MEMO

ARCADIS Design & Consultancy for natural and built assets

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From:
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Date:
April 18, 2019

Arcadis Project No.:
B0090004.0008

Subject:
First Quarter 2019 Groundwater Sampling Summary
Northern Cold Spring 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 first quarter 2019 groundwater sampling event. The site location is shown on **Figure 1**.

The groundwater monitoring field event was completed by Arcadis personnel February 18 through 20, 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 dated February 21, 2018. Included herein are summaries of the field activities, field observations, and analytical results for groundwater sampling completed during the February 2019 event.

FIELD ACTIVITIES

During the February 2019 event, Arcadis completed groundwater monitoring and gauging. A liquid level meter, which is able to detect non-aqueous phase liquid (NAPL), was used to gauge each well for 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**). A total of 15 monitoring wells were sampled. The following six monitoring wells were not sampled: BMW5, BMW6, BMW13, MW-201, MW-206, and MW-209. Monitoring wells BMW5 and BMW13 had NAPL present, monitoring wells MW-206 and MW-209 were obstructed by frozen conditions in their above grade riser pipes, and the other two monitoring well locations (BMW6 and MW-201) did not have sufficient groundwater to collect a sample. The remaining 15 monitoring wells were purged and sampled using disposable bailers and a three-volume purge technique. Purge water and equipment rinse water was containerized and sent for off-site disposal at Covanta Environmental Solutions – Mohawk located at 120 Dry Road 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.

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 first 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 February 2019 sampling event, samples collected from four of the 15 monitoring wells sampled (BMW14R, MW-204, MW-208, and MW-210) exhibited one or more VOC constituents at concentrations greater than NYSDEC ambient water quality standards and guidance values presented in NYSDEC's Technical and Operational Guidance Series (TOGS) 1.1.1. Samples collected from monitoring wells BMW3, BMW8, BMW14R, MW-202, MW-204, MW-208, and MW-211 exhibited concentrations of manganese greater than NYSDEC ambient water quality standards and guidance values presented in NYSDEC's TOGS 1.1.1.

The results from the 2018 sampling events (second, third, and fourth quarters) and the 2019 sampling event (first quarter) were generally consistent.

SUMMARY AND FUTURE PLANNED ACTIVITES

Groundwater samples were collected from a total of 15 monitoring wells during the first quarter monitoring event to provide a representation of current dissolved constituent concentrations at the subject site and to monitor NAPL thicknesses and location. One or more individual dissolved phase BTEX concentrations above TOGS 1.1.1 were detected at four of the 15 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 NAPL.

Groundwater sample collection and associated reporting will continue quarterly throughout 2019. Following the fourth quarter 2019 sampling event, data will be reviewed for trends and for mapping future actions 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 – 2019 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 – 2019 – First Quarter
Figure 4 – Total VOC and SVOC Concentrations

Attachments

Attachment A – Laboratory Reports

TABLES

Table 1
2019 Groundwater Measurements

Groundwater Sampling Summary 2019 - First 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	7.50	ND	389.15	389.15	
BMW3	1141323.86	908969.02	395.30	2	3.5-29.0	ND	12.49	ND	382.81	382.81	
BMW5	1141248.92	908820.46	389.50	2	10.0-30.0	24.41	25.44	1.03	364.06	364.87	No sample collected due to the presence of NAPL.
BMW6	1141286.17	908914.24	394.88	2	10.0-30.0	ND	Dry	ND	Dry	Dry	No sample collected, well was dry.
BMW7	1141347.84	908824.60	397.61	2	5.0-15.0	ND	8.59	ND	389.02	389.02	
BMW8	1141420.52	908826.55	399.86	2	5.0-20.0	ND	7.43	ND	392.43	392.43	
BMW9	1141334.24	909181.88	380.15	2	5.0-15.0	ND	2.25	ND	377.90	377.90	
BMW13	1141243.20	909014.31	382.60	4	UK	18.01	18.07	0.06	364.53	364.58	No sample collected due to the presence of NAPL.
BMW14R	1141257.52	909096.329	379.82	2	5.0-20.0	ND	14.85	ND	364.97	364.97	
MW-201	1141290.74	908861.62	395.24	2	14.0-24.0	ND	Dry	ND	Dry	Dry	No sample collected, well was dry.
MW-202	1141329.17	908898.17	395.25	2	6.0-16.5	ND	12.19	ND	383.06	383.06	
MW-203	1141307.55	909013.86	394.31	2	5.0-20.0	ND	8.03	ND	386.28	386.28	
MW-204	1141427.24	908980.08	394.95	2	5.0-20.0	ND	3.37	ND	391.58	391.58	
MW-205	1141543.83	908866.84	397.79	2	10.0-20.0	ND	4.52	ND	393.27	393.27	
MW-206	1141541.04	908921.18	397.68	2	5.0-20.0	NA	NA	NA	NA	NA	No sample collected, frozen conditions in the above grade riser pipe.
MW-207	1141519.38	908997.73	398.50	2	5.0-20.0	ND	3.44	ND	395.06	395.06	
MW-208	1141526.88	909080.26	397.09	2	5.0-20.0	ND	3.77	ND	393.32	393.32	
MW-209	1141600.72	909076.11	399.62	2	5.0-20.0	ND	NA	NA	NA	NA	No sample collected, frozen conditions in the above grade riser pipe.
MW-210	1141345.09	909129.64	386.60	2	8.0-18.0	ND	5.28	ND	381.32	381.32	
MW-211	1141377.65	909200.72	387.45	2	5.0-15.0	ND	6.43	ND	381.02	381.02	
PZ106S	1141279.48	909152.97	374.02	2	5.5-UK	ND	3.59	ND	370.43	370.43	

Notes:
* DTW was above the screened interval for the following wells: BMW2, BMW9, BMW13, MW-204, MW-205, MW-207, MW-208, MW-210, MW-211, and PZ106S.
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
LL = Liquid level
NA = Not applicable
NAPL = Nonaqueous phase liquid
ND = No detection
UK = Unknown

Table 2
2019 Historical Summary of Groundwater Constituents of Concern

ARCADIS Design & Consultancy for natural and built assets

Groundwater Sampling Summary 2019 - First Quarter
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
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
BMW5	5/15/2018	NAPL Present					
BMW5	9/25/2018	NAPL Present					
BMW5	12/3/2018	NAPL Present					
BMW5	2/18/2019	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					
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
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
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
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					
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
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-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-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-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

See Notes on Page 2.

Table 2
2019 Historical Summary of Groundwater Constituents of Concern

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Groundwater Sampling Summary 2019 - First Quarter
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-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-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-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-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-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
MW-209	2/18/2019	Frozen					
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-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
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

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.

NAPL = Non-aqueous phase liquid
SVOC = Semivolatile organic compound
VOC = Volatile organic compound
U = Compound was analyzed for, but not detected.
ug/L = Micrograms per liter

Table 3
Groundwater Analytical Data

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

Location ID: Date Collected: SDG:	NYSDEC TOGS 1 1 1 (GA Groundwater)	Units	BMW2 02/20/19 30280927	BMW3 02/19/19 30280833	BMW7 02/19/19 30280833	BMW8 02/19/19 30280833	BMW9 02/18/19 30280833	BMW14R 02/20/19 30280927	MW-202 02/19/19 30280833	MW-203 02/19/19 30280833
VOCs (EPA 8260C)										
1,2,4-Trimethylbenzene	5	ug/L	1 U	1 U	1 U	1 U	1 U	**1,790**	1 U	1 U
1,3,5-Trimethylbenzene	5	ug/L	1 U	1 U	1 U	1 U	1 U	**476**	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 UCL2c	200 UL13c	200 UL13c	200 UL13c	200 UMHL13c	200 UCL2c	200 UL13c	200 UL13c
Ethylbenzene	5	ug/L	1 U	1 U	1 U	1 U	1 U	**202**	1 U	1 U
Isopropylbenzene	5	ug/L	1 U	1 U	1 U	1 U	1 U	**80.2**	1 U	1 U
m&p-Xylene	5	ug/L	2 U	2 U	2 U	2 U	2 U	**762**	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	**611**	2 U	2 U
n-Butylbenzene	5	ug/L	1 U	1 U	1 U	1 U	1 U	**16.2**	1 U	1 U
n-Propylbenzene	5	ug/L	1 U	1 U	1 U	1 U	1 U	**192**	1 U	1 U
o-Xylene	5	ug/L	1 U	1 U	1 U	1 U	1 U	**5.6**	1 U	1 U
p-Isopropyltoluene	5	ug/L	1 U	1 U	1 U	1 U	1 U	**8.9**	1 U	1 U
sec-Butylbenzene	5	ug/L	1 U	1 U	1 U	1 U	1 U	**10.7**	1 U	1 U
Tert-Butylbenzene	5	ug/L	1 U	1 U	1 U	1 U	1 U	1.4	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	200 U	200 U	4,156	200 U	200 U
SVOCs (EPA 8270D by SIM)										
Acenaphthene	20	ug/L	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U	0.45 1c	0.11 U1c	0.11 U1c
Acenaphthylene	- -	ug/L	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U	0.17 1c	0.11 U1c	0.11 U1c
Anthracene	50	ug/L	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U	0.11 U1c	0.11 U1c	0.11 U1c
Benz(a)Anthracene	0.002	ug/L	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U	0.11 U1c	0.11 U1c	0.11 U1c
Benzo(a)Pyrene	- -	ug/L	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U1c	0.1 UR1	0.11 U1c	0.11 U1c	0.11 U1c
Benzo(b)Fluoranthene	0.002	ug/L	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U1c	0.1 UR1	0.11 Uip1c	0.11 U1c	0.11 U1c
Benzo(g,h,i)Perylene	- -	ug/L	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U1c	0.1 UR1	0.11 U1c	0.11 U1c	0.11 U1c
Benzo(k)Fluoranthene	0.002	ug/L	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U1c	0.1 UR1	0.11 Uip1c	0.11 U1c	0.11 U1c
Chrysene	0.002	ug/L	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U	0.11 U1c	0.11 U1c	0.11 U1c
Dibenzo(a,h)Anthracene	- -	ug/L	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U1c	0.1 UR1	0.11 U1c	0.11 U1c	0.11 U1c
Fluoranthene	50	ug/L	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U	0.11 1c	0.11 U1c	0.11 U1c
Fluorene	50	ug/L	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U	0.79 1c	0.11 U1c	0.11 U1c
Indeno(1,2,3-cd)Pyrene	0.002	ug/L	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U1c	0.1 UR1	0.11 U1c	0.11 U1c	0.11 U1c
Phenanthrene	50	ug/L	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U	0.27 1c	0.11 U1c	0.11 U1c
Pyrene	50	ug/L	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U1c	0.1 U	0.13 1c	0.11 U1c	0.11 U1c
Total SVOCs	- -	ug/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1.92	0.11 U	0.11 U
Metals (EPA 6010B)										
Manganese	300	ug/L	108	**2,300**	288	**1,060**	92.1	**930**	**1,180**	209
Dissolved Metals										
Manganese	300	ug/L	19.8	5 U	44.1	**882**	43.8	**815**	**1,000**	5 U
General Chemistry										
Alkalinity, Carbonate (pH4.5)	- -	mg/L	10 U	10 U	10 U	10 U	10 UH1	10 U	10 U	10 U
Alkalinity,Bicarbonate (pH4.5)	- -	mg/L	256	510	490	460	390 H1	676	590	330
Alkalinity,Total (CaCO3 pH4.5)	- -	mg/L	256 ML	510	490	460	390 H1ML	676	590	330
Iron, Ferrous	- -	mg/L	0.1 UH3H6	0.1 UH6H1	0.1 UH3H6	1.5 H6H1	0.1 UH3H6	2.8 H6H1ML	0.1 UH3H6	0.1 UH6H1
Nitrogen, NO2 plus NO3	- -	mg/L	0.1 U	0.85	0.1 U	0.1 U	0.1 UML	0.1 U	0.1 U	0.41
Sulfate	- -	mg/L	50 UD3	27.2	100 UD3	81.3	66.3	50 UD3	128	65.6

See Notes on Page 5.

Table 3
Groundwater Analytical Data

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

Location ID: Date Collected: SDG:	NYSDEC TOGS 1 1 1 (GA Groundwater)	Units	BMW2 02/20/19 30280927	BMW3 02/19/19 30280833	BMW7 02/19/19 30280833	BMW8 02/19/19 30280833	BMW9 02/18/19 30280833	BMW14R 02/20/19 30280927	MW-202 02/19/19 30280833	MW-203 02/19/19 30280833
Field Parameters										
pH	- -		7.01	7.41	6.89	6.76	7.19	7.19	7.05	7.17
Temperature	- -	C	5.36	2.09	5.21	4.88	4.01	4.38	3.79	1.06
Conductivity	- -	mS/cm	0.483	0.904	0.823	0.902	0.820	1.003	1.025	0.657
Dissolved Oxygen	- -	mg/L	5.82	14.74	5.56	2.13	2.60	5.23	5.65	6.44
ORP	- -	mV	48.7	88.4	90.2	69.2	47.0	-42.7	103.2	78.2
Turbidity	- -	NTU	21.9	8.7	74	4.58	1.36	10.2	10.6	40.2

See Notes on Page 5.

Table 3
Groundwater Analytical Data

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

Location ID: Date Collected: SDG:	NYSDEC TOGS 1 1 1 (GA Groundwater)	Units	MW-204 02/18/19 30280833	MW-205 02/18/19 30280833	MW-207 02/18/19 30280833	MW-208 02/18/19 30280833	MW-210 02/20/19 30280927	MW-211* 02/18/19 30280833	PZ106S 02/20/19 30280927
VOCs (EPA 8260C)									
1,2,4-Trimethylbenzene	5	ug/L	**8.6**	1 U	1 U [1 U]	**32.7**	**8.4**	1 U	1 U
1,3,5-Trimethylbenzene	5	ug/L	2.3	1 U	1 U [1 U]	**20.5**	2.3	1 U	1 U
Benzene	1	ug/L	**4.6**	1 U	1 U [1 U]	1 U	1 U	1 U	1 U
Ethanol	- -	ug/L	200 UL13c	200 UL13c	200 UL13c [200 UL13c]	200 UL13c	200 UCL2c	200 UL13c	200 UCL2c
Ethylbenzene	5	ug/L	4.2	1 U	1 U [1 U]	4.7	1 U	1 U	1 U
Isopropylbenzene	5	ug/L	1.3	1 U	1 U [1 U]	**5.7**	1 U	1 U	1 U
m&p-Xylene	5	ug/L	**8.2**	2 U	2 U [2 U]	**15.6**	3.7	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]	3.7	4.1	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	3.2	1 U	1 U [1 U]	**6**	1 U	1 U	1 U
o-Xylene	5	ug/L	1.3	1 U	1 U [1 U]	3.2	1.8	1 U	1 U
p-Isopropyltoluene	5	ug/L	1 U	1 U	1 U [1 U]	2.5	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	2.4	1 U	1 U [1 U]	1 U	1 U	1 U	1 U
Total VOCs	- -	ug/L	36.1	200 U	200 U [200 U]	94.6	20.3	200 U	200 U
SVOCs (EPA 8270D by SIM)									
Acenaphthene	20	ug/L	0.1 U	0.1 U	0.1 U1c [0.12 U]	0.1 U	0.1 U1c	0.1 U1c2c	0.1 U1c
Acenaphthylene	- -	ug/L	0.1 U	0.1 U	0.1 U1c [0.12 U]	0.1 U	0.1 U1c	0.1 U1c2c	0.1 U1c
Anthracene	50	ug/L	0.1 U	0.1 U	0.1 U1c [0.12 U]	0.1 U	0.1 U1c	0.1 U1c2c	0.1 U1c
Benz(a)Anthracene	0.002	ug/L	0.1 U	0.1 U	0.1 U1c [0.12 U]	0.1 U	0.1 U1c	0.1 U1c2c	0.1 U1c
Benzo(a)Pyrene	- -	ug/L	0.1 U	0.1 U	0.1 U1c [0.12 U]	0.1 U	0.1 U1c	0.1 U1c2c	0.1 U1c
Benzo(b)Fluoranthene	0.002	ug/L	0.1 U	0.1 U	0.1 U1c [0.12 U]	0.1 U	0.1 U1c	0.1 U1c2c	0.1 U1c
Benzo(g,h,i)Perylene	- -	ug/L	0.1 U	0.1 U	0.1 U1c [0.12 U]	0.1 U	0.1 U1c	0.1 U1c2c	0.1 U1c
Benzo(k)Fluoranthene	0.002	ug/L	0.1 U	0.1 U	0.1 U1c [0.12 U]	0.1 U	0.1 U1c	0.1 U1c2c	0.1 U1c
Chrysene	0.002	ug/L	0.1 U	0.1 U	0.1 U1c [0.12 U]	0.1 U	0.1 U1c	0.1 U1c2c	0.1 U1c
Dibenzo(a,h)Anthracene	- -	ug/L	0.1 U	0.1 U	0.1 U1c [0.12 U]	0.1 U	0.1 U1c	0.1 U1c2c	0.1 U1c
Fluoranthene	50	ug/L	0.1 U	0.1 U	0.1 U1c [0.12 U]	0.1 U	0.1 U1c	0.1 U1c2c	0.1 U1c
Fluorene	50	ug/L	0.1 U	0.1 U	0.1 U1c [0.12 U]	0.1 U	0.1 U1c	0.1 U1c2c	0.1 U1c
Indeno(1,2,3-cd)Pyrene	0.002	ug/L	0.1 U	0.1 U	0.1 U1c [0.12 U]	0.1 U	0.1 U1c	0.1 U1c2c	0.1 U1c
Phenanthrene	50	ug/L	0.1 U	0.1 U	0.1 U1c [0.12 U]	0.1 U	0.1 U1c	0.1 U1c2c	0.1 U1c
Pyrene	50	ug/L	0.1 U	0.1 U	0.1 U1c [0.12 U]	0.1 U	0.1 U1c	0.1 U1c2c	0.1 U1c
Total SVOCs	- -	ug/L	0.1 U	0.1 U	0.1 U [0.12 U]	0.1 U	0.1 U	0.1 U	0.1 U
Metals (EPA 6010B)									
Manganese	300	ug/L	**1,180**	46.8	37.3 [98.6]	**1,300**	181	**872**	201
Dissolved Metals									
Manganese	300	ug/L	**1,030**	35.4	5 U [5 U]	**1,060**	5 U	29.7	12.2
General Chemistry									
Alkalinity, Carbonate (pH4.5)	- -	mg/L	10 UH1	10 UH1	10 UH1 [10 UH1]	10 UH1	10 U	10 UH1	10 U
Alkalinity,Bicarbonate (pH4.5)	- -	mg/L	540 H1	310 H1	260 H1 [260 H1]	470 H1	296	430 H1	352
Alkalinity,Total (CaCO3 pH4.5)	- -	mg/L	540 H1	310 H1	260 H1 [260 H1]	470 H1	296	430 H1	352
Iron, Ferrous	- -	mg/L	0.55 H3H6	0.24 H3H6	0.1 UH3H6 [0.1 UH3H6]	0.11 H3H6	0.1 UH6H1	0.1 UH3H6	0.1 UH3H6
Nitrogen, NO2 plus NO3	- -	mg/L	0.1 U	0.1 U	0.86 [0.86]	0.1 U	1.8	0.1 U	0.9
Sulfate	- -	mg/L	30.8	502	24.1 [23.9]	51	10 U	61.2	53.7

See Notes on Page 5.

Table 3
Groundwater Analytical Data

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

Location ID: Date Collected: SDG:	NYSDEC TOGS 1 1 1 (GA Groundwater)	Units	MW-204 02/18/19 30280833	MW-205 02/18/19 30280833	MW-207 02/18/19 30280833	MW-208 02/18/19 30280833	MW-210 02/20/19 30280927	MW-211* 02/18/19 30280833	PZ106S 02/20/19 30280927
Field Parameters									
pH	- -		6.97	7.03	7.96	7.08	7.29	7.42	7.32
Temperature	- -	C	4.32	5.37	4.24	5.24	2.47	2.56	4.85
Conductivity	- -	mS/cm	0.977	1.170	0.514	0.931	0.652	0.884	0.675
Dissolved Oxygen	- -	mg/L	4.80	6.25	9.74	2.82	9.14	8.35	9.98
ORP	- -	mV	11.1	40.5	93.2	70.9	-43.5	61.1	74.0
Turbidity	- -	NTU	3.38	6.66	20.1	25.9	16.1	14.5	39.9

See Notes on Page 5.

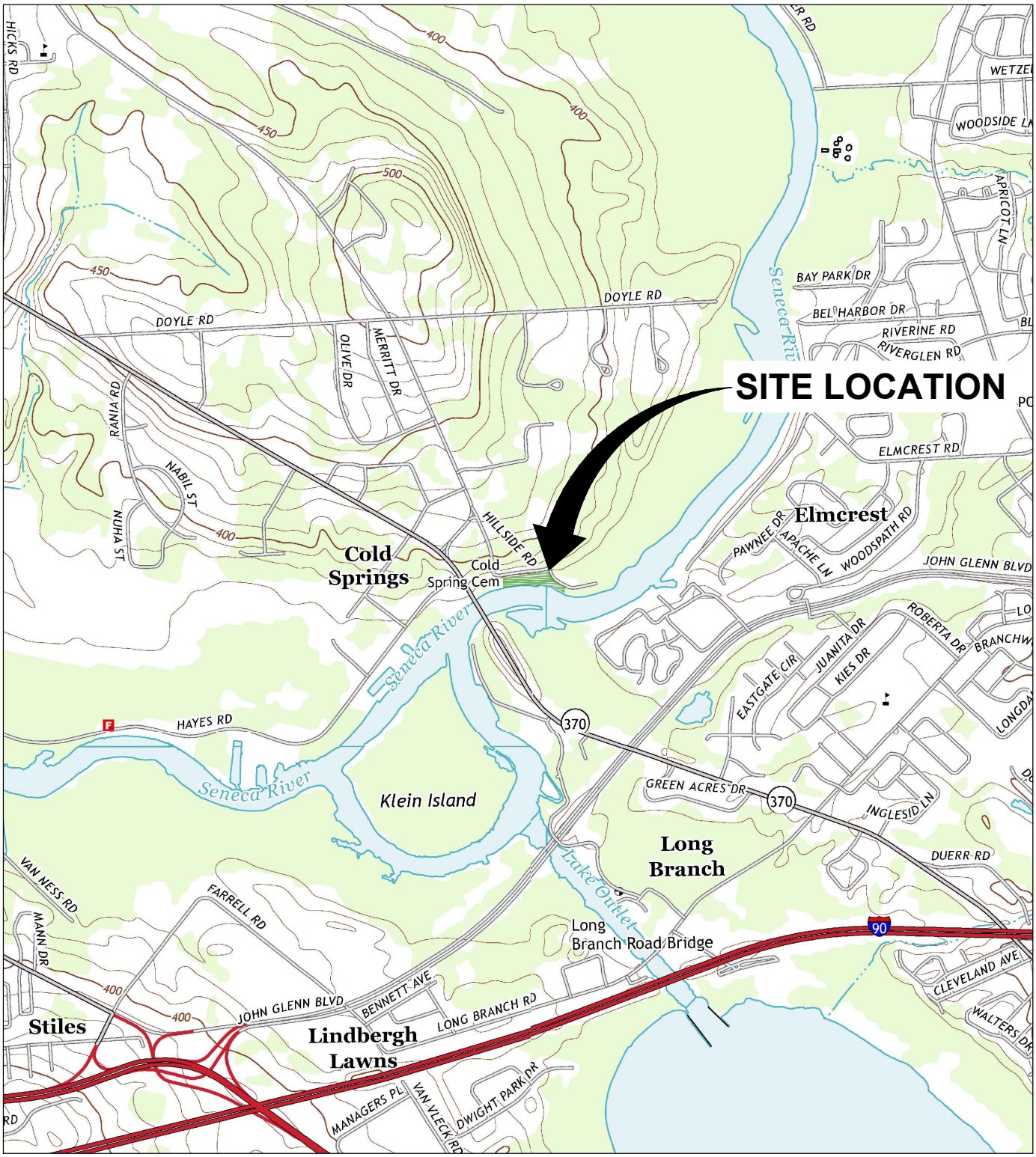
Table 3
Groundwater Analytical Data

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

Notes:
* The lab identified MW-211 had residual chlorine of the 1L glass amber unpreserved jar (SVOC) when checked at the time of login.
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.
C = Celsius
mS/cm = MilliSiemens per centimeter
mg/L = Milligrams per liter
mV = Millivolt
NTU = Nephelometric turbidity unit
SVOC = Semivolatile organic compound
VOC = Volatile organic compound
ug/L = Micrograms per liter

Lab Qualifiers	Definition
1c	A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.
2c	Dechlorinated 02/26/19.
3c	Minimum RF criteria not met.
CL	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased low.
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.
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.
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.
R1	RPD value was outside control limits.
U	Indicates the compound was analyzed for, but not detected.

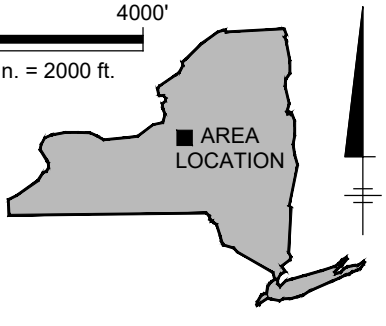
FIGURES



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 - FIRST QUARTER

SITE LOCATION MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER PIC: PM: V. MARESCO TM: R. HENSEL TR: N. GRIFFITH LYR:(Opt)ON=*;OFF=*REF*
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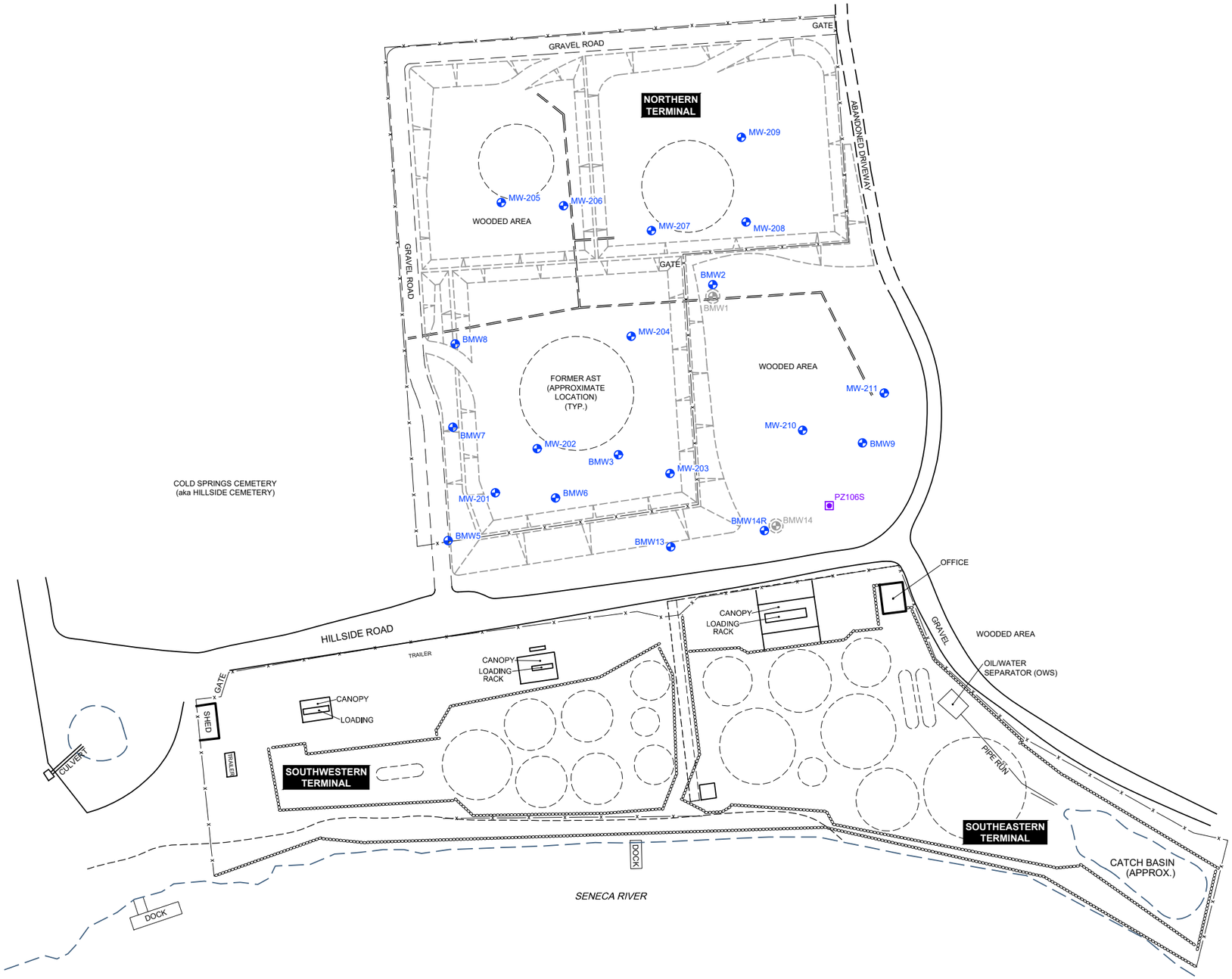
2019Q1-Title Block



LEGEND:

- MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- PIEZOMETER
- FORMER AST
- 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 - FIRST 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:(Opt)ON=*;OFF=*REF*
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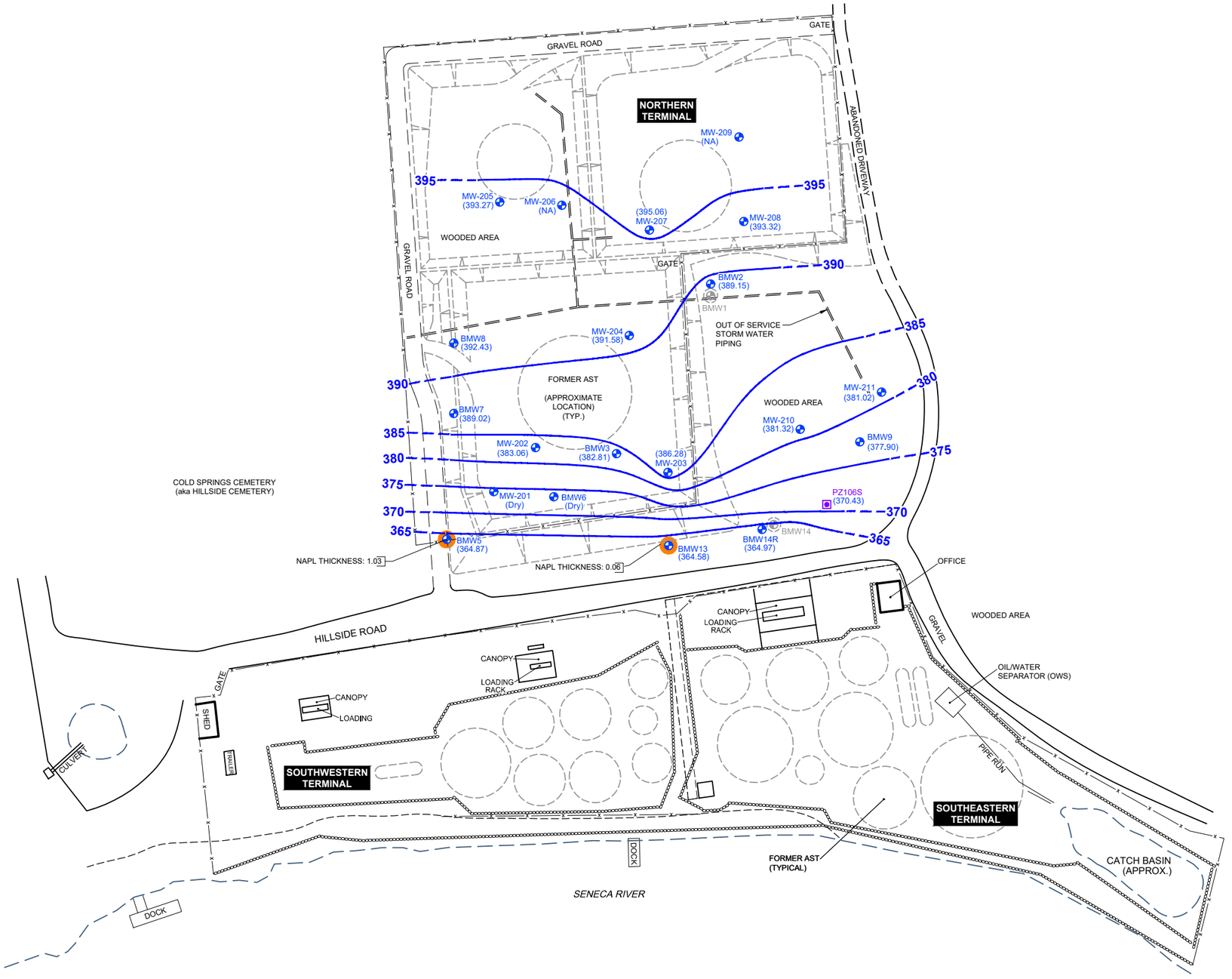
X-Base Map



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)
- (386.28) GROUNDWATER ELEVATION (FT AMSL)
- NAPL DETECTED
- NA NOT APPLICABLE (FROZEN)

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.
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 - FIRST QUARTER

GROUNDWATER CONTOUR

ARCADIS Design & Consultancy for natural and built assets

FIGURE 3

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER PIC: PM: V. MARESCO TM: R. HENSEL TR: K. ROSKOFF LYR:(Opt)ON="OFF=*REF"
C:\BIM\OneDrive - ARCADIS\BIM 360 Docs\ANA - BP AMOCO CORPORATION\Buckeye Pipeline Company\2019\B0090004.0011\01-DWG\2019Q1_Fig3_GW CONT 2018Q4.dwg LAYOUT: 3 SAVED: 4/10/2019 9:58 PM ACADVER: 21.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB
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XREFS: IMAGES: PROJECTNAME: ----
2019Q1-Title Block
X-Base Map

MW-206				
Date	5/15/2018	9/24/2018	12/3/2018	2/18/2019
Total VOC (ppb)	NI	200 U	200 U [200 U]	Frozen
Total SVOC (ppb)	NI	0.098 U	0.1 U [0.1 U]	Frozen

MW-207				
Date	5/15/2018	9/24/2018	12/3/2018	2/18/2019
Total VOC (ppb)	NI	200 U	200 U	200 U [200 U]
Total SVOC (ppb)	NI	0.1 U	0.1 U	0.1 U [0.12 U]

MW-209				
Date	5/15/2018	9/24/2018	12/3/2018	2/18/2019
Total VOC (ppb)	NI	1.1 [1]	200 U	Frozen
Total SVOC (ppb)	NI	0.099 U [0.099 U]	0.091 U	Frozen

MW-208				
Date	5/15/2018	9/24/2018	12/3/2018	2/18/2019
Total VOC (ppb)	NI	202.1	58.6	94.6
Total SVOC (ppb)	NI	0.099 U	0.091 U	0.1 U

MW-205				
Date	5/15/2018	9/24/2018	12/3/2018	2/18/2019
Total VOC (ppb)	NI	6.0	200 U	200 U
Total SVOC (ppb)	NI	0.1 U	0.1 U	0.1 U

BMW2				
Date	5/17/2018	9/25/2018	12/4/2018	2/20/2019
Total VOC (ppb)	200 U	200 U	200 U	200 U
Total SVOC (ppb)	0.099 U	0.1 U	0.098 U	0.1 U

BMW8				
Date	5/14/2018	9/25/2018	12/4/2018	2/19/2019
Total VOC (ppb)	200 U	200 U	200 U	200 U
Total SVOC (ppb)	0.099 U	0.098 U	0.099 U	0.1 U

MW-210				
Date	5/15/2018	9/26/2018	12/4/2018	2/20/2019
Total VOC (ppb)	NI	200 U	200 U	20.3
Total SVOC (ppb)	NI	0.13	0.098 U	0.1 U

MW-202				
Date	5/15/2018	9/25/2018	12/3/2018	2/19/2019
Total VOC (ppb)	NI	Dry	Dry	200 U
Total SVOC (ppb)	NI	Dry	Dry	0.11 U

MW-211				
Date	5/15/2018	9/25/2018	12/4/2018	2/18/2019
Total VOC (ppb)	NI	200 U	200 U	200 U
Total SVOC (ppb)	NI	0.29 U	0.098 U	0.1 U

BMW7				
Date	5/14/2018	9/25/2018	12/3/2018	2/19/2019
Total VOC (ppb)	200 U	Dry	Dry	200 U
Total SVOC (ppb)	0.099 U	Dry	Dry	0.1 U

BMW9				
Date	5/17/2018	9/25/2018	12/4/2018	2/18/2019
Total VOC (ppb)	1.3	Dry	200 U	200 U
Total SVOC (ppb)	0.097 U	Dry	0.098 U	0.1 U

MW-201				
Date	5/15/2018	9/25/2018	12/3/2018	2/18/2019
Total VOC (ppb)	NI	Dry	Dry	Dry
Total SVOC (ppb)	NI	Dry	Dry	Dry

PZ106S				
Date	5/17/2018	9/26/2018	12/5/2018	2/20/2019
Total VOC (ppb)	200 U	200 U	200 U	200 U
Total SVOC (ppb)	0.097 U	0.11 U	0.097 U	0.1 U

BMW5				
Date	5/15/2018	9/25/2018	12/3/2018	2/18/2019
Total VOC (ppb)	NP	NP	NP	NP
Total SVOC (ppb)	NP	NP	NP	NP

BMW14R				
Date	8/6/2018	9/25/2018	12/5/2018	2/20/2019
Total VOC (ppb)	2,979.7	4,757.6	4,345.8	4,156.0
Total SVOC (ppb)	1.53	6.82	0.93	1.92

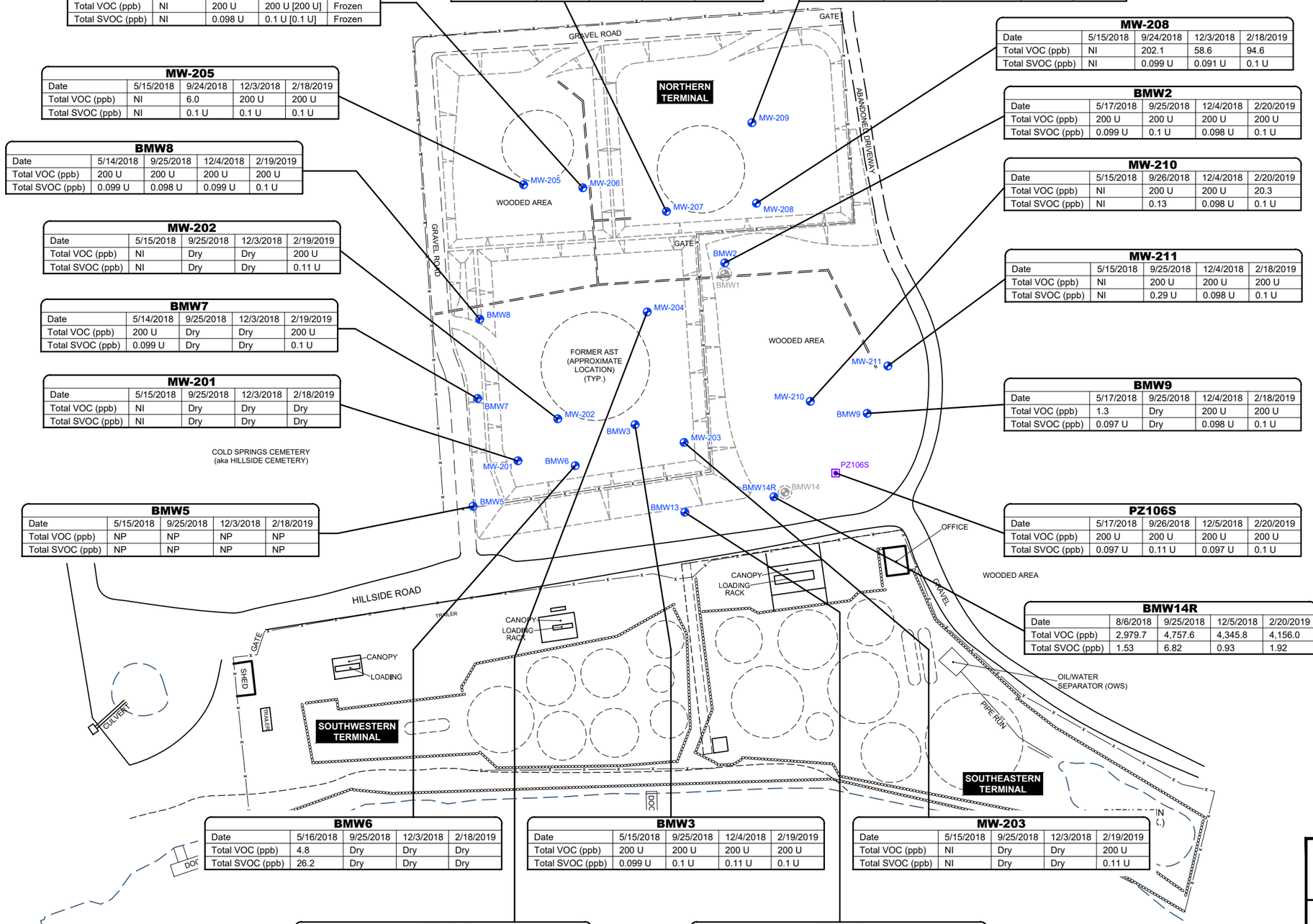
BMW6				
Date	5/16/2018	9/25/2018	12/3/2018	2/18/2019
Total VOC (ppb)	4.8	Dry	Dry	Dry
Total SVOC (ppb)	26.2	Dry	Dry	Dry

BMW3				
Date	5/15/2018	9/25/2018	12/4/2018	2/19/2019
Total VOC (ppb)	200 U	200 U	200 U	200 U
Total SVOC (ppb)	0.099 U	0.1 U	0.11 U	0.1 U

MW-203				
Date	5/15/2018	9/25/2018	12/3/2018	2/19/2019
Total VOC (ppb)	NI	Dry	Dry	200 U
Total SVOC (ppb)	NI	Dry	Dry	0.11 U

MW-204				
Date	5/15/2018	9/25/2018	12/3/2018	2/18/2019
Total VOC (ppb)	NI	138.5	5.3	36.1
Total SVOC (ppb)	NI	0.099 U	0.083 U	0.1 U

BMW13				
Date	5/17/2018	9/25/2018	12/5/2018	2/18/2019
Total VOC (ppb)	25,838	NP	38,276.9	NP
Total SVOC (ppb)	8.8	Dry	2.05	NP



LEGEND:

- MONITORING WELL
- DECOMMISSIONED MONITORING WELL
- PIEZOMETER
- FORMER AST
- 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. AST = ABOVE GROUND STORAGE TANK.
5. U = INDICATES THE COMPOUND WAS ANALYZED FOR, BUT NOT DETECTED.
6. NI = NOT INSTALLED.
7. NP = NAPL PRESENT.
8. Dry/Frozen = INSUFFICIENT WATER TO COLLECT A SAMPLE.
9. FIELD DUPLICATE SAMPLE RESULTS ARE PRESENTED IN BRACKETS.

0 100' 200'

GRAPHIC SCALE

NORTHERN COLD SPRINGS TERMINAL
LYSANDER, NEW YORK

GROUNDWATER SAMPLING SUMMARY 2019 - FIRST 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:(On)ON=*;OFF=*REF*
C:\BIM\OneDrive - ARCADIS\BIM 360 Docs\ANA - BP AMOCO CORPORATION\Buckeye Pipeline Company\2019\B0090004.0011\01-DWG\2019Q1_Fig4_Databoxes.dwg LAYOUT: 4 SAVED: 4/10/2019 10:03 PM ACADVER: 21.0S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 4/11/2019 8:36 AM BY: KRAHMER, ERIC
XREFS: IMAGES: PROJECTNAME: ---
2019Q1-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

March 07, 2019

Vin Maresco
Arcadis
6723 Towpath Road
Syracuse, NY 13214

RE: Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280833

Dear Vin Maresco:
Enclosed are the analytical results for sample(s) received by the laboratory on February 20, 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 Dissolved Gases analysis. The results of this analysis are reported on the Pace Analytical Energy Services data tables attached.

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

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

cc: Mr. Mike Teeling, Woodard & Curran

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.: 30280833

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
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
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Greensburg, PA 15601
(724)850-5600

SAMPLE SUMMARY

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280833

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30280833001	**BMW9-021819**	Water	02/18/19 11:45	02/20/19 12:00
30280833002	**BMW9-021819 (MS)**	Water	02/18/19 11:45	02/20/19 12:00
30280833003	**BMW9-021819 (MSD)**	Water	02/18/19 11:45	02/20/19 12:00
30280833004	**MW-211-021819**	Water	02/18/19 12:30	02/20/19 12:00
30280833005	**MW-207-021819**	Water	02/18/19 14:40	02/20/19 12:00
30280833006	**MW-208-021819**	Water	02/18/19 15:00	02/20/19 12:00
30280833007	**MW-205-021819**	Water	02/18/19 17:00	02/20/19 12:00
30280833008	**MW-204-021819**	Water	02/18/19 17:30	02/20/19 12:00
30280833009	**DUP- 021819**	Water	02/18/19 00:01	02/20/19 12:00
30280833010	**TB-021819**	Water	02/18/19 00:01	02/20/19 12:00
30280833011	**BMW3-021919**	Water	02/19/19 14:00	02/20/19 12:00
30280833012	**MW-202-201919**	Water	02/19/19 11:20	02/20/19 12:00
30280833013	**BMW7-201919**	Water	02/19/19 11:35	02/20/19 12:00
30280833014	**MW-203-201919**	Water	02/19/19 13:00	02/20/19 12:00
30280833015	**BMW8-201919**	Water	02/19/19 13:30	02/20/19 12:00

Pace Analytical Services, LLC
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SAMPLE ANALYTE COUNT

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280833

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30280833001	**BMW9-021819**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	KAS	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 D516-90,02	LEP	1	PASI-PA
30280833002	**BMW9-021819 (MS)**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	KAS	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 D516-90,02	LEP	1	PASI-PA
30280833003	**BMW9-021819 (MSD)**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	KAS	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 D516-90,02	LEP	1	PASI-PA
30280833004	**MW-211-021819**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	KAS	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 D516-90,02	LEP	1	PASI-PA
30280833005	**MW-207-021819**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	KAS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	JAS	20	PASI-PA
		SM 2320B-2011	ZMH	3	PASI-PA

Pace Analytical Services, LLC
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SAMPLE ANALYTE COUNT

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280833

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 D516-90,02	LEP	1	PASI-PA
30280833006	**MW-208-021819**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	KAS	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 D516-90,02	LEP	1	PASI-PA
30280833007	**MW-205-021819**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	KAS	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 D516-90,02	LEP	1	PASI-PA
30280833008	**MW-204-021819**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	KAS	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 D516-90,02	LEP	1	PASI-PA
30280833009	**DUP- 021819**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	KAS	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 D516-90,02	LEP	1	PASI-PA
30280833010	**TB-021819**	EPA 8260C	JAS	20	PASI-PA
30280833011	**BMW3-021919**	EPA 6010C	CTS	1	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.: 30280833

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 6010C	KAS	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 D516-90,02	LEP	1	PASI-PA
30280833012	**MW-202-201919**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	KAS	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 D516-90,02	LEP	1	PASI-PA
30280833013	**BMW7-201919**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	KAS	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 D516-90,02	LEP	1	PASI-PA
30280833014	**MW-203-201919**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	KAS	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 D516-90,02	LEP	1	PASI-PA
30280833015	**BMW8-201919**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	KAS	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

Pace Analytical Services, LLC
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(724)850-5600

SAMPLE ANALYTE COUNT

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280833

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 4500NO3F-2011	JLM	1	PASI-PA
		ASTM D516-90,02	LEP	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.: 30280833

Sample: BMW9-021819 **Lab ID: 30280833001** Collected: 02/18/19 11:45 Received: 02/20/19 12:00 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	**92.1**	ug/L	5.0	1.2	1	02/21/19 08:43	02/22/19 10:40	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**43.8**	ug/L	5.0	1.2	1	02/22/19 09:15	02/22/19 16:29	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	02/21/19 11:51	02/22/19 16:13	83-32-9	
Acenaphthylene	ND	ug/L	0.10	0.035	1	02/21/19 11:51	02/22/19 16:13	208-96-8	
Anthracene	ND	ug/L	0.10	0.028	1	02/21/19 11:51	02/22/19 16:13	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.10	0.040	1	02/21/19 11:51	02/22/19 16:13	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.10	0.013	1	02/21/19 11:51	02/22/19 16:13	50-32-8	R1
Benzo(b)fluoranthene	ND	ug/L	0.10	0.028	1	02/21/19 11:51	02/22/19 16:13	205-99-2	R1
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.036	1	02/21/19 11:51	02/22/19 16:13	191-24-2	R1
Benzo(k)fluoranthene	ND	ug/L	0.10	0.024	1	02/21/19 11:51	02/22/19 16:13	207-08-9	R1
Chrysene	ND	ug/L	0.10	0.041	1	02/21/19 11:51	02/22/19 16:13	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.028	1	02/21/19 11:51	02/22/19 16:13	53-70-3	R1
Fluoranthene	ND	ug/L	0.10	0.033	1	02/21/19 11:51	02/22/19 16:13	206-44-0	
Fluorene	ND	ug/L	0.10	0.032	1	02/21/19 11:51	02/22/19 16:13	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.031	1	02/21/19 11:51	02/22/19 16:13	193-39-5	R1
Phenanthrene	ND	ug/L	0.10	0.045	1	02/21/19 11:51	02/22/19 16:13	85-01-8	
Pyrene	ND	ug/L	0.10	0.037	1	02/21/19 11:51	02/22/19 16:13	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	34	%.	19-97		1	02/21/19 11:51	02/22/19 16:13	321-60-8	
Terphenyl-d14 (S)	46	%.	47-105		1	02/21/19 11:51	02/22/19 16:13	1718-51-0	S8,SR
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.24	1		02/21/19 12:30	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.20	1		02/21/19 12:30	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 12:30	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.28	1		02/21/19 12:30	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 12:30	64-17-5	3c,L1, MH
Ethylbenzene	ND	ug/L	1.0	0.31	1		02/21/19 12:30	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.24	1		02/21/19 12:30	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.36	1		02/21/19 12:30	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 12:30	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		02/21/19 12:30	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.29	1		02/21/19 12:30	103-65-1	
Toluene	ND	ug/L	1.0	0.30	1		02/21/19 12:30	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 12:30	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.21	1		02/21/19 12:30	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.60	1		02/21/19 12:30	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.18	1		02/21/19 12:30	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	103	%.	78-122		1		02/21/19 12:30	460-00-4	
1,2-Dichloroethane-d4 (S)	102	%.	80-120		1		02/21/19 12:30	17060-07-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280833

Sample: BMW9-021819 **Lab ID: 30280833001** Collected: 02/18/19 11:45 Received: 02/20/19 12:00 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		02/21/19 12:30	2037-26-5	
Dibromofluoromethane (S)	100	%.	80-120		1		02/21/19 12:30	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**390**	mg/L	10.0	10.0	1		03/05/19 20:42		H1
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		03/05/19 20:42		H1
Alkalinity,Total (CaCO3 pH4.5)	**390**	mg/L	10.0	1.0	1		03/05/19 20:42		H1,ML
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		02/20/19 16:10		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.028	1		02/25/19 11:56		ML
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	**66.3**	mg/L	50.0	23.4	5		02/21/19 13:51	14808-79-8	

Sample: BMW9-021819 (MS) **Lab ID: 30280833002** Collected: 02/18/19 11:45 Received: 02/20/19 12:00 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	**134**	ug/L	5.0	1.2	1	02/21/19 08:43	02/22/19 10:49	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**41.1**	ug/L	5.0	1.2	1	02/22/19 09:15	02/22/19 16:38	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	**1.1**	ug/L	0.10	0.030	1	02/21/19 11:51	02/22/19 16:33	83-32-9	
Acenaphthylene	**1.1**	ug/L	0.10	0.035	1	02/21/19 11:51	02/22/19 16:33	208-96-8	
Anthracene	**1.2**	ug/L	0.10	0.028	1	02/21/19 11:51	02/22/19 16:33	120-12-7	
Benzo(a)anthracene	**1.3**	ug/L	0.10	0.040	1	02/21/19 11:51	02/22/19 16:33	56-55-3	
Benzo(a)pyrene	**1.0**	ug/L	0.10	0.013	1	02/21/19 11:51	02/22/19 16:33	50-32-8	
Benzo(b)fluoranthene	**1.1**	ug/L	0.10	0.028	1	02/21/19 11:51	02/22/19 16:33	205-99-2	
Benzo(g,h,i)perylene	**0.93**	ug/L	0.10	0.036	1	02/21/19 11:51	02/22/19 16:33	191-24-2	
Benzo(k)fluoranthene	**1.1**	ug/L	0.10	0.024	1	02/21/19 11:51	02/22/19 16:33	207-08-9	
Chrysene	**1.3**	ug/L	0.10	0.041	1	02/21/19 11:51	02/22/19 16:33	218-01-9	
Dibenz(a,h)anthracene	**1.0**	ug/L	0.10	0.028	1	02/21/19 11:51	02/22/19 16:33	53-70-3	
Fluoranthene	**1.5**	ug/L	0.10	0.033	1	02/21/19 11:51	02/22/19 16:33	206-44-0	
Fluorene	**1.1**	ug/L	0.10	0.032	1	02/21/19 11:51	02/22/19 16:33	86-73-7	
Indeno(1,2,3-cd)pyrene	**0.96**	ug/L	0.10	0.031	1	02/21/19 11:51	02/22/19 16:33	193-39-5	
Phenanthrene	**1.4**	ug/L	0.10	0.045	1	02/21/19 11:51	02/22/19 16:33	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.: 30280833

Sample: BMW9-021819 (MS) **Lab ID: 30280833002** Collected: 02/18/19 11:45 Received: 02/20/19 12:00 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	**1.5**	ug/L	0.10	0.037	1	02/21/19 11:51	02/22/19 16:33	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	52	%.	19-97		1	02/21/19 11:51	02/22/19 16:33	321-60-8	
Terphenyl-d14 (S)	57	%.	47-105		1	02/21/19 11:51	02/22/19 16:33	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	**22.5**	ug/L	1.0	0.24	1		02/21/19 20:04	71-43-2	
n-Butylbenzene	**22.5**	ug/L	1.0	0.20	1		02/21/19 20:04	104-51-8	
sec-Butylbenzene	**23.0**	ug/L	1.0	0.25	1		02/21/19 20:04	135-98-8	
tert-Butylbenzene	**22.9**	ug/L	1.0	0.28	1		02/21/19 20:04	98-06-6	
Ethanol	**350**	ug/L	200	79.8	1		02/21/19 20:04	64-17-5	3c,L1
Ethylbenzene	**21.9**	ug/L	1.0	0.31	1		02/21/19 20:04	100-41-4	
Isopropylbenzene (Cumene)	**23.0**	ug/L	1.0	0.24	1		02/21/19 20:04	98-82-8	
p-Isopropyltoluene	**22.2**	ug/L	1.0	0.36	1		02/21/19 20:04	99-87-6	
Methyl-tert-butyl ether	**18.5**	ug/L	1.0	0.23	1		02/21/19 20:04	1634-04-4	
Naphthalene	**23.0**	ug/L	2.0	0.82	1		02/21/19 20:04	91-20-3	
n-Propylbenzene	**22.2**	ug/L	1.0	0.29	1		02/21/19 20:04	103-65-1	
Toluene	**21.5**	ug/L	1.0	0.30	1		02/21/19 20:04	108-88-3	
1,2,4-Trimethylbenzene	**23.1**	ug/L	1.0	0.25	1		02/21/19 20:04	95-63-6	
1,3,5-Trimethylbenzene	**22.4**	ug/L	1.0	0.21	1		02/21/19 20:04	108-67-8	
m&p-Xylene	**44.2**	ug/L	2.0	0.60	1		02/21/19 20:04	179601-23-1	
o-Xylene	**21.8**	ug/L	1.0	0.18	1		02/21/19 20:04	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	107	%.	78-122		1		02/21/19 20:04	460-00-4	
1,2-Dichloroethane-d4 (S)	99	%.	80-120		1		02/21/19 20:04	17060-07-0	
Toluene-d8 (S)	99	%.	80-120		1		02/21/19 20:04	2037-26-5	
Dibromofluoromethane (S)	100	%.	80-120		1		02/21/19 20:04	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**380**	mg/L	10.0	10.0	1		03/05/19 20:57		H1
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		03/05/19 20:57		H1
Alkalinity,Total (CaCO3 pH4.5)	**380**	mg/L	10.0	1.0	1		03/05/19 20:57		H1
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	**0.97**	mg/L	0.10	0.020	1		02/20/19 16:15		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.028	1		02/25/19 12:00		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	**65.6**	mg/L	50.0	23.4	5		02/21/19 13:55	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.: 30280833

Sample: BMW9-021819 (MSD) **Lab ID: 30280833003** Collected: 02/18/19 11:45 Received: 02/20/19 12:00 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	**101**	ug/L	5.0	1.2	1	02/21/19 08:43	02/22/19 10:51	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**39.4**	ug/L	5.0	1.2	1	02/22/19 09:15	02/22/19 16:40	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	**0.95**	ug/L	0.11	0.031	1	02/21/19 11:51	02/22/19 16:53	83-32-9	
Acenaphthylene	**0.95**	ug/L	0.11	0.036	1	02/21/19 11:51	02/22/19 16:53	208-96-8	
Anthracene	**1.1**	ug/L	0.11	0.029	1	02/21/19 11:51	02/22/19 16:53	120-12-7	
Benzo(a)anthracene	**1.0**	ug/L	0.11	0.041	1	02/21/19 11:51	02/22/19 16:53	56-55-3	
Benzo(a)pyrene	**0.75**	ug/L	0.11	0.013	1	02/21/19 11:51	02/22/19 16:53	50-32-8	
Benzo(b)fluoranthene	**0.82**	ug/L	0.11	0.029	1	02/21/19 11:51	02/22/19 16:53	205-99-2	
Benzo(g,h,i)perylene	**0.65**	ug/L	0.11	0.038	1	02/21/19 11:51	02/22/19 16:53	191-24-2	
Benzo(k)fluoranthene	**0.80**	ug/L	0.11	0.024	1	02/21/19 11:51	02/22/19 16:53	207-08-9	
Chrysene	**1.0**	ug/L	0.11	0.042	1	02/21/19 11:51	02/22/19 16:53	218-01-9	
Dibenz(a,h)anthracene	**0.72**	ug/L	0.11	0.029	1	02/21/19 11:51	02/22/19 16:53	53-70-3	
Fluoranthene	**1.3**	ug/L	0.11	0.034	1	02/21/19 11:51	02/22/19 16:53	206-44-0	
Fluorene	**0.98**	ug/L	0.11	0.033	1	02/21/19 11:51	02/22/19 16:53	86-73-7	
Indeno(1,2,3-cd)pyrene	**0.63**	ug/L	0.11	0.032	1	02/21/19 11:51	02/22/19 16:53	193-39-5	
Phenanthrene	**1.2**	ug/L	0.11	0.047	1	02/21/19 11:51	02/22/19 16:53	85-01-8	
Pyrene	**1.3**	ug/L	0.11	0.038	1	02/21/19 11:51	02/22/19 16:53	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	45	%.	19-97		1	02/21/19 11:51	02/22/19 16:53	321-60-8	
Terphenyl-d14 (S)	45	%.	47-105		1	02/21/19 11:51	02/22/19 16:53	1718-51-0	S8,SR
8260C MSV	Analytical Method: EPA 8260C								
Benzene	**22.0**	ug/L	1.0	0.24	1		02/21/19 20:30	71-43-2	
n-Butylbenzene	**22.0**	ug/L	1.0	0.20	1		02/21/19 20:30	104-51-8	
sec-Butylbenzene	**22.5**	ug/L	1.0	0.25	1		02/21/19 20:30	135-98-8	
tert-Butylbenzene	**22.3**	ug/L	1.0	0.28	1		02/21/19 20:30	98-06-6	
Ethanol	**360**	ug/L	200	79.8	1		02/21/19 20:30	64-17-5	3c,L1
Ethylbenzene	**22.4**	ug/L	1.0	0.31	1		02/21/19 20:30	100-41-4	
Isopropylbenzene (Cumene)	**22.9**	ug/L	1.0	0.24	1		02/21/19 20:30	98-82-8	
p-Isopropyltoluene	**22.5**	ug/L	1.0	0.36	1		02/21/19 20:30	99-87-6	
Methyl-tert-butyl ether	**19.1**	ug/L	1.0	0.23	1		02/21/19 20:30	1634-04-4	
Naphthalene	**22.6**	ug/L	2.0	0.82	1		02/21/19 20:30	91-20-3	
n-Propylbenzene	**22.0**	ug/L	1.0	0.29	1		02/21/19 20:30	103-65-1	
Toluene	**22.4**	ug/L	1.0	0.30	1		02/21/19 20:30	108-88-3	
1,2,4-Trimethylbenzene	**23.1**	ug/L	1.0	0.25	1		02/21/19 20:30	95-63-6	
1,3,5-Trimethylbenzene	**22.1**	ug/L	1.0	0.21	1		02/21/19 20:30	108-67-8	
m&p-Xylene	**44.2**	ug/L	2.0	0.60	1		02/21/19 20:30	179601-23-1	
o-Xylene	**21.4**	ug/L	1.0	0.18	1		02/21/19 20:30	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	106	%.	78-122		1		02/21/19 20:30	460-00-4	
1,2-Dichloroethane-d4 (S)	102	%.	80-120		1		02/21/19 20:30	17060-07-0	
Toluene-d8 (S)	99	%.	80-120		1		02/21/19 20:30	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.: 30280833

Sample: BMW9-021819 (MSD) **Lab ID: 30280833003** Collected: 02/18/19 11:45 Received: 02/20/19 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
Dibromofluoromethane (S)	106	%.	80-120		1		02/21/19 20:30	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**360**	mg/L	10.0	10.0	1		03/05/19 20:58		H1
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		03/05/19 20:58		H1
Alkalinity,Total (CaCO3 pH4.5)	**360**	mg/L	10.0	1.0	1		03/05/19 20:58		H1
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	**0.90**	mg/L	0.10	0.020	1		02/20/19 16:15		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.028	1		02/25/19 12:01		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	**62.9**	mg/L	50.0	23.4	5		02/21/19 13:57	14808-79-8	

Sample: MW-211-021819 **Lab ID: 30280833004** Collected: 02/18/19 12:30 Received: 02/20/19 12:00 Matrix: Water

Comments: • Sample tested positive for chlorine.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese	**872**	ug/L	5.0	1.2	1	02/21/19 08:43	02/22/19 10:53	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**29.7**	ug/L	5.0	1.2	1	02/22/19 09:15	02/22/19 16:42	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	02/25/19 12:35	02/26/19 17:35	83-32-9	1c,2c
Acenaphthylene	ND	ug/L	0.10	0.035	1	02/25/19 12:35	02/26/19 17:35	208-96-8	1c,2c
Anthracene	ND	ug/L	0.10	0.029	1	02/25/19 12:35	02/26/19 17:35	120-12-7	1c,2c
Benzo(a)anthracene	ND	ug/L	0.10	0.041	1	02/25/19 12:35	02/26/19 17:35	56-55-3	1c,2c
Benzo(a)pyrene	ND	ug/L	0.10	0.013	1	02/25/19 12:35	02/26/19 17:35	50-32-8	1c,2c
Benzo(b)fluoranthene	ND	ug/L	0.10	0.028	1	02/25/19 12:35	02/26/19 17:35	205-99-2	1c,2c
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.037	1	02/25/19 12:35	02/26/19 17:35	191-24-2	1c,2c
Benzo(k)fluoranthene	ND	ug/L	0.10	0.024	1	02/25/19 12:35	02/26/19 17:35	207-08-9	1c,2c
Chrysene	ND	ug/L	0.10	0.042	1	02/25/19 12:35	02/26/19 17:35	218-01-9	1c,2c
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.029	1	02/25/19 12:35	02/26/19 17:35	53-70-3	1c,2c
Fluoranthene	ND	ug/L	0.10	0.034	1	02/25/19 12:35	02/26/19 17:35	206-44-0	1c,2c
Fluorene	ND	ug/L	0.10	0.032	1	02/25/19 12:35	02/26/19 17:35	86-73-7	1c,2c
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.031	1	02/25/19 12:35	02/26/19 17:35	193-39-5	1c,2c
Phenanthrene	ND	ug/L	0.10	0.046	1	02/25/19 12:35	02/26/19 17:35	85-01-8	1c,2c

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.: 30280833

Sample: MW-211-021819 **Lab ID: 30280833004** Collected: 02/18/19 12:30 Received: 02/20/19 12:00 Matrix: Water

Comments: • Sample tested positive for chlorine.

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	02/25/19 12:35	02/26/19 17:35	129-00-0	1c,2c
Surrogates									
2-Fluorobiphenyl (S)	41	%.	19-97		1	02/25/19 12:35	02/26/19 17:35	321-60-8	
Terphenyl-d14 (S)	56	%.	47-105		1	02/25/19 12:35	02/26/19 17:35	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.24	1		02/21/19 12:57	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.20	1		02/21/19 12:57	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 12:57	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.28	1		02/21/19 12:57	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 12:57	64-17-5	3c,L1
Ethylbenzene	ND	ug/L	1.0	0.31	1		02/21/19 12:57	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.24	1		02/21/19 12:57	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.36	1		02/21/19 12:57	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 12:57	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		02/21/19 12:57	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.29	1		02/21/19 12:57	103-65-1	
Toluene	ND	ug/L	1.0	0.30	1		02/21/19 12:57	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 12:57	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.21	1		02/21/19 12:57	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.60	1		02/21/19 12:57	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.18	1		02/21/19 12:57	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	103	%.	78-122		1		02/21/19 12:57	460-00-4	
1,2-Dichloroethane-d4 (S)	102	%.	80-120		1		02/21/19 12:57	17060-07-0	
Toluene-d8 (S)	97	%.	80-120		1		02/21/19 12:57	2037-26-5	
Dibromofluoromethane (S)	101	%.	80-120		1		02/21/19 12:57	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**430**	mg/L	10.0	10.0	1		03/05/19 21:00		H1
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		03/05/19 21:00		H1
Alkalinity,Total (CaCO3 pH4.5)	**430**	mg/L	10.0	1.0	1		03/05/19 21:00		H1
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		02/20/19 16:17		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.028	1		02/25/19 12:03		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	**61.2**	mg/L	50.0	23.4	5		02/21/19 13:57	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.: 30280833

Sample: MW-207-021819 **Lab ID: 30280833005** Collected: 02/18/19 14:40 Received: 02/20/19 12:00 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	**37.3**	ug/L	5.0	1.2	1	02/21/19 08:43	02/22/19 11:00	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	02/22/19 09:15	02/22/19 16:45	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	02/25/19 12:35	02/26/19 17:54	83-32-9	1c
Acenaphthylene	ND	ug/L	0.10	0.034	1	02/25/19 12:35	02/26/19 17:54	208-96-8	1c
Anthracene	ND	ug/L	0.10	0.028	1	02/25/19 12:35	02/26/19 17:54	120-12-7	1c
Benzo(a)anthracene	ND	ug/L	0.10	0.039	1	02/25/19 12:35	02/26/19 17:54	56-55-3	1c
Benzo(a)pyrene	ND	ug/L	0.10	0.012	1	02/25/19 12:35	02/26/19 17:54	50-32-8	1c
Benzo(b)fluoranthene	ND	ug/L	0.10	0.027	1	02/25/19 12:35	02/26/19 17:54	205-99-2	1c
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.036	1	02/25/19 12:35	02/26/19 17:54	191-24-2	1c
Benzo(k)fluoranthene	ND	ug/L	0.10	0.023	1	02/25/19 12:35	02/26/19 17:54	207-08-9	1c
Chrysene	ND	ug/L	0.10	0.041	1	02/25/19 12:35	02/26/19 17:54	218-01-9	1c
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.028	1	02/25/19 12:35	02/26/19 17:54	53-70-3	1c
Fluoranthene	ND	ug/L	0.10	0.032	1	02/25/19 12:35	02/26/19 17:54	206-44-0	1c
Fluorene	ND	ug/L	0.10	0.031	1	02/25/19 12:35	02/26/19 17:54	86-73-7	1c
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.030	1	02/25/19 12:35	02/26/19 17:54	193-39-5	1c
Phenanthrene	ND	ug/L	0.10	0.044	1	02/25/19 12:35	02/26/19 17:54	85-01-8	1c
Pyrene	ND	ug/L	0.10	0.037	1	02/25/19 12:35	02/26/19 17:54	129-00-0	1c
Surrogates									
2-Fluorobiphenyl (S)	57	%.	19-97		1	02/25/19 12:35	02/26/19 17:54	321-60-8	
Terphenyl-d14 (S)	63	%.	47-105		1	02/25/19 12:35	02/26/19 17:54	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.24	1		02/21/19 13:24	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.20	1		02/21/19 13:24	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 13:24	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.28	1		02/21/19 13:24	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 13:24	64-17-5	3c,L1
Ethylbenzene	ND	ug/L	1.0	0.31	1		02/21/19 13:24	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.24	1		02/21/19 13:24	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.36	1		02/21/19 13:24	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 13:24	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		02/21/19 13:24	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.29	1		02/21/19 13:24	103-65-1	
Toluene	ND	ug/L	1.0	0.30	1		02/21/19 13:24	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 13:24	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.21	1		02/21/19 13:24	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.60	1		02/21/19 13:24	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.18	1		02/21/19 13:24	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	103	%.	78-122		1		02/21/19 13:24	460-00-4	
1,2-Dichloroethane-d4 (S)	99	%.	80-120		1		02/21/19 13:24	17060-07-0	
Toluene-d8 (S)	96	%.	80-120		1		02/21/19 13:24	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.: 30280833

Sample: MW-207-021819 **Lab ID: 30280833005** Collected: 02/18/19 14:40 Received: 02/20/19 12:00 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		02/21/19 13:24	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**260**	mg/L	10.0	10.0	1		03/05/19 21:01		H1
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		03/05/19 21:01		H1
Alkalinity,Total (CaCO3 pH4.5)	**260**	mg/L	10.0	1.0	1		03/05/19 21:01		H1
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		02/20/19 16:17		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	**0.86**	mg/L	0.10	0.028	1		02/25/19 12:04		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	**24.1**	mg/L	10.0	4.7	1		02/21/19 13:59	14808-79-8	

Sample: MW-208-021819 **Lab ID: 30280833006** Collected: 02/18/19 15:00 Received: 02/20/19 12:00 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	**1300**	ug/L	5.0	1.2	1	02/21/19 08:43	02/22/19 11:02	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**1060**	ug/L	5.0	1.2	1	02/22/19 09:15	02/22/19 16:52	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	02/21/19 11:51	02/22/19 17:52	83-32-9	
Acenaphthylene	ND	ug/L	0.10	0.034	1	02/21/19 11:51	02/22/19 17:52	208-96-8	
Anthracene	ND	ug/L	0.10	0.028	1	02/21/19 11:51	02/22/19 17:52	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.10	0.039	1	02/21/19 11:51	02/22/19 17:52	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.10	0.013	1	02/21/19 11:51	02/22/19 17:52	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.10	0.027	1	02/21/19 11:51	02/22/19 17:52	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.036	1	02/21/19 11:51	02/22/19 17:52	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.10	0.023	1	02/21/19 11:51	02/22/19 17:52	207-08-9	
Chrysene	ND	ug/L	0.10	0.041	1	02/21/19 11:51	02/22/19 17:52	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.028	1	02/21/19 11:51	02/22/19 17:52	53-70-3	
Fluoranthene	ND	ug/L	0.10	0.033	1	02/21/19 11:51	02/22/19 17:52	206-44-0	
Fluorene	ND	ug/L	0.10	0.032	1	02/21/19 11:51	02/22/19 17:52	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.031	1	02/21/19 11:51	02/22/19 17:52	193-39-5	
Phenanthrene	ND	ug/L	0.10	0.045	1	02/21/19 11:51	02/22/19 17:52	85-01-8	
Pyrene	ND	ug/L	0.10	0.037	1	02/21/19 11:51	02/22/19 17:52	129-00-0	

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.: 30280833

Sample: MW-208-021819 **Lab ID: 30280833006** Collected: 02/18/19 15:00 Received: 02/20/19 12:00 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								
Surrogates									
2-Fluorobiphenyl (S)	57	%.	19-97		1	02/21/19 11:51	02/22/19 17:52	321-60-8	
Terphenyl-d14 (S)	59	%.	47-105		1	02/21/19 11:51	02/22/19 17:52	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.24	1		02/21/19 13:50	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.20	1		02/21/19 13:50	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 13:50	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.28	1		02/21/19 13:50	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 13:50	64-17-5	3c,L1
Ethylbenzene	**4.7**	ug/L	1.0	0.31	1		02/21/19 13:50	100-41-4	
Isopropylbenzene (Cumene)	**5.7**	ug/L	1.0	0.24	1		02/21/19 13:50	98-82-8	
p-Isopropyltoluene	**2.5**	ug/L	1.0	0.36	1		02/21/19 13:50	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 13:50	1634-04-4	
Naphthalene	**3.7**	ug/L	2.0	0.82	1		02/21/19 13:50	91-20-3	
n-Propylbenzene	**6.0**	ug/L	1.0	0.29	1		02/21/19 13:50	103-65-1	
Toluene	ND	ug/L	1.0	0.30	1		02/21/19 13:50	108-88-3	
1,2,4-Trimethylbenzene	**32.7**	ug/L	1.0	0.25	1		02/21/19 13:50	95-63-6	
1,3,5-Trimethylbenzene	**20.5**	ug/L	1.0	0.21	1		02/21/19 13:50	108-67-8	
m&p-Xylene	**15.6**	ug/L	2.0	0.60	1		02/21/19 13:50	179601-23-1	
o-Xylene	**3.2**	ug/L	1.0	0.18	1		02/21/19 13:50	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	108	%.	78-122		1		02/21/19 13:50	460-00-4	
1,2-Dichloroethane-d4 (S)	103	%.	80-120		1		02/21/19 13:50	17060-07-0	
Toluene-d8 (S)	100	%.	80-120		1		02/21/19 13:50	2037-26-5	
Dibromofluoromethane (S)	95	%.	80-120		1		02/21/19 13:50	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**470**	mg/L	10.0	10.0	1		03/05/19 21:02		H1
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		03/05/19 21:02		H1
Alkalinity,Total (CaCO3 pH4.5)	**470**	mg/L	10.0	1.0	1		03/05/19 21:02		H1
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	**0.11**	mg/L	0.10	0.020	1		02/20/19 16:19		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.028	1		02/25/19 12:05		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	**51.0**	mg/L	10.0	4.7	1		02/21/19 13:59	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.: 30280833

Sample: MW-205-021819 **Lab ID: 30280833007** Collected: 02/18/19 17:00 Received: 02/20/19 12:00 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	**46.8**	ug/L	5.0	1.2	1	02/21/19 08:43	02/22/19 11:04	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**35.4**	ug/L	5.0	1.2	1	02/22/19 09:15	02/22/19 16:54	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	02/21/19 11:51	02/22/19 18:12	83-32-9	
Acenaphthylene	ND	ug/L	0.10	0.034	1	02/21/19 11:51	02/22/19 18:12	208-96-8	
Anthracene	ND	ug/L	0.10	0.028	1	02/21/19 11:51	02/22/19 18:12	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.10	0.039	1	02/21/19 11:51	02/22/19 18:12	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.10	0.013	1	02/21/19 11:51	02/22/19 18:12	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.10	0.027	1	02/21/19 11:51	02/22/19 18:12	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.036	1	02/21/19 11:51	02/22/19 18:12	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.10	0.023	1	02/21/19 11:51	02/22/19 18:12	207-08-9	
Chrysene	ND	ug/L	0.10	0.041	1	02/21/19 11:51	02/22/19 18:12	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.028	1	02/21/19 11:51	02/22/19 18:12	53-70-3	
Fluoranthene	ND	ug/L	0.10	0.033	1	02/21/19 11:51	02/22/19 18:12	206-44-0	
Fluorene	ND	ug/L	0.10	0.032	1	02/21/19 11:51	02/22/19 18:12	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.031	1	02/21/19 11:51	02/22/19 18:12	193-39-5	
Phenanthrene	ND	ug/L	0.10	0.045	1	02/21/19 11:51	02/22/19 18:12	85-01-8	
Pyrene	ND	ug/L	0.10	0.037	1	02/21/19 11:51	02/22/19 18:12	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	48	%.	19-97		1	02/21/19 11:51	02/22/19 18:12	321-60-8	
Terphenyl-d14 (S)	53	%.	47-105		1	02/21/19 11:51	02/22/19 18:12	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.24	1		02/21/19 14:17	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.20	1		02/21/19 14:17	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 14:17	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.28	1		02/21/19 14:17	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 14:17	64-17-5	3c,L1
Ethylbenzene	ND	ug/L	1.0	0.31	1		02/21/19 14:17	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.24	1		02/21/19 14:17	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.36	1		02/21/19 14:17	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 14:17	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		02/21/19 14:17	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.29	1		02/21/19 14:17	103-65-1	
Toluene	ND	ug/L	1.0	0.30	1		02/21/19 14:17	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 14:17	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.21	1		02/21/19 14:17	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.60	1		02/21/19 14:17	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.18	1		02/21/19 14:17	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	106	%.	78-122		1		02/21/19 14:17	460-00-4	
1,2-Dichloroethane-d4 (S)	101	%.	80-120		1		02/21/19 14:17	17060-07-0	
Toluene-d8 (S)	99	%.	80-120		1		02/21/19 14:17	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.: 30280833

Sample: MW-205-021819 **Lab ID: 30280833007** Collected: 02/18/19 17:00 Received: 02/20/19 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
Dibromofluoromethane (S)	97	%.	80-120		1		02/21/19 14:17	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**310**	mg/L	10.0	10.0	1		03/05/19 21:05		H1
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		03/05/19 21:05		H1
Alkalinity,Total (CaCO3 pH4.5)	**310**	mg/L	10.0	1.0	1		03/05/19 21:05		H1
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	**0.24**	mg/L	0.10	0.020	1		02/20/19 16:22		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.028	1		02/25/19 12:07		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	**502**	mg/L	100	46.7	10		02/21/19 14:00	14808-79-8	

Sample: MW-204-021819 **Lab ID: 30280833008** Collected: 02/18/19 17:30 Received: 02/20/19 12:00 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	**1180**	ug/L	5.0	1.2	1	02/21/19 08:43	02/22/19 11:07	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**1030**	ug/L	5.0	1.2	1	02/22/19 09:15	02/22/19 16:57	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	02/21/19 11:51	02/22/19 18:31	83-32-9	
Acenaphthylene	ND	ug/L	0.10	0.034	1	02/21/19 11:51	02/22/19 18:31	208-96-8	
Anthracene	ND	ug/L	0.10	0.028	1	02/21/19 11:51	02/22/19 18:31	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.10	0.039	1	02/21/19 11:51	02/22/19 18:31	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.10	0.013	1	02/21/19 11:51	02/22/19 18:31	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.10	0.027	1	02/21/19 11:51	02/22/19 18:31	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.036	1	02/21/19 11:51	02/22/19 18:31	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.10	0.023	1	02/21/19 11:51	02/22/19 18:31	207-08-9	
Chrysene	ND	ug/L	0.10	0.041	1	02/21/19 11:51	02/22/19 18:31	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.028	1	02/21/19 11:51	02/22/19 18:31	53-70-3	
Fluoranthene	ND	ug/L	0.10	0.033	1	02/21/19 11:51	02/22/19 18:31	206-44-0	
Fluorene	ND	ug/L	0.10	0.032	1	02/21/19 11:51	02/22/19 18:31	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.031	1	02/21/19 11:51	02/22/19 18:31	193-39-5	
Phenanthrene	ND	ug/L	0.10	0.045	1	02/21/19 11:51	02/22/19 18:31	85-01-8	
Pyrene	ND	ug/L	0.10	0.037	1	02/21/19 11:51	02/22/19 18:31	129-00-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(724)850-5600

ANALYTICAL RESULTS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280833

Sample: MW-204-021819 **Lab ID: 30280833008** Collected: 02/18/19 17:30 Received: 02/20/19 12:00 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								
Surrogates									
2-Fluorobiphenyl (S)	62	%.	19-97		1	02/21/19 11:51	02/22/19 18:31	321-60-8	
Terphenyl-d14 (S)	61	%.	47-105		1	02/21/19 11:51	02/22/19 18:31	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	**4.6**	ug/L	1.0	0.24	1		02/21/19 14:44	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.20	1		02/21/19 14:44	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 14:44	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.28	1		02/21/19 14:44	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 14:44	64-17-5	3c,L1
Ethylbenzene	**4.2**	ug/L	1.0	0.31	1		02/21/19 14:44	100-41-4	
Isopropylbenzene (Cumene)	**1.3**	ug/L	1.0	0.24	1		02/21/19 14:44	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.36	1		02/21/19 14:44	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 14:44	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		02/21/19 14:44	91-20-3	
n-Propylbenzene	**3.2**	ug/L	1.0	0.29	1		02/21/19 14:44	103-65-1	
Toluene	**2.4**	ug/L	1.0	0.30	1		02/21/19 14:44	108-88-3	
1,2,4-Trimethylbenzene	**8.6**	ug/L	1.0	0.25	1		02/21/19 14:44	95-63-6	
1,3,5-Trimethylbenzene	**2.3**	ug/L	1.0	0.21	1		02/21/19 14:44	108-67-8	
m&p-Xylene	**8.2**	ug/L	2.0	0.60	1		02/21/19 14:44	179601-23-1	
o-Xylene	**1.3**	ug/L	1.0	0.18	1		02/21/19 14:44	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	106	%.	78-122		1		02/21/19 14:44	460-00-4	
1,2-Dichloroethane-d4 (S)	100	%.	80-120		1		02/21/19 14:44	17060-07-0	
Toluene-d8 (S)	100	%.	80-120		1		02/21/19 14:44	2037-26-5	
Dibromofluoromethane (S)	98	%.	80-120		1		02/21/19 14:44	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**540**	mg/L	10.0	10.0	1		03/05/19 21:06		H1
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		03/05/19 21:06		H1
Alkalinity,Total (CaCO3 pH4.5)	**540**	mg/L	10.0	1.0	1		03/05/19 21:06		H1
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	**0.55**	mg/L	0.10	0.020	1		02/20/19 16:24		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.028	1		02/25/19 12:11		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	**30.8**	mg/L	10.0	4.7	1		02/21/19 14:01	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.: 30280833

Sample: DUP- 021819 **Lab ID: 30280833009** Collected: 02/18/19 00:01 Received: 02/20/19 12:00 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	**98.6**	ug/L	5.0	1.2	1	02/21/19 08:43	02/22/19 11:09	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	02/22/19 09:15	02/22/19 16:59	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	ND	ug/L	0.12	0.035	1	02/21/19 11:51	02/22/19 18:51	83-32-9	
Acenaphthylene	ND	ug/L	0.12	0.041	1	02/21/19 11:51	02/22/19 18:51	208-96-8	
Anthracene	ND	ug/L	0.12	0.033	1	02/21/19 11:51	02/22/19 18:51	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.12	0.047	1	02/21/19 11:51	02/22/19 18:51	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.12	0.015	1	02/21/19 11:51	02/22/19 18:51	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.12	0.032	1	02/21/19 11:51	02/22/19 18:51	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.12	0.043	1	02/21/19 11:51	02/22/19 18:51	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.12	0.028	1	02/21/19 11:51	02/22/19 18:51	207-08-9	
Chrysene	ND	ug/L	0.12	0.048	1	02/21/19 11:51	02/22/19 18:51	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.12	0.033	1	02/21/19 11:51	02/22/19 18:51	53-70-3	
Fluoranthene	ND	ug/L	0.12	0.039	1	02/21/19 11:51	02/22/19 18:51	206-44-0	
Fluorene	ND	ug/L	0.12	0.037	1	02/21/19 11:51	02/22/19 18:51	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.12	0.036	1	02/21/19 11:51	02/22/19 18:51	193-39-5	
Phenanthrene	ND	ug/L	0.12	0.053	1	02/21/19 11:51	02/22/19 18:51	85-01-8	
Pyrene	ND	ug/L	0.12	0.043	1	02/21/19 11:51	02/22/19 18:51	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	47	%.	19-97		1	02/21/19 11:51	02/22/19 18:51	321-60-8	
Terphenyl-d14 (S)	48	%.	47-105		1	02/21/19 11:51	02/22/19 18:51	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.24	1		02/21/19 15:10	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.20	1		02/21/19 15:10	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 15:10	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.28	1		02/21/19 15:10	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 15:10	64-17-5	3c,L1
Ethylbenzene	ND	ug/L	1.0	0.31	1		02/21/19 15:10	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.24	1		02/21/19 15:10	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.36	1		02/21/19 15:10	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 15:10	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		02/21/19 15:10	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.29	1		02/21/19 15:10	103-65-1	
Toluene	ND	ug/L	1.0	0.30	1		02/21/19 15:10	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 15:10	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.21	1		02/21/19 15:10	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.60	1		02/21/19 15:10	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.18	1		02/21/19 15:10	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	105	%.	78-122		1		02/21/19 15:10	460-00-4	
1,2-Dichloroethane-d4 (S)	100	%.	80-120		1		02/21/19 15:10	17060-07-0	
Toluene-d8 (S)	97	%.	80-120		1		02/21/19 15:10	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.: 30280833

Sample: DUP- 021819 **Lab ID: 30280833009** Collected: 02/18/19 00:01 Received: 02/20/19 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
Dibromofluoromethane (S)	97	%.	80-120		1		02/21/19 15:10	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**260**	mg/L	10.0	10.0	1		03/05/19 21:07		H1
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		03/05/19 21:07		H1
Alkalinity,Total (CaCO3 pH4.5)	**260**	mg/L	10.0	1.0	1		03/05/19 21:07		H1
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		02/20/19 16:24		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	**0.86**	mg/L	0.10	0.028	1		02/25/19 12:12		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	**23.9**	mg/L	10.0	4.7	1		02/21/19 14:02	14808-79-8	

Sample: TB-021819 **Lab ID: 30280833010** Collected: 02/18/19 00:01 Received: 02/20/19 12:00 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	0.24	1		02/21/19 12:03	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.20	1		02/21/19 12:03	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 12:03	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.28	1		02/21/19 12:03	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 12:03	64-17-5	3c,L1
Ethylbenzene	ND	ug/L	1.0	0.31	1		02/21/19 12:03	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.24	1		02/21/19 12:03	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.36	1		02/21/19 12:03	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 12:03	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		02/21/19 12:03	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.29	1		02/21/19 12:03	103-65-1	
Toluene	ND	ug/L	1.0	0.30	1		02/21/19 12:03	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 12:03	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.21	1		02/21/19 12:03	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.60	1		02/21/19 12:03	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.18	1		02/21/19 12:03	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	107	%.	78-122		1		02/21/19 12:03	460-00-4	
1,2-Dichloroethane-d4 (S)	103	%.	80-120		1		02/21/19 12:03	17060-07-0	
Toluene-d8 (S)	98	%.	80-120		1		02/21/19 12:03	2037-26-5	
Dibromofluoromethane (S)	97	%.	80-120		1		02/21/19 12:03	1868-53-7	

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.: 30280833

Sample: BMW3-021919 **Lab ID: 30280833011** Collected: 02/19/19 14:00 Received: 02/20/19 12:00 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	**2300**	ug/L	5.0	1.2	1	02/21/19 08:43	02/22/19 11:11	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	02/22/19 09:15	02/22/19 17:01	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	02/25/19 12:35	02/26/19 13:00	83-32-9	1c
Acenaphthylene	ND	ug/L	0.10	0.035	1	02/25/19 12:35	02/26/19 13:00	208-96-8	1c
Anthracene	ND	ug/L	0.10	0.029	1	02/25/19 12:35	02/26/19 13:00	120-12-7	1c
Benzo(a)anthracene	ND	ug/L	0.10	0.041	1	02/25/19 12:35	02/26/19 13:00	56-55-3	1c
Benzo(a)pyrene	ND	ug/L	0.10	0.013	1	02/25/19 12:35	02/26/19 13:00	50-32-8	1c
Benzo(b)fluoranthene	ND	ug/L	0.10	0.028	1	02/25/19 12:35	02/26/19 13:00	205-99-2	1c
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.037	1	02/25/19 12:35	02/26/19 13:00	191-24-2	1c
Benzo(k)fluoranthene	ND	ug/L	0.10	0.024	1	02/25/19 12:35	02/26/19 13:00	207-08-9	1c
Chrysene	ND	ug/L	0.10	0.042	1	02/25/19 12:35	02/26/19 13:00	218-01-9	1c
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.029	1	02/25/19 12:35	02/26/19 13:00	53-70-3	1c
Fluoranthene	ND	ug/L	0.10	0.034	1	02/25/19 12:35	02/26/19 13:00	206-44-0	1c
Fluorene	ND	ug/L	0.10	0.032	1	02/25/19 12:35	02/26/19 13:00	86-73-7	1c
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.031	1	02/25/19 12:35	02/26/19 13:00	193-39-5	1c
Phenanthrene	ND	ug/L	0.10	0.046	1	02/25/19 12:35	02/26/19 13:00	85-01-8	1c
Pyrene	ND	ug/L	0.10	0.038	1	02/25/19 12:35	02/26/19 13:00	129-00-0	1c
Surrogates									
2-Fluorobiphenyl (S)	66	%.	19-97		1	02/25/19 12:35	02/26/19 13:00	321-60-8	
Terphenyl-d14 (S)	63	%.	47-105		1	02/25/19 12:35	02/26/19 13:00	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.24	1		02/21/19 15:37	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.20	1		02/21/19 15:37	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 15:37	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.28	1		02/21/19 15:37	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 15:37	64-17-5	3c,L1
Ethylbenzene	ND	ug/L	1.0	0.31	1		02/21/19 15:37	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.24	1		02/21/19 15:37	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.36	1		02/21/19 15:37	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 15:37	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		02/21/19 15:37	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.29	1		02/21/19 15:37	103-65-1	
Toluene	ND	ug/L	1.0	0.30	1		02/21/19 15:37	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 15:37	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.21	1		02/21/19 15:37	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.60	1		02/21/19 15:37	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.18	1		02/21/19 15:37	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	103	%.	78-122		1		02/21/19 15:37	460-00-4	
1,2-Dichloroethane-d4 (S)	100	%.	80-120		1		02/21/19 15:37	17060-07-0	
Toluene-d8 (S)	96	%.	80-120		1		02/21/19 15:37	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.: 30280833

Sample: BMW3-021919 **Lab ID: 30280833011** Collected: 02/19/19 14:00 Received: 02/20/19 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
Dibromofluoromethane (S)	97	%.	80-120		1		02/21/19 15:37	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**510**	mg/L	10.0	10.0	1		03/05/19 21:08		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		03/05/19 21:08		
Alkalinity,Total (CaCO3 pH4.5)	**510**	mg/L	10.0	1.0	1		03/05/19 21:08		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		02/20/19 16:27		H1,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	**0.85**	mg/L	0.10	0.028	1		02/25/19 12:14		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	**27.2**	mg/L	10.0	4.7	1		02/21/19 14:02	14808-79-8	

Sample: MW-202-201919 **Lab ID: 30280833012** Collected: 02/19/19 11:20 Received: 02/20/19 12:00 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	**1180**	ug/L	5.0	1.2	1	02/21/19 08:43	02/22/19 11:13	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**1000**	ug/L	5.0	1.2	1	02/22/19 09:15	02/22/19 17:03	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	02/25/19 12:35	02/26/19 13:19	83-32-9	1c
Acenaphthylene	ND	ug/L	0.11	0.036	1	02/25/19 12:35	02/26/19 13:19	208-96-8	1c
Anthracene	ND	ug/L	0.11	0.029	1	02/25/19 12:35	02/26/19 13:19	120-12-7	1c
Benzo(a)anthracene	ND	ug/L	0.11	0.041	1	02/25/19 12:35	02/26/19 13:19	56-55-3	1c
Benzo(a)pyrene	ND	ug/L	0.11	0.013	1	02/25/19 12:35	02/26/19 13:19	50-32-8	1c
Benzo(b)fluoranthene	ND	ug/L	0.11	0.028	1	02/25/19 12:35	02/26/19 13:19	205-99-2	1c
Benzo(g,h,i)perylene	ND	ug/L	0.11	0.037	1	02/25/19 12:35	02/26/19 13:19	191-24-2	1c
Benzo(k)fluoranthene	ND	ug/L	0.11	0.024	1	02/25/19 12:35	02/26/19 13:19	207-08-9	1c
Chrysene	ND	ug/L	0.11	0.042	1	02/25/19 12:35	02/26/19 13:19	218-01-9	1c
Dibenz(a,h)anthracene	ND	ug/L	0.11	0.029	1	02/25/19 12:35	02/26/19 13:19	53-70-3	1c
Fluoranthene	ND	ug/L	0.11	0.034	1	02/25/19 12:35	02/26/19 13:19	206-44-0	1c
Fluorene	ND	ug/L	0.11	0.033	1	02/25/19 12:35	02/26/19 13:19	86-73-7	1c
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.11	0.032	1	02/25/19 12:35	02/26/19 13:19	193-39-5	1c
Phenanthrene	ND	ug/L	0.11	0.046	1	02/25/19 12:35	02/26/19 13:19	85-01-8	1c
Pyrene	ND	ug/L	0.11	0.038	1	02/25/19 12:35	02/26/19 13:19	129-00-0	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.: 30280833

Sample: MW-202-201919 **Lab ID: 30280833012** Collected: 02/19/19 11:20 Received: 02/20/19 12:00 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								
Surrogates									
2-Fluorobiphenyl (S)	56	%.	19-97		1	02/25/19 12:35	02/26/19 13:19	321-60-8	
Terphenyl-d14 (S)	62	%.	47-105		1	02/25/19 12:35	02/26/19 13:19	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.24	1		02/21/19 16:04	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.20	1		02/21/19 16:04	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 16:04	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.28	1		02/21/19 16:04	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 16:04	64-17-5	3c,L1
Ethylbenzene	ND	ug/L	1.0	0.31	1		02/21/19 16:04	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.24	1		02/21/19 16:04	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.36	1		02/21/19 16:04	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 16:04	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		02/21/19 16:04	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.29	1		02/21/19 16:04	103-65-1	
Toluene	ND	ug/L	1.0	0.30	1		02/21/19 16:04	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 16:04	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.21	1		02/21/19 16:04	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.60	1		02/21/19 16:04	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.18	1		02/21/19 16:04	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	101	%.	78-122		1		02/21/19 16:04	460-00-4	
1,2-Dichloroethane-d4 (S)	104	%.	80-120		1		02/21/19 16:04	17060-07-0	
Toluene-d8 (S)	95	%.	80-120		1		02/21/19 16:04	2037-26-5	
Dibromofluoromethane (S)	101	%.	80-120		1		02/21/19 16:04	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**590**	mg/L	10.0	10.0	1		03/05/19 21:09		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		03/05/19 21:09		
Alkalinity,Total (CaCO3 pH4.5)	**590**	mg/L	10.0	1.0	1		03/05/19 21:09		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		02/20/19 16:27		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.028	1		02/25/19 12:15		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	**128**	mg/L	50.0	23.4	5		02/21/19 14:04	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.: 30280833

Sample: BMW7-201919 **Lab ID: 30280833013** Collected: 02/19/19 11:35 Received: 02/20/19 12:00 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	**288**	ug/L	5.0	1.2	1	02/21/19 08:43	02/22/19 11:19	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**44.1**	ug/L	5.0	1.2	1	02/22/19 09:15	02/22/19 17:09	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	02/25/19 12:35	02/26/19 13:39	83-32-9	1c
Acenaphthylene	ND	ug/L	0.10	0.035	1	02/25/19 12:35	02/26/19 13:39	208-96-8	1c
Anthracene	ND	ug/L	0.10	0.029	1	02/25/19 12:35	02/26/19 13:39	120-12-7	1c
Benzo(a)anthracene	ND	ug/L	0.10	0.040	1	02/25/19 12:35	02/26/19 13:39	56-55-3	1c
Benzo(a)pyrene	ND	ug/L	0.10	0.013	1	02/25/19 12:35	02/26/19 13:39	50-32-8	1c
Benzo(b)fluoranthene	ND	ug/L	0.10	0.028	1	02/25/19 12:35	02/26/19 13:39	205-99-2	1c
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.037	1	02/25/19 12:35	02/26/19 13:39	191-24-2	1c
Benzo(k)fluoranthene	ND	ug/L	0.10	0.024	1	02/25/19 12:35	02/26/19 13:39	207-08-9	1c
Chrysene	ND	ug/L	0.10	0.041	1	02/25/19 12:35	02/26/19 13:39	218-01-9	1c
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.029	1	02/25/19 12:35	02/26/19 13:39	53-70-3	1c
Fluoranthene	ND	ug/L	0.10	0.033	1	02/25/19 12:35	02/26/19 13:39	206-44-0	1c
Fluorene	ND	ug/L	0.10	0.032	1	02/25/19 12:35	02/26/19 13:39	86-73-7	1c
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.031	1	02/25/19 12:35	02/26/19 13:39	193-39-5	1c
Phenanthrene	ND	ug/L	0.10	0.045	1	02/25/19 12:35	02/26/19 13:39	85-01-8	1c
Pyrene	ND	ug/L	0.10	0.037	1	02/25/19 12:35	02/26/19 13:39	129-00-0	1c
Surrogates									
2-Fluorobiphenyl (S)	41	%.	19-97		1	02/25/19 12:35	02/26/19 13:39	321-60-8	
Terphenyl-d14 (S)	49	%.	47-105		1	02/25/19 12:35	02/26/19 13:39	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.24	1		02/21/19 16:30	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.20	1		02/21/19 16:30	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 16:30	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.28	1		02/21/19 16:30	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 16:30	64-17-5	3c,L1
Ethylbenzene	ND	ug/L	1.0	0.31	1		02/21/19 16:30	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.24	1		02/21/19 16:30	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.36	1		02/21/19 16:30	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 16:30	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		02/21/19 16:30	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.29	1		02/21/19 16:30	103-65-1	
Toluene	ND	ug/L	1.0	0.30	1		02/21/19 16:30	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 16:30	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.21	1		02/21/19 16:30	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.60	1		02/21/19 16:30	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.18	1		02/21/19 16:30	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	104	%.	78-122		1		02/21/19 16:30	460-00-4	
1,2-Dichloroethane-d4 (S)	108	%.	80-120		1		02/21/19 16:30	17060-07-0	
Toluene-d8 (S)	95	%.	80-120		1		02/21/19 16:30	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.: 30280833

Sample: BMW7-201919 **Lab ID: 30280833013** Collected: 02/19/19 11:35 Received: 02/20/19 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
Dibromofluoromethane (S)	98	%.	80-120		1		02/21/19 16:30	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**490**	mg/L	10.0	10.0	1		03/05/19 21:11		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		03/05/19 21:11		
Alkalinity,Total (CaCO3 pH4.5)	**490**	mg/L	10.0	1.0	1		03/05/19 21:11		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		02/20/19 16:29		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.028	1		02/25/19 12:16		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	ND	mg/L	100	46.7	10		02/21/19 14:06	14808-79-8	D3

Sample: MW-203-201919 **Lab ID: 30280833014** Collected: 02/19/19 13:00 Received: 02/20/19 12:00 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	**209**	ug/L	5.0	1.2	1	02/21/19 08:43	02/22/19 11:26	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	02/22/19 09:15	02/22/19 17:12	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	ND	ug/L	0.11	0.031	1	02/25/19 12:35	02/26/19 13:59	83-32-9	1c
Acenaphthylene	ND	ug/L	0.11	0.037	1	02/25/19 12:35	02/26/19 13:59	208-96-8	1c
Anthracene	ND	ug/L	0.11	0.030	1	02/25/19 12:35	02/26/19 13:59	120-12-7	1c
Benzo(a)anthracene	ND	ug/L	0.11	0.042	1	02/25/19 12:35	02/26/19 13:59	56-55-3	1c
Benzo(a)pyrene	ND	ug/L	0.11	0.013	1	02/25/19 12:35	02/26/19 13:59	50-32-8	1c
Benzo(b)fluoranthene	ND	ug/L	0.11	0.029	1	02/25/19 12:35	02/26/19 13:59	205-99-2	1c
Benzo(g,h,i)perylene	ND	ug/L	0.11	0.039	1	02/25/19 12:35	02/26/19 13:59	191-24-2	1c
Benzo(k)fluoranthene	ND	ug/L	0.11	0.025	1	02/25/19 12:35	02/26/19 13:59	207-08-9	1c
Chrysene	ND	ug/L	0.11	0.044	1	02/25/19 12:35	02/26/19 13:59	218-01-9	1c
Dibenz(a,h)anthracene	ND	ug/L	0.11	0.030	1	02/25/19 12:35	02/26/19 13:59	53-70-3	1c
Fluoranthene	ND	ug/L	0.11	0.035	1	02/25/19 12:35	02/26/19 13:59	206-44-0	1c
Fluorene	ND	ug/L	0.11	0.034	1	02/25/19 12:35	02/26/19 13:59	86-73-7	1c
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.11	0.033	1	02/25/19 12:35	02/26/19 13:59	193-39-5	1c
Phenanthrene	ND	ug/L	0.11	0.048	1	02/25/19 12:35	02/26/19 13:59	85-01-8	1c
Pyrene	ND	ug/L	0.11	0.039	1	02/25/19 12:35	02/26/19 13:59	129-00-0	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.: 30280833

Sample: MW-203-201919 **Lab ID: 30280833014** Collected: 02/19/19 13:00 Received: 02/20/19 12:00 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								
Surrogates									
2-Fluorobiphenyl (S)	55	%.	19-97		1	02/25/19 12:35	02/26/19 13:59	321-60-8	
Terphenyl-d14 (S)	65	%.	47-105		1	02/25/19 12:35	02/26/19 13:59	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.24	1		02/21/19 16:57	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.20	1		02/21/19 16:57	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 16:57	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.28	1		02/21/19 16:57	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 16:57	64-17-5	3c,L1
Ethylbenzene	ND	ug/L	1.0	0.31	1		02/21/19 16:57	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.24	1		02/21/19 16:57	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.36	1		02/21/19 16:57	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 16:57	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		02/21/19 16:57	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.29	1		02/21/19 16:57	103-65-1	
Toluene	ND	ug/L	1.0	0.30	1		02/21/19 16:57	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 16:57	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.21	1		02/21/19 16:57	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.60	1		02/21/19 16:57	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.18	1		02/21/19 16:57	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	103	%.	78-122		1		02/21/19 16:57	460-00-4	
1,2-Dichloroethane-d4 (S)	101	%.	80-120		1		02/21/19 16:57	17060-07-0	
Toluene-d8 (S)	97	%.	80-120		1		02/21/19 16:57	2037-26-5	
Dibromofluoromethane (S)	100	%.	80-120		1		02/21/19 16:57	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**330**	mg/L	10.0	10.0	1		03/05/19 21:12		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		03/05/19 21:12		
Alkalinity,Total (CaCO3 pH4.5)	**330**	mg/L	10.0	1.0	1		03/05/19 21:12		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		02/20/19 16:29		H1,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	**0.41**	mg/L	0.10	0.028	1		02/25/19 12:18		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	**65.6**	mg/L	50.0	23.4	5		02/21/19 14:08	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.: 30280833

Sample: BMW8-201919 **Lab ID: 30280833015** Collected: 02/19/19 13:30 Received: 02/20/19 12:00 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	**1060**	ug/L	5.0	1.2	1	02/21/19 08:43	02/22/19 11:28	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**882**	ug/L	5.0	1.2	1	02/22/19 09:15	02/22/19 17:19	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	ND	ug/L	0.10	0.030	1	02/25/19 12:35	02/26/19 14:18	83-32-9	1c
Acenaphthylene	ND	ug/L	0.10	0.035	1	02/25/19 12:35	02/26/19 14:18	208-96-8	1c
Anthracene	ND	ug/L	0.10	0.028	1	02/25/19 12:35	02/26/19 14:18	120-12-7	1c
Benzo(a)anthracene	ND	ug/L	0.10	0.040	1	02/25/19 12:35	02/26/19 14:18	56-55-3	1c
Benzo(a)pyrene	ND	ug/L	0.10	0.013	1	02/25/19 12:35	02/26/19 14:18	50-32-8	1c
Benzo(b)fluoranthene	ND	ug/L	0.10	0.028	1	02/25/19 12:35	02/26/19 14:18	205-99-2	1c
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.036	1	02/25/19 12:35	02/26/19 14:18	191-24-2	1c
Benzo(k)fluoranthene	ND	ug/L	0.10	0.024	1	02/25/19 12:35	02/26/19 14:18	207-08-9	1c
Chrysene	ND	ug/L	0.10	0.041	1	02/25/19 12:35	02/26/19 14:18	218-01-9	1c
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.028	1	02/25/19 12:35	02/26/19 14:18	53-70-3	1c
Fluoranthene	ND	ug/L	0.10	0.033	1	02/25/19 12:35	02/26/19 14:18	206-44-0	1c
Fluorene	ND	ug/L	0.10	0.032	1	02/25/19 12:35	02/26/19 14:18	86-73-7	1c
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.031	1	02/25/19 12:35	02/26/19 14:18	193-39-5	1c
Phenanthrene	ND	ug/L	0.10	0.045	1	02/25/19 12:35	02/26/19 14:18	85-01-8	1c
Pyrene	ND	ug/L	0.10	0.037	1	02/25/19 12:35	02/26/19 14:18	129-00-0	1c
Surrogates									
2-Fluorobiphenyl (S)	53	%.	19-97		1	02/25/19 12:35	02/26/19 14:18	321-60-8	
Terphenyl-d14 (S)	60	%.	47-105		1	02/25/19 12:35	02/26/19 14:18	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.24	1		02/21/19 17:24	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.20	1		02/21/19 17:24	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 17:24	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.28	1		02/21/19 17:24	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 17:24	64-17-5	3c,L1
Ethylbenzene	ND	ug/L	1.0	0.31	1		02/21/19 17:24	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.24	1		02/21/19 17:24	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.36	1		02/21/19 17:24	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 17:24	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		02/21/19 17:24	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.29	1		02/21/19 17:24	103-65-1	
Toluene	ND	ug/L	1.0	0.30	1		02/21/19 17:24	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 17:24	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.21	1		02/21/19 17:24	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.60	1		02/21/19 17:24	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.18	1		02/21/19 17:24	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	104	%.	78-122		1		02/21/19 17:24	460-00-4	
1,2-Dichloroethane-d4 (S)	102	%.	80-120		1		02/21/19 17:24	17060-07-0	
Toluene-d8 (S)	99	%.	80-120		1		02/21/19 17:24	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.: 30280833

Sample: BMW8-201919 **Lab ID: 30280833015** Collected: 02/19/19 13:30 Received: 02/20/19 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
Dibromofluoromethane (S)	104	%.	80-120		1		02/21/19 17:24	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**460**	mg/L	10.0	10.0	1		03/05/19 21:13		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		03/05/19 21:13		
Alkalinity,Total (CaCO3 pH4.5)	**460**	mg/L	10.0	1.0	1		03/05/19 21:13		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	**1.5**	mg/L	0.10	0.020	1		02/20/19 16:31		H1,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.028	1		02/25/19 12:19		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	**81.3**	mg/L	50.0	23.4	5		02/21/19 14:08	14808-79-8	

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.: 30280833

QC Batch: 331004 Analysis Method: EPA 6010C
QC Batch Method: EPA 3005A Analysis Description: 6010C MET
Associated Lab Samples: 30280833001, 30280833002, 30280833003, 30280833004, 30280833005, 30280833006, 30280833007, 30280833008, 30280833009, 30280833011, 30280833012, 30280833013, 30280833014, 30280833015

METHOD BLANK: 1610503 Matrix: Water
Associated Lab Samples: 30280833001, 30280833002, 30280833003, 30280833004, 30280833005, 30280833006, 30280833007, 30280833008, 30280833009, 30280833011, 30280833012, 30280833013, 30280833014, 30280833015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Manganese	ug/L	ND	5.0	1.2	02/22/19 10:34	

LABORATORY CONTROL SAMPLE: 1610504

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Manganese	ug/L	500	520	104	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1610506 1610507

Parameter	Units	30280833001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Manganese	ug/L	92.1	500	500	593	592	100	100	75-125	0	20	

MATRIX SPIKE SAMPLE: 1610509

Parameter	Units	30280833012 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Manganese	ug/L	1180	500	1660	96	75-125	

SAMPLE DUPLICATE: 1610505

Parameter	Units	30280833001 Result	Dup Result	RPD	Max RPD	Qualifiers
Manganese	ug/L	92.1	97.3	5	20	

SAMPLE DUPLICATE: 1610508

Parameter	Units	30280833012 Result	Dup Result	RPD	Max RPD	Qualifiers
Manganese	ug/L	1180	1170	1	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.: 30280833

QC Batch: 331162 Analysis Method: EPA 6010C
QC Batch Method: EPA 3005A Analysis Description: 6010C MET Dissolved
Associated Lab Samples: 30280833001, 30280833002, 30280833003, 30280833004, 30280833005, 30280833006, 30280833007, 30280833008, 30280833009, 30280833011, 30280833012, 30280833013, 30280833014, 30280833015

METHOD BLANK: 1611300 Matrix: Water
Associated Lab Samples: 30280833001, 30280833002, 30280833003, 30280833004, 30280833005, 30280833006, 30280833007, 30280833008, 30280833009, 30280833011, 30280833012, 30280833013, 30280833014, 30280833015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Manganese, Dissolved	ug/L	ND	5.0	1.2	02/22/19 16:25	

LABORATORY CONTROL SAMPLE: 1611301

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Manganese, Dissolved	ug/L	500	490	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1611303 1611304

Parameter	Units	30280833001 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	43.8	500	500	522	528	96	97	75-125	1	20	

MATRIX SPIKE SAMPLE: 1611306

Parameter	Units	30280833012 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Manganese, Dissolved	ug/L	1000	500	1480	95	75-125	

SAMPLE DUPLICATE: 1611302

Parameter	Units	30280833001 Result	Dup Result	RPD	Max RPD	Qualifiers
Manganese, Dissolved	ug/L	43.8	44.0	0	20	

SAMPLE DUPLICATE: 1611305

Parameter	Units	30280833012 Result	Dup Result	RPD	Max RPD	Qualifiers
Manganese, Dissolved	ug/L	1000	999	0	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.: 30280833

QC Batch: 331029 Analysis Method: EPA 8260C
QC Batch Method: EPA 8260C Analysis Description: 8260C MSV
Associated Lab Samples: 30280833001, 30280833002, 30280833003, 30280833004, 30280833005, 30280833006, 30280833007, 30280833008, 30280833009, 30280833010, 30280833011, 30280833012, 30280833013, 30280833014, 30280833015

METHOD BLANK: 1610569 Matrix: Water
Associated Lab Samples: 30280833001, 30280833002, 30280833003, 30280833004, 30280833005, 30280833006, 30280833007, 30280833008, 30280833009, 30280833010, 30280833011, 30280833012, 30280833013, 30280833014, 30280833015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	ND	1.0	0.25	02/21/19 11:10	
1,3,5-Trimethylbenzene	ug/L	ND	1.0	0.21	02/21/19 11:10	
Benzene	ug/L	ND	1.0	0.24	02/21/19 11:10	
Ethanol	ug/L	ND	200	79.8	02/21/19 11:10	3c
Ethylbenzene	ug/L	ND	1.0	0.31	02/21/19 11:10	
Isopropylbenzene (Cumene)	ug/L	ND	1.0	0.24	02/21/19 11:10	
m&p-Xylene	ug/L	ND	2.0	0.60	02/21/19 11:10	
Methyl-tert-butyl ether	ug/L	ND	1.0	0.23	02/21/19 11:10	
n-Butylbenzene	ug/L	ND	1.0	0.20	02/21/19 11:10	
n-Propylbenzene	ug/L	ND	1.0	0.29	02/21/19 11:10	
Naphthalene	ug/L	ND	2.0	0.82	02/21/19 11:10	
o-Xylene	ug/L	ND	1.0	0.18	02/21/19 11:10	
p-Isopropyltoluene	ug/L	ND	1.0	0.36	02/21/19 11:10	
sec-Butylbenzene	ug/L	ND	1.0	0.25	02/21/19 11:10	
tert-Butylbenzene	ug/L	ND	1.0	0.28	02/21/19 11:10	
Toluene	ug/L	ND	1.0	0.30	02/21/19 11:10	
1,2-Dichloroethane-d4 (S)	%.	102	80-120		02/21/19 11:10	
4-Bromofluorobenzene (S)	%.	106	78-122		02/21/19 11:10	
Dibromofluoromethane (S)	%.	103	80-120		02/21/19 11:10	
Toluene-d8 (S)	%.	99	80-120		02/21/19 11:10	

LABORATORY CONTROL SAMPLE: 1610570

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	23.0	115	70-130	
1,3,5-Trimethylbenzene	ug/L	20	22.8	114	70-130	
Benzene	ug/L	20	22.4	112	70-130	
Ethanol	ug/L	200	437	219	10-175	3c,L1
Ethylbenzene	ug/L	20	22.7	114	70-130	
Isopropylbenzene (Cumene)	ug/L	20	23.1	116	70-130	
m&p-Xylene	ug/L	40	44.3	111	70-130	
Methyl-tert-butyl ether	ug/L	20	19.6	98	70-130	
n-Butylbenzene	ug/L	20	23.6	118	71-138	
n-Propylbenzene	ug/L	20	22.4	112	70-130	
Naphthalene	ug/L	20	23.8	119	69-135	
o-Xylene	ug/L	20	21.5	108	70-130	

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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.: 30280833

LABORATORY CONTROL SAMPLE: 1610570

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
p-Isopropyltoluene	ug/L	20	23.2	116	70-130	
sec-Butylbenzene	ug/L	20	23.7	118	70-130	
tert-Butylbenzene	ug/L	20	22.4	112	70-130	
Toluene	ug/L	20	21.4	107	70-130	
1,2-Dichloroethane-d4 (S)	%.			101	80-120	
4-Bromofluorobenzene (S)	%.			105	78-122	
Dibromofluoromethane (S)	%.			105	80-120	
Toluene-d8 (S)	%.			100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1610571 1610572

Parameter	Units	30280833001 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	23.1	23.1	115	116	70-130	0	30	
1,3,5-Trimethylbenzene	ug/L	ND	20	20	22.4	22.1	112	110	70-130	1	30	
Benzene	ug/L	ND	20	20	22.5	22.0	113	110	67-119	2	30	
Ethanol	ug/L	ND	200	200	350	360	175	180	10-175	3	30	3c,MH
Ethylbenzene	ug/L	ND	20	20	21.9	22.4	110	112	69-127	2	30	
Isopropylbenzene (Cumene)	ug/L	ND	20	20	23.0	22.9	115	115	70-130	1	30	
m&p-Xylene	ug/L	ND	40	40	44.2	44.2	111	111	70-129	0	30	
Methyl-tert-butyl ether	ug/L	ND	20	20	18.5	19.1	92	96	70-130	3	30	
n-Butylbenzene	ug/L	ND	20	20	22.5	22.0	112	110	54-128	2	30	
n-Propylbenzene	ug/L	ND	20	20	22.2	22.0	111	110	62-127	1	30	
Naphthalene	ug/L	ND	20	20	23.0	22.6	115	113	60-136	1	30	
o-Xylene	ug/L	ND	20	20	21.8	21.4	109	107	68-126	2	30	
p-Isopropyltoluene	ug/L	ND	20	20	22.2	22.5	111	112	60-125	1	30	
sec-Butylbenzene	ug/L	ND	20	20	23.0	22.5	115	113	63-125	2	30	
tert-Butylbenzene	ug/L	ND	20	20	22.9	22.3	115	111	64-124	3	30	
Toluene	ug/L	ND	20	20	21.5	22.4	108	112	70-130	4	30	
1,2-Dichloroethane-d4 (S)	%.						99	102	80-120			
4-Bromofluorobenzene (S)	%.						107	106	78-122			
Dibromofluoromethane (S)	%.						100	106	80-120			
Toluene-d8 (S)	%.						99	99	80-120			

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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.: 30280833

QC Batch: 330997 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3510C Analysis Description: 8270D Water PAH by SIM MSSV
Associated Lab Samples: 30280833001, 30280833002, 30280833003, 30280833006, 30280833007, 30280833008, 30280833009

METHOD BLANK: 1610477 Matrix: Water
Associated Lab Samples: 30280833001, 30280833002, 30280833003, 30280833006, 30280833007, 30280833008, 30280833009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Acenaphthene	ug/L	ND	0.10	0.029	02/22/19 13:17	
Acenaphthylene	ug/L	ND	0.10	0.034	02/22/19 13:17	
Anthracene	ug/L	ND	0.10	0.028	02/22/19 13:17	
Benzo(a)anthracene	ug/L	ND	0.10	0.039	02/22/19 13:17	
Benzo(a)pyrene	ug/L	ND	0.10	0.012	02/22/19 13:17	
Benzo(b)fluoranthene	ug/L	ND	0.10	0.027	02/22/19 13:17	
Benzo(g,h,i)perylene	ug/L	ND	0.10	0.035	02/22/19 13:17	
Benzo(k)fluoranthene	ug/L	ND	0.10	0.023	02/22/19 13:17	
Chrysene	ug/L	ND	0.10	0.040	02/22/19 13:17	
Dibenz(a,h)anthracene	ug/L	ND	0.10	0.028	02/22/19 13:17	
Fluoranthene	ug/L	ND	0.10	0.032	02/22/19 13:17	
Fluorene	ug/L	ND	0.10	0.031	02/22/19 13:17	
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.10	0.030	02/22/19 13:17	
Phenanthrene	ug/L	ND	0.10	0.044	02/22/19 13:17	
Pyrene	ug/L	ND	0.10	0.036	02/22/19 13:17	
2-Fluorobiphenyl (S)	%.	59	19-97		02/22/19 13:17	
Terphenyl-d14 (S)	%.	67	47-105		02/22/19 13:17	

LABORATORY CONTROL SAMPLE: 1610478

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Acenaphthene	ug/L	2	1.2	61	34-105	
Acenaphthylene	ug/L	2	1.2	59	30-121	
Anthracene	ug/L	2	1.3	66	39-113	
Benzo(a)anthracene	ug/L	2	1.5	75	51-115	
Benzo(a)pyrene	ug/L	2	1.4	72	46-117	
Benzo(b)fluoranthene	ug/L	2	1.6	80	50-126	
Benzo(g,h,i)perylene	ug/L	2	1.4	68	48-117	
Benzo(k)fluoranthene	ug/L	2	1.5	74	52-118	
Chrysene	ug/L	2	1.4	72	55-107	
Dibenz(a,h)anthracene	ug/L	2	1.4	70	53-118	
Fluoranthene	ug/L	2	1.5	75	45-122	
Fluorene	ug/L	2	1.3	63	36-113	
Indeno(1,2,3-cd)pyrene	ug/L	2	1.4	69	52-117	
Phenanthrene	ug/L	2	1.3	67	40-109	
Pyrene	ug/L	2	1.5	75	45-122	
2-Fluorobiphenyl (S)	%.			62	19-97	
Terphenyl-d14 (S)	%.			69	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.: 30280833

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1610479 1610480

Parameter	Units	30280833001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Acenaphthene	ug/L	ND	2.1	2.1	1.1	0.95	51	44	10-111	11	20	
Acenaphthylene	ug/L	ND	2.1	2.1	1.1	0.95	51	45	14-121	10	20	
Anthracene	ug/L	ND	2.1	2.1	1.2	1.1	58	50	23-108	12	20	
Benzo(a)anthracene	ug/L	ND	2.1	2.1	1.3	1.0	62	49	30-118	20	20	
Benzo(a)pyrene	ug/L	ND	2.1	2.1	1.0	0.75	50	35	10-126	32	20	R1
Benzo(b)fluoranthene	ug/L	ND	2.1	2.1	1.1	0.82	55	39	17-127	32	20	R1
Benzo(g,h,i)perylene	ug/L	ND	2.1	2.1	0.93	0.65	45	30	10-122	35	20	R1
Benzo(k)fluoranthene	ug/L	ND	2.1	2.1	1.1	0.80	55	38	22-118	35	20	R1
Chrysene	ug/L	ND	2.1	2.1	1.3	1.0	61	49	29-110	20	20	
Dibenz(a,h)anthracene	ug/L	ND	2.1	2.1	1.0	0.72	50	34	10-124	36	20	R1
Fluoranthene	ug/L	ND	2.1	2.1	1.5	1.3	72	59	15-134	17	20	
Fluorene	ug/L	ND	2.1	2.1	1.1	0.98	53	45	16-113	12	20	
Indeno(1,2,3-cd)pyrene	ug/L	ND	2.1	2.1	0.96	0.63	47	30	10-125	42	20	R1
Phenanthrene	ug/L	ND	2.1	2.1	1.4	1.2	62	50	20-112	17	20	
Pyrene	ug/L	ND	2.1	2.1	1.5	1.3	71	59	25-125	15	20	
2-Fluorobiphenyl (S)	%.						52	45	19-97		20	
Terphenyl-d14 (S)	%.						57	45	47-105		20	S8,SR

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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.: 30280833

QC Batch: 331279 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3510C Analysis Description: 8270D Water PAH by SIM MSSV
Associated Lab Samples: 30280833004, 30280833005, 30280833011, 30280833012, 30280833013, 30280833014, 30280833015

METHOD BLANK: 1612253 Matrix: Water
Associated Lab Samples: 30280833004, 30280833005, 30280833011, 30280833012, 30280833013, 30280833014, 30280833015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Acenaphthene	ug/L	ND	0.10	0.029	02/26/19 12:20	
Acenaphthylene	ug/L	ND	0.10	0.034	02/26/19 12:20	
Anthracene	ug/L	ND	0.10	0.028	02/26/19 12:20	
Benzo(a)anthracene	ug/L	ND	0.10	0.039	02/26/19 12:20	
Benzo(a)pyrene	ug/L	ND	0.10	0.012	02/26/19 12:20	
Benzo(b)fluoranthene	ug/L	ND	0.10	0.027	02/26/19 12:20	
Benzo(g,h,i)perylene	ug/L	ND	0.10	0.035	02/26/19 12:20	
Benzo(k)fluoranthene	ug/L	ND	0.10	0.023	02/26/19 12:20	
Chrysene	ug/L	ND	0.10	0.040	02/26/19 12:20	
Dibenz(a,h)anthracene	ug/L	ND	0.10	0.028	02/26/19 12:20	
Fluoranthene	ug/L	ND	0.10	0.032	02/26/19 12:20	
Fluorene	ug/L	ND	0.10	0.031	02/26/19 12:20	
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.10	0.030	02/26/19 12:20	
Phenanthrene	ug/L	ND	0.10	0.044	02/26/19 12:20	
Pyrene	ug/L	ND	0.10	0.036	02/26/19 12:20	
2-Fluorobiphenyl (S)	%.	71	19-97		02/26/19 12:20	
Terphenyl-d14 (S)	%.	71	47-105		02/26/19 12:20	

LABORATORY CONTROL SAMPLE: 1612254

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Acenaphthene	ug/L	2	0.96	48	34-105	
Acenaphthylene	ug/L	2	0.95	48	30-121	
Anthracene	ug/L	2	1.1	53	39-113	
Benzo(a)anthracene	ug/L	2	1.3	65	51-115	
Benzo(a)pyrene	ug/L	2	1.2	62	46-117	
Benzo(b)fluoranthene	ug/L	2	1.3	63	50-126	
Benzo(g,h,i)perylene	ug/L	2	1.3	64	48-117	
Benzo(k)fluoranthene	ug/L	2	1.2	61	52-118	
Chrysene	ug/L	2	1.3	63	55-107	
Dibenz(a,h)anthracene	ug/L	2	1.3	64	53-118	
Fluoranthene	ug/L	2	1.2	62	45-122	
Fluorene	ug/L	2	1.0	50	36-113	
Indeno(1,2,3-cd)pyrene	ug/L	2	1.3	64	52-117	
Phenanthrene	ug/L	2	1.1	54	40-109	
Pyrene	ug/L	2	1.3	63	45-122	
2-Fluorobiphenyl (S)	%.			50	19-97	
Terphenyl-d14 (S)	%.			59	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.: 30280833

QC Batch: 332372 Analysis Method: SM 2320B-2011
QC Batch Method: SM 2320B-2011 Analysis Description: 2320B Alkalinity
Associated Lab Samples: 30280833001, 30280833002, 30280833003, 30280833004, 30280833005, 30280833006, 30280833007, 30280833008, 30280833009, 30280833011, 30280833012, 30280833013, 30280833014, 30280833015

METHOD BLANK: 1617376 Matrix: Water
Associated Lab Samples: 30280833001, 30280833002, 30280833003, 30280833004, 30280833005, 30280833006, 30280833007, 30280833008, 30280833009, 30280833011, 30280833012, 30280833013, 30280833014, 30280833015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Carbonate (pH4.5)	mg/L	ND	10.0	10.0	03/05/19 20:39	
Alkalinity,Bicarbonate (pH4.5)	mg/L	ND	10.0	10.0	03/05/19 20:39	
Alkalinity,Total (CaCO3 pH4.5)	mg/L	ND	10.0	1.0	03/05/19 20:39	

LABORATORY CONTROL SAMPLE: 1617377

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity,Total (CaCO3 pH4.5)	mg/L	20	18.0	90	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1617378 1617379

Parameter	Units	30280833001 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	390	50	50	400	410	20	40	85-115	2	20	H1,ML

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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.: 30280833

QC Batch: 330949 Analysis Method: SM 3500-FeB-2011
QC Batch Method: SM 3500-FeB-2011 Analysis Description: Iron, Ferrous
Associated Lab Samples: 30280833001, 30280833002, 30280833003, 30280833004, 30280833005, 30280833006, 30280833007, 30280833008, 30280833009, 30280833011, 30280833012, 30280833013, 30280833014, 30280833015

METHOD BLANK: 1610181 Matrix: Water
Associated Lab Samples: 30280833001, 30280833002, 30280833003, 30280833004, 30280833005, 30280833006, 30280833007, 30280833008, 30280833009, 30280833011, 30280833012, 30280833013, 30280833014, 30280833015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	ND	0.10	0.020	02/20/19 16:08	H6

LABORATORY CONTROL SAMPLE: 1610182

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	1	1.0	103	90-110	H6

MATRIX SPIKE SAMPLE: 1610183

Parameter	Units	30280833001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	ND	1	0.87	85	85-115	H3,H6

MATRIX SPIKE SAMPLE: 1610184

Parameter	Units	30280833001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	ND	1	0.90	88	85-115	H3,H6

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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.: 30280833

QC Batch: 331297 Analysis Method: SM 4500NO3F-2011
QC Batch Method: SM 4500NO3F-2011 Analysis Description: SM4500NO3-F, Nitrate, Preserved
Associated Lab Samples: 30280833001, 30280833002, 30280833003, 30280833004, 30280833005, 30280833006, 30280833007, 30280833008, 30280833009, 30280833011, 30280833012, 30280833013, 30280833014, 30280833015

METHOD BLANK: 1612552 Matrix: Water
Associated Lab Samples: 30280833001, 30280833002, 30280833003, 30280833004, 30280833005, 30280833006, 30280833007, 30280833008, 30280833009, 30280833011, 30280833012, 30280833013, 30280833014, 30280833015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	0.028	02/25/19 11:49	

LABORATORY CONTROL SAMPLE: 1612553

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	4	3.9	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1612554 1612555

Parameter	Units	30280833001 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	3.8	4.1	76	81	85-115	6	20	ML

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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.: 30280833

QC Batch: 331052 Analysis Method: ASTM D516-90,02
QC Batch Method: ASTM D516-90,02 Analysis Description: ASTM D516-90, 02 Sulfate Water
Associated Lab Samples: 30280833001, 30280833002, 30280833003, 30280833004, 30280833005, 30280833006, 30280833007, 30280833008, 30280833009, 30280833011, 30280833012, 30280833013, 30280833014, 30280833015

METHOD BLANK: 1610651 Matrix: Water
Associated Lab Samples: 30280833001, 30280833002, 30280833003, 30280833004, 30280833005, 30280833006, 30280833007, 30280833008, 30280833009, 30280833011, 30280833012, 30280833013, 30280833014, 30280833015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	10.0	4.7	02/21/19 13:50	

LABORATORY CONTROL SAMPLE: 1610652

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	30	31.6	105	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1610653 1610654

Parameter	Units	30280833001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	66.3	100	100	174	169	107	103	85-115	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280833

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: 331279

[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	Dechlorinated 02/26/19
3c	Minimum RF criteria not met
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.
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.
R1	RPD value was outside control limits.

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QUALIFIERS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280833

ANALYTE QUALIFIERS

S8	Surrogate recovery outside laboratory control limits due to matrix interferences (confirmed by similar results from sample re-extraction and/or re-analysis)
SR	Surrogate recovery was below laboratory control limits. Results may be biased low.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280833

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
30280833001	**BMW9-021819**	EPA 3005A	331004	EPA 6010C	331089
30280833002	**BMW9-021819 (MS)**	EPA 3005A	331004	EPA 6010C	331089
30280833003	**BMW9-021819 (MSD)**	EPA 3005A	331004	EPA 6010C	331089
30280833004	**MW-211-021819**	EPA 3005A	331004	EPA 6010C	331089
30280833005	**MW-207-021819**	EPA 3005A	331004	EPA 6010C	331089
30280833006	**MW-208-021819**	EPA 3005A	331004	EPA 6010C	331089
30280833007	**MW-205-021819**	EPA 3005A	331004	EPA 6010C	331089
30280833008	**MW-204-021819**	EPA 3005A	331004	EPA 6010C	331089
30280833009	**DUP- 021819**	EPA 3005A	331004	EPA 6010C	331089
30280833011	**BMW3-021919**	EPA 3005A	331004	EPA 6010C	331089
30280833012	**MW-202-201919**	EPA 3005A	331004	EPA 6010C	331089
30280833013	**BMW7-201919**	EPA 3005A	331004	EPA 6010C	331089
30280833014	**MW-203-201919**	EPA 3005A	331004	EPA 6010C	331089
30280833015	**BMW8-201919**	EPA 3005A	331004	EPA 6010C	331089
30280833001	**BMW9-021819**	EPA 3005A	331162	EPA 6010C	331239
30280833002	**BMW9-021819 (MS)**	EPA 3005A	331162	EPA 6010C	331239
30280833003	**BMW9-021819 (MSD)**	EPA 3005A	331162	EPA 6010C	331239
30280833004	**MW-211-021819**	EPA 3005A	331162	EPA 6010C	331239
30280833005	**MW-207-021819**	EPA 3005A	331162	EPA 6010C	331239
30280833006	**MW-208-021819**	EPA 3005A	331162	EPA 6010C	331239
30280833007	**MW-205-021819**	EPA 3005A	331162	EPA 6010C	331239
30280833008	**MW-204-021819**	EPA 3005A	331162	EPA 6010C	331239
30280833009	**DUP- 021819**	EPA 3005A	331162	EPA 6010C	331239
30280833011	**BMW3-021919**	EPA 3005A	331162	EPA 6010C	331239
30280833012	**MW-202-201919**	EPA 3005A	331162	EPA 6010C	331239
30280833013	**BMW7-201919**	EPA 3005A	331162	EPA 6010C	331239
30280833014	**MW-203-201919**	EPA 3005A	331162	EPA 6010C	331239
30280833015	**BMW8-201919**	EPA 3005A	331162	EPA 6010C	331239
30280833001	**BMW9-021819**	EPA 3510C	330997	EPA 8270D by SIM	331125
30280833002	**BMW9-021819 (MS)**	EPA 3510C	330997	EPA 8270D by SIM	331125
30280833003	**BMW9-021819 (MSD)**	EPA 3510C	330997	EPA 8270D by SIM	331125
30280833004	**MW-211-021819**	EPA 3510C	331279	EPA 8270D by SIM	331383
30280833005	**MW-207-021819**	EPA 3510C	331279	EPA 8270D by SIM	331383
30280833006	**MW-208-021819**	EPA 3510C	330997	EPA 8270D by SIM	331125
30280833007	**MW-205-021819**	EPA 3510C	330997	EPA 8270D by SIM	331125
30280833008	**MW-204-021819**	EPA 3510C	330997	EPA 8270D by SIM	331125
30280833009	**DUP- 021819**	EPA 3510C	330997	EPA 8270D by SIM	331125
30280833011	**BMW3-021919**	EPA 3510C	331279	EPA 8270D by SIM	331383
30280833012	**MW-202-201919**	EPA 3510C	331279	EPA 8270D by SIM	331383
30280833013	**BMW7-201919**	EPA 3510C	331279	EPA 8270D by SIM	331383
30280833014	**MW-203-201919**	EPA 3510C	331279	EPA 8270D by SIM	331383
30280833015	**BMW8-201919**	EPA 3510C	331279	EPA 8270D by SIM	331383
30280833001	**BMW9-021819**	EPA 8260C	331029		
30280833002	**BMW9-021819 (MS)**	EPA 8260C	331029		
30280833003	**BMW9-021819 (MSD)**	EPA 8260C	331029		
30280833004	**MW-211-021819**	EPA 8260C	331029		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280833

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
30280833005	**MW-207-021819**	EPA 8260C	331029		
30280833006	**MW-208-021819**	EPA 8260C	331029		
30280833007	**MW-205-021819**	EPA 8260C	331029		
30280833008	**MW-204-021819**	EPA 8260C	331029		
30280833009	**DUP- 021819**	EPA 8260C	331029		
30280833010	**TB-021819**	EPA 8260C	331029		
30280833011	**BMW3-021919**	EPA 8260C	331029		
30280833012	**MW-202-201919**	EPA 8260C	331029		
30280833013	**BMW7-201919**	EPA 8260C	331029		
30280833014	**MW-203-201919**	EPA 8260C	331029		
30280833015	**BMW8-201919**	EPA 8260C	331029		
30280833001	**BMW9-021819**	SM 2320B-2011	332372		
30280833002	**BMW9-021819 (MS)**	SM 2320B-2011	332372		
30280833003	**BMW9-021819 (MSD)**	SM 2320B-2011	332372		
30280833004	**MW-211-021819**	SM 2320B-2011	332372		
30280833005	**MW-207-021819**	SM 2320B-2011	332372		
30280833006	**MW-208-021819**	SM 2320B-2011	332372		
30280833007	**MW-205-021819**	SM 2320B-2011	332372		
30280833008	**MW-204-021819**	SM 2320B-2011	332372		
30280833009	**DUP- 021819**	SM 2320B-2011	332372		
30280833011	**BMW3-021919**	SM 2320B-2011	332372		
30280833012	**MW-202-201919**	SM 2320B-2011	332372		
30280833013	**BMW7-201919**	SM 2320B-2011	332372		
30280833014	**MW-203-201919**	SM 2320B-2011	332372		
30280833015	**BMW8-201919**	SM 2320B-2011	332372		
30280833001	**BMW9-021819**	SM 3500-FeB-2011	330949		
30280833002	**BMW9-021819 (MS)**	SM 3500-FeB-2011	330949		
30280833003	**BMW9-021819 (MSD)**	SM 3500-FeB-2011	330949		
30280833004	**MW-211-021819**	SM 3500-FeB-2011	330949		
30280833005	**MW-207-021819**	SM 3500-FeB-2011	330949		
30280833006	**MW-208-021819**	SM 3500-FeB-2011	330949		
30280833007	**MW-205-021819**	SM 3500-FeB-2011	330949		
30280833008	**MW-204-021819**	SM 3500-FeB-2011	330949		
30280833009	**DUP- 021819**	SM 3500-FeB-2011	330949		
30280833011	**BMW3-021919**	SM 3500-FeB-2011	330949		
30280833012	**MW-202-201919**	SM 3500-FeB-2011	330949		
30280833013	**BMW7-201919**	SM 3500-FeB-2011	330949		
30280833014	**MW-203-201919**	SM 3500-FeB-2011	330949		
30280833015	**BMW8-201919**	SM 3500-FeB-2011	330949		
30280833001	**BMW9-021819**	SM 4500NO3F-2011	331297		
30280833002	**BMW9-021819 (MS)**	SM 4500NO3F-2011	331297		
30280833003	**BMW9-021819 (MSD)**	SM 4500NO3F-2011	331297		
30280833004	**MW-211-021819**	SM 4500NO3F-2011	331297		
30280833005	**MW-207-021819**	SM 4500NO3F-2011	331297		
30280833006	**MW-208-021819**	SM 4500NO3F-2011	331297		
30280833007	**MW-205-021819**	SM 4500NO3F-2011	331297		
30280833008	**MW-204-021819**	SM 4500NO3F-2011	331297		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280833

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
30280833009	**DUP- 021819**	SM 4500NO3F-2011	331297		
30280833011	**BMW3-021919**	SM 4500NO3F-2011	331297		
30280833012	**MW-202-201919**	SM 4500NO3F-2011	331297		
30280833013	**BMW7-201919**	SM 4500NO3F-2011	331297		
30280833014	**MW-203-201919**	SM 4500NO3F-2011	331297		
30280833015	**BMW8-201919**	SM 4500NO3F-2011	331297		
30280833001	**BMW9-021819**	ASTM D516-90,02	331052		
30280833002	**BMW9-021819 (MS)**	ASTM D516-90,02	331052		
30280833003	**BMW9-021819 (MSD)**	ASTM D516-90,02	331052		
30280833004	**MW-211-021819**	ASTM D516-90,02	331052		
30280833005	**MW-207-021819**	ASTM D516-90,02	331052		
30280833006	**MW-208-021819**	ASTM D516-90,02	331052		
30280833007	**MW-205-021819**	ASTM D516-90,02	331052		
30280833008	**MW-204-021819**	ASTM D516-90,02	331052		
30280833009	**DUP- 021819**	ASTM D516-90,02	331052		
30280833011	**BMW3-021919**	ASTM D516-90,02	331052		
30280833012	**MW-202-201919**	ASTM D516-90,02	331052		
30280833013	**BMW7-201919**	ASTM D516-90,02	331052		
30280833014	**MW-203-201919**	ASTM D516-90,02	331052		
30280833015	**BMW8-201919**	ASTM D516-90,02	331052		

WO# : 30280833

30280833

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

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

Company: Arcadis
Address: 110 W. Fayette Street
Report To: PJ Hart
Copy To: Vin Maresco
Customer Project Name/Number: Cold Springs Terminal
Phone: 315-447-0428
Email:
Collected By (print): Nicholle Griffith
Collected By (signature):
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:

Billing Information:
Email To: vin.maresco@arcadis.com
Site Collection Info/Address: Lysander, NY
State: County/City: / Onondaga Time Zone Collected: [ ] PT [ ] MT [ ] CT [X] ET
Site/Facility ID #:
Compliance Monitoring? [ ] Yes [ ] No
Purchase Order #:
Quote #:
DW PWS ID #:
DW Location Code:
Turnaround Date Required:
Immediately Packed on Ice: [ ] Yes [ ] No
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)

LAB ... er Number or ... LY

Container Preservative Type **: U, 3, U, , 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 Date	Collected Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	SVOC 8270	VOC 8260	Cl, Sulfate, Alkalinity	CO2	Nitrate / Nitrite	Manganese	Manganese - Lab Filtered	Lab Sample # / Comments
BMW9-021819	GW		2/18/19	11:45					2	3	1	2	1	1	1	001
BMW9-021819 (MS)	GW		2/18/19	11:45					2	3	1	2	1	1	1	002
BMW9-021819 (MSD)	GW		2/18/19	11:45					2	3	1	2	1	1	1	003
MW-211-021819	GW		2/18/19	12:30					2	3	1	2	1	1	1	004
MW-207-021819	GW		2/18/19	14:40					2	3	1	2	1	1	1	005
MW-208-021819	GW		2/18/19	15:00					2	3	1	2	1	1	1	006
MW-205-021819	GW		2/18/19	17:00					2	3	1	2	1	1	1	007
MW-204-021819	GW		2/18/19	17:30					2	3	1	2	1	1	1	008
DUP-021819	GW		2/18/19	—					2	3	1	2	1	1	1	009
TB-021819	TB									2						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: 1002981
Sulfide Present Y N (NA)
Lead Acetate Strips:

LAB USE ONLY:
Lab Sample # / Comments: JB/OB

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None
Packing Material Used: Bubble
Radchem sample(s) screened (<500 cpm): Y N (NA)

SHORT HOLDS PRESENT (<72 hours): (Y) N N/A
Lab Tracking #: 774508173059 2357533
Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#: 10
Cooler 1 Temp Upon Receipt: 0.6, 1.4, 1.1, 1.0, 2.6 oC
Cooler 1 Therm Corr. Factor: +0.0 oC
Cooler 1 Corrected Temp: 0.6, 1.4, 1.1, 1.0, 2.6 oC
Comments:
MDS 2-20-19

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Nicholle Griffith / Arcadis	2/19/19 / 16:00	PACE	2/19/19 16:00
			2-20-19 1200

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: 1 of: 2

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical

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

LAB USE **WO#: 30280833** imber or

PM: RDC Due Date: 02/27/19

CLIENT: BUCKARCNY

Company: Arcadis	Billing Information:
Address: 110 W Fayette	
Report To: PS Hart	Email To: Vin.maresco@arcadis
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): Nicholle Griffith	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 **

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, Sulfide, Alkalinity	CO2	Nitrate, Nitrite	Manganese	Manganese - lab filtered			Lab Profile/Line:
BMW3-021919	GW	G	2/19/19	14:00					2	3	1	2	1	1	1			011
MW-202-021919	GW	G	2/19/19	11:20					2	3	1	2	1	1	1			012
BMW7-021919	GW	G	2/19/19	11:35					2	3	1	2	1	1	1			013
MW-203-021919	GW	G	2/19/19	13:00					2	3	1	2	1	1	1			014
~~BMW8~~ BMW8-021919	GW	G	2/19/19	13:30					2	3	1	2	1	1	1			015
~~BMW9~~																		

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 first page JTB/JW

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

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

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

Lab Tracking #: 2357534

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:

Relinquished by/Company: (Signature) Nicholle Griffith / Arcadis	Date/Time: 2/19/19 16:00	Received by/Company: (Signature) PACE
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)

Date/Time:	MTJL LAB USE ONLY
2/19/19 16:00	Table #:
	Acctnum:
Date/Time: 2-20-19 1200	Template:
	Prelogin:
	PM:
	PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 2 of: 2

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Sample Receiving Non-Conformance Form (NCF)

Date: 2-20-19	Evaluated by: MJS
Client: Arcadis	

WO# : 30280833

PM: RDC **Due Date: 02/27/19**

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:

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:

Sample MW-211-021819 has residual chlorine

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

March 5, 2019

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

RE: **30280833**

Pace Workorder: 29543

Dear Rachel Christner:

Enclosed are the analytical results for sample(s) received by the laboratory on Monday, February 25, 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 03/05/2019
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 32

Pace Analytical Energy Services LLC
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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: 29543 30280833

Lab ID	Sample ID	Matrix	Date Collected	Date Received
295430001	30280833 001	Water	2/18/2019 11:45	2/25/2019 09:00
295430002	30280833 002 MS	Water	2/18/2019 11:45	2/25/2019 09:00
295430003	30280833 003 MSD	Water	2/18/2019 11:45	2/25/2019 09:00
295430004	30280833 004	Water	2/18/2019 12:30	2/25/2019 09:00
295430005	30280833 005	Water	2/18/2019 14:40	2/25/2019 09:00
295430006	30280833 006	Water	2/18/2019 15:00	2/25/2019 09:00
295430007	30280833 007	Water	2/18/2019 17:00	2/25/2019 09:00
295430008	30280833 008	Water	2/18/2019 17:30	2/25/2019 09:00
295430009	30280833 009	Water	2/18/2019 00:01	2/25/2019 09:00
295430010	30280833 011	Water	2/18/2019 14:00	2/25/2019 09:00
295430011	30280833 012	Water	2/18/2019 11:20	2/25/2019 09:00
295430012	30280833 013	Water	2/18/2019 11:35	2/25/2019 09:00
295430013	30280833 014	Water	2/19/2019 13:00	2/25/2019 09:00
295430014	30280833 015	Water	2/18/2019 13:30	2/25/2019 09:00

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PROJECT SUMMARY

Workorder: 29543 30280833

Workorder Comments

The samples 29543 (0001-0014) were collected in an alternate container type, than that assigned to PAES method RSK175. The sample container was BAK preserved and capped with butyl septa.

Only one vial was provided for analysis of method RSK175. In order to assure accurate reporting of all analytes, the equilibrated headspace was transferred to a headspace vial. Results reported at dilution.

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ANALYTICAL RESULTS

Workorder: 29543 30280833

Lab ID: **295430001** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280833 001** Date Collected: 2/18/2019 11:45

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**55**	mg/l	5.0	0.12	1	2/26/2019 07:22	BW	n
Analysis Desc: EPA RSK175		Analytical Method: EPA RSK175						
Methane	**2.5**	ug/l	2.5	0.34	5	2/28/2019 08:50	AK	d
Ethane	**0.030U**	ug/l	1.0	0.030	5	2/28/2019 08:50	AK	d
Ethene	**0.060U**	ug/l	1.0	0.060	5	2/28/2019 08:50	AK	d

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ANALYTICAL RESULTS

Workorder: 29543 30280833

Lab ID: **295430002** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280833 002 MS** Date Collected: 2/18/2019 11:45

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Carbon Dioxide	**170**	mg/l	5.0	0.12	1	2/26/2019 07:35	BW	n
Analysis Desc: EPA RSK175			Analytical Method: EPA RSK175					
Methane	**57**	ug/l	2.5	0.34	5	2/28/2019 09:00	AK	d
Ethane	**100**	ug/l	1.0	0.030	5	2/28/2019 09:00	AK	d
Ethene	**97**	ug/l	1.0	0.060	5	2/28/2019 09:00	AK	d

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ANALYTICAL RESULTS

Workorder: 29543 30280833

Lab ID: **295430003** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280833 003 MSD** Date Collected: 2/18/2019 11:45

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Carbon Dioxide	**170**	mg/l	5.0	0.12	1	2/26/2019 07:46	BW	n
Analysis Desc: EPA RSK175			Analytical Method: EPA RSK175					
Methane	**53**	ug/l	2.5	0.34	5	2/28/2019 09:12	AK	d
Ethane	**93**	ug/l	1.0	0.030	5	2/28/2019 09:12	AK	d
Ethene	**89**	ug/l	1.0	0.060	5	2/28/2019 09:12	AK	d

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ANALYTICAL RESULTS

Workorder: 29543 30280833

Lab ID: **295430004** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280833 004** Date Collected: 2/18/2019 12:30

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**75**	mg/l	5.0	0.12	1	2/26/2019 07:59	BW	n
Analysis Desc: EPA RSK175		Analytical Method: EPA RSK175						
Methane	**0.58J**	ug/l	2.5	0.34	5	2/28/2019 09:23	AK	d
Ethane	**0.030U**	ug/l	1.0	0.030	5	2/28/2019 09:23	AK	d
Ethene	**0.060U**	ug/l	1.0	0.060	5	2/28/2019 09:23	AK	d

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ANALYTICAL RESULTS

Workorder: 29543 30280833

Lab ID: **295430005** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280833 005** Date Collected: 2/18/2019 14:40

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Carbon Dioxide	**14**	mg/l	5.0	0.12	1	2/26/2019 08:11	BW	n
Analysis Desc: EPA RSK175			Analytical Method: EPA RSK175					
Methane	**0.38J**	ug/l	2.5	0.34	5	2/28/2019 09:33	AK	d
Ethane	**0.030U**	ug/l	1.0	0.030	5	2/28/2019 09:33	AK	d
Ethene	**0.060U**	ug/l	1.0	0.060	5	2/28/2019 09:33	AK	d

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ANALYTICAL RESULTS

Workorder: 29543 30280833

Lab ID: **295430006** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280833 006** Date Collected: 2/18/2019 15:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Carbon Dioxide	**100**	mg/l	5.0	0.12	1	2/26/2019 08:21	BW	n
Analysis Desc: EPA RSK175			Analytical Method: EPA RSK175					
Methane	**69**	ug/l	2.5	0.34	5	2/28/2019 09:43	AK	d
Ethane	**0.030U**	ug/l	1.0	0.030	5	2/28/2019 09:43	AK	d
Ethene	**0.060U**	ug/l	1.0	0.060	5	2/28/2019 09:43	AK	d

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ANALYTICAL RESULTS

Workorder: 29543 30280833

Lab ID: **295430007** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280833 007** Date Collected: 2/18/2019 17:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**38**	mg/l	5.0	0.12	1	2/26/2019 08:31	BW	n
Analysis Desc: EPA RSK175		Analytical Method: EPA RSK175						
Methane	**1.4J**	ug/l	2.5	0.34	5	2/28/2019 09:54	AK	d
Ethane	**0.14J**	ug/l	1.0	0.030	5	2/28/2019 09:54	AK	d
Ethene	**0.072J**	ug/l	1.0	0.060	5	2/28/2019 09:54	AK	d

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ANALYTICAL RESULTS

Workorder: 29543 30280833

Lab ID: **295430008** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280833 008** Date Collected: 2/18/2019 17:30

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Carbon Dioxide	**130**	mg/l	5.0	0.12	1	2/26/2019 08:41	BW	n
Analysis Desc: EPA RSK175			Analytical Method: EPA RSK175					
Methane	**330**	ug/l	2.5	0.34	5	2/28/2019 10:04	AK	d
Ethane	**0.23J**	ug/l	1.0	0.030	5	2/28/2019 10:04	AK	d
Ethene	**0.060U**	ug/l	1.0	0.060	5	2/28/2019 10:04	AK	d

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ANALYTICAL RESULTS

Workorder: 29543 30280833

Lab ID: **295430009** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280833 009** Date Collected: 2/18/2019 00:01

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**14**	mg/l	5.0	0.12	1	2/26/2019 08:55	BW	n
Analysis Desc: EPA RSK175		Analytical Method: EPA RSK175						
Methane	**0.42J**	ug/l	2.5	0.34	5	2/28/2019 10:15	AK	d
Ethane	**0.030U**	ug/l	1.0	0.030	5	2/28/2019 10:15	AK	d
Ethene	**0.060U**	ug/l	1.0	0.060	5	2/28/2019 10:15	AK	d

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

ANALYTICAL RESULTS

Workorder: 29543 30280833

Lab ID: **295430010** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280833 011** Date Collected: 2/18/2019 14:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**140**	mg/l	5.0	0.12	1	2/26/2019 09:05	BW	n
Analysis Desc: EPA RSK175		Analytical Method: EPA RSK175						
Methane	**0.34U**	ug/l	2.5	0.34	5	2/28/2019 10:25	AK	d
Ethane	**0.030U**	ug/l	1.0	0.030	5	2/28/2019 10:25	AK	d
Ethene	**0.060U**	ug/l	1.0	0.060	5	2/28/2019 10:25	AK	d

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ANALYTICAL RESULTS

Workorder: 29543 30280833

Lab ID: **295430011** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280833 012** Date Collected: 2/18/2019 11:20

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**170**	mg/l	5.0	0.12	1	2/26/2019 09:17	BW	n
Analysis Desc: EPA RSK175		Analytical Method: EPA RSK175						
Methane	**0.68J**	ug/l	2.5	0.34	5	2/28/2019 10:57	AK	d
Ethane	**0.030U**	ug/l	1.0	0.030	5	2/28/2019 10:57	AK	d
Ethene	**0.060U**	ug/l	1.0	0.060	5	2/28/2019 10:57	AK	d

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ANALYTICAL RESULTS

Workorder: 29543 30280833

Lab ID: **295430012** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280833 013** Date Collected: 2/18/2019 11:35

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**180**	mg/l	5.0	0.12	1	2/26/2019 09:28	BW	n
Analysis Desc: EPA RSK175		Analytical Method: EPA RSK175						
Methane	**1.0J**	ug/l	2.5	0.34	5	2/28/2019 11:07	AK	d
Ethane	**0.030U**	ug/l	1.0	0.030	5	2/28/2019 11:07	AK	d
Ethene	**0.060U**	ug/l	1.0	0.060	5	2/28/2019 11:07	AK	d

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ANALYTICAL RESULTS

Workorder: 29543 30280833

Lab ID: **295430013** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280833 014** Date Collected: 2/19/2019 13:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Carbon Dioxide	**54**	mg/l	5.0	0.12	1	2/26/2019 10:57	BW	n
Analysis Desc: EPA RSK175			Analytical Method: EPA RSK175					
Methane	**0.34U**	ug/l	2.5	0.34	5	2/28/2019 11:20	AK	d
Ethane	**0.030U**	ug/l	1.0	0.030	5	2/28/2019 11:20	AK	d
Ethene	**0.060U**	ug/l	1.0	0.060	5	2/28/2019 11:20	AK	d

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ANALYTICAL RESULTS

Workorder: 29543 30280833

Lab ID: **295430014** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280833 015** Date Collected: 2/18/2019 13:30

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Carbon Dioxide	**190**	mg/l	5.0	0.12	1	2/26/2019 11:13	BW	n
Analysis Desc: EPA RSK175			Analytical Method: EPA RSK175					
Methane	**7.7**	ug/l	2.5	0.34	5	2/28/2019 11:30	AK	d
Ethane	**0.030U**	ug/l	1.0	0.030	5	2/28/2019 11:30	AK	d
Ethene	**0.060U**	ug/l	1.0	0.060	5	2/28/2019 11:30	AK	d

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Phone: (412) 826-5245
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ANALYTICAL RESULTS QUALIFIERS

Workorder: 29543 30280833

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.
d	The analyte concentration was determined from a dilution.

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Phone: (412) 826-5245
Fax: (412) 826-3433

QUALITY CONTROL DATA

Workorder: 29543 30280833

QC Batch: DISG/7382 Analysis Method: AM20GAX

QC Batch Method: AM20GAX

Associated Lab Samples: 295430001, 295430002, 295430003, 295430004, 295430005, 295430006, 295430007, 295430008, 295430009, 295430010, 295430011, 295430012, 295430013, 295430014

METHOD BLANK: 59909

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Carbon Dioxide	mg/l	0.12U	0.12	n

LABORATORY CONTROL SAMPLE & LCSD: 59911 59913

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Carbon Dioxide	mg/l	120	120	120	105	102	80-120	3.5	20	n

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 59920 59921 Original: 295430001

Parameter	Units	Original Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK											
Carbon Dioxide	mg/l	55	120	170	170	99	100	70-130	1.2	20	n

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Fax: (412) 826-3433

QUALITY CONTROL DATA

Workorder: 29543 30280833

QC Batch: DISG/7388 Analysis Method: EPA RSK175

QC Batch Method: EPA RSK175

Associated Lab Samples: 295430001, 295430002, 295430003, 295430004, 295430005, 295430006, 295430007, 295430008, 295430009, 295430010, 295430011, 295430012, 295430013, 295430014

METHOD BLANK: 59944

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Methane	ug/l	0.067U	0.067	
Ethane	ug/l	0.0060U	0.0060	
Ethene	ug/l	0.012U	0.012	

LABORATORY CONTROL SAMPLE & LCSD: 59945 59946

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Methane	ug/l	44	44	43	99	97	85-115	1.1	20	
Ethane	ug/l	83	82	80	98	97	85-115	1.4	20	
Ethene	ug/l	78	80	78	102	100	85-115	2.4	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 59947 59948 Original: 295430001

Parameter	Units	Original Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK											
Methane	ug/l	2.5	44	57	53	122	114	70-130	6.1	20	d
Ethane	ug/l	0	83	100	93	121	112	70-130	7.5	20	d
Ethene	ug/l	0	78	97	89	124	114	70-130	8.4	20	d

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Phone: (412) 826-5245
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QUALITY CONTROL DATA QUALIFIERS

Workorder: 29543 30280833

QUALITY CONTROL PARAMETER QUALIFIERS

d	The analyte concentration was determined from a dilution.
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 CROSS REFERENCE TABLE

Workorder: 29543 30280833

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
295430001	30280833 001			AM20GAX	DISG/7382
295430002	30280833 002 MS			AM20GAX	DISG/7382
295430003	30280833 003 MSD			AM20GAX	DISG/7382
295430004	30280833 004			AM20GAX	DISG/7382
295430005	30280833 005			AM20GAX	DISG/7382
295430006	30280833 006			AM20GAX	DISG/7382
295430007	30280833 007			AM20GAX	DISG/7382
295430008	30280833 008			AM20GAX	DISG/7382
295430009	30280833 009			AM20GAX	DISG/7382
295430010	30280833 011			AM20GAX	DISG/7382
295430011	30280833 012			AM20GAX	DISG/7382
295430012	30280833 013			AM20GAX	DISG/7382
295430013	30280833 014			AM20GAX	DISG/7382
295430014	30280833 015			AM20GAX	DISG/7382
295430001	30280833 001			EPA RSK175	DISG/7388
295430002	30280833 002 MS			EPA RSK175	DISG/7388
295430003	30280833 003 MSD			EPA RSK175	DISG/7388
295430004	30280833 004			EPA RSK175	DISG/7388
295430005	30280833 005			EPA RSK175	DISG/7388
295430006	30280833 006			EPA RSK175	DISG/7388
295430007	30280833 007			EPA RSK175	DISG/7388
295430008	30280833 008			EPA RSK175	DISG/7388
295430009	30280833 009			EPA RSK175	DISG/7388
295430010	30280833 011			EPA RSK175	DISG/7388
295430011	30280833 012			EPA RSK175	DISG/7388
295430012	30280833 013			EPA RSK175	DISG/7388
295430013	30280833 014			EPA RSK175	DISG/7388
295430014	30280833 015			EPA RSK175	DISG/7388

Chain of Custody

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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	5	
Received on Ice	Yes	No
Sealed Cooler	Yes	No
Samples Intact	Yes	No

Subcontractor Project No.: 29543
P.O. No: ASR- 30280833

Request Date: 2/21/19 Analysis Due Date: 2/27/2019
Shipped By: Courier

Certification Required: NY

Pace Project No.: 30280833
Report/Invoice to: Rachel Christner

Page 1 of

	Pace Sample ID:	Matrix:	Collection Date:	Time:	Analysis Requested:	Analytical Method:	Preservative Type:
1	30280833 001	WT	2/18/19	11:45	Methane, Ethane, Ethene	RSK-175	BAK
2	30280833 001	WT	2/18/19	11:45	Carbon Dioxide	AM20GAX	BAK
3	30280833 002	WT	2/18/19	11:45	Methane, Ethane, Ethene	RSK-175	BAK
4	30280833 002	WT	2/18/19	11:45	Carbon Dioxide	AM20GAX	BAK
5	30280833 003	WT	2/18/19	11:45	Methane, Ethane, Ethene	RSK-175	BAK
6	30280833 003	WT	2/18/19	11:45	Carbon Dioxide	AM20GAX	BAK
7	30280833 004	WT	2/18/19	12:30	Methane, Ethane, Ethene	RSK-175	BAK
8	30280833 004	WT	2/18/19	12:30	Carbon Dioxide	AM20GAX	BAK
9	30280833 005	WT	2/18/19	14:40	Methane, Ethane, Ethene	RSK-175	BAK
10	30280833 005	WT	2/18/19	14:40	Carbon Dioxide	AM20GAX	BAK
11	30280833 006	WT	2/18/19	15:00	Methane, Ethane, Ethene	RSK-175	BAK
12	30280833 006	WT	2/18/19	15:00	Carbon Dioxide	AM20GAX	BAK

Special Requirements:

****Please supply a method blank and LCS QC information on the final report****
*001=QC, 002=MS, 003=MSD

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

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

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

Relinquished By: PACE 2-22-19 1600 (Signature & Affiliation) (Date) (Time)

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

Received By: 2.25.19 0900 (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.

Chain of Custody

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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		
Received on Ice	Yes	No
Sealed Cooler	Yes	No
Samples Intact	Yes	No

Subcontractor Project No.: 29543
P.O. No: ASR- 30280833

Request Date: 2/21/19 Analysis Due Date: 2/27/2019
Shipped By: Courier

Certification Required: NY

Pace Project No.: 30280833
Report/Invoice to: Rachel Christner

Page 2 of

	Pace Sample ID:	Matrix:	Collection Date:	Time:	Analysis Requested:	Analytical Method:	Preservative Type:
1	30280833 007	WT	2/18/19	17:00	Methane, Ethane, Ethene	RSK-175	BAK
2	30280833 007	WT	2/18/19	17:00	Carbon Dioxide	AM20GAX	BAK
3	30280833 008	WT	2/18/19	17:30	Methane, Ethane, Ethene	RSK-175	BAK
4	30280833 008	WT	2/18/19	17:30	Carbon Dioxide	AM20GAX	BAK
5	30280833 009	WT	2/18/19	00:01	Methane, Ethane, Ethene	RSK-175	BAK
6	30280833 009	WT	2/18/19	00:01	Carbon Dioxide	AM20GAX	BAK
7	30280833 011	WT	2/19/19	14:00	Methane, Ethane, Ethene	RSK-175	BAK
8	30280833 011	WT	2/19/19	14:00	Carbon Dioxide	AM20GAX	BAK
9	30280833 012	WT	2/19/19	11:20	Methane, Ethane, Ethene	RSK-175	BAK
10	30280833 012	WT	2/19/19	11:20	Carbon Dioxide	AM20GAX	BAK
11	30280833 013	WT	2/19/19	11:35	Methane, Ethane, Ethene	RSK-175	BAK
12	30280833 013	WT	2/19/19	11:35	Carbon Dioxide	AM20GAX	BAK

Special Requirements:

****Please supply a method blank and LCS QC information on the final report****
*001=QC, 002=MS, 003=MSD

Subcontract Lab: Pace Analytical Energy Services PA (Microseep
Address: 220 William Pitt Way
Pittsburgh, PA 15238
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 (Signature & Affiliation) 2-22-19 (Date) 1600 (Time)

Received By: (Signature & Affiliation) 2.25.19 (Date) 0900 (Time)

Relinquished By: (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.

Chain of Custody

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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	0.5	
Received on Ice	Yes	No
Sealed Cooler	Yes	No
Samples Intact	Yes	No

Subcontractor Project No.: 29543
P.O. No: ASR- 30280833

Request Date: 2/21/19 Analysis Due Date: 2/27/2019
Shipped By: Courier

Certification Required: NY

Pace Project No.: 30280833
Report/Invoice to: Rachel Christner

Page 3 of

	Pace Sample ID:	Matrix:	Collection Date:	Time:	Analysis Requested:	Analytical Method:	Preservative Type:
1	30280833 014	WT	2/19/19	13:00	Methane, Ethane, Ethene	RSK-175	BAK
2	30280833 014	WT	2/19/19	13:00	Carbon Dioxide	AM20GAX	BAK
3	30280833 015	WT	2/18/19	13:30	Methane, Ethane, Ethene	RSK-175	BAK
4	30280833 015	WT	2/18/19	13:30	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****
*001=QC, 002=MS, 003=MSD

Subcontract Lab: Pace Analytical Energy Services PA (Microsee
Address: 220 William Pitt Way
Pittsburgh, PA 15238
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 2-22-19 1600 (Signature & Affiliation) (Date) (Time)

Received By: 2.25.19 0900 (Signature & Affiliation) (Date) (Time)

Relinquished By: (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: 30280833 Lab Work Order: 29543

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: 5°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:** 2-25-19

Project Manager Review : JW **Date:** 2.26.19

NON-CONFORMANCE FORM

PAES Work Order #: 29543

Date: 2.25.19 Time of Receipt: 0900 Receiver: LJ

Client: Pace

REASON FOR NON-CONFORMANCE:

1. All vials had headspace, except for 1 vial @ 30280833011.
2. Requested RSK175 for MEE on BAK vials.

ACTION TAKEN:

Client name: _____ Date: _____ Time: _____

Client emailed

Customer Service Initials: JW Date: 2.26.19

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

Joseph Ward - 30280833

From: Joseph Ward
To: Rachel Christner
Subject: 30280833

Upon receiving your samples for the project referenced above, all sample vials have headspace in them except for 1 vial for sample 30280833 011.

Joseph Ward
Customer Service
Pace Analytical Energy Services
220 William Pitt Way
Pittsburgh PA 15238
412-826-5245/412-826-2384(Direct)

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

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

WO# : 30280833

30280833

LAB Number or 29543

LY

Page 79 of 81

Company: Arcadis	Billing Information:
Address: 110 W. Fayette Street	
Report To: PJ Hart	Email To: Vin.mansco@arcadis.com
Copy To: Vin Mansco	Site Collection Info/Address: Lysander, NY
Customer Project Name/Number: Cold Springs Terminal	State: County/City: / Onondaga Time Zone Collected: [ ] PT [ ] MT [ ] CT [X] ET
Phone: 315-447-0428 Email:	Site/Facility ID #:
Collected By (print): Nicholle Griffith	Purchase Order #: Quote #:
Collected By (signature):	Turnaround Date Required:
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: [ ] Hold:	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Compliance Monitoring? [ ] Yes [ ] No

DW PWS ID #: DW Location Code:

Immediately Packed on Ice: [ ] Yes [ ] No

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 **: H3 H4 2 1 H

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 _____

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	RI, Sulfide, Alkalinity	CO2	Nitrate / Nitrite	Manganese	Manganese - Lab Filtered			Lab Sample # / Comments
BMW9-021819	GW		2/18/19	11:45					2	3	1	2	1	1	1			001
BMW9-021819 (MS)	GW		2/18/19	11:45					2	3	1	2	1	1	1			002
BMW9-021819 (MSD)	GW		2/18/19	11:45					2	3	1	2	1	1	1			003
MW-211-021819	GW		2/18/19	12:30					2	3	1	2	1	1	1			004
MW-207-021819	GW		2/18/19	14:40					2	3	1	2	1	1	1			005
MW-208-021819	GW		2/18/19	15:00					2	3	1	2	1	1	1			006
MW-205-021819	GW		2/18/19	17:00					2	3	1	2	1	1	1			007
MW-204-021819	GW		2/18/19	17:30					2	3	1	2	1	1	1			008
DUP-021819	GW		2/18/19	—					2	3	1	2	1	1	1			009
TB-021819	TB									2								010

Analyses

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: 1007981	
Sulfide Present	Y N (NA)
Lead Acetate Strips:	

LAB USE ONLY:

Lab Sample # / Comments:

JB/DB

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used: Bubble

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

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

Lab Tracking #: 774508173059 2357533

Samples received via: FEDEX UPS Client Courier Pace Courier

Lab Sample Temperature Info:

Temp Blank Received: (Y) N NA

Therm ID#: 10

Cooler 1 Temp Upon Receipt: 0.0, 1.4, 1.1, 1.9 oC

Cooler 1 Therm Corr. Factor: +0.0 oC

Cooler 1 Corrected Temp: 0.6, 1.4 oC

Comments: 1.1, 1.0, 2.6

MOS 2-20-19

Trip Blank Received: (Y) N NA

(HCl) MeOH TSP Other

Non Conformance(s): (YES) / NO

Page: 1 of: 2

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Michelle Griffith / Arcadis	2/19/19 10:00	PACE	2/19/19 16:00
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
			2-20-19 1200
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

MTJL LAB USE ONLY

Table #:

Acctnum:

Template:

Prelogin:

PM:

PB:

WO#: 30280833
PM: RDC Due Date: 02/27/19
CLIENT: BUCKARCNY
29543

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

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

LAB USE ... umber or

Company: Arcadis	Billing Information:
Address: 110 W Fayette	
Report To: PJ Hart	Email To: vin.maresco@arcadis
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): Nicholle Griffith	Purchase Order #: Quote #:	DW PWS ID #: DW Location Code:
Collected By (signature): [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 **

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	Time	Composite End Date	Time	Res Cl	# of Ctns	SVOC 8270	VOC 8260	FeI, Sulfide, Alkalinity	CO_2	Nitrate, Nitrite	Manganese	Manganese - Lab Filtered			Lab Sample # / Comments
BMW3-021919	GW	G	2/19/19	14:00					2	3	1	2	1	1	1			011
MW-202-021919	GW	G	2/19/19	11:20					2	3	1	2	1	1	1			012
BMW7-021919	GW	G	2/19/19	11:35					2	3	1	2	1	1	1			013
MW-203-021919	GW	G	2/19/19	13:00					2	3	1	2	1	1	1			014
~~BMW8~~ BMW8-021919	GW	G	2/19/19	13:30					2	3	1	2	1	1	1			015
~~BMW9~~																		

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 first page JW/DD

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

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

Packing Material Used:

Lab Tracking #: 2357534

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

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:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	MTJL LAB USE ONLY
Nicholle Griffith / Arcadis	2/19/19 16:00	[signature] PACE	2/19/19 16:00	Table #:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature) [signature]	Date/Time: 2-20-19 1200	Acctnum: Template: Prelogin:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	PM: PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: 2 of: 2

29543

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Sample Receiving Non-Conformance Form (NCF)

Date: 2-20-19	Evaluated by: MDS
Client: Arcadis	

WO# : 30280833

PM: RDC Due Date: 02/27/19

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:

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:

Sample MW-211-021819 has residual chlorine

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

March 05, 2019

Vin Maresco
Arcadis
6723 Towpath Road
Syracuse, NY 13214

RE: Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280927

Dear Vin Maresco:
Enclosed are the analytical results for sample(s) received by the laboratory on February 21, 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 Dissolved Gases analysis. The results of this analysis are reported on the Pace Analytical Energy Services data tables attached.

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

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

cc: Mr. Mike Teeling, Woodard & Curran

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.: 30280927

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
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
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Greensburg, PA 15601
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SAMPLE SUMMARY

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280927

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30280927001	**Trip Blank- 022019**	Water	02/20/19 07:45	02/21/19 10:00
30280927002	**BMW2-022019**	Water	02/20/19 08:00	02/21/19 10:00
30280927003	**PZ1065-022019**	Water	02/20/19 09:10	02/21/19 10:00
30280927004	**MW-210-022019**	Water	02/20/19 10:00	02/21/19 10:00
30280927005	**BMW14-022019**	Water	02/20/19 11:00	02/21/19 10:00

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.: 30280927

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30280927001	**Trip Blank- 022019**	EPA 8260C	LEL	20	PASI-PA
30280927002	**BMW2-022019**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	KAS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	LEL	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 D516-90,02	LEP	1	PASI-PA
30280927003	**PZ1065-022019**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	KAS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	LEL	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 D516-90,02	LEP	1	PASI-PA
30280927004	**MW-210-022019**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	KAS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	LEL	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 D516-90,02	LEP	1	PASI-PA
30280927005	**BMW14-022019**	EPA 6010C	CTS	1	PASI-PA
		EPA 6010C	KAS	1	PASI-PA
		EPA 8270D by SIM	AJC	17	PASI-PA
		EPA 8260C	LEL	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 D516-90,02	LEP	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.: 30280927

Sample: Trip Blank- 022019 **Lab ID: 30280927001** Collected: 02/20/19 07:45 Received: 02/21/19 10:00 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	0.24	1		02/21/19 17:20	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.20	1		02/21/19 17:20	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 17:20	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.28	1		02/21/19 17:20	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 17:20	64-17-5	2c,CL
Ethylbenzene	ND	ug/L	1.0	0.31	1		02/21/19 17:20	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.24	1		02/21/19 17:20	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.36	1		02/21/19 17:20	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 17:20	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		02/21/19 17:20	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.29	1		02/21/19 17:20	103-65-1	
Toluene	ND	ug/L	1.0	0.30	1		02/21/19 17:20	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 17:20	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.21	1		02/21/19 17:20	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.60	1		02/21/19 17:20	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.18	1		02/21/19 17:20	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	105	%.	78-122		1		02/21/19 17:20	460-00-4	
1,2-Dichloroethane-d4 (S)	106	%.	80-120		1		02/21/19 17:20	17060-07-0	
Toluene-d8 (S)	100	%.	80-120		1		02/21/19 17:20	2037-26-5	
Dibromofluoromethane (S)	103	%.	80-120		1		02/21/19 17:20	1868-53-7	

Sample: BMW2-022019 **Lab ID: 30280927002** Collected: 02/20/19 08:00 Received: 02/21/19 10:00 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	**108**	ug/L	5.0	1.2	1	02/26/19 10:15	02/27/19 08:10	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**19.8**	ug/L	5.0	1.2	1	02/22/19 09:15	02/22/19 17:21	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	02/25/19 12:35	02/26/19 14:38	83-32-9	1c
Acenaphthylene	ND	ug/L	0.10	0.035	1	02/25/19 12:35	02/26/19 14:38	208-96-8	1c
Anthracene	ND	ug/L	0.10	0.029	1	02/25/19 12:35	02/26/19 14:38	120-12-7	1c
Benzo(a)anthracene	ND	ug/L	0.10	0.040	1	02/25/19 12:35	02/26/19 14:38	56-55-3	1c
Benzo(a)pyrene	ND	ug/L	0.10	0.013	1	02/25/19 12:35	02/26/19 14:38	50-32-8	1c
Benzo(b)fluoranthene	ND	ug/L	0.10	0.028	1	02/25/19 12:35	02/26/19 14:38	205-99-2	1c
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.037	1	02/25/19 12:35	02/26/19 14:38	191-24-2	1c
Benzo(k)fluoranthene	ND	ug/L	0.10	0.024	1	02/25/19 12:35	02/26/19 14:38	207-08-9	1c
Chrysene	ND	ug/L	0.10	0.041	1	02/25/19 12:35	02/26/19 14:38	218-01-9	1c
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.029	1	02/25/19 12:35	02/26/19 14:38	53-70-3	1c
Fluoranthene	ND	ug/L	0.10	0.033	1	02/25/19 12:35	02/26/19 14:38	206-44-0	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.: 30280927

Sample: BMW2-022019 **Lab ID: 30280927002** Collected: 02/20/19 08:00 Received: 02/21/19 10:00 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								
Fluorene	ND	ug/L	0.10	0.032	1	02/25/19 12:35	02/26/19 14:38	86-73-7	1c
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.031	1	02/25/19 12:35	02/26/19 14:38	193-39-5	1c
Phenanthrene	ND	ug/L	0.10	0.045	1	02/25/19 12:35	02/26/19 14:38	85-01-8	1c
Pyrene	ND	ug/L	0.10	0.037	1	02/25/19 12:35	02/26/19 14:38	129-00-0	1c
Surrogates									
2-Fluorobiphenyl (S)	47	%.	19-97		1	02/25/19 12:35	02/26/19 14:38	321-60-8	
Terphenyl-d14 (S)	55	%.	47-105		1	02/25/19 12:35	02/26/19 14:38	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.24	1		02/21/19 20:35	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.20	1		02/21/19 20:35	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 20:35	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.28	1		02/21/19 20:35	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 20:35	64-17-5	2c,CL
Ethylbenzene	ND	ug/L	1.0	0.31	1		02/21/19 20:35	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.24	1		02/21/19 20:35	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.36	1		02/21/19 20:35	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 20:35	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		02/21/19 20:35	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.29	1		02/21/19 20:35	103-65-1	
Toluene	ND	ug/L	1.0	0.30	1		02/21/19 20:35	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 20:35	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.21	1		02/21/19 20:35	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.60	1		02/21/19 20:35	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.18	1		02/21/19 20:35	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	104	%.	78-122		1		02/21/19 20:35	460-00-4	
1,2-Dichloroethane-d4 (S)	111	%.	80-120		1		02/21/19 20:35	17060-07-0	
Toluene-d8 (S)	99	%.	80-120		1		02/21/19 20:35	2037-26-5	
Dibromofluoromethane (S)	107	%.	80-120		1		02/21/19 20:35	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**256**	mg/L	10.0	10.0	1		02/27/19 20:42		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		02/27/19 20:42		
Alkalinity,Total (CaCO3 pH4.5)	**256**	mg/L	10.0	1.0	1		02/27/19 20:42		ML
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		02/21/19 18:47		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.028	1		02/28/19 18:04		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	ND	mg/L	50.0	23.4	5		02/21/19 14:33	14808-79-8	D3

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.: 30280927

Sample: PZ1065-022019 **Lab ID: 30280927003** Collected: 02/20/19 09:10 Received: 02/21/19 10:00 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	**201**	ug/L	5.0	1.2	1	02/26/19 10:15	02/27/19 08:19	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**12.2**	ug/L	5.0	1.2	1	02/22/19 09:15	02/22/19 17:24	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	02/25/19 12:35	02/26/19 14:58	83-32-9	1c
Acenaphthylene	ND	ug/L	0.10	0.035	1	02/25/19 12:35	02/26/19 14:58	208-96-8	1c
Anthracene	ND	ug/L	0.10	0.028	1	02/25/19 12:35	02/26/19 14:58	120-12-7	1c
Benzo(a)anthracene	ND	ug/L	0.10	0.040	1	02/25/19 12:35	02/26/19 14:58	56-55-3	1c
Benzo(a)pyrene	ND	ug/L	0.10	0.013	1	02/25/19 12:35	02/26/19 14:58	50-32-8	1c
Benzo(b)fluoranthene	ND	ug/L	0.10	0.028	1	02/25/19 12:35	02/26/19 14:58	205-99-2	1c
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.036	1	02/25/19 12:35	02/26/19 14:58	191-24-2	1c
Benzo(k)fluoranthene	ND	ug/L	0.10	0.024	1	02/25/19 12:35	02/26/19 14:58	207-08-9	1c
Chrysene	ND	ug/L	0.10	0.041	1	02/25/19 12:35	02/26/19 14:58	218-01-9	1c
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.028	1	02/25/19 12:35	02/26/19 14:58	53-70-3	1c
Fluoranthene	ND	ug/L	0.10	0.033	1	02/25/19 12:35	02/26/19 14:58	206-44-0	1c
Fluorene	ND	ug/L	0.10	0.032	1	02/25/19 12:35	02/26/19 14:58	86-73-7	1c
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.031	1	02/25/19 12:35	02/26/19 14:58	193-39-5	1c
Phenanthrene	ND	ug/L	0.10	0.045	1	02/25/19 12:35	02/26/19 14:58	85-01-8	1c
Pyrene	ND	ug/L	0.10	0.037	1	02/25/19 12:35	02/26/19 14:58	129-00-0	1c
Surrogates									
2-Fluorobiphenyl (S)	49	%.	19-97		1	02/25/19 12:35	02/26/19 14:58	321-60-8	
Terphenyl-d14 (S)	60	%.	47-105		1	02/25/19 12:35	02/26/19 14:58	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.24	1		02/21/19 21:00	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.20	1		02/21/19 21:00	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 21:00	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.28	1		02/21/19 21:00	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 21:00	64-17-5	2c,CL
Ethylbenzene	ND	ug/L	1.0	0.31	1		02/21/19 21:00	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.24	1		02/21/19 21:00	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.36	1		02/21/19 21:00	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 21:00	1634-04-4	
Naphthalene	ND	ug/L	2.0	0.82	1		02/21/19 21:00	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.29	1		02/21/19 21:00	103-65-1	
Toluene	ND	ug/L	1.0	0.30	1		02/21/19 21:00	108-88-3	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 21:00	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.21	1		02/21/19 21:00	108-67-8	
m&p-Xylene	ND	ug/L	2.0	0.60	1		02/21/19 21:00	179601-23-1	
o-Xylene	ND	ug/L	1.0	0.18	1		02/21/19 21:00	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	104	%.	78-122		1		02/21/19 21:00	460-00-4	
1,2-Dichloroethane-d4 (S)	113	%.	80-120		1		02/21/19 21:00	17060-07-0	
Toluene-d8 (S)	98	%.	80-120		1		02/21/19 21:00	2037-26-5	

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.: 30280927

Sample: PZ1065-022019 **Lab ID: 30280927003** Collected: 02/20/19 09:10 Received: 02/21/19 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
Dibromofluoromethane (S)	105	%.	80-120		1		02/21/19 21:00	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**352**	mg/L	10.0	10.0	1		02/27/19 20:47		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		02/27/19 20:47		
Alkalinity,Total (CaCO3 pH4.5)	**352**	mg/L	10.0	1.0	1		02/27/19 20:47		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		02/21/19 18:49		H3,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	**0.90**	mg/L	0.10	0.028	1		02/28/19 18:06		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	**53.7**	mg/L	50.0	23.4	5		02/21/19 14:33	14808-79-8	

Sample: MW-210-022019 **Lab ID: 30280927004** Collected: 02/20/19 10:00 Received: 02/21/19 10:00 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	**181**	ug/L	5.0	1.2	1	02/26/19 10:15	02/27/19 08:21	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	02/22/19 09:15	02/22/19 17:26	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	02/25/19 12:35	02/26/19 15:17	83-32-9	1c
Acenaphthylene	ND	ug/L	0.10	0.034	1	02/25/19 12:35	02/26/19 15:17	208-96-8	1c
Anthracene	ND	ug/L	0.10	0.028	1	02/25/19 12:35	02/26/19 15:17	120-12-7	1c
Benzo(a)anthracene	ND	ug/L	0.10	0.039	1	02/25/19 12:35	02/26/19 15:17	56-55-3	1c
Benzo(a)pyrene	ND	ug/L	0.10	0.012	1	02/25/19 12:35	02/26/19 15:17	50-32-8	1c
Benzo(b)fluoranthene	ND	ug/L	0.10	0.027	1	02/25/19 12:35	02/26/19 15:17	205-99-2	1c
Benzo(g,h,i)perylene	ND	ug/L	0.10	0.036	1	02/25/19 12:35	02/26/19 15:17	191-24-2	1c
Benzo(k)fluoranthene	ND	ug/L	0.10	0.023	1	02/25/19 12:35	02/26/19 15:17	207-08-9	1c
Chrysene	ND	ug/L	0.10	0.041	1	02/25/19 12:35	02/26/19 15:17	218-01-9	1c
Dibenz(a,h)anthracene	ND	ug/L	0.10	0.028	1	02/25/19 12:35	02/26/19 15:17	53-70-3	1c
Fluoranthene	ND	ug/L	0.10	0.032	1	02/25/19 12:35	02/26/19 15:17	206-44-0	1c
Fluorene	ND	ug/L	0.10	0.031	1	02/25/19 12:35	02/26/19 15:17	86-73-7	1c
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.10	0.030	1	02/25/19 12:35	02/26/19 15:17	193-39-5	1c
Phenanthrene	ND	ug/L	0.10	0.044	1	02/25/19 12:35	02/26/19 15:17	85-01-8	1c
Pyrene	ND	ug/L	0.10	0.037	1	02/25/19 12:35	02/26/19 15:17	129-00-0	1c

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.: 30280927

Sample: MW-210-022019 **Lab ID: 30280927004** Collected: 02/20/19 10:00 Received: 02/21/19 10:00 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								
Surrogates									
2-Fluorobiphenyl (S)	46	%.	19-97		1	02/25/19 12:35	02/26/19 15:17	321-60-8	
Terphenyl-d14 (S)	62	%.	47-105		1	02/25/19 12:35	02/26/19 15:17	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.24	1		02/21/19 21:24	71-43-2	
n-Butylbenzene	ND	ug/L	1.0	0.20	1		02/21/19 21:24	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.25	1		02/21/19 21:24	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.28	1		02/21/19 21:24	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 21:24	64-17-5	2c,CL
Ethylbenzene	ND	ug/L	1.0	0.31	1		02/21/19 21:24	100-41-4	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.24	1		02/21/19 21:24	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.36	1		02/21/19 21:24	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 21:24	1634-04-4	
Naphthalene	**4.1**	ug/L	2.0	0.82	1		02/21/19 21:24	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.29	1		02/21/19 21:24	103-65-1	
Toluene	ND	ug/L	1.0	0.30	1		02/21/19 21:24	108-88-3	
1,2,4-Trimethylbenzene	**8.4**	ug/L	1.0	0.25	1		02/21/19 21:24	95-63-6	
1,3,5-Trimethylbenzene	**2.3**	ug/L	1.0	0.21	1		02/21/19 21:24	108-67-8	
m&p-Xylene	**3.7**	ug/L	2.0	0.60	1		02/21/19 21:24	179601-23-1	
o-Xylene	**1.8**	ug/L	1.0	0.18	1		02/21/19 21:24	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	99	%.	78-122		1		02/21/19 21:24	460-00-4	
1,2-Dichloroethane-d4 (S)	113	%.	80-120		1		02/21/19 21:24	17060-07-0	
Toluene-d8 (S)	98	%.	80-120		1		02/21/19 21:24	2037-26-5	
Dibromofluoromethane (S)	104	%.	80-120		1		02/21/19 21:24	1868-53-7	
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**296**	mg/L	10.0	10.0	1		02/27/19 20:49		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		02/27/19 20:49		
Alkalinity,Total (CaCO3 pH4.5)	**296**	mg/L	10.0	1.0	1		02/27/19 20:49		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	ND	mg/L	0.10	0.020	1		02/21/19 18:49		H1,H6
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	**1.8**	mg/L	0.10	0.028	1		02/28/19 18:07		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	ND	mg/L	10.0	4.7	1		02/21/19 14:35	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.: 30280927

Sample: BMW14-022019 **Lab ID: 30280927005** Collected: 02/20/19 11:00 Received: 02/21/19 10:00 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	**930**	ug/L	5.0	1.2	1	02/26/19 10:15	02/27/19 08:23	7439-96-5	
6010C MET ICP, Lab Filtered	Analytical Method: EPA 6010C Preparation Method: EPA 3005A								
Manganese, Dissolved	**815**	ug/L	5.0	1.2	1	02/22/19 09:15	02/22/19 17:28	7439-96-5	
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3510C								
Acenaphthene	**0.45**	ug/L	0.11	0.031	1	02/25/19 12:35	02/26/19 15:37	83-32-9	1c
Acenaphthylene	**0.17**	ug/L	0.11	0.036	1	02/25/19 12:35	02/26/19 15:37	208-96-8	1c
Anthracene	ND	ug/L	0.11	0.030	1	02/25/19 12:35	02/26/19 15:37	120-12-7	1c
Benzo(a)anthracene	ND	ug/L	0.11	0.042	1	02/25/19 12:35	02/26/19 15:37	56-55-3	1c
Benzo(a)pyrene	ND	ug/L	0.11	0.013	1	02/25/19 12:35	02/26/19 15:37	50-32-8	1c
Benzo(b)fluoranthene	ND	ug/L	0.11	0.029	1	02/25/19 12:35	02/26/19 15:37	205-99-2	1c,ip
Benzo(g,h,i)perylene	ND	ug/L	0.11	0.038	1	02/25/19 12:35	02/26/19 15:37	191-24-2	1c
Benzo(k)fluoranthene	ND	ug/L	0.11	0.025	1	02/25/19 12:35	02/26/19 15:37	207-08-9	1c,ip
Chrysene	ND	ug/L	0.11	0.043	1	02/25/19 12:35	02/26/19 15:37	218-01-9	1c
Dibenz(a,h)anthracene	ND	ug/L	0.11	0.030	1	02/25/19 12:35	02/26/19 15:37	53-70-3	1c
Fluoranthene	**0.11**	ug/L	0.11	0.034	1	02/25/19 12:35	02/26/19 15:37	206-44-0	1c
Fluorene	**0.79**	ug/L	0.11	0.033	1	02/25/19 12:35	02/26/19 15:37	86-73-7	1c
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.11	0.032	1	02/25/19 12:35	02/26/19 15:37	193-39-5	1c
Phenanthrene	**0.27**	ug/L	0.11	0.047	1	02/25/19 12:35	02/26/19 15:37	85-01-8	1c
Pyrene	**0.13**	ug/L	0.11	0.039	1	02/25/19 12:35	02/26/19 15:37	129-00-0	1c
Surrogates									
2-Fluorobiphenyl (S)	52	%.	19-97		1	02/25/19 12:35	02/26/19 15:37	321-60-8	
Terphenyl-d14 (S)	57	%.	47-105		1	02/25/19 12:35	02/26/19 15:37	1718-51-0	
8260C MSV	Analytical Method: EPA 8260C								
Benzene	ND	ug/L	1.0	0.24	1		02/21/19 21:48	71-43-2	
n-Butylbenzene	**16.2**	ug/L	1.0	0.20	1		02/21/19 21:48	104-51-8	
sec-Butylbenzene	**10.7**	ug/L	1.0	0.25	1		02/21/19 21:48	135-98-8	
tert-Butylbenzene	**1.4**	ug/L	1.0	0.28	1		02/21/19 21:48	98-06-6	
Ethanol	ND	ug/L	200	79.8	1		02/21/19 21:48	64-17-5	2c,CL
Ethylbenzene	**202**	ug/L	1.0	0.31	1		02/21/19 21:48	100-41-4	
Isopropylbenzene (Cumene)	**80.2**	ug/L	1.0	0.24	1		02/21/19 21:48	98-82-8	
p-Isopropyltoluene	**8.9**	ug/L	1.0	0.36	1		02/21/19 21:48	99-87-6	
Methyl-tert-butyl ether	ND	ug/L	1.0	0.23	1		02/21/19 21:48	1634-04-4	
Naphthalene	**611**	ug/L	20.0	8.2	10		02/21/19 22:12	91-20-3	
n-Propylbenzene	**192**	ug/L	1.0	0.29	1		02/21/19 21:48	103-65-1	
Toluene	ND	ug/L	1.0	0.30	1		02/21/19 21:48	108-88-3	
1,2,4-Trimethylbenzene	**1790**	ug/L	10.0	2.5	10		02/21/19 22:12	95-63-6	
1,3,5-Trimethylbenzene	**476**	ug/L	10.0	2.1	10		02/21/19 22:12	108-67-8	
m&p-Xylene	**762**	ug/L	2.0	0.60	1		02/21/19 21:48	179601-23-1	
o-Xylene	**5.6**	ug/L	1.0	0.18	1		02/21/19 21:48	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	101	%.	78-122		1		02/21/19 21:48	460-00-4	
1,2-Dichloroethane-d4 (S)	92	%.	80-120		1		02/21/19 21:48	17060-07-0	
Toluene-d8 (S)	108	%.	80-120		1		02/21/19 21:48	2037-26-5	

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.: 30280927

Sample: BMW14-022019 **Lab ID: 30280927005** Collected: 02/20/19 11:00 Received: 02/21/19 10:00 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260C MSV	Analytical Method: EPA 8260C								
Surrogates									
Dibromofluoromethane (S)	76	%.	80-120		1		02/21/19 21:48	1868-53-7	SR
2320B Alkalinity	Analytical Method: SM 2320B-2011								
Alkalinity,Bicarbonate (pH4.5)	**676**	mg/L	10.0	10.0	1		02/27/19 20:51		
Alkalinity, Carbonate (pH4.5)	ND	mg/L	10.0	10.0	1		02/27/19 20:51		
Alkalinity,Total (CaCO3 pH4.5)	**676**	mg/L	10.0	1.0	1		02/27/19 20:51		
Iron, Ferrous	Analytical Method: SM 3500-FeB-2011								
Iron, Ferrous	**2.8**	mg/L	0.10	0.020	1		02/21/19 18:52		H1,H6, ML
SM4500NO3-F, NO3-NO2	Analytical Method: SM 4500NO3F-2011								
Nitrogen, NO2 plus NO3	ND	mg/L	0.10	0.028	1		02/28/19 18:08		
ASTM D516 Sulfate Water	Analytical Method: ASTM D516-90,02								
Sulfate	ND	mg/L	50.0	23.4	5		02/21/19 14:35	14808-79-8	D3

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.: 30280927

QC Batch: 331399 Analysis Method: EPA 6010C
QC Batch Method: EPA 3005A Analysis Description: 6010C MET
Associated Lab Samples: 30280927002, 30280927003, 30280927004, 30280927005

METHOD BLANK: 1612877 Matrix: Water
Associated Lab Samples: 30280927002, 30280927003, 30280927004, 30280927005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Manganese	ug/L	ND	5.0	1.2	02/27/19 08:31	

LABORATORY CONTROL SAMPLE: 1612878

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Manganese	ug/L	500	515	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1612880 1612881

Parameter	Units	30280927002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Manganese	ug/L	108	500	500	619	608	102	100	75-125	2	20	

SAMPLE DUPLICATE: 1612879

Parameter	Units	30280927002 Result	Dup Result	RPD	Max RPD	Qualifiers
Manganese	ug/L	108	109	1	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.: 30280927

QC Batch: 331162 Analysis Method: EPA 6010C
QC Batch Method: EPA 3005A Analysis Description: 6010C MET Dissolved
Associated Lab Samples: 30280927002, 30280927003, 30280927004, 30280927005

METHOD BLANK: 1611300 Matrix: Water
Associated Lab Samples: 30280927002, 30280927003, 30280927004, 30280927005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Manganese, Dissolved	ug/L	ND	5.0	1.2	02/22/19 16:25	

LABORATORY CONTROL SAMPLE: 1611301

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Manganese, Dissolved	ug/L	500	490	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1611303 1611304

Parameter	Units	30280833001 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	43.8	500	500	522	528	96	97	75-125	1	20	

MATRIX SPIKE SAMPLE: 1611306

Parameter	Units	30280833012 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Manganese, Dissolved	ug/L	1000	500	1480	95	75-125	

SAMPLE DUPLICATE: 1611302

Parameter	Units	30280833001 Result	Dup Result	RPD	Max RPD	Qualifiers
Manganese, Dissolved	ug/L	43.8	44.0	0	20	

SAMPLE DUPLICATE: 1611305

Parameter	Units	30280833012 Result	Dup Result	RPD	Max RPD	Qualifiers
Manganese, Dissolved	ug/L	1000	999	0	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.: 30280927

QC Batch: 331110 Analysis Method: EPA 8260C
QC Batch Method: EPA 8260C Analysis Description: 8260C MSV
Associated Lab Samples: 30280927001, 30280927002, 30280927003, 30280927004, 30280927005

METHOD BLANK: 1610947 Matrix: Water
Associated Lab Samples: 30280927001, 30280927002, 30280927003, 30280927004, 30280927005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	ND	1.0	0.25	02/21/19 16:06	
1,3,5-Trimethylbenzene	ug/L	ND	1.0	0.21	02/21/19 16:06	
Benzene	ug/L	ND	1.0	0.24	02/21/19 16:06	
Ethanol	ug/L	ND	200	79.8	02/21/19 16:06	2c,CL
Ethylbenzene	ug/L	ND	1.0	0.31	02/21/19 16:06	
Isopropylbenzene (Cumene)	ug/L	ND	1.0	0.24	02/21/19 16:06	
m&p-Xylene	ug/L	ND	2.0	0.60	02/21/19 16:06	
Methyl-tert-butyl ether	ug/L	ND	1.0	0.23	02/21/19 16:06	
n-Butylbenzene	ug/L	ND	1.0	0.20	02/21/19 16:06	
n-Propylbenzene	ug/L	ND	1.0	0.29	02/21/19 16:06	
Naphthalene	ug/L	ND	2.0	0.82	02/21/19 16:06	
o-Xylene	ug/L	ND	1.0	0.18	02/21/19 16:06	
p-Isopropyltoluene	ug/L	ND	1.0	0.36	02/21/19 16:06	
sec-Butylbenzene	ug/L	ND	1.0	0.25	02/21/19 16:06	
tert-Butylbenzene	ug/L	ND	1.0	0.28	02/21/19 16:06	
Toluene	ug/L	ND	1.0	0.30	02/21/19 16:06	
1,2-Dichloroethane-d4 (S)	%.	112	80-120		02/21/19 16:06	
4-Bromofluorobenzene (S)	%.	99	78-122		02/21/19 16:06	
Dibromofluoromethane (S)	%.	104	80-120		02/21/19 16:06	
Toluene-d8 (S)	%.	98	80-120		02/21/19 16:06	

LABORATORY CONTROL SAMPLE: 1610948

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	20.9	104	70-130	
1,3,5-Trimethylbenzene	ug/L	20	20.6	103	70-130	
Benzene	ug/L	20	19.6	98	70-130	
Ethanol	ug/L	200	172J	86	10-175	2c,CL
Ethylbenzene	ug/L	20	19.6	98	70-130	
Isopropylbenzene (Cumene)	ug/L	20	21.2	106	70-130	
m&p-Xylene	ug/L	40	39.6	99	70-130	
Methyl-tert-butyl ether	ug/L	20	18.4	92	70-130	
n-Butylbenzene	ug/L	20	20.5	102	71-138	
n-Propylbenzene	ug/L	20	21.5	108	70-130	
Naphthalene	ug/L	20	18.9	95	69-135	
o-Xylene	ug/L	20	19.2	96	70-130	
p-Isopropyltoluene	ug/L	20	19.9	99	70-130	
sec-Butylbenzene	ug/L	20	20.6	103	70-130	
tert-Butylbenzene	ug/L	20	20.3	101	70-130	
Toluene	ug/L	20	19.8	99	70-130	

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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.: 30280927

LABORATORY CONTROL SAMPLE: 1610948

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2-Dichloroethane-d4 (S)	%.			99	80-120	
4-Bromofluorobenzene (S)	%.			101	78-122	
Dibromofluoromethane (S)	%.			96	80-120	
Toluene-d8 (S)	%.			103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1610949 1610950

Parameter	Units	30280827002 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	20.2	20.9	101	105	70-130	4	30	
1,3,5-Trimethylbenzene	ug/L	ND	20	20	19.9	20.7	99	104	70-130	4	30	
Benzene	ug/L	ND	20	20	19.2	20.0	96	100	67-119	4	30	
Ethanol	ug/L	ND	200	200	141J	177J	70	89	10-175		30	2c,CL
Ethylbenzene	ug/L	ND	20	20	19.3	19.4	97	97	69-127	0	30	
Isopropylbenzene (Cumene)	ug/L	ND	20	20	20.9	21.6	104	108	70-130	4	30	
m&p-Xylene	ug/L	ND	40	40	40.1	39.9	100	100	70-129	0	30	
Methyl-tert-butyl ether	ug/L	ND	20	20	18.1	18.4	91	92	70-130	1	30	
n-Butylbenzene	ug/L	ND	20	20	20.3	20.6	102	103	54-128	1	30	
n-Propylbenzene	ug/L	ND	20	20	21.0	21.9	105	109	62-127	4	30	
Naphthalene	ug/L	ND	20	20	18.0	18.6	90	93	60-136	3	30	
o-Xylene	ug/L	ND	20	20	19.4	19.3	97	96	68-126	1	30	
p-Isopropyltoluene	ug/L	ND	20	20	19.1	19.9	96	100	60-125	4	30	
sec-Butylbenzene	ug/L	ND	20	20	20.5	21.0	103	105	63-125	2	30	
tert-Butylbenzene	ug/L	ND	20	20	19.9	20.3	99	101	64-124	2	30	
Toluene	ug/L	ND	20	20	19.7	20.1	99	101	70-130	2	30	
1,2-Dichloroethane-d4 (S)	%.						102	103	80-120			
4-Bromofluorobenzene (S)	%.						101	102	78-122			
Dibromofluoromethane (S)	%.						96	98	80-120			
Toluene-d8 (S)	%.						103	102	80-120			

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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.: 30280927

QC Batch: 331279 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3510C Analysis Description: 8270D Water PAH by SIM MSSV
Associated Lab Samples: 30280927002, 30280927003, 30280927004, 30280927005

METHOD BLANK: 1612253 Matrix: Water
Associated Lab Samples: 30280927002, 30280927003, 30280927004, 30280927005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Acenaphthene	ug/L	ND	0.10	0.029	02/26/19 12:20	
Acenaphthylene	ug/L	ND	0.10	0.034	02/26/19 12:20	
Anthracene	ug/L	ND	0.10	0.028	02/26/19 12:20	
Benzo(a)anthracene	ug/L	ND	0.10	0.039	02/26/19 12:20	
Benzo(a)pyrene	ug/L	ND	0.10	0.012	02/26/19 12:20	
Benzo(b)fluoranthene	ug/L	ND	0.10	0.027	02/26/19 12:20	
Benzo(g,h,i)perylene	ug/L	ND	0.10	0.035	02/26/19 12:20	
Benzo(k)fluoranthene	ug/L	ND	0.10	0.023	02/26/19 12:20	
Chrysene	ug/L	ND	0.10	0.040	02/26/19 12:20	
Dibenz(a,h)anthracene	ug/L	ND	0.10	0.028	02/26/19 12:20	
Fluoranthene	ug/L	ND	0.10	0.032	02/26/19 12:20	
Fluorene	ug/L	ND	0.10	0.031	02/26/19 12:20	
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.10	0.030	02/26/19 12:20	
Phenanthrene	ug/L	ND	0.10	0.044	02/26/19 12:20	
Pyrene	ug/L	ND	0.10	0.036	02/26/19 12:20	
2-Fluorobiphenyl (S)	%.	71	19-97		02/26/19 12:20	
Terphenyl-d14 (S)	%.	71	47-105		02/26/19 12:20	

LABORATORY CONTROL SAMPLE: 1612254

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Acenaphthene	ug/L	2	0.96	48	34-105	
Acenaphthylene	ug/L	2	0.95	48	30-121	
Anthracene	ug/L	2	1.1	53	39-113	
Benzo(a)anthracene	ug/L	2	1.3	65	51-115	
Benzo(a)pyrene	ug/L	2	1.2	62	46-117	
Benzo(b)fluoranthene	ug/L	2	1.3	63	50-126	
Benzo(g,h,i)perylene	ug/L	2	1.3	64	48-117	
Benzo(k)fluoranthene	ug/L	2	1.2	61	52-118	
Chrysene	ug/L	2	1.3	63	55-107	
Dibenz(a,h)anthracene	ug/L	2	1.3	64	53-118	
Fluoranthene	ug/L	2	1.2	62	45-122	
Fluorene	ug/L	2	1.0	50	36-113	
Indeno(1,2,3-cd)pyrene	ug/L	2	1.3	64	52-117	
Phenanthrene	ug/L	2	1.1	54	40-109	
Pyrene	ug/L	2	1.3	63	45-122	
2-Fluorobiphenyl (S)	%.			50	19-97	
Terphenyl-d14 (S)	%.			59	47-105	

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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.: 30280927

QC Batch: 331604 Analysis Method: SM 2320B-2011
QC Batch Method: SM 2320B-2011 Analysis Description: 2320B Alkalinity
Associated Lab Samples: 30280927002, 30280927003, 30280927004, 30280927005

METHOD BLANK: 1613833 Matrix: Water
Associated Lab Samples: 30280927002, 30280927003, 30280927004, 30280927005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Carbonate (pH4.5)	mg/L	ND	10.0	10.0	02/27/19 20:41	
Alkalinity,Bicarbonate (pH4.5)	mg/L	ND	10.0	10.0	02/27/19 20:41	
Alkalinity,Total (CaCO3 pH4.5)	mg/L	ND	10.0	1.0	02/27/19 20:41	

LABORATORY CONTROL SAMPLE: 1613834

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: 1613835 1613836

Parameter	Units	30280927002 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	256	50	50	288	288	64	64	85-115	0	20	ML

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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.: 30280927

QC Batch: 331130 Analysis Method: SM 3500-FeB-2011
QC Batch Method: SM 3500-FeB-2011 Analysis Description: Iron, Ferrous
Associated Lab Samples: 30280927002, 30280927003, 30280927004, 30280927005

METHOD BLANK: 1611099 Matrix: Water
Associated Lab Samples: 30280927002, 30280927003, 30280927004, 30280927005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Iron, Ferrous	mg/L	ND	0.10	0.020	02/21/19 18:45	H6

LABORATORY CONTROL SAMPLE: 1611100

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	1	0.92	92	90-110	H6

MATRIX SPIKE SAMPLE: 1611102

Parameter	Units	30280927005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Iron, Ferrous	mg/L	2.8	1	2.9	8	85-115	H1,H6,ML

SAMPLE DUPLICATE: 1611101

Parameter	Units	30280927005 Result	Dup Result	RPD	Max RPD	Qualifiers
Iron, Ferrous	mg/L	2.8	2.8	1	20	H1,H6

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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.: 30280927

QC Batch: 331753 Analysis Method: SM 4500NO3F-2011
QC Batch Method: SM 4500NO3F-2011 Analysis Description: SM4500NO3-F, Nitrate, Preserved
Associated Lab Samples: 30280927002, 30280927003, 30280927004, 30280927005

METHOD BLANK: 1614516 Matrix: Water
Associated Lab Samples: 30280927002, 30280927003, 30280927004, 30280927005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.10	0.028	02/28/19 17:53	

LABORATORY CONTROL SAMPLE: 1614517

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	4	4.0	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1614520 1614521

Parameter	Units	30280299001 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	0.34	5	5	4.6	4.7	86	87	85-115	1	20	

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REPORT OF LABORATORY ANALYSIS

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Greensburg, PA 15601
(724)850-5600

QUALITY CONTROL DATA

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280927

QC Batch: 331053 Analysis Method: ASTM D516-90,02
QC Batch Method: ASTM D516-90,02 Analysis Description: ASTM D516-90, 02 Sulfate Water
Associated Lab Samples: 30280927002, 30280927003, 30280927004, 30280927005

METHOD BLANK: 1610655 Matrix: Water
Associated Lab Samples: 30280927002, 30280927003, 30280927004, 30280927005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	ND	10.0	4.7	02/21/19 14:15	

LABORATORY CONTROL SAMPLE: 1610656

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: 1610657 1610658

Parameter	Units	30280733002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	40.9	20	20	60.0	59.7	95	94	85-115	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280927

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: 331279

[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	Minimum RF criteria not met
CL	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased low.
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.
ML	Matrix spike recovery and/or matrix spike duplicate recovery was below laboratory control limits. Result may be biased low.
SR	Surrogate recovery was below laboratory control limits. Results may be biased low.
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.

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QUALIFIERS

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280927

ANALYTE QUALIFIERS

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

Project: Liverpool Terminal-Cold Spring
Pace Project No.: 30280927

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
30280927002	**BMW2-022019**	EPA 3005A	331399	EPA 6010C	331478
30280927003	**PZ1065-022019**	EPA 3005A	331399	EPA 6010C	331478
30280927004	**MW-210-022019**	EPA 3005A	331399	EPA 6010C	331478
30280927005	**BMW14-022019**	EPA 3005A	331399	EPA 6010C	331478
30280927002	**BMW2-022019**	EPA 3005A	331162	EPA 6010C	331239
30280927003	**PZ1065-022019**	EPA 3005A	331162	EPA 6010C	331239
30280927004	**MW-210-022019**	EPA 3005A	331162	EPA 6010C	331239
30280927005	**BMW14-022019**	EPA 3005A	331162	EPA 6010C	331239
30280927002	**BMW2-022019**	EPA 3510C	331279	EPA 8270D by SIM	331383
30280927003	**PZ1065-022019**	EPA 3510C	331279	EPA 8270D by SIM	331383
30280927004	**MW-210-022019**	EPA 3510C	331279	EPA 8270D by SIM	331383
30280927005	**BMW14-022019**	EPA 3510C	331279	EPA 8270D by SIM	331383
30280927001	**Trip Blank- 022019**	EPA 8260C	331110		
30280927002	**BMW2-022019**	EPA 8260C	331110		
30280927003	**PZ1065-022019**	EPA 8260C	331110		
30280927004	**MW-210-022019**	EPA 8260C	331110		
30280927005	**BMW14-022019**	EPA 8260C	331110		
30280927002	**BMW2-022019**	SM 2320B-2011	331604		
30280927003	**PZ1065-022019**	SM 2320B-2011	331604		
30280927004	**MW-210-022019**	SM 2320B-2011	331604		
30280927005	**BMW14-022019**	SM 2320B-2011	331604		
30280927002	**BMW2-022019**	SM 3500-FeB-2011	331130		
30280927003	**PZ1065-022019**	SM 3500-FeB-2011	331130		
30280927004	**MW-210-022019**	SM 3500-FeB-2011	331130		
30280927005	**BMW14-022019**	SM 3500-FeB-2011	331130		
30280927002	**BMW2-022019**	SM 4500NO3F-2011	331753		
30280927003	**PZ1065-022019**	SM 4500NO3F-2011	331753		
30280927004	**MW-210-022019**	SM 4500NO3F-2011	331753		
30280927005	**BMW14-022019**	SM 4500NO3F-2011	331753		
30280927002	**BMW2-022019**	ASTM D516-90,02	331053		
30280927003	**PZ1065-022019**	ASTM D516-90,02	331053		
30280927004	**MW-210-022019**	ASTM D516-90,02	331053		
30280927005	**BMW14-022019**	ASTM D516-90,02	331053		

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

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

LAB USE (**WO# : 30280927** mber or MTJL Log-in

30280927

ONLY

Company: Arcadis	**Billing Information:**
Address: 110 W Fayette Street	
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 (ET)
Phone: **Email:**	**Site/Facility ID #** / **Compliance Monitoring?** [ ] Yes [ ] No
Collected by (print):	**Purchase Order #** / **DW PWS ID #:** / **Quote #** / **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:**

* 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 4 2 1 4

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 _____

Customer Sample ID	Matrix*	Comp/ Grab	Collected (or Composite Start) Date	Time	Composite End Date	Time	Res Cl	# of Ctns	Analyses: SVOC 8270	VOC 8260	Fe I, Sulfate, Alkanity.	CO2	nitrate / nitrite	manganese	manganese, Lab Filtered	LAB USE ONLY: Lab Sample # / Comments
Trip Blank-022019	TB		2/20/19	0745						2						001
BMW2-022019	GW	G	2/20/19	0800					2	3	1	2	1	1	1	002
PZ1065-022019	GW	G	2/20/19	0910					2	3	1	2	1	1	1	003
MW-210-022019	GW	G	2/20/19	1000					2	3	1	2	1	1	1	004
BMW14R-022019	GW	G	2/20/19	11:04					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: 1002981			
Sulfide Present	Y	N	NA
Lead Acetate Strips:			

JLB/JLB

Customer Remarks/ Special Conditions/ Possible Hazards:

Type of Ice Used: Wet [ ] Blue [ ] Dry [ ] None [ ]

SHORT HOLDS PRESENT (< 72 hours): Y N N/A JLB 02/21/19

Packing Material Used: Bubble Wrap

LAB Tracking #: 7745 1745 0738

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

Samples received via: FEDEX [ ] UPS [ ] Client [ ] Courier [ ] Pace Courier

MTJL LAB USE ONLY

Table #:

ACCT #:

Template:

Prelogin:

PM:

PB:

LAB Sample Temperature Info:

Temp Blank received: Y N NA

Therm ID #: 10

Cooler 1 Temp Upon Receipt: 38/1.7 oC

Cooler 1 Therm Corr. Factor: 0 oC

Cooler 1 Corrected Temp: 38/1.7 oC

Comments: JLB 02/21/19

Trip Blank Received: Y N N/A

HCL MeOH TSP Other

NonConformance(s): YES / NO JLB 02/21/19

Page 1 of 1

Relinquished by/Company : (Signature)	Date/Time:	Received by/Company : (Signature)	Date/Time:
Michelle Griffin Arcadis	2/20/19 11:50	PACE	2/20/19 11:50
PACE	2/20/19 17:00	PACE	02/21/19 1000

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F-ALL-C-010-rev.00, 05Jul2018

Pace Analytical
www.pacelabs.com

Sample Receiving Non-Conformance Form (NCF)

Date: 02/21/19	Evaluated by: JJB
Client: Arcadis	

Affi
W

WO# : 30280927

PM: RDC **Due Date: 02/28/19**

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:

no collector name or signature

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

March 5, 2019

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

RE: **30280927**

Pace Workorder: 29544

Dear Rachel Christner:

Enclosed are the analytical results for sample(s) received by the laboratory on Monday, February 25, 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 03/05/2019
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 19

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).

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SAMPLE SUMMARY

Workorder: 29544 30280927

Lab ID	Sample ID	Matrix	Date Collected	Date Received
295440001	30280927 002	Water	2/20/2019 08:00	2/25/2019 09:00
295440002	30280927 003	Water	2/20/2019 09:10	2/25/2019 09:00
295440003	30280927 004	Water	2/20/2019 10:00	2/25/2019 09:00
295440004	30280927 005	Water	2/20/2019 11:00	2/25/2019 09:00

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PROJECT SUMMARY

Workorder: 29544 30280927

Workorder Comments

The samples 29544 (0001-0004) were collected in an alternate container type, than that assigned to PAES method RSK175. The sample container was BAK preserved and capped with butyl septa.

Only one vial was provided for analysis of method RSK175. In order to assure accurate reporting of all analytes, the equilibrated headspace was transferred to a headspace vial. Results reported at dilution.

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ANALYTICAL RESULTS

Workorder: 29544 30280927

Lab ID: **295440001** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280927 002** Date Collected: 2/20/2019 08:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Carbon Dioxide	**10**	mg/l	5.0	0.12	1	2/26/2019 11:23	BW	n
Analysis Desc: EPA RSK175			Analytical Method: EPA RSK175					
Methane	**0.59J**	ug/l	2.5	0.34	5	2/28/2019 11:40	AK	d
Ethane	**0.030U**	ug/l	1.0	0.030	5	2/28/2019 11:40	AK	d
Ethene	**0.060U**	ug/l	1.0	0.060	5	2/28/2019 11:40	AK	d

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ANALYTICAL RESULTS

Workorder: 29544 30280927

Lab ID: **295440002** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280927 003** Date Collected: 2/20/2019 09:10

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**43**	mg/l	5.0	0.12	1	2/26/2019 11:33	BW	n
Analysis Desc: EPA RSK175		Analytical Method: EPA RSK175						
Methane	**0.34U**	ug/l	2.5	0.34	5	2/28/2019 11:51	AK	d
Ethane	**0.030U**	ug/l	1.0	0.030	5	2/28/2019 11:51	AK	d
Ethene	**0.060U**	ug/l	1.0	0.060	5	2/28/2019 11:51	AK	d

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ANALYTICAL RESULTS

Workorder: 29544 30280927

Lab ID: **295440003** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280927 004** Date Collected: 2/20/2019 10:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX		Analytical Method: AM20GAX						
Carbon Dioxide	**22**	mg/l	5.0	0.12	1	2/26/2019 11:52	BW	n
Analysis Desc: EPA RSK175		Analytical Method: EPA RSK175						
Methane	**0.34U**	ug/l	2.5	0.34	5	2/28/2019 12:02	AK	d
Ethane	**0.030U**	ug/l	1.0	0.030	5	2/28/2019 12:02	AK	d
Ethene	**0.060U**	ug/l	1.0	0.060	5	2/28/2019 12:02	AK	d

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ANALYTICAL RESULTS

Workorder: 29544 30280927

Lab ID: **295440004** Date Received: 2/25/2019 09:00 Matrix: Water

Sample ID: **30280927 005** Date Collected: 2/20/2019 11:00

Parameters	Results	Units	PQL	MDL	DF	Analyzed	By	Qualifiers
RISK - PAES								
Analysis Desc: AM20GAX			Analytical Method: AM20GAX					
Carbon Dioxide	**120**	mg/l	5.0	0.12	1	2/26/2019 12:02	BW	n
Analysis Desc: EPA RSK175			Analytical Method: EPA RSK175					
Methane	**3400**	ug/l	10	1.3	20	2/28/2019 12:53	AK	d
Ethane	**1.1**	ug/l	1.0	0.030	5	2/28/2019 12:12	AK	d
Ethene	**0.060U**	ug/l	1.0	0.060	5	2/28/2019 12:12	AK	d

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ANALYTICAL RESULTS QUALIFIERS

Workorder: 29544 30280927

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.
d	The analyte concentration was determined from a dilution.

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QUALITY CONTROL DATA

Workorder: 29544 30280927

QC Batch: DISG/7382 Analysis Method: AM20GAX

QC Batch Method: AM20GAX

Associated Lab Samples: 295440001, 295440002, 295440003, 295440004

METHOD BLANK: 59909

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Carbon Dioxide	mg/l	0.12U	0.12	n

LABORATORY CONTROL SAMPLE & LCSD: 59911 59913

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Carbon Dioxide	mg/l	120	120	120	105	102	80-120	3.5	20	n

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 59920 59921 Original: 295430001

Parameter	Units	Original Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK											
Carbon Dioxide	mg/l	55	120	170	170	99	100	70-130	1.2	20	n

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QUALITY CONTROL DATA

Workorder: 29544 30280927

QC Batch: DISG/7388 Analysis Method: EPA RSK175

QC Batch Method: EPA RSK175

Associated Lab Samples: 295440001, 295440002, 295440003, 295440004

METHOD BLANK: 59944

Parameter	Units	Blank Result	Reporting Limit	Qualifiers
RISK				
Methane	ug/l	0.067U	0.067	
Ethane	ug/l	0.0060U	0.0060	
Ethene	ug/l	0.012U	0.012	

LABORATORY CONTROL SAMPLE & LCSD: 59945 59946

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK										
Methane	ug/l	44	44	43	99	97	85-115	1.1	20	
Ethane	ug/l	83	82	80	98	97	85-115	1.4	20	
Ethene	ug/l	78	80	78	102	100	85-115	2.4	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 59947 59948 Original: 295430001

Parameter	Units	Original Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
RISK											
Methane	ug/l	2.5	44	57	53	122	114	70-130	6.1	20	d
Ethane	ug/l	0	83	100	93	121	112	70-130	7.5	20	d
Ethene	ug/l	0	78	97	89	124	114	70-130	8.4	20	d

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QUALITY CONTROL DATA QUALIFIERS

Workorder: 29544 30280927

QUALITY CONTROL PARAMETER QUALIFIERS

d	The analyte concentration was determined from a dilution.
n	The laboratory does not hold NELAP/TNI accreditation for this method or analyte.

Pace Analytical Energy Services LLC
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Phone: (412) 826-5245
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 29544 30280927

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
295440001	30280927 002			AM20GAX	DISG/7382
295440002	30280927 003			AM20GAX	DISG/7382
295440003	30280927 004			AM20GAX	DISG/7382
295440004	30280927 005			AM20GAX	DISG/7382
295440001	30280927 002			EPA RSK175	DISG/7388
295440002	30280927 003			EPA RSK175	DISG/7388
295440003	30280927 004			EPA RSK175	DISG/7388
295440004	30280927 005			EPA RSK175	DISG/7388

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	5	
Received on Ice	Yes	No
Sealed Cooler	Yes	No
Samples Intact	Yes	No

Subcontractor Project No.: 29544
P.O. No: ASR- 30280927

Request Date: 2/21/19 Analysis Due Date: 2/28/2019
Shipped By: Courier

Certification Required: NY

Pace Project No.: 30280927
Report/Invoice to: Rachel Christner

Page 1 of 1

	Pace Sample ID:	Matrix:	Collection Date:	Time:	Analysis Requested:	Analytical Method:	Preservative Type:
1	30280927 002	WT	2/20/19	8:00	Methane, Ethane, Ethene	RSK-175	BAK
2	30280927 002	WT	2/20/19	8:00	Carbon Dioxide	AM20GAX	BAK
3	30280927 003	WT	2/20/19	9:10	Methane, Ethane, Ethene	RSK-175	BAK
4	30280927 003	WT	2/20/19	9:10	Carbon Dioxide	AM20GAX	BAK
5	30280927 004	WT	2/20/19	10:00	Methane, Ethane, Ethene	RSK-175	BAK
6	30280927 004	WT	2/20/19	10:00	Carbon Dioxide	AM20GAX	BAK
7	30280927 005	WT	2/20/19	11:00	Methane, Ethane, Ethene	RSK-175	BAK
8	30280927 005	WT	2/20/19	11:00	Carbon Dioxide	AM20GAX	BAK
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: Rachel Christner Project Manager
Pace Agent Name Title

Acceptance of Terms By:
Subcontract Lab Agent Title

Relinquished By: 2-22-19 1600
(Signature & Affiliation) (Date) (Time)

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

Received By: 2-25.19 0900
(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.

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

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

LAB USE ONLY — WO# : 30280927 — 30280927 — Number or MTJL Log-in 29544

Company: Arcadis	Billing Information:
Address: 110 W Fayette Street	
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 (ET)
Phone: / Email:	Site/Facility ID #: / Compliance Monitoring? [ ] Yes [ ] No
Collected by (print):	Purchase Order #: / DW PWS ID #: / Quote #: / DW Location Code #:
Collected by (signature):	Turnaround Date Required: / Immediately Packed on Ice? [ ] Yes [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive ____ [ ] Hold ____	RUSH: Next Day 2 Day 3 Day 4 Day / Same 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 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:

* 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	Time	Composite End Date	Time	Res Cl	# of Ctns	SVOC 8270	VOC 8260	Fe I, Sulfide, Alkanity.	CO2	nitrate / nitrite	manganese	manganese, Lab filtered				LAB USE ONLY: Lab Sample # / Comments
Trip Blank-022019	TB		2/20/19	0745						2									001
BMW2-022019	GW	G	2/20/19	0800					2	3	1	2	1	1	1				002
PZ1065-022019	GW	G	2/20/19	0910					2	3	1	2	1	1	1				003
MW-210-022019	GW	G	2/20/19	1000					2	3	1	2	1	1	1				004
BMW14R-022019	GW	G	2/20/19	11:04					2	3	1	2	1	1	1				005

Customer Remarks/ Special Conditions/ Possible Hazards:

Type of Ice Used: Wet [U] Blue [ ] Dry [ ] None [ ] — SHORT HOLDS PRESENT (< 72 hours): (Y) N N/A JUB 02/21/19

Packing Material Used: Bubble Wrap — Lab Tracking #: 1745 1745 0738

Radchem sample(s) screened: (<500 cpm): [ ] Y [ ] N [U] NA — Samples received via: FEDEX [ ] UPS [ ] Client [ ] Courier [ ] Pace Courier

MTJL LAB USE ONLY: Table #: / ACCT #: / Template: / Prelogin: / PM: / PB:

LAB Sample Temperature Info: Temp Blank received: Y (N) NA; Therm ID #: 10; Cooler 1 Temp Upon Receipt: 3.8/1.7 oC; Cooler 1 Therm Corr. Factor: 0 oC; Cooler 1 Corrected Temp: 3.8/1.7 oC; Comments: JUB 02/21/19

Trip Blank Received: (Y) N N/A — HCl MeOH TSP Other

Nonconformance(s): (YES) / NO — JUB 02/21/19 — Page 1 of 1

Relinquished by/Company : (Signature)	Date/Time:	Received by/Company : (Signature)	Date/Time:
Michelle Griffith Arcadis	2/20/19 11:50	PACE	2/20/19 11:50
PACE	2/20/19 17:00	PACE	02/21/19 1000

F-ALL-C-010-rev.00, 05Jul2018

29574

Pace Analytical
www.pacelabs.com

Sample Receiving Non-Conformance Form (NCF)

Date: 02/21/19	Evaluated by: JLB
Client: Arcadis	

Affi
W

WO#: 30280927

PM: RDC **Due Date: 02/28/19**

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:

no collector name or signature

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:

Cooler Receipt Form

Client Name: Pace Project: 30280927 Lab Work Order: 29544

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: 5°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 : LY **Date:** 2.25.19

Project Manager Review : JW **Date:** 2.26.19

NON-CONFORMANCE FORM

PAES Work Order #: 29544

Date: 2.25.19 Time of Receipt: 0900 Receiver: LY

Client: Pace

REASON FOR NON-CONFORMANCE:

1. Headspace in all vials.
2. Requested RSK175 for MEE with BAK vials.

ACTION TAKEN:

Client name: _____ Date: _____ Time: _____

Client emailed

Customer Service Initials: JW Date: 2/26/19

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

Joseph Ward - 30280927

From: Joseph Ward
To: Rachel Christner
Subject: 30280927

Upon receiving your samples for the project referenced above there is headspace in all of the sample vials.

Joseph Ward
Customer Service
Pace Analytical Energy Services
220 William Pitt Way
Pittsburgh PA 15238
412-826-5245/412-826-2384(Direct)