial and Final pH:	Lot # of pres added:

5. Client Contact: If client is contacted for any issue listed above, fill in details below:

Client:	Contacted per:	
PM Initials:	Date/Time:	

Client Comments/Instructions:

Pace Analytical Energy Services LLC
220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

November 15, 2019

Rachel Christner
Pace Analytical Services, Inc.
1638 Roseytown Road
Suites 2,3,4
Greensburg, PA 15601
USA

RE: **30332977**

Pace Workorder: 32020

Dear Rachel Christner:

Enclosed are the analytical results for sample(s) received by the laboratory on Tuesday, November 05, 2019. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Ruth Welsh 11/15/2019
Ruth.Welsh@pacelabs.com

Customer Service Representative

Enclosures

As a valued client we would appreciate your comments on our service.
Please email PAESfeedback@pacelabs.com.

Total Number of Pages 27

CERTIFICATE OF ANALYSIS

Pace Analytical Energy Services LLC
220 William Pitt Way
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LABORATORY ACCREDITATIONS & CERTIFICATIONS

Accreditor:	Pennsylvania Department of Environmental Protection, Bureau of Laboratories
Accreditation ID:	02-00538
Scope:	NELAP Non-Potable Water
Accreditor:	West Virginia Department of Environmental Protection, Division of Water and Waste Management
Accreditation ID:	395
Scope:	Non-Potable Water
Accreditor:	South Carolina Department of Health and Environmental Control, Office of Environmental Laboratory Certification
Accreditation ID:	89009003
Scope:	Clean Water Act (CWA); Resource Conservation and Recovery Act (RCRA)
Accreditor:	State of Virginia
Accreditation ID:	460201
Scope:	Non-Potable Water
Accreditor:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water
Accreditor:	State of Connecticut, Department of Public Health, Division of Environmental Health
Accreditation ID:	PH-0263
Scope:	Clean Water Act (CWA) Resource Conservation and Recovery Act (RCRA)
Accreditor:	NELAP: Texas, Commission on Environmental Quality
Accreditation ID:	T104704453-09-TX
Scope:	Non-Potable Water
Accreditor:	State of New Hampshire
Accreditation ID:	299409
Scope:	Non-potable water
Accreditor:	State of Georgia
Accreditation ID:	Chapter 391-3-26
Scope:	As per the Georgia EPD Rules and Regulations for Commercial Laboratories, PAES is accredited by the Pennsylvania Department of Environmental Protection Bureau of Laboratories under the National Environmental Laboratory Approval Program (NELAC).

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SAMPLE SUMMARY

Workorder: 32020 30332977

Lab ID	Sample ID	Matrix	Date Collected	Date Received
320200001	30332977 001	Water	10/29/2019 10:20	11/5/2019 12:30
320200002	30332977 002	Water	10/29/2019 11:20	11/5/2019 12:30
320200003	30332977 003	Water	10/29/2019 12:30	11/5/2019 12:30
320200004	30332977 004	Water	10/29/2019 10:50	11/5/2019 12:30
320200005	30332977 005	Water	10/29/2019 16:00	11/5/2019 12:30
320200006	30332977 006	Water	10/30/2019 11:15	11/5/2019 12:30
320200007	30332977 007	Water	10/30/2019 09:00	11/5/2019 12:30
320200008	30332977 008	Water	10/30/2019 08:30	11/5/2019 12:30
320200009	30332977 009	Water	10/30/2019 12:20	11/5/2019 12:30
320200010	30332977 010	Water	10/30/2019 11:47	11/5/2019 12:30
320200011	30332977 011	Water	10/30/2019 12:20	11/5/2019 12:30
320200012	30332977 012	Water	10/30/2019 09:00	11/5/2019 12:30
320200013	30332977 013	Water	10/30/2019 09:00	11/5/2019 12:30

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ANALYTICAL RESULTS

Workorder: 32020 30332977

Lab ID: **320200001** Date Received: 11/5/2019 12:30 Matrix: Water

Sample ID: **30332977 001** Date Collected: 10/29/2019 10:20

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**25**	mg/l	5.0	0.47	1	11/11/2019 13:03	TD	n

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ANALYTICAL RESULTS

Workorder: 32020 30332977

Lab ID: **320200002** Date Received: 11/5/2019 12:30 Matrix: Water

Sample ID: **30332977 002** Date Collected: 10/29/2019 11:20

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**110**	mg/l	5.0	0.47	1	11/11/2019 13:16	TD	n

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ANALYTICAL RESULTS

Workorder: 32020 30332977

Lab ID: **320200003** Date Received: 11/5/2019 12:30 Matrix: Water

Sample ID: **30332977 003** Date Collected: 10/29/2019 12:30

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**71**	mg/l	5.0	0.47	1	11/11/2019 13:31	TD	n

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ANALYTICAL RESULTS

Workorder: 32020 30332977

Lab ID: **320200004** Date Received: 11/5/2019 12:30 Matrix: Water

Sample ID: **30332977 004** Date Collected: 10/29/2019 10:50

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**150**	mg/l	5.0	0.47	1	11/11/2019 13:43	TD	n

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ANALYTICAL RESULTS

Workorder: 32020 30332977

Lab ID: **320200005** Date Received: 11/5/2019 12:30 Matrix: Water

Sample ID: **30332977 005** Date Collected: 10/29/2019 16:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**160**	mg/l	5.0	0.47	1	11/11/2019 13:57	TD	n

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ANALYTICAL RESULTS

Workorder: 32020 30332977

Lab ID: **320200006** Date Received: 11/5/2019 12:30 Matrix: Water

Sample ID: **30332977 006** Date Collected: 10/30/2019 11:15

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**90**	mg/l	5.0	0.47	1	11/11/2019 14:09	TD	n

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ANALYTICAL RESULTS

Workorder: 32020 30332977

Lab ID: **320200007** Date Received: 11/5/2019 12:30 Matrix: Water

Sample ID: **30332977 007** Date Collected: 10/30/2019 09:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**100**	mg/l	5.0	0.47	1	11/11/2019 14:22	TD	n

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ANALYTICAL RESULTS

Workorder: 32020 30332977

Lab ID: **320200008** Date Received: 11/5/2019 12:30 Matrix: Water

Sample ID: **30332977 008** Date Collected: 10/30/2019 08:30

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**12**	mg/l	5.0	0.45	1	11/13/2019 12:15	BW	n

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ANALYTICAL RESULTS

Workorder: 32020 30332977

Lab ID: **320200009** Date Received: 11/5/2019 12:30 Matrix: Water

Sample ID: **30332977 009** Date Collected: 10/30/2019 12:20

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**77**	mg/l	5.0	0.45	1	11/13/2019 12:25	BW	n

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ANALYTICAL RESULTS

Workorder: 32020 30332977

Lab ID: **320200010** Date Received: 11/5/2019 12:30 Matrix: Water

Sample ID: **30332977 010** Date Collected: 10/30/2019 11:47

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**120**	mg/l	5.0	0.45	1	11/13/2019 12:35	BW	n

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ANALYTICAL RESULTS

Workorder: 32020 30332977

Lab ID: **320200011** Date Received: 11/5/2019 12:30 Matrix: Water

Sample ID: **30332977 011** Date Collected: 10/30/2019 12:20

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**93**	mg/l	5.0	0.45	1	11/13/2019 18:09	BW	n

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ANALYTICAL RESULTS

Workorder: 32020 30332977

Lab ID: **320200012** Date Received: 11/5/2019 12:30 Matrix: Water

Sample ID: **30332977 012** Date Collected: 10/30/2019 09:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**83**	mg/l	5.0	0.45	1	11/13/2019 18:21	BW	n

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ANALYTICAL RESULTS

Workorder: 32020 30332977

Lab ID: **320200013** Date Received: 11/5/2019 12:30 Matrix: Water

Sample ID: **30332977 013** Date Collected: 10/30/2019 09:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**120**	mg/l	5.0	0.45	1	11/13/2019 18:30	BW	n

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ANALYTICAL RESULTS QUALIFIERS

Workorder: 32020 30332977

DEFINITIONS/QUALIFIERS

MDL	Method Detection Limit. Can be used synonymously with LOD; Limit Of Detection.
PQL	Practical Quanitation Limit. Can be used synonymously with LOQ; Limit Of Quantitation.
ND	Not detected at or above reporting limit.
DF	Dilution Factor.
S	Surrogate.
RPD	Relative Percent Difference.
% Rec	Percent Recovery.
U	Indicates the compound was analyzed for, but not detected at or above the noted concentration.
J	Estimated concentration greater than the set method detection limit (MDL) and less than the set reporting limit (PQL).
n	The laboratory does not hold NELAP/TNI accreditation for this method or analyte.

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QUALITY CONTROL DATA

Workorder: 32020 30332977

QC Batch: DISG/7910 Analysis Method: AM20GAX

QC Batch Method: AM20GAX

Associated Lab Samples: 320200001, 320200002, 320200003, 320200004, 320200005, 320200006, 320200007

METHOD BLANK: 64293

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Carbon Dioxide	mg/l	0.47U	0.47	n

LABORATORY CONTROL SAMPLE & LCSD: 64295 64297

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Carbon Dioxide	mg/l	120	130	130	109	109	80-120	0.75	20	n

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QUALITY CONTROL DATA

Workorder: 32020 30332977

QC Batch: DISG/7911 Analysis Method: AM20GAX

QC Batch Method: AM20GAX

Associated Lab Samples: 320200008, 320200009, 320200010

METHOD BLANK: 64301

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Carbon Dioxide	mg/l	0.45U	0.45	n

LABORATORY CONTROL SAMPLE & LCSD: 64303 64305

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Carbon Dioxide	mg/l	120	120	100	98	89	80-120	10	20	n

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QUALITY CONTROL DATA

Workorder: 32020 30332977

QC Batch: DISG/7912 Analysis Method: AM20GAX

QC Batch Method: AM20GAX

Associated Lab Samples: 320200011, 320200012, 320200013

METHOD BLANK: 64315

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Carbon Dioxide	mg/l	0.45U	0.45	n

LABORATORY CONTROL SAMPLE & LCSD: 64317 64319

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Carbon Dioxide	mg/l	120	120	120	101	101	80-120	0.55	20	n

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QUALITY CONTROL DATA QUALIFIERS

Workorder: 32020 30332977

QUALITY CONTROL PARAMETER QUALIFIERS

n	The laboratory does not hold NELAP/TNI accreditation for this method or analyte.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 32020 30332977

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
320200001	30332977 001			AM20GAX	DISG/7910
320200002	30332977 002			AM20GAX	DISG/7910
320200003	30332977 003			AM20GAX	DISG/7910
320200004	30332977 004			AM20GAX	DISG/7910
320200005	30332977 005			AM20GAX	DISG/7910
320200006	30332977 006			AM20GAX	DISG/7910
320200007	30332977 007			AM20GAX	DISG/7910
320200008	30332977 008			AM20GAX	DISG/7911
320200009	30332977 009			AM20GAX	DISG/7911
320200010	30332977 010			AM20GAX	DISG/7911
320200011	30332977 011			AM20GAX	DISG/7912
320200012	30332977 012			AM20GAX	DISG/7912
320200013	30332977 013			AM20GAX	DISG/7912

Chain of Custody

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Greensburg, PA 15601
Phone: (724) 850-5600
FAX: (724) 850-5601

Sample Condition upon Receipt: (Please record the following information)		
Temp in C	1.9	
Received on Ice	Yes	No
Sealed Cooler	Yes	No
Samples Intact	Yes	No

Subcontractor Project No.: 32020
P.O. No: ASR- 30332977

Request Date: 11/4/19 Analysis Due Date: 11/7/2019
Shipped By: Courier

Certification Required: NY

Pace Project No.: 30332977
Report/Invoice to: Rachel Christner

Page 1 of 2

	Pace Sample ID:	Matrix:	Collection Date:	Time:	Analysis Requested:	Analytical Method:	Preservative Type:
1	30332977 001	WT	10/29/19	10:20	Carbon Dioxide	RSK-175	BAK
2	30332977 002	WT	10/29/19	11:20	Carbon Dioxide	RSK-175	BAK
3	30332977 003	WT	10/29/19	12:30	Carbon Dioxide	RSK-175	BAK
4	30332977 004	WT	10/29/19	10:50	Carbon Dioxide	RSK-175	BAK
5	30332977 005	WT	10/29/19	16:00	Carbon Dioxide	RSK-175	BAK
6	30332977 006	WT	10/30/19	11:15	Carbon Dioxide	RSK-175	BAK
7	30332977 007	WT	10/30/19	9:00	Carbon Dioxide	RSK-175	BAK
8	30332977 008	WT	10/30/19	8:30	Carbon Dioxide	RSK-175	BAK
9	30332977 009	WT	10/30/19	12:20	Carbon Dioxide	RSK-175	BAK
10	30332977 010	WT	10/30/19	11:47	Carbon Dioxide	RSK-175	BAK
11	30332977 011	WT	10/30/19	12:20	Carbon Dioxide	RSK-175	BAK
12	30332977 012	WT	10/30/19	9:00	Carbon Dioxide	RSK-175	BAK

Special Requirements: ****Please supply a method blank and LCS QC information on the final report****

Subcontract Lab: Pace Analytical Energy Services PA (Microseep
Address: 220 William Pitt Way
Pittsburgh, PA 15238
Phone: 412-826-5245

Analysis Authorized By: Rachel DChristner (Pace Agent Name) Project Manager (Title)

Acceptance of Terms By: _____ (Subcontract Lab Agent) _____ (Title)

Relinquished By: PACE 11-5-19 1230 (Signature & Affiliation) (Date) (Time)

Relinquished By: _____ (Signature & Affiliation) (Date) (Time)

Received By: PAES 11.5.19 1230 (Signature & Affiliation) (Date) (Time)

Received By: _____ (Signature & Affiliation) (Date) (Time)

Comments:

In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.

C:\Users\ksmetanka\Desktop\SUBCON\30332977 asr paes pg 1]

Chain of Custody

Pace Analytical™
www.pacelabs.com

Sample Condition upon Receipt: (Please record the following information)		
Temp in C	1.4	
Received on Ice	Yes	No
Sealed Cooler	Yes	No
Samples Intact	Yes	No

Subcontractor Project No.: 32020
P.O. No: ASR- 30332977

Pace Analytical Services, Inc.
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Greensburg, PA 15601
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FAX: (724) 850-5601

Request Date: 11/4/19 Analysis Due Date: 11/7/2019
Shipped By: Courier

Certification Required: NY

Page 2 of 2

Pace Project No.: 30332977
Report/Invoice to: Rachel Christner

	Pace Sample ID:	Matrix:	Collection Date:	Time:	Analysis Requested:	Analytical Method:	Preservative Type:
1	30332977 013	WT	10/30/19	9:00	Carbon Dioxide	RSK-175	BAK
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

Special Requirements: ****Please supply a method blank and LCS QC information on the final report****

Subcontract Lab: Pace Analytical Energy Services PA (Microseep
Address: 220 William Pitt Way
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Phone: 412-826-5245

Analysis Authorized By: Rachel D Christner (Pace Agent Name) Project Manager (Title)
Acceptance of Terms By: (Subcontract Lab Agent) (Title)

Relinquished By: PACE 11-5-19 1230 (Signature & Affiliation) (Date) (Time)
Relinquished By: (Signature & Affiliation) (Date) (Time)

Received By: PAES 11.5.19 1230 (Signature & Affiliation) (Date) (Time)
Received By: (Signature & Affiliation) (Date) (Time)

Comments:

In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.

Cooler Receipt Form

Client Name: Pace **Project:** 303329777 **Lab Work Order:** 32020

A. **Shipping/Container Information** (circle appropriate response)

Courier: FedEx UPS USPS (Client) Other:_____ **Air bill Present:** Yes No

Tracking Number:_____

Custody Seal on Cooler/Box Present: Yes (No) **Seals Intact:** Yes No

Cooler/Box Packing Material: (Bubble Wrap) Absorbent Foam Other:_____

Type of Ice: (Wet) Blue None **Ice Intact:** (Yes) Melted

Cooler Temperature: 1.4°C **Radiation Screened:** Yes (No) **Chain of Custody Present:** (Yes) No

Comments:_____

B. **Laboratory Assignment/Log-in** (check appropriate response)

	YES	NO	N/A	Comment Reference non-Conformance
Chain of Custody properly filled out	✓			
Chain of Custody relinquished	✓			
Sampler Name & Signature on COC			✓	
Containers intact	✓			
Were samples in separate bags	✓			
Sample container labels match COC Sample name/date and time collected	✓			
Sufficient volume provided	✓			
PAES containers used	✓			
Are containers properly preserved for the requested testing? (as labeled)	✓			
If an unknown preservation state, were containers checked? Exception: VOA's coliform			✓	If yes, see pH form.
Was volume for dissolved testing field filtered, as noted on the COC? Was volume received in a preserved container?			✓	
Headspace present?	✓			

Comments:_____

_____

Cooler contents examined/received by : LG **Date:** 11.5.19

Project Manager Review : ELG **Date:** 11/5/19

F-PAE-Q-009-rev.01, 3Oct2017

NON-CONFORMANCE FORM

PAES Work Order #: 32020

Date: 11.5.19 Time of Receipt: 12:30 Receiver: LY

Client: Pace

REASON FOR NON-CONFORMANCE:

1. 30332977-003 BAK vials, with clear septa
2. Headspace in 1 vial of 004, 009, 010, 012 & 013.

ACTION TAKEN:

Client name: Pace Date: 11/5/19 Time: 17:19

Emailed client to notify.

Customer Service Initials: ERG Date: 11/5/19

F-PAE-Q-014-rev.00, 20 Nov2014

Emma Louis - 30332977 Samples

From: Emma Louis
To: Rachel Christner
Subject: 30332977 Samples

Hi Rachel,

Sample 30332977-003 was received in BAK vials with a clear septa. Our SOP recommends a butyl septa. There may be a narration on the report for this sample being received in an alternate container. Additionally, head space larger than 6mm was found present in 1 vial of 004, 009, 010, 012, and 013. We will use the remaining vials and qualify as needed.

Thank you

Emma Louis
Project Coordinator
Pace Analytical Energy Services, LLC
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Emma.Louis@pacelabs.com
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